A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
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Situating Beginnings
Questioning Representation
Alternative Educations
Abstractions and Conceptions
Developing Beginnings
Pedagogical Constructions
Primary Contexts
Informing Beginnings
Educational Pedagogies
Analog / Digital Beginnings
Curriculum and Continuity
Interdisciplinary Curricula
Beginnings
Design / Build
Cultural Pluralities
Contentions
Revisions
Projections
A Beginner’s Mind
The 21st National Conference on the Beginning Design Student

Conference Chair
Stephen Temple

Keynote Presentation
Dr. Robert Leamnson
University of Massachusetts Dartmouth

Plenary Presentations
John Ritzu, RA
Ritzu Crandall Architects, Chicago IL

Daniel Willis, Chair
Department of Architecture; Penn State University

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Eric Connell  Isabel Garcia  Nils Gore
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Developing A Beginner's Mind

STEPHEN TEMPLE
Chair of the 21st National Conference on the Beginning Design Student

Most design faculty were educated to be designers, not teachers. Consequently, there is a tendency for architectural design instructors to resort to “teaching as one has been taught,” frequently with little knowledge of, experience with, or insight into any guiding or coherent approach to education theory, education psychology, theories of learning, instructional philosophy, or curricular development. There is also a tendency to believe we know our students and know what is best for them because, after all, we are ourselves capable designers and our own beginning design experience resulted in our success, so our educations must be worthy of emulation. With the best of intentions, our own educational experiences become interpreted into a teaching model that is at best a facsimile of the pedagogy of our remembrances. In this way, “teaching as one has been taught,” functions outside of formal teaching or learning theory as a kind of folk practice. As happens in folk traditions, each successive generation evolves the model pedagogy by molding and remodeling it to fit into a differing context. Forces from outside our own educational experiences, such as accreditation requirements, faculty and student attitudes, curricular structures, university fit, and ideological shifts, often become reconciled within pedagogical development akin to the slowly grinding gears of a vast machine. Almost in spite of the educational task at hand, educational issues from the disciplines of education theory, education psychology, theories of learning, or instructional philosophy develop only marginal relationship or remain externalized. Yet the beginning student new to the discipline of design, a “student in transition”¹ is foremost in need of educational models that can reach, inspire, provoke, and, most importantly, allow them to make emotive decisions, not just about the discipline of design, but about the very act of being educated.²

The question of “A Beginner's Mind” is put forward not merely as an inquiry into the constitution of the beginning design student (intellectual and otherwise) but also as an examination of the practice of engaging students in becoming active in their own education, both specific to the design disciplines of the building arts and with respect to engagement in developing their own educational experience. Learning at the foundation level (let alone learning to design) involves issues related specifically to perceptions, processes, and definitions but also necessitates the formation of habits of mind, habits of hand, habits of reflection, and habits of communication, as a basis for continued learning, exploration, and development. Beginning design pedagogy is at its core an opening of possibilities for design learning for the learner, the teacher, the curriculum, and the environment of design education, the studio. Most beginning design pedagogies are very specific to their respective design disciplines and thus, overlook student capacities for more flexible and broad inquires in which the building arts are but one of many intertwining factors. Education psychology and education theory suggests that learning experiences from across disciplines enable development of fundamental connections as they enmesh with each student’s interests and life experiences.³ For example, raising a cross-disciplinary topic such as sustainability in beginning design curriculum may not mean learning only issues specific to architectural sustainability but learning about it as a conceptual inquiry across all human activity, on a personal, cultural, economic, and historical, as well as
environmental level. These deeper, broader connections allow learning to more readily take hold on a fundamental, neurological level, thus enabling following learning experiences to occur principally on each student's own initiative, as may be relevant to each student's own life experience. This is consistent with findings from research on learning that indicate that learning is a continual experientially developing process, rather than a moment of knowledge. Thus, beginning design education is significantly more about diversifying exposure and establishing self-initiated inquiry than it is training for discipline specific tasks.

Already consistent with the transformative nature of developmental learning theory is that some design students do, in fact, mature as they progress through successive layers of creative design studio experience. But high attrition rates and low graduation percentages across design programs belie the efficacy of discipline specific teaching traditions. More actively integrating education psychology into generationally inherited design teaching traditions will not be brought about easily because the conditions and influences of education theory are antithetical to “teaching as one was taught.” However, if no longer viewed as “outside” approaches, models of teaching and learning from education theory and educational psychology such as developmental learning, experiential learning, brain-based learning, transformational learning, enactive learning, inquiry learning, and cooperative learning can modify and even impeach imperatives to teaching as a hermetic, discipline specific (ergo, “folk”) practice. Integrating education theory can influence course, curriculum, and instructional development and more importantly will recognize the transitional nature of the beginning design student to more purposefully enable greater connectedness, responsiveness, and self-initiation in learning.

The Significance of Beginning

A central question of all learning theories is to determine what constitutes a learner and how should this be considered as a function of developing an appropriate beginning pedagogy? A writer always considers who is the intended audience for the written work. If an educator were to consider students as “audience,” is there a typical “first year mentality” beginning curricula must address and/or initiate? To what extent should design pedagogy reconcile with the changing and diverse beginning student, especially in light of student misconceptions about design education and design practice? “Who our students are” always and inevitably directly effects our pedagogical decisions, especially given the closeness brought about by the studio classroom itself. To be certain, consideration of a beginner's mind in the form of tailoring a pedagogy for a socioculturally determinate intellectual proclivity raises ethical questions at the same time it opens new possibilities, especially in the name of broader diversity. Can a “beginner's mind,” as differentiated by locale, school, life experiences, etc., be defined clearly enough to affect pedagogy or should this best be left to the student body to bring to form? Often, pedagogies intended to exploit or draw out ethnic, regional, or even individual differences in beginning students obscure the intended curricular content by enabling experiences that are too familiar and friendly and, thus, prohibit content from being abstracted from the concreteness of that familiarity. In the other extreme, approaches to learning that begin or develop abstractly often obscure the connectedness necessary to actual learning by creating personal distance that cannot be overcome.

A second issue is the question of the relation of beginning design pedagogy to the structure of the curriculum; should beginning design pedagogy be framed by the remainder of the curriculum or should beginning design pedagogy itself become a germinator of the curriculum structure and content directives? As a question of educational prerogatives, beginning design can "feed" a curriculum or it can “seed” a curriculum. Upper level courses (or rather, every course that follows beginning design) have a curricular agenda that necessitates a particular level of
educational development both with a skill set and as a designer. These attributes are complimentary and mutually developed. However, when out of balance in either direction, the education of a complete designer suffers. Inevitably, a design curriculum will come to stress one over the other. A curriculum that develops its beginning design pedagogy as a feeder course can often become a top down learning system that devalues initial learning experiences and can lapse into a training regimen that subrogates independent, exploratory thinking at the core of creative design activities for simplistic directed skills attainment. The student becomes a mere performer. To the contrary, when beginning design pedagogy is structured to seed the curriculum its purpose is to foment growth of an individual’s abilities to reason and make his/her own decisions; in the terminology of Piaget, to structure their own knowledge in continuous interaction with the world. A student thus becomes an active agent of their own actions and reflections on those actions, a trait that is central to creative design thinking. I have generalized the argument of “feed or seed” to make a point - I believe curricular stucture must take beginning design seriously or its students become whipsawed by this issue.

Abstract and Concrete Learning

The issue of abstract learning versus concrete learning is central to design studies because buildings themselves are concrete, material realities that, through human experience, become realized by designers through the instrumental use of abstract processes of symbolism, conceptualization, and transfiguration. Much of the work of learning design involves making transformations between concrete and abstract permutations of a building throughout a design process. This issue raises primary questions for beginning design pedagogy. Do the best beginning learning experiences consist of instructional methods that stress abstract mechanisms of instruction or do the best modes of beginning design pedagogy involve holistic approaches employing first-hand or hands-on experiences with actual materials or even full-scale design build? Architectural design readily arises from the constitution of a “maker,” from sensitivities gained in manipulating the physical world, by making things. Direct relationship with materials is the basis for this sensitivity, both as a curiosity and as an act of will and desire. This sensitivity must be reborn in beginning design experiences. It must be cultivated, as if watering a seed. When a designer makes a drawing or digital representation it is only through provocarbon in bodily, material engagement that its significance and use becomes comprehensible. Direct experience, getting one’s hands on materials, grounds the abstraction of representational devices. Making decisions about materials is making decisions about design. These are the directives of a design curriculum [and ultimately, practice] where the tangibility of buildings in all their palpable realness is the primary outcome. Pedagogies that stress abstract means of design production are in danger of producing architects that fail to understand the relationship between representation and human experience and hold little value for the realness of the direct experience of the built environment. Beginning design pedagogies cast the die and can provoke lifelong significance of the connection of abstract and concrete means of exploration, creativity, and design.

Pedagogy: Technique or Creativity?

An argument exists as to whether design content for beginning design pedagogy ought to be oriented toward development of technical skills (e.g., graphics, vocabulary, design elements, etc.) or toward development of creative and critical thinking and the motives of designing. Characterized in the extreme, should beginning learning experiences instruct students in the techniques of vocation or should beginning instruction impart a desire for inquiry, self-development, and life-long learning? One rational underlying both positions of this argument is that beginning design learning experiences become paradigms for future learning experiences, literally on a biological level. A pedagogical orientation to imparting technical skills tends to
corroborate with student preconceptions that learning design is an instrumental activity - that it is principally about vocational preparation and gaining competence and skills that will lead to greater chance for employment after degree acquisition. Student preconceptions are satisfied. But are they not misperceiving the depth of education needed to become a designer? A technique based pedagogy creates difficulties later in the curriculum precisely because it reduces design to chunks of information at the expense of both the engagement in the transformative complexities of designing and the development of design process through this engagement. Individual motives for making design decisions become marginalized in favor of fragmented problem solving tasks about line, or plane, representation, or convention. Impressionable beginning design students, seeking to “define design” for themselves, often mistakenly take reduced, fragmented skill building exercises for a paradigm of design process that will be carried with them well into their education and their careers. Many of the Bauhaus and art school methodologies that are still formative in beginning design pedagogy and curricula have morphed into technically oriented forms of teaching, and as such, have maligned and obfuscated the intentions toward discovery and experimentation that are the core of Bauhaus methodologies.

Design education is developmentally acquired. Design experiences are built upon one another and synthesized into an on-going body of design activity. Design pedagogies oriented toward skill-building restrict creative and critical engagement, and the self-development that grows out of searching for and discovering motives for one's own design decision-making. Only when self-awareness begins to emerge about process and creative decision-making based upon heuristic testing, self-initiated reflection and criticism, is the student truly engaged in design. And only side by side with this self-development comes integration of and competence with basic technical skills. Creativity and technique are always mutually intertwined. To focus on student development toward either technique or creativity at the exclusion of the other constructs a bias that must be recognized by both students and educator (and in turn brought to bear on the design curriculum). Diminishing student self-development does not correlate with the goals of being educated, especially in the case of architecture, whose practice, by its very nature, incorporates a broad yet deep view of human existence - with the intention of furthering this breadth and depth.

The pedagogical opposition between technique and creativity raises the question of the specificity of architectural content for beginning design pedagogy. Beginning design programs that derive teaching methods from Bauhaus or art school pedagogies are often criticized for seeming to deflect or delay specifically architectural content. In opposition are architectural pedagogies that begin with “full-blown architecture” design projects. Although beginning with “full-blown architecture” projects correlates with typical student preconceptions of what design school should be, beginning with these kinds of design projects produces the deleterious effect of throwing students into content far beyond their present learning abilities (e.g., abilities include abstract thinking like conceptualizing, critical thinking, and creative thinking; etc.), or skill levels (e.g., drawing and visualizing; representation; understanding of abstraction, etc.). The resulting experience is so abstracted from “what they think they know” from their life experiences that most become immersed in a primal disorientation from which they will never productively emerge during their education or even their careers. Low graduation rates attest to the fact that the small percentage of students that emerge productively from this experience in later studios do so either through sheer tenacity or because of an affluent background in which the complexity necessary to address a full-blown architectural design challenge was already part of their life experiences. Clearly, architectural design education should not be aimed toward only those who are from affluence or who are curriculum “survivors.”? In contrast to the awkward beginning design experience presented in “full-blown architecture” projects, beginning design projects that are analogous to building design offer an alternate. Analogous projects offer illumination of architectural design decision-making as a construct of varieties of experiences, with connections
to “full-blown architecture” occurring either as conceptions or as potentials to be realized, much like a seed already contains the mature tree.

**Learning Teaching**

The purpose of the 21st National Conference theme, “A Beginner’s Mind,” was to raise questions, not develop answers. In a discipline where creativity is primary, there is nothing more dangerous than educators who project conviction that they know what they are doing. My teaching is completely different from how I was taught. I teach from the perspective of student learning, guided, in part, by empathy with the disorienting situation of the beginning design student. Education theory and education psychology guide another part. On-going curiosity about and critical judgment of my own experience in the classroom, first as a student, then as a teacher, and as a colleague to other teachers, causes me to constantly re-think and modify my approach to the classroom, to the design studio, to the students, and to learning itself. My teaching has been influenced by the introspective and critical thinking of design teachers like Jon Lang, John Zeisel, Neil Leach, Peter Rowe, Herman Hertzberger, Simon Unwin, Seymour Papert, and Peter Zumthor. But I have also and maybe more profoundly been caused to reform the way I teach by the writings of theorists, Jean Piaget, John Dewey, William James, Jerome Bruner, David Kolb, Ellen Langer, and Howard Gardner, among others. But the most important influences on my teaching have been the relationships I have forged with other teachers, both in architecture and other disciplines, and with my students. I try to be responsive, and I try to care about students and what they are learning and not learning, not only paternalistically and as an instructor, but also as someone who is there with them.

In the classroom, I try never to do the same thing twice in the same way but to be responsive to the community of students. Each successive class offers a different “set” of students with an independent personality and thirst for learning design. I prefer to tap into their curiosity as students because curiosity is the antidote of arrogance, and many students, while not outrightly arrogant, bring to the classroom an attitude that is not their own. Curiosity, however is uniquely your own, and tapping into it breeds inquiry and depth. I always bring to the classroom the notion that the study of architecture is often a discovery and study of the self that, while it leads to maturation, also leads to confusion and the need for redefinition. If discovery is to be at the root of design learning, heuristic methods must be employed whenever possible, to help develop and encourage cultivation of each students own design methodologies and inquires that are mindful of both creative processes and cultural traditions of learning to design.

Probably most central to design teaching pedagogy is to help students to cultivate creative thinking, which means most simply, thinking for themselves by raising questions and making inventive, yet sound decisions that can materialize ideas. To paraphrase architect, Peter Zumthor, what is to be taught is the asking of questions, because design is itself a questioning. And the first thing a student of architecture can concretely question is what both the making and the experience of architecture starts with - materials:

`All design work starts from the premise of this physical, objective sensuousness of architecture, of its materials. To experience architecture in a concrete way means to touch, see, hear, and smell it. To discover and consciously work with these qualities - these are the themes of our teaching.

- Peter Zumthor 8`

This can only happen through the direct engagement necessary in making and experiencing making. Learning about materials is learning about design. Making things is itself,
questioning. I believe that the experience of a maker is at the root of architecture and therefore, of learning to design. Beginning to learn to be a designer of buildings is built upon this. Abstract learning and learning abstractly is grounded in the concreteness of making. The abstraction of drawing, analyzing, diagramming, theory, the virtual, and the density of critique can only be reliably built upon the direct, physical, objective experience of materials. Education psychology holds that beginning learning experiences have the best chance for success when structured in relation to the learning experiences of the whole curriculum. A question that must be addressed by all design curricula is this: Is beginning design merely a training ground or are beginning design learning experiences best as germinators of the remaining design curriculum, as a seed planted grows into a mature tree? Beginning design pedagogy must address what it means to begin - to be at the beginning of the development of learning to learn. Only then can it address what it means to begin to learn to design.

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21st National Conference on the Beginning Design Student

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JULIO BERMUDEZ
University of Utah

“In the beginner’s mind there are many possibilities, but in the expert’s there are few.”
Shunryu Suzuki (1973, p.21)

Abstract
Key knowledge for mastering of design teaching, learning, and practice remains inaccessible because we lack appropriate conceptual frameworks, discursive methods, and vocabulary to express it. This paper uses the conference topic “Beginner’s Mind” to start searching for such enabling structures. The insights offered in the book “Zen Mind, Beginner’s Mind” by Shunryu Suzuki are used to lead the discussion. Parallels between Zen teaching and beginning design education as well as between Zen mind and design mind are examined. The role of thinking, knowledge, goal, perception, sincerity, judgment, trust, and more are considered in light of Beginner’s Mind. Seven implications for design education are drawn. The objective of this work is twofold:(1) the utilization of Zen insights to bring out hitherto inarticulate design understandings, pedagogies, and methods, and (2) the development of a scholarly method to make Zen accessible, debatable, testable, and therefore useful to design instruction and related fields such as educational psychology, philosophy of education, and epistemology.

Introduction
There is plenty of knowledge in our discipline regarding how to attain design mastery. Such precious material has been collected through the hard work of generations of teachers and designers and passed down to us in written and oral forms. Yet, much crucial knowledge remains unsaid, unexplained, unpublished, inaccessible. This lack of formalization and clarity at the very core of our field generates considerable frustration among inexperienced teachers, university administrators, non-architects, and, for certain, beginning design students. Although we have sought and found support from other discipline in this task (e.g., educational psychology, philosophy, brain and mind sciences, to name a few), there still a gap separating what we tacitly know, and what we ourselves or our allied disciplines are able to articulate and ‘explain’. This gap has been directly or indirectly acknowledged by many for quite some time (Banathy 1987, Read 1966, Rittel 1986, Schön 1983).

Remarkably, this gap is one of the signs of great expertise. It is well known in psychology that experts cannot consciously explain their deepest knowledge or heuristics routines with any accuracy (XXXX). What experts do and how and why they do it is often beyond their conscious grasp. This has been known for quite some time (Polanyi 1964) and what rendered ineffectual the Artificial Intelligence movement efforts of the 1980’s. So we are left with the fact that our best design teachers tacitly know it. Our most successful designers implicitly know it. But when/if they manage to penetrate into their deep expertise (the one remaining in shadows), they find themselves unable to transmit it without sounding esoteric, inarticulate, or incomprehensible. Lacking appropriate vocabulary and context, their invaluable knowledge remains ‘personal’ (as Polanyi puts it) and deemed idiosyncratic or subjective by our objectivist/positivist biased academia (Jonassen 1992) that therefore considered useless beyond anecdotal curiosity. As a
result, the wisdom gained is lost with every great teacher/designer retiring and needs to be construed anew by each individual every generation. Making available a framework or method to share, compare, validate, and encode these fundamental experiences would be arguably one of the greatest contributions we could make to our field.

The topic of this conference, “Beginner’s Mind”, is in this spirit. The concept “Beginner’s Mind” is indeed one of those apparently obscure terms that our great teachers and designers often refer to in their attempt to communicate some essential insight into the nature of design. “Beginner’s Mind” makes reference to an unconditioned or creative type of mind able to learn rapidly, see freshly and solve problems anew. This concept by and large stems from the cultural influence made by Shinryu Suzuki’s book “Zen Mind, Beginner’s Mind” that became very popular right after publication in 1973. As often is the case with popularized ideas, the ‘street’ version of “Beginner’s Mind” has some truth mixed with misleading superficiality. The Beginner’s Mind condition is indeed of relevance to Beginning Design pedagogy and consequently deserves inquiry. But it may best serve the aim of making explicit the crucial yet inarticulate areas of design knowledge discussed earlier. So, in studying the meaning and implications of “Beginner’s Mind”, this paper seeks to benefit both goals.

Beginner’s Mind: When Design Mind Meets Zen Mind

Zen Master Suzuki describes the beginner’s mind as open, fresh, and boundlessly creative because of its freedom from opinion, prejudice and expectations. Having no thought of self or achievement, the beginner’s mind dwells in ‘emptiness’—an emptiness that in Zen is not vacuum-like but rather full of potentiality for birthing. For Suzuki, “if your mind is empty, it is always ready for anything; it is open to everything.” (ibid, p.21) Dwelling in such free mind, one is ready to accept or doubt without bias and thus penetrate into the original nature of things. In commenting on Suzuki’s book, Zenkei Blanche Hartman (another Zen master) clarifies the concept farther (2001):

“Beginner’s mind is just present to explore and observe and see ‘things as-they-are.’ I think of beginner’s mind as the mind that faces life like a small child, full of curiosity and wonder and amazement. ‘I wonder what this is? I wonder what that is? I wonder what this means?’ Without approaching things with a fixed point of view or a prior judgment, just asking ‘what is it?’”

“Zen Mind, Beginner’s Mind” is a book with a mission: to make us return time and time again to the realization that maintaining an innocent or ‘original’ mind is the secret to act and experience life at our fullest. So high does Suzuki regards the ‘beginner’s mind’ that he equates it with the Zen mind itself!

I think that most designers wouldn’t find it hard to agree with Suzuki’s insight when considering design excellence. Who would dispute that great design usually results from applying such Beginner’s Mind? Of course, we don’t call it as such. We prefer terms such as intuition, right brain thinking, lateral thinking, creative problem solving, and alike. In a way, Beginner’s Mind is Design Mind at its best (Silvestrin 1999, Zumthor 1999). From this perspective, it is not surprising to find design teachers working hard at creating the circumstances for such mind to arise. This brings the discussion close to home. For, of all design educators, few know more of the blessing and difficulty inherent in the Beginner’s Mind than us, beginning design instructors.

In their natural ignorance, spontaneity, and naiveté, beginning design students are close to accessing the Beginner’s Mind Suzuki talks about and that potentially delivers us to great design work. Yet, by the same token, they are also very near the pitfalls of incompetence, confusion,
frustration, and banality. After all, our beginning design students are far from being unbiased: they have gone through 12+ years of education and even longer acculturation. However, it is still true that, by comparison, these students offer the most unspoiled, uneducated, free minds than anybody engaged in professional design will ever have thereafter. Since these students will probably never be closer to accessing their Beginner’s Mind than at this time, our job as teachers takes on remarkable educational, professional, and philosophical responsibilities. Can we make the best of such an unique opportunity? How? The challenge doesn't stop there. It gets more difficult. For the education of beginners in the practice of design invariably means (at least in the short term) the very loss of the student's innate ingenuity and freedom. We are asked to teach students how to become design experts without corrupting their Beginner’s Mind!

For millennia, Zen has been successfully training people in the practice of attaining and maintaining a beginner’s mind amidst real life conditions. Zen also has an unparalleled oral and written tradition that allows people to frame, debate, and validate deep, highly qualitative, and personal mental experiences. As a result, there is much to learn from Zen when addressing this essential topic. Let me here acknowledge the difficulty of this enterprise. If not careful, I could easily fall into broad and useless generalizations, or inappropriate discussions in the context of our present academic inquiry (e.g., religiosity, spirituality, etc.). However, and recognizing such dangers, I feel qualified and ready to take the risk. I have over 15 years of experience in teaching beginning design studio, been seriously practicing Zen for the past 8, and earned a doctoral degree in Education. Indeed, literature in constructivist learning theories (e.g., Dewey 1938, Newman 1996), epistemology and philosophy of mind (Ford 1975, Lakoff & Johnson 1999, Whitehead 1967, 1961), psychology of mind (Csikszentmihalyi 1990, Block 2002, Kramer 1983), the art and culture of improvisation (Belgrad 1998, Sloboda 1990), qualitative research theory (Morrow et al 2001, Patton 2002), and brain/mind science research (Austin 1998, Pinker 1997) further encourages me in this direction as they suggest educational principles, tactics, and efforts with remarkable correlations with Zen teachings.

Towards a Beginner’s Mind
Susuki sets two main conditions for the Beginner’s Mind to arise: no thought of achievement and no thought of self. Although these two conditions are quite natural and often experienced when deeply engaged in design practice, some design teachers may find them hard to accept as they challenge common held beliefs regarding cognitive operation. Following I will briefly examine them.

No Achievement
“Our effort in our practice should be directed from achievement to non-achievement … Usually, when you do something, you want to achieve something, you attach to some result. [Moving] from achievement to non-achievement means to get rid of the unnecessary and bad results of effort … When you make some special effort to achieve something, some excessive quality, some extra element is involved in it. You should get rid of excessive things.” (ibid, p.59)

From a Zen perspective, seeking achievement means to use a situation for a gain beyond itself. Such pursuit separates us from what we are doing, creating a gap that not only clutters our understanding but also impedes skillful action. The process becomes corrupted and the result is, at best, only half-right. Behind achievement, there is always some expectation of what the outcome ought to be like. This means that we are holding some type of a-priori knowledge, experience or ideal about what is being confronted. As a result, we steer the situation towards
that expectation and not necessarily to what the situation needs. We justify the steering in the assumption that obtaining such result is better than approaching the situation without any knowledge or idea. This attachment to success and this knowledge of what is better are the hallmarks of expertise. In effect, a knowledgeable individual is able to seize an encountered situation within a familiar framework and thus offer a proven (i.e., ‘safe’) and quick resolution. Resolution that may match our expectation but may not fully address the situation. We get what we want. Nothing less but certainly nothing more either.

This can’t be farther from a Beginner’s Mind attitude. Acting with a Beginner’s Mind means to avoid agendas beyond what is present right here now. It demands to give up what we want in order to do what is needed, to choose not-knowing over knowing, and to be a beginner instead of an expert. It is this return from authority to innocence that rescues the meaning of the action from the hypnotic hold of a seemingly assured, yet limited and too often self-serving goal. Acting from such non-achievement focused mind grants us the ability to respond best because we are able to contemplate the situation in all its richness and complexity. Because we don’t know what we’ll get, the outcome is novel and free. Because we see things as they are, we can respond to them in the just measure. Letting go of achievement means dropping off our ideas, preconceptions, and goals which, as we will see, implies nothing less than letting go of the self as well.

No Self
In parallel to abandoning our attachment to result, Suzuki recommends an egoless attitude. He says that Beginner’s Mind activity “is activity which is completely burned out, with nothing remaining except ashes.” (ibid, p.63). He explains:

“When you do something, you should be completely involved with it. You should devote yourself to it completely. Then you have nothing. So, if there is no true emptiness in your activity, it is not natural … If it comes out of nothingness, whatever you do is natural, and that is true activity. You have the true joy of practice, the true joy of life in it.” (ibid, p.109)

At one time or another, all designers have experienced that moment in which they have lost themselves to the design in such a way that time, space, goal, and self have been completely consumed. In fact, anybody that has had a peak experience of any sort can attest to such sense of total awareness without a trace of self (Csikszentmihalyi 1990). Full involvement or identification with a situation dissolves the object-subject divide and propels us into the Beginner’s Mind.

Hence, totally giving ourselves to a situation makes selfless action (action for the sake of itself) not just natural but unavoidable. Such action burns itself out in the sense that nothing remains afterwards. Because it never had any extras to start with (i.e., no goals, no preconceptions, no self), this action leaves behind no regret, no hope, no what-ifs. It is complete and finished when done. And because the Beginner’s Mind has no-thing in mind, it is truly empty. Being empty, it doesn’t know, holds no opinion, offers no preference, has no precedent. Yet such empty mind is alive and pulsing with possibilities of engagement. When it is called to do so, it engages the situation coming out nothingness, and therefore offers free, open, attentive, curious, and appropriate response.

Implications and Reflections
There are several implications inherent in attaining and sustaining a Beginner’s Mind for design teaching. Unless specified, my use of the word ‘we’ stands for us design teachers, students, and/or practitioners. The order of implications doesn’t follow any hierarchy.
Implication 1: *We need to give up our desire to (intellectually) understand what is going on.*

Since the Beginner’s Mind is empty and comes out of nothingness, it knows that it doesn’t know and proactively gives up any desire of grasping the situation. No matter how smart we are, reality is just too complex to figure out. Suzuki offers this insight thus:

“You cannot find … nature by vivisection. Reality cannot be caught by the thinking or feeling mind. Moment by moment to watch your breathing, to watch your posture, is true nature. There is no secret beyond this point.” (ibid, p.135)

Suzuki suggests a radical yet humble phenomenology relying on conscious attention and feedback rather than in detached mental ruminations for responding to what is naturally unfolding moment by moment. The message is simple and clear: it is possible to give full response to a situation without fully understanding it.

This is very hard to take because it demands, as we saw, to trust in not-knowing as the guarantor of success, and to believe that having no idea is better than having one, and that a Beginner’s Mind is more appropriate than an Expert Mind when seeking for a great (design) response to a situation. This of course makes no sense intellectually. Yet this is exactly what is needed. So, what is called for is a suspension of judgment while concentrating in the present practice. Believe it or not, practicing Beginner’s Mind this way will eventually get us there. This leads to our second implication:

Implication 2: *We need to trust and then practice, practice, practice.* (Trust will be addressed in implication 6)

Implication 3: *We already have valid pedagogies facilitating students access to a Beginner’s Mind*

There are two well known Beginning Design pedagogies used to facilitate student access to a Beginner’s Mind. Both rely on creating contexts that deny the mind its codes of engagement to the point that it no longer knows what to seek, think, or do. Actions emerging from this place of not-knowing come from the Beginner’s Mind. Creativity is, if not assured, kindly invited.

One of such pedagogies consists of setting up an unfamiliar topic or obscure process that makes it impossible for students to use any preconception or knowledge. The other pedagogy asks students to solve an apparently familiar problem using their existing knowledge when in reality such knowledge cannot possibly do it. In the frustrating situation, students discover their ignorance as a precursor to open themselves up and thus access the Beginner’s Mind. The fact that these two methods do work and produce excellent results proves, if not the reality of the Beginner’s Mind, at the very least the pragmatic validity of its assumption.

Implication 4: *We need to acknowledge and make best use of the central role that the Beginner’s Mind may play in forging the character of the student.*

Learning how to design naturally encourages students to monitor themselves in operation and thus cast light in whom they are. This metacognitive process, as it’s called in educational psychology, gives students tools to guide their own development as well as forge their character. This affective dimension of pedagogy is not much discussed but is central to beginning design teaching, since it sets the foundation of a person’s education and life.

Operating from a Beginner’s Mind enhances this process. Giving ourselves totally to a situation doesn’t cause our obliteration. Neither does abandoning our goals, ideas, and the rest erase
ourselves. Rather, these actions liberate us from much of our emotional, intellectual, and cultural baggage, propelling us to uncover our ‘true’ self. According to Suzuki,

“When you become you, Zen becomes Zen. When you are you, you see things as they are, and you become one with your surroundings.” (ibid, p.80)

In other words, dropping off preconceptions, preferences, hopes, knowledge and alike produces a deep mental cleansing that rescues the self from the grip of conditioning and returns it to its natural Beginner’s Mind: what in Zen is termed the “original” or “true” self. From this state, the self is able to see and act without hindrance while still remaining true to its unique character. We can see this situation expressed in every good design work. Although we can appreciate the ‘signature’ of the individual behind it, no trace of self-consciousness, mannerism, strife, or pride remains. Thus idiosyncracy and selfhood enter design through the sincerity of the commitment to the challenge rather than by imposing one’s will. And while such sincerity of giving oneself to the task doesn’t always result in great design, great design never takes place without it. This is what Suzuki emphasizes:

“More important than any stage which you will attain is your sincerity, your right effort.”
(ibid, p.100)

Hence, common sense pedagogy calling for student sincerity and involvement is more than validated. It becomes the way to Beginner’s Mind and, through it, to facilitate each student realization of whom they are. This realization is no other than seeing first hand that what they had usually considered themselves to be (i.e., their ideas, experiences, prejudices, hopes, preferences) is not really whom they really are. In the purity of the Beginner’s Mind, they realize that rather than losing themselves, they are more alive and themselves than they have ever been… Who hasn’t experienced this unforgettable moment at a peak design experience?

Implication 5: Design teachers need to exercise great caution, patience, knowledge and restraint when working under Beginner’s Mind conditions.

On one hand, asking students to seek no achievement means to ask them to moment by moment surrender themselves to the design process. On the other hand, asking students to seek selflessness means to request the surrendering of their cognitive tools and images of themselves. Although both requests imply a great deal of trust from the student, they are not new in beginning design teaching.

We often ask our students to devote themselves totally to design without worrying about the outcome. The trust, we say, should be placed in the process. Although implementing such pedagogy may result in unfortunate episodes when not properly managed (e.g., sleep deprivation, insecurity, fear, anger), this method has the unmistakable advantage of catapulting students into a Beginner’s Mind state. Again, this by no means condones the extreme studio culture situations properly critiqued by the AIAS and others over the past decade. (AIAS 2002). However, it points out the wisdom intrinsic in some of our standard studio practices.

The second request entails a huge transfer of power and knowledge from the student to the teacher. Removing the ordinary means by which students operate, and placing them in an unknown territory and under the total guidance of the teacher demand from the student a great deal of courage, trust, and faith. Not only has the student to ‘submit’ themselves to the cognitive authority of the teacher, but also to believe that that instructor will exercise those powers wisely and compassionately. In effect, the teacher must offer students a great deal of patience, empathy, respect, and support because experiencing the Beginner’s Mind could be quite disconcerting if not scary and frustrating at first. In other words, the affective part of the teaching becomes as (if
not more) important as the cognitive dimension. It is only by creating a safe place that the student will be able to drop off their shield and become both open and vulnerable. A bad experience in this context could be very traumatic and generate permanent scars making it hard to do it again. Hence, extraordinary caution and restrain in the part of the teacher is necessary.

Implication 6: Both Beginner’s Mind and Expert Mind are necessary.
This paper thus far may have given the impression that a Beginner’s Mind is preferable over an Expert Mind. But this is not so. We need both. A Beginner’s Mind allows us to get to the source of creativity, selfhood, great design, deep insight, innocence, joy, and alike. An Expert Mind allows us to bring into reality whatever has been gained from such source. The former gives and the latter develops. One generates and the other critiques. One offers and the other chooses. One creates and the other takes responsibility. Both are absolutely necessary. And yet, greatness lies in accessing the Beginner’ Mind.

Unfortunately, our culture, civilization, and profession have been emphasizing the Expert Mind over the Beginner’s Mind to such an extent that we are unbalanced (Bergman 1984, Capra 1982, Harrison 1985). One easy way to recognize this fact is the intellectual hypertrophy affecting our society and discipline (Albrech 2002, Sontag 1990). What cannot be rationally articulated, analytically understood, or consciously produced is given little or no value. This needs recognition and fixing. As educators we ought to work towards a balance. And what better than starting at the very beginning of the education cycle? Thus, waking up the Beginner’s Mind is not just a good thing for Beginning Design but for our schools, profession and society at large.

Implication 7: We need to cease hoping to explain away design.
Explaining design to students is a common challenge to all design educators. How do we transmit deep design knowledge to people without any experience in the subject while resorting to language plagued with structural limitations and socio-cultural associations? Can we avoid sounding obscure and incomprehensible to the ears of beginning design students? Zen Master Suzuki helps us here:

“The more you understand our thinking, the more you find it difficult to talk about it. The purpose of my talking is to give you some idea of our way, but actually, it is not something to talk about, but something to practice. The best way is just to practice without saying anything. When we talk about our way, there is apt to be some misunderstanding, because the true way always has at least two sides, the negative and the positive. When we talk about the negative side, the positive is missing, and when we talk about the negative side, the positive side is missing. We cannot speak in a positive and negative way at the same time. So we do not know what to say. It is almost impossible to talk about [it]. So not to say something, just to practice it, is the best way.” (ibid, p.90)

Whatever side of a subject is illuminated causes the other sides to remain in shadows. In other words, it is ultimately impossible to explain design to beginning design students. Talking about it may only partially point at ‘it’. And, of course, the corollary of this implication holds true for this paper. Yet, the hope is that what has been addressed does illuminate those areas of design that tend to remain hidden by the difficulty inherent in observing and expressing them.

Parting Words
Bringing up the concept of “Beginner’s Mind” at a national meeting on beginning design education is a perfect opportunity to start discussing topics hitherto considered off-limit academically. It provides us with a chance to begin building a valid framework to save from extinction wisdom
gained over years of hard teaching practice. By sharing age old, Zen insights in relationship to
design teaching, this paper humbly seeks to support this important enterprise.

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A Beginner’s Mind

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Reflective Inquiry in Architecture Education: The Place to Begin

ANUBHUTI BHATIA
Florida State University

Introduction
Meaning-making in architecture is a consequence of the interaction of human beings with the built environment. Meaning is not an inherent property of a building. Architecture can provide immense values to the social structure if it responds to social needs, and architects need a theoretical understanding of the way people impart meaning through their values to the physical environment. This interaction of human beings with the built environment affects every aspect of life – psychological, behavioral, social, and cultural. If designers are “master builders”, as the term architect translates, the behavioral and psychological responses of end users should obviously be their foremost concern. Scholars have emphasized the need for students to realize the importance of the design process, to consider clients’ needs beyond basic functional requirements, and to apply studies of history, psychology, environmental concerns, and human behavior to design concepts.

These concepts form the basis of this paper. The theory that forms the basis of the concepts presented in this paper is pragmatism in art and art education. In the following sections I will discuss in detail the concept of pragmatism and its application in architecture education. The study that has influenced interpretations in this paper is part of a pilot study conducted for a future extended study. Final year architecture students were interviewed about beliefs about architecture they had brought with them to the field and what criteria they emphasized during the design process. The opinions presented by final year students provided important insights into what they should have been taught at the beginning of their architecture program.

Architecture Education – Its Needs
There is a need for the study of psychology in architecture in order to enhance the evaluation of pre-theoretical personal experiences in the formation of convictions and assumptions during professional practice. The need for incorporating theories of behavioral psychology and the interaction of human beings with the built environment as important stages in the architectural design process has been emphasized and studied. Some of the other concerns addressed as being important to design education include professional ethics towards issues of biological, social, and cultural environment, cultural forces, societal laws, and nature.

The claims that architecture makes should go beyond making sure that the building will be structurally sound and resistant to problems such as leakage. One ought to be able to take these things for granted and focus on concerns like social, cultural, and environmental issues. This approach would give rise to a refined set of standards for architects. These standards will embrace societal traditions, and reflect the entire society as well as the values of all who are part of the culture. Clearly architecture education needs to go further than basic functions, structural concerns, legal guidelines, and anthropometric data. Architecture needs aspects that relate more to the end user – the occupant who is going to get directly affected physically as well as psychologically by the spaces that these students will design as practicing architects.

Methodology
The study that this paper derives from is aimed at identifying the extent to which architecture schools incorporate concepts of social, psychological, behavioral, cultural, and client
considerations in their curriculum. This paper was based on inferences derived from the analysis of six interviews and observations of their interaction with faculty as part of a pilot study conducted at an architecture program at a state university in a county in Florida. The pilot study focused on deriving an understanding of students’ design process and concept formulation.

Sample Selection
Six students were interviewed for this study. All students were seniors in an undergraduate architecture program. The fourth-year studio was chosen for this study because this is the studio in which some serious design process takes place. Selecting seniors for the study would minimize trivialization of the study because seniors will be well aware of traditional knowledge and skills. The six students volunteered for the interviews and were from varied ethnic backgrounds and age groups – one 53 year old white male, one African American female, one half Palestinian male, one half Puerto Rican half African American male, one white male, and one African American male. Except for one student, all students were between 23 and 25 years old. The male to female ratio in the group was representative of the ratio in the entire group. Students came from different towns like Pensacola, Chicago, and a small town in Alabama.

Data Collection
The interview protocol for the semi-structured interviews for the study was developed on two aspects: students’ opinions about architecture as a profession, and concerns addressed in the project they were working on at that time. All participants signed consent forms and the interviews were tape recorded and later transcribed.

The interviews were followed by observations of students in their studio and their interaction with each other. I went to the studio five times over the course of a fortnight. Student presentations were postponed three times during these five visits. During the course of the research, two critiques by faculty were held. I participated in both critiques in order to observe the concerns that were being emphasized by students and professors in these critiques. Students presented projects to a panel including their faculty and a guest critic. The presentations were followed by discussion of projects, questions and comments by the jury members. I also sat with students during their discussions with each other, while they were working on their projects, or just waiting for the professors. Each visit to the studio was between two to three hours. After each visit to the studio, field notes were typed from memory and from notes taken during the visits.

Data Analysis
The analysis of interviews with students identified beliefs that students brought to the architecture program. Students talked about ideas they had held when they began their architecture program. Another aspect identified was the concerns that students addressed in the process of design. Interesting themes emerged when the two categories were compared with each other.

Categories that emerged from students’ responses to questions about their opinions about architecture as a profession included: (1) sustainability or environmental responsibility, (2) behavioral, (3) social, (4) spatial experience, (5) business aspect and clients, (6) form of building, and (7) reference to other architects (cases). It may be said that students had brought with them an understanding of architecture as a profession that is client-oriented and that should concern itself with the well-being of the end-user and of the environment. They talked about experience and about the environment. Some of the comments included statements like, “(Architecture) is something you experience, not something you just see”; and “An architect can offer a client a great deal in energy savings and economics as well as aesthetics”; “(Architecture) is a way to design people’s lives”; and “(Architecture) develops the whole social life of people”.
Another set of categories emerged from students’ responses to questions pertaining to the concerns they had addressed in their designs. These categories were also derived from students’ presentations during critiques and the aspects of their designs which they emphasized when they presented their projects. These concerns include: (1) site context, (2) personal preferences, (3) technical, (4) form of building, (5) culture, and (6) technical skills. Students comments included statements like, “I wanted to do something different.”

**Discussion**

Comparing the two sets of categories that emerged, it is interesting to note that students had ideas that were consistent with what literature suggests architecture education should focus on. However, somewhere during the course of the design process these ideas about client psychology, architecture as an experience, and the responsibilities of architecture as a profession were overshadowed by technical concerns. It is essential to nurture the ideas that students bring to the program in the early stages so that they do not get lost in technical concerns. Students bring interesting concepts about architecture to the program and it becomes the responsibility of architecture programs to ensure that these ideas and concepts are developed further and students are taught to incorporate them in their designs. The solution to this problem lies in a theory in art and art education.

**Theoretical Framework**

Suggestions for architecture education may be derived pragmatism and the incorporation of its concepts to fulfill the gaps in architecture education. This section provides an overview of pragmatism in art and art education, and its relevance to architecture education. Pragmatism is based on the effect that art has on its audience – the social, cultural, and psychological aspects of art.

**Pragmatism in Art**

Art exists in order to achieve certain designed purposes in terms of its effect on the audience. Neo-pragmatic art educators identify the pragmatic method of instruction as one through which students can reorient their beliefs towards themselves and the events that they encounter. It goes beyond the impressions brought to the work of art or the first impressions. Therefore, pragmatism may be stated as an approach to art that delves into the meaning that the viewer arrives at after interacting with the work of art. This meaning may include societal and world views, opinions about one’s own position in the world, and various other aspects of life, society, culture, etc.

**Reflective Inquiry in Art and Architecture**

Encouraging students to actively analyze and experience will be a great way of teaching certain concepts. The concept of reflective inquiry derives from the pragmatic view of art. Human interaction with a work of art leads the viewer through a process of inquiry based on what he brought to the work, what his experiences with the work led him to believe, and how this interaction influenced his beliefs of himself and of the world. It is the process of reflecting upon one’s psyche and how it gets affected at various stages of the interaction that takes place between viewer and art work.

In classrooms reflective inquiry will involve exploring stories from students’ lives and experiences, and to explore the relationships between art and the lives of people. The same may be applicable to architecture. Encouraging students to explore their feelings, emotions, and sensory as well as psychological responses in spaces they encounter will make them more aware of the impact that built spaces have on occupants. Just as art is capable of reorienting the viewer’s beliefs, architecture is capable of influencing the occupants in a manner greater than
students and architects can perceive without reflecting on their personal experiences in spaces and analyzing these experiences. This approach to architecture education would be a step towards a complete architecture education – education that produces architects geared towards socially responsible designs that respond to more than the occupants’ requirements in terms of functionality.

This reinforcement is extremely important in the beginning semesters of their program. Students will be able to identify their ideas about architecture, explore these ideas and beliefs in detail, and analyze these beliefs. Students will be able to identify a theoretical framework within which they can place their beliefs about architecture and design. This approach, I believe, will also introduce students to research and theoretical studies and reinforce theory in architecture as being equally important to design.

Conclusion

Encouraging reflective inquiry among first year students will orient them to the extent to which their designs influence the end-users. It will ensure that ideas that students bring to architecture about the responsibility of architecture towards clients and environment are nurtured. Students can be encouraged to recognize their ideas, their importance and their incorporation in design. It will ensure that architecture schools produce graduates who are committed to designs that acknowledge clients’ social, cultural, psychological, and behavioral needs; and address environmental concerns. This should be an important aspect of architecture programs. In fact, I believe that it should be the first step in architecture education – it is the place to begin.

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The Riddle of Design
The Open Project: Poetry + Making in the Present Tense

MARK BLIZARD
University of Texas San Antonio

abstract

The process of design is not linear, linking, through a series of points, the known with the unknown, but rather, design is fragmentary, proceeding in fits and starts. Along this circuitous route, design is marked by enjambments, simultaneities, and coincidences. Essentially it seems a rather tangled tale, or perhaps a riddle. It is from this premise that elements have been gathered to inform the trajectory of this paper. Drawing from Umberto Eco’s studies of language and interpretation, which have been tainted by a not uncertain fascination I have with the writings of Jorge Luis Borges, this work proceeds from the act of misreading.

Rather than the presentation of accumulated images representing student work, which inevitably read like so many beads on a string...
Rather than reviewing what would inevitably be construed as a linear process situated on the line between cause and effect...
Rather than definite products and measurable accomplishments...
This paper is situated in the realm of conjecture. What I offer here are a few disparate fragments that allude to the potential exploration of a speculative territory.

Yet, somehow there is always a value to be found in sequentially reviewing the process of design. Following such reviews, fragments seem to remain salient in our minds; passed back and forth in memory. In a process not unlike design, they are reformed, taken apart, recombined, and drawn into a dialogue with what has come before. During this process of flux, through which they are informing prior images and thoughts, they become tainted, contaminated. It is this riddle of design that intrigues me, and serves as a fulcrum or starting point for understanding the importance of the open project.

The open project, defined as an uncertain, vague terrain within this paper, becomes the vehicle for misreading -- for dialogue and discovery. Subsequent to this definition, is an exploration of the ramifications of such projects within the course of beginning design. It is here, in the foundation of education, that the open project is the most critical for it establishes a mode of radical practice. The design laboratory becomes the engine for radical practice. The projects conjectured within the body of this paper are projections, or provocations -- as such, they remain enigmatic and, of course, open to misreading and without clear boundaries. What is suggested, is that perhaps it is the search for boundaries conducted within an unknown and open territory, which needs to be the central core of the design laboratory.

To begin, perhaps, with a misreading...

Now when I was a little chap I had a passion for maps. I would look for hours at South America, or Africa, or Australia, and lose myself in all the glories of exploration. At that time, there were
many blank spaces on the earth, and when I saw one that looked particularly inviting on a map (but they all look that) I would put my finger on it and say, ‘When I grow up I will go there.’ The North Pole was one of these places, I remember. Well, I haven’t been there yet, and shall not try now... Other places were scattered about the equator, and in every sort of latitude all over the two hemispheres... But there was one yet -- the biggest, the most blank, so to speak -- that I had a hankering after. True, by this time it was not a blank space anymore. It had got filled since my boyhood with rivers and lakes and names. It had ceased to be a blank space of delightful mystery -- a white patch for a boy to dream gloriously over. It had become a place of darkness. But there was in it one river especially, a mighty big river, that you could see on the map, resembling an immense snake uncoiled, with its head in the sea, its body at rest curving afar over a vast country, and its tail lost in the depths of the land... The snake had charmed me.

-- Joseph Conrad

Published in 1902, Joseph Conrad’s *Heart of Darkness*, nonetheless, seems to resonate with the faint echo of J. L. Borges’ work, *Dreamtigers* (first published in 1960). Every time I return to Conrad’s exploration of unknown recesses, I discover, as if for the first time, images and elements of Borges’ language, salient, emerging through the text. Indeed, the text, a palimpsest, has been tainted by this misreading. Contorted. Transformed. And somehow I am drawn into the vague regions of this contamination. Unlikely connections are formed as one text mingles with the other. At some point, I look up, surprised at the inextricable relationship between the two. This new text, which is neither wholly one or the other, has been generated through the act of reading. An act that is neither passive or inert, but is rather, active and poetic -- a coincidental enjambment which is a making of sorts.

Likewise, I am intrigued with the image presented in the passage above. An image of maps and territories, and of the unknown that resides there... an image that seems to search the tensions between memory, desire, and the potency of exploring the unknown. This unknown territory is, at once, formed of the fundamental elements of the world, and serves as a reflection of the self: both a window and a mirror. Somehow this speaks to the idea or process of beginning and presents the elements necessary for discovery. In other words, the foundation of education is founded on the premise of the unknown.

An alternate beginning...

Igor Stravinsky’s book, *The Poetics of Music*, offers itself up to a multiplicity of readings. Perhaps more than any other text, I have brought these six lectures into the foundation design laboratories. This serves as no text book for the beginning design student -- there are a couple of worthy texts that could be mentioned -- but rather, it is a vehicle for thinking about the process, methods, means, and materials of making. Of course we are talking about design education rather than music education. I simply substitute the word “architecture” or the word “design” in the place of the word “music” in Stravinsky’s eloquent work. This intentional misreading has always struck me as meaningful. An analogy is formed between these two categories of making (making present). Music is, after all, a parallel art. Listening to the *L’Oiseau de Feu* or *Sacre du Printemps*, one can begin to perceive the “architecture” of the music. Yet we understand the use of the word, “architecture” in this case, as an analogy. This justifiable misreading becomes intriguing when we find how potent Stravinsky’s words are when brought into a dialogue with architecture. Even as other texts on architecture lose my interest -- becoming predictable, their authors overly didactic -- *The Poetics of Music* continues to present new readings, new correlations between map and territory. Here the territory in question is foundation design.
What remains critical to our question of *beginnings* in both of these examples (Stravinsky and Conrad), is not so much their content as their *openness*. Obviously, the layers that emerge through reading (and misreading) speak of something both universal and particular. Universal in that the ideas are not confined to the text -- they speak to certain over-arching patterns, forces, or processes. Particular in that when read in the context of the text, a certain logic seems to unite the part to the whole: a cohesiveness becomes apparent.

Marlow’s fascination with the unknown becomes our fascination with the place of discovery, of confrontation. In Stravinsky we read:

*For the phenomenon of music is nothing other than a phenomenon of speculation… It simply presupposes that the basis of musical creation is a preliminary feeling out, a will moving first in an abstract realm with the object of giving shape to something concrete.*

Following this, our misreading:

*For the phenomenon of architecture is nothing other than a phenomenon of speculation… It simply presupposes that the basis of architectural creation is a preliminary feeling out, a will moving first in an abstract realm with the object of giving shape to something concrete.*

Stravinsky’s own words are powerful, and today, obvious to any student of 20th century musicology. Following on the heels of Freud and the rediscovery of primitive culture, concurrently explored by Cubism, Stravinsky sought to reveal something primary and creative within the unconscious mind. Yet, artifice requires that the maker navigate between the abstract and the concrete -- between the search for a language and its equivalent artistic representation. Stravinsky’s approach has had a profound influence on the development of 20th century music.

Our misreading, however, seems tainted with a certain affectation, an awkwardness that eludes a singular and clear reading. We find ourselves passing these few sentences back and forth in our minds. Turning them over. Examining their minutest detail as well as their general trajectory. As the exactitude of their meaning escapes us, we search for the patterns that reveal the hidden nature of connections proposed in the reading. The first thing that strikes us is the definition of architecture as a phenomenon. Rather than as an object, we must understand architecture as a field of which we are a part. We engage this field through the whole of our senses. The thought of architecture as a “phenomenon of speculation,” suggests an even deeper engagement, one that involves the maker in both conjecture and surmise. It is as if we are searching for something other than architecture, and that architecture serves as the vehicle for exploration, and becomes, necessarily, the resultant. It is this speculation that demands of the maker the search for an equivalency between drawing and building. In this reading, the text has been colored by post-structuralism and clearly influenced by the late work of Merleau-Ponty and Umberto Eco’s semiology.

**The design studio**

Every time I confront a new semester, or the blank page that seems to precede each project statement, I have a need to rediscover making, or perhaps, the process of design… a process that I have long understood as poetic. What this paper proposes exists in the realm of conjecture. I offer no litany of student projects to support and verify the program of study, the pedagogy, or the philosophy that serves as structure for the design studio or school in general. When confronted with such papers, we admittedly, find a certain joy and are tempted by the
linearity of purpose and effect, to break off a little piece and walk away satisfied. Such evidence is "plastic" anyway -- conforming to the container into which it is placed... our current trajectory of thought. And also, most all student work in foundation design seems to me seductive. I seek to reach beyond this way of thinking that substitutes one project for another, or one sequence of projects for another sequence. In the effort to find the appropriate project, we lose sight of the purpose of our work as teachers. What is needed is a radical rethinking that restructures our understanding of the design project and foundation education in general.

I have seen students puzzle over project statements, attempting to "decode" them as if the answer to the problem was somehow hidden within the text. An answer known to the faculty and intentionally kept from the students. The results of the design process are often understood by the students as being measured against the a priori, "correct," or known solution. This odd archeology of the project statement seems to arise when the project statement describes the end result -- an object which serves as the focus or intent of the project. Once the goal or object is unearthed from the initial statement, the student proceeds in a more or less linear fashion. The instructor's prior knowledge of what the project should "look like" shapes the structure and content of the design studio. This training process is far from educational and involves no dialogue and discovery.

If the project statement is configured as a beginning... place from which to set out... a definition of a certain field [of relationships] to explore... a subject which, although obvious at first glance, remains unknown, untested... Here the studio can best be understood as a laboratory:

- an estuary
- an organism
- a vehicle for discovery
- as nourishment
  - open to establishing connection between...

What I am conjecturing is a design laboratory centered on the structure of the open project...

**the open project**

The open project does not posit the student in a linear process or a certain sequence leading to a known end. The awareness that there is an answer presupposes a single passage, a particular and successive sequence of design, from a known position to a projected end result. Once the end is named and defined it becomes an instrument of measure, a performance standard, against which the student's results are laid out and compared. In this linear process, the student's are not learning how to think, but rather, how to act, how to perform. Oddly enough, the product of this objective process, is not an object, but is more similar to a sign. That which results from these successive actions is not so much a work of design as a simmulacrum. Design must become a process of designification, a dialogue through abstractions which draws the student into direct confrontation with the concrete world.

I am advocating the active role of the student in "reading" the project. The statement drafted by the instructor, though a springboard, is not a point of origin of the design process anymore than a map is the origin of the territory. There is a trajectory incorporated within the project statement that allows the student to venture out into and begin to engage the territory of the project... or rather, the statement *is* the trajectory. The territory of the project consists of the body of elements that define the field of inquiry: materials, operations, subjects, and objects, as well as certain concepts that are often expressed in dichotomies. The interplay between these elements is
critical. An analogy to the project might be a game of chess, which is also a labyrinth. With every “move,” a range of new possibilities come into view. The trajectory of the project, organized through the elements that constitute its territory, provide the criteria against which each decision is made.

The interpretation of the territory is discovered through the process of direct engagement. We learn through our hands. Yet this must be distinguished from craft. More akin to bricolage, the material and operations at hand begin to inform the student’s thinking. The potential within the territory, its structure, order, character, and the range of possible relationships among its elements, becomes understood through engagement. The patterns that emerge are corollaries to patterns of thinking. Through the reciprocity of making and thinking, operational, spacial, and material structures allow the students to perceive and grasp patterns of ideas and principles. The student establishes connections that begin to form a constellation, a pattern that reveals itself along the trajectory of the work.

**Interpretation**

*Unlimited semiosis does not lead to the conclusion that interpretation has no criteria.*
(Eco, *OI*, p. 23)

Umberto Eco proposes three theories of interpretation:

1. radical reader-oriented theory
2. original intention of the author
3. the intention of the text (Eco, OI, p. 25)

The first theory suggests that what the student brings to the project becomes the focus of their discovery. The studio, then, can offer no criteria for review, nor any trajectory for learning. Likewise, I am rejecting the second theory as serving only as a means for students to mimic the a priori understanding of the instructor. Discoveries, in this case which is akin to training, lie outside of the student. Within the third theory, the intention of the text, is a middle ground. The work is situated in the contested space between the territory of the project and the student. Through their engagement, which forms a dialogue with this territory, the student navigates, making judgements and responding to the changes in the conditions at hand.

The student’s work is an exploration, not of the text or project statement, but of the territory as prepared by the instructor. The exploration of the territory uncovers certain patterns and principles that are understood within the framework of making. The possible resolutions inherent in an open project are never fully explored. However, certain categories become apparent when reviewing the students’ work. These reflect the inherent order within the territory of the project. These types of resolutions can serve as a vehicle for the initial discussion with the students.

The boundary or envelope of the project is critical for it defines the field of the project. “If boundaries are not recognized, then there can be no civitas.” (Eco, OI, p. 27) The boundary becomes the place of exploration… how many, how few, how far, how thin. Of course it takes a violation in order for the students to recognize the extent, position, and structure of the boundary. The project statement describes a territory whose boundary conditions are unknown. The intention of the open project implies a certain a stretching out as the student explores the boundaries following the trajectory of the work. What comes together along this arc are the discoveries of certain interconnections and relationships among the elements of the project. The
different work in the laboratory leads to a singular body of discoveries, where each student's work informs (and often questions) the others.

a partial taxonomy of the open project

The open project is a complex field of forces that configure possible events (Eco, OW, p. 14). The project statement remains incomplete, a fragment, left open for interpretation. As the end result is never named as a definitive solution, it cannot serve to prefigure the student's work, but more often poses a question. The center of reference for the student becomes the work itself as it plays against both their thinking and the territory described by the project statement. The following is a partial taxonomy of the open project, and may serve to suggest a range of particular projects.

i narrative structure
A narrative structure organizes the project's territory -- defining a series of certain boundaries and centers, each of which begin to inform the trajectory of the work. The work takes place within this constellation of forces and limitations of tools, operations, materials, subjects, and objects. The work results from the exploration of the consequences of the constellation. The resistance encountered guides the decision making process and subsequent actions. [construct an orderly support for a rock]

ii field of possibilities
The project's territory is a field of elements whose relationship, position, place, and influence, remain uncertain. Navigating through their work, the student finds patterns which suggest a whole, and direct the decision making process. [contain 4 found objects]

iii site of study
A particular site is given in conjunction with certain operations. The site is explored through a series of analytical exercises that allow the student to understand the constituent elements of the site and their organization or potential organization. [paper, folding + cutting, tower; 1 sf of a surface, mapping]

iv the object as analogy
The project defines its object in terms of another object. The tension between the known categories and the possibilities, suggested by the analogical bridging between them, serves to define certain questions, which are enmeshed within the territory of the project. [wall/room; plaza/room; place/joint]

v contested space
The project's territory is positioned between two or more conditions, materials, elements, or spaces. The student seeks the orderly resolution of the contested space between. [inside-outside; beam-column; object-table]

closure

To [Marlow] the meaning of an episode was not inside like a kernel but outside, enveloping the tale which brought it out...

I believe that the deeper intent of this work is actually the surface or envelope that it presents,
rather than the particulars that are drawn together. The envelope of this paper is a project[ion] itself… put forward as a conjecture. In order for the beginning of design education to remain vital, its projects need to be open for dialogue and discovery. Somehow, this has been largely lost to the comfort of assured ends. Although aspects of the open project have been explored over the last decade in foundation laboratories I have taught at Virginia Tech and UTSA, I am only beginning to draw the fragments of these experiences together into a coherent model. Perhaps the desire will always exist just beyond what I am able to put into practice. In this sense, my understanding of the open project will always be evolving, incomplete, and open to interpretation.

[The title of this paper is drawn from Borges’ first lecture in This Craft of Verse entitled “The Riddle of Poetry.”]

afterward: the open project is...

The open project is “...an act of improvised creation...” (Eco, OW, p. 1)

The potential for the student’s exploration, for dialogue and discovery, is a function of the structure established through the initial project statement.

The open project proposes a field of possibilities as an invitation to explore the unknown.

The open project has no singular solution. It is structured as a map, not a set of instructions. What is discovered of the territory may well be unique for each student.

The open project can be configured as a matrix that allows multiple readings and suggests a multiplicity of possible connections.

The open project is not an open-ended or meandering process. Its closure is informed by the discoveries and decisions made throughout the process.

The open project is an interplay of stimulus and response where the project statement serves to initiate this dialogue and define the field of study.

The open project offers “…itself not as finite works which prescribe specific repetition along given structural coordinates but as ‘open’ works which are brought to conclusion by the [student] at the same time as he experiences them on an aesthetic plane.” (Eco, OW p. 3)

The result of the open project is the growing awareness of patterns inherent in the design process, material structure, methods of composition and assembly, and comprehension of over-arching ideas.

The open project provides a wealth of different resonances and echoes that intertwine, recede, and emerge again within the next project.

The open project is open to differing interpretations, misinterpretation, as well as over interpretation -- all of which may contribute to dialogue and discovery.

The open project is uncertain. It is this uncertainty that invites us to enter the project.
The student must be conscious of particular decisions and how they form a body of coherent thought whose focus is a point discovered in a field of interrelations.

Any program, project statement, or exercise could be considered open -- what is critical is the means the instructor chooses to convey the project. Misreading the project is what transforms it into a vehicle for dialogue and discovery. The foundation student is in no position to transform the project. The student must know that the project is open. There must be a prompt of some kind.

The open project is similar to Heraclitus’ river -- always in flux, changing. The lack of a definitive point opens the project and the student to discovery. Interconnections are made which are understood only through the direct exploration of means, materials, and methods.

The object of the open project becomes its subject.

The open project describes a beginning.

The open project exists in the present tense. It is never about some thing or some idea, but always is. It is here that the open project becomes analogical: in its ability to suggest that which is outside of the project.

The open project is not directed or burdened by preconception. Often, the open project is not named. To name some thing is to call it into being and to fictionalize it at the same time. The name can falsely suggest a predetermined end. The object of the project is set before the student as if some kind of grail.

“The important thing is to prevent a single sense from imposing itself at the very outset of the receptive process. Blank space surrounding a word, typographical adjustments, and spacial composition in the page setting… of the text -- all contribute to create a halo of indefiniteness and make the text pregnant with infinite suggestive possibilities.” (Eco, OW, p. 8)

“This search for suggestiveness is a deliberate move to ‘open’ the work…” (Eco, OW, p. 9)

The open project needs to be considered as a vehicle or apparatus through which or by which work and reflection proceeds.

The open project outlines a field that is a “…complex interplay of motive forces… a configuration of possible events, a complete dynamism of structure.” (Eco, OW, p. 14)

Every act of making explains the open project but does not exhaust the project’s possibilities. Each work by an individual student illuminates the work of the others, complements it, and suggests further permutations, possibilities, potential trajectories.

The open project offers no privileged points of view. The instructor must surrender their position of knowledge of the outcome and concentrate on establishing and nourishing an environment conducive to serendipity.

The open project encourages students to make connections between seemingly different things. These connections serve as a framework for the project as it proceeds.
The *open project* is not a conglomeration of random activity with an amorphous outcome.

The *open project* sets an organizing rule that governs the design process. It provides a structure through which the design process takes shape. The structure establishes a dialogue between pattern and material.

The *open project* provides a territory and a structure for interpretation (and misinterpretation).

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**the matrix**

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bibliography


A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Minding the Future: A Traditional and ContemporaryBeginning

PATRICIA BOGE AND MICHAEL MACPHAIL
Wentworth Institute of Technology

As architecture schools re-evaluate and restructure their curriculum for the new millennium, it is imperative that both digital and manual techniques of representation are equally promoted. While a facility with current software applications is extremely important for graduating architecture students, the profession calls for a mastery of the thought processes that supercede a facility with computers. These processes are best learned using the simplest of equipment: the eye and the hand. This seeming disparity reveals that the success of any new pedagogy depends on the ability of students to critically apply the best graphic approaches, whether manual or digital, to solving design problems.

In the fall of 2004, Wentworth Institute of Technology in Boston began a “laptop initiative” providing all 300 first-year architecture students and their instructors with identical laptop computers and an abundance of software. At the same time, the school decided to re-emphasize the importance of architectural freehand drawing for these same students. The goal was to initiate a pedagogy that integrated both the manual and digital aspects of architectural representation and exploration into a new essential foundation for beginning design students. This paper will focus on the subsequent developments of this program. It will explore the significance of teaching fundamental architectural knowledge and skills simultaneously within manual and digital graphic environments. By presenting the pedagogical focus of the courses and coursework within the first year curriculum, it will evaluate the promises, possibilities, and problems encountered in this emergent program. By equally acknowledging, and even combining, manual and digital forms of design and representation at the foundation level, the program hopes to foster students rooted in the richness of the profession’s past while also being prepared and positioned for the future.

Manual and Digital: Common Threads in Graphic Representation

Rather than pitting traditional against emerging (manual against digital) methods of representation, a critical approach to the potential applications of both should be discussed. Within the framework of a successful approach to teaching architecture, fundamental design principles must be conveyed through a set of representational conventions using a series of repetitive graphic exercises. Examples of these principles include scale, form, structure, dimensionality, and language. These fundamentals have the potential to act as common threads that weave together seemingly disparate approaches within an architectural design curriculum. Positing these principles as a framework for representation focuses learning on the development of the conceptual and graphic content of the work, rather than the tool that is being used. For example, considering structure as a common thread, one could posit ideas of construction lines and guidelines in freehand drawing, file organization and basic page layout in web design, and layer management, design parti formation, and tectonics in CAD design and modeling. By focusing on the elaboration of fundamental design principles, the discussion engages a more critical approach to the expanding possibilities of using both means of representation within the design process.

Using the simplest possible equipment to introduce these design principles focuses attention on content, rather than the end product. Manual representation, especially in the form of freehand drawing, allows the pencil, in connection with the hand and the eye, to become a tool for
thought. Even a seemingly simple drawing problem becomes an exercise in thinking. Without drafting tools, careful and thoughtful attention must be given to each discovered “fact” (dimension, proportion, position, etc.) that characterizes the subject being drawn. The subject, whether physical or imagined, must be analyzed and mentally disassembled into its essential component parts, so that it can be understood and re-built on paper. Axes, lines of symmetry, and “bounding boxes,” which delimit the subject’s scale, become the initial drawing structure to describe the object and/or idea as a whole. As the drawing process continues, additional complexity and detail emerges in the proper relationship to the established structure. The standard list of architectural drawings (elevation, section, axon, perspective) becomes a means to create and describe a three-dimensional idea; the object is created and becomes “real.” Through the process of manual drawing, representations of an object or idea are created which describe, with greater insight, the original subject.

Compared to the directness of pencil on paper or knife on basswood, the keyboard and mouse arbitrate between the thought and desires of the user and the “real” subject. There exists an inherent separation between the real and the virtual. However, the computer, as a tool of representation, continues to exert an ever-increasing influence in the design studio. Its ability to quickly change parameters and generate endless alternatives allows the student to explore ideas in innovative and unforeseen ways. As Stan Allen states in his essay, “Terminal Velocities: The Computer in the Design Studio,”

> In the virtual space of the computer, it is possible to go quickly back and forth (or even to work simultaneously) on the two-dimensional projection or three-dimensional object. That object is a series of projections as well as a collection of commands. Instead of a finite number of representations constructing an object there is already an object capable of generating an infinite number of representations of itself. [Practice: Architecture, Technique, and Representation. (Australia: G+B Arts International, 2000)]

But, the computer can also be a source of questionable assertions and idealized expectations. Virtual reality does not imply a new way of being but rather a new way of seeing. Rather than focusing on the problematic claims of new “worlds” or “realities,” the computer can be seen as a sophisticated device that allows the designer to diagram, map, re-present, and render an infinite number of possibilities in a very short period of time. This in turn can allow the quick creative exploration of design principles.

Manual and digital modes of representation become less disparate once they are designated secondary to a set of design principles within a pedagogy. As students focus less on the means used to generate imagery and more on the content and composition of the graphic representation itself, they begin to develop rudimentary critical skills that help them assess their own work. Taking the discussion beyond manual versus digital to general principles of composition (scale, form, structure, dimensionality, etc.), grounds the curriculum in a viable design process within a hybrid graphic environment.

WIT History: A Fertile Environment for an Integrative Approach

Originally founded as a technical high school, Wentworth Institute of Technology today is an institution whose primary focus continues to be practice-oriented programs including computer science, design, engineering, engineering technology, and management of technology, as well as architecture. In the past, this emphasis on practice and professional competency muted more experimental or theoretical approaches to developing a more comprehensive means of teaching graphic representation. Seeking to educate competent practitioners, courses such as
construction documents betrayed a pragmatic, if not prosaic, approach to teaching drawing and modeling in the first year curriculum.

Currently at Wentworth, the simultaneous introduction of both manual and digital representation is a founding principle in the creation and implementation of a new architectural foundation curriculum. Though the architecture program at Wentworth has always had a strong dedication to “making” (how do forms and materials go together to create space?), in the past ten years the school has re-formed itself several times to become equally focused on “thinking” (why do forms and materials go together to create space?). The department created a new curriculum firmly rooted in both thinking and making that was implemented for the first time in the fall semester of 2004. Within this new program, both manual and digital representation are viewed as essential instruments for teaching fundamental principles of design.

Although manual representation had always been a part of the first year drawing course, the desire to restructure and enhance the program came from several sources. First, the school wanted to ensure that students mastered analytical thought processes that would make later computer use in the program more than just a skill. Second, the school responded to concerns from the professional community and the upper levels of the academic program that implied students were giving too much preferentiality to the computer when it came to drawing and rendering, diminishing an instinctive sense of proportion, scale, and use of the architectural language. Third, there was a need for consistency in course material for the school's 280-300 entering freshman. The numerous sections (up to 17 separate classes often taught by adjunct faculty) required a more rigorous framework for disseminating the curriculum.

At the same time, the department decided to reorient computer-related or computer-supported courses. Sensing that the conventional computer lab was becoming anachronistic, the program sought alternative ways to teach courses that relied on digital learning and new ways to integrate computer technology into traditionally non-digital courses. The result of this investigation was the “laptop initiative,” a program based on supplying every student and each instructor with an identical laptop computer as well as all the software required for coursework. The program also included course management software and extensive wireless networking to help integrate and administer this system of laptops.

Integrated First-Year Coursework

Beginning in the first weeks of the semester, first year students work back and forth between traditional skills (constructed freehand drawing) and digital imaging (painting programs and website design), focusing on the common threads between them. Such threads (structure, scale, form, etc.) convey to the student a cognitive ordering system that transcends the common tools used to generate both manual and digital images. The first semester curriculum is separated into two main components: a studio/lab where students solve drawing exercises and a lecture course where they both study the history and theory of architecture and develop individual websites. In the studio, students construct traditional architectural drawings (elevations through two-point perspectives) of machined objects as take-home assignments as well as objects and views during on-site drawing trips around the city. The drawings are freehand—but not sketched; instead, they are carefully structured and constructed using guidelines and proper line quality and lineweight. The emphasis of the work is on seeing and evaluating; the subject is understood by both breaking it down into its component parts and by observing its function as a whole.
As part of the separate, but integrally related lecture course, the students design and construct individual websites using both Photoshop and GoLive software provided on the laptops. The project is the students’ first complex design problem; they must take their many ideas about what information to include (scanned drawings, travel photographs, writing samples, personal information, etc.) and structure it to form a completed project. “Structure” in this project takes several forms. The graphic layout of each page of the site must be visually structured to not only hold essential information (images and text, as well as links and graphics), but to make it easily accessible to the viewer. Though each page has a unique identity, the individual pages must also be functionally and graphically linked to one another in a way that allows the user to navigate and understand the site as a whole. The website structure, like the drawing structure, thus is essential to mediate the relationship of the parts (the pages) to the whole (the site), in order to gain a complete picture of the subject.

In the second semester of first year, emphasis is placed on the research and analysis of specific architectural precedents considered through the lens of digital representation. The course seeks to familiarize the student with the means and methods of computational representation as they explore traditional ideas of design processes and methodologies. Weekly exercises involve the creative use and application of computational drawing and model building. Encouraging a critical understanding of how the computer is used as an instrument to both generate design and graphically represent space, the class focuses on analyzing and constructing form using 3D programs like SketchUp, VectorWorks and FormZ as well as formatting and presenting information using 2D drawing and painting programs like Photoshop and Illustrator. Ultimately, this use of 2D and 3D software helps students to develop particular methods and techniques that will extend out of the computer lab and into the design studios.

The second semester exercises emphasize the diagrammatic exploration and analysis of specific pieces of architecture. Students are encouraged to examine, investigate, and disassemble the various elements of the building in order to better understand both its conceptual meaning and architectonic expression. Here, the idea or common thread of “structure” becomes a literal interpretation as well as a conceptual one. Students examine structure, not only as a cognitive framework, but also as a type of real and material ordering system that allows buildings to stand up. As they progress through the next series of exercises, students continue to move toward a clear understanding of the tectonic relationships a building has with not only the site, but with program and circulation as well. As they move from manual representation in the first semester to digital representation in the second semester, their shifting notions of structure provide a rudimentary framework for critical thinking. In other words, the various definitions and interpretations of this common thread provide a critical approach to both the making of and thinking about architecture.
Results of the Program/Conclusion
The first semester of the integrated program within the new curriculum was a period of directional nudges, modified steps, and trial-and-error methodology. On the other hand, much was learned that allowed for a more sophisticated exploration of design principles in the second semester and will allow an even greater integration of manual and digital formats next year. First, a late-semester deadline for the website to be available on-line was a missed opportunity for the students to improve their drawing skills. Because scanned pencil drawings reveal much about the quality of lineweight, posting the drawings on-line sooner may have elicited constructive feedback that would have improved the students’ ongoing work. Also, because students tend to focus more attention on work that is going to be displayed (i.e. presentation drawings), especially work to be displayed for a potentially large audience, an earlier website launch may have encouraged students to give it their full concentration. Finally, the sheer numbers in the class (which truly justifies the use of the web to share work) also presents a challenge to deliver detailed instruction in a lecture format. Websites and course management software can be more fully integrated to allow both the instructors to better help the students and the students to better help each other.

Though both the fall and the spring semester of the new curriculum presented challenges, in many ways, the success of the new program is already becoming evident. The fundamentals of the architectural drawing language that the profession uses to communicate (structure, proportion, lineweight, etc.) have not only been learned, but were used as tools in the building analysis exercises which made up much of the second semester curriculum. By first semester’s end, the entire freshman class had operating websites. These sites grew and developed in the second semester of the program and will continue to do so throughout the students’ time at Wentworth. Most importantly, students are using the fundamental design principles (scale, form, structure, dimensionality, etc.) that were taught in one medium as tools to engage design problems in another. A manual and digital foundation of knowledge and analytical skills has been set within the first year program that can be further broadened as the students proceed into the second year design studio and beyond.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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Beginner's Praxis Workshop
A Social Constructivist Approach to Learning through Scaffolding

DWAYNE BOHUSLAV
San Antonio College

Praxis Gk. prattein = act and designates the actual execution of an activity (contrary to theory). Put another way, it is putting theoretical knowledge into practice.

Scaffolding as educational theory refers to Russian Developmental Psychologist Lev Vygotsky’s Zone of Proximal Development (ZPD) = The intellectual development of a Beginner's Mind is a function of human communities, rather than individuals.

The study unit for understanding the human condition cannot be the individual person or organism alone or its behavior or experience, but should be a complex including the individual and the social and the biological and the cultural; and this complex needs to be seen in its historical nature. The Beginner's Praxis Workshop directed freshmen students through scaffolding figuratively and literally, navigating both educational theory framing the student within the social, extended community outside of the classroom, and putting that theoretical knowledge into praxis by construction of a temporary, lightweight installation within and the physical scaffolding ringing the Downtown University of Texas at San Antonio Campus where the Conference was held.

Fig. 1. Territorial Fragmentation Installation Group Photograph

Lev Vygotsky:

There is a growing interest in what has come to be known as ‘sociocultural theory’ and its near relative ‘activity theory’. Both traditions are historically linked to the work of Lev Vygotsky (1896-1934) and both attempt to theorize and provide an account of learning and development as a mediated process. They both acknowledge that in the course of their development human beings actively shape the very forces that are shaping them.

One aim of this paper, then, is to explore the implications of scaffolding theory that is developing under the influence of the writing of Lev Vygotsky. His work has been translated and retranslated from the original Russian, and these developments in social theory are creating new and important possibilities for practices of teaching and learning in schools and beyond. They
provide us with theoretical constructs, insights and understandings which we can use to develop our own thinking about the practices of education for the beginning design student.

Many of the ideas which inform scaffolding theory were originally forged at a time of rapid and intense social upheaval – the Russian Revolution. They were developed by Vygotsky, who was charged with developing a state system for the education of ‘pedagogically neglected’ learners (Daniels, 2001). Vygotsky argued that the culture of education as it had existed was itself in need of profound transformation and that this was possible in the new social circumstances that obtained in Russia. He embarked on the creation of psychological theories which he and others used as tools for the development of new pedagogies for all learners. This creative fusion and the development of many perspectives and persuasions were cast adrift in the tragedy that befell the Soviet Union under Stalin. It was selectively molded, transformed and suppressed for many years. His texts have become known in the West only since the 1970s.

**Scaffolding as Educational Theory:**

According to Stone (1998), the term ‘scaffolding’ was originally used as an instructional metaphor in a largely pragmatic and a theoretical manner. Wood (1976) defined ‘scaffolding’ as a form of adult assistance that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. He envisioned a process whereby the instructor controlled those elements of the task that were initially beyond the learner’s capacity, thus allowing the learner to complete those that were within existing capabilities. The overall emphasis here was on the creation of a pedagogic context in which the combined effort resulted in a successful outcome.

But how does the ‘scaffolding’ approach work? According to Daniels (2001), through shielding a student from distraction; by fore fronting crucial features of a problem; by sequencing the steps to understanding; by promoting negotiation; or by some other form of ‘scaffolding’ the task at hand. How does the teacher know what the student needs? Here, intersubjectivity enters. Most important, culture gets internalized by the mediation of others. The very transmission of culture depends upon (a) some principled concordance between a student’s capabilities and what the culture has to offer; (b) some person in the culture, a teacher, who can sense what a student needs and delivers it, and (c) some shared agreement about how such an intersubjective arrangement is supposed to work canonically in this particular culture.

Within the scaffolding concept envisaged by Wood, five levels of increasing control are suggested. These prompts range from minimum control – the teacher prompts the student with a general question, such as ‘What might be done here?’ – to highly controlled situations, in which the teacher actually demonstrates the steps needed to fulfill the requirements of the task:

- **Level 0:** no assistance
- **Level 1:** a general verbal prompt (‘What might you do here?’);
- **Level 2:** specific verbal (‘You might use your computer tools here’);
- **Level 3:** indicates materials (‘Why not use a graph plotter?’);
- **Level 4:** prepares materials (selects and sets up tool);
- **Level 5:** demonstrates use.

Every time the student makes a correct move or action, Wood’s principle of contingency suggests the teacher reduces the level of control. If the student makes a mistake the level of control is raised. The level of scaffolding support is thus contingent on the student’s progress within the interaction between the teacher and the student. The teacher’s task is to seek to ensure progress while at the same time reducing the level of control. Ideally the learner actually decreases the level of dependence upon the support structure as the learning sequences progresses. Scaffolding instruction results in faster and better maintenance of learning.
Stone (1998) identifies four key features of the use of scaffolding that also typify reciprocal teaching. These are useful in that they at minimum place some sort of boundary around the use of the term. They are:

1. The recruitment by a teacher of a student’s involvement in a meaningful and culturally desirable activity beyond the student’s current understanding or control.
2. The titration of the assistance provided utilizing a process of ‘online diagnosis’ of the learner’s understanding and skill level and estimation of the amount of support required.
3. The support is not a uniform prescription – it may vary in mode as well as amount.
4. The support provided is gradually withdrawn as control over the task is transferred to the student.

Scaffolding for the Beginning Design Student

Scaffolding strategies have been explored in three specific educational contexts: design and technology, mathematics and science. The skills required for sensitive pedagogic assistance and the understanding of scientific concepts which constitute the knowledge domain become necessary features of effective teaching and learning which makes claims to a Vygotskian root.

To imagine that socially constructed knowledge in areas like science, technology or mathematics is everyday knowledge is to misunderstand the purpose of schooling, which is the student’s initiation into the grappling with the theoretical objects of these domains. (Bliss, 1996, p. 60)

The teaching of architectural design to the beginning design student unquestionably conveys ‘socially constructed knowledge.’ Scaffolding’s literal definition engages directly the platform for the processes of construction, repair or demolition of a structure within society. The ‘scaffolding’ interpretation for the beginning design student is one in which a distinction is made between support for the initial performance of tasks and subsequent performance without assistance; ‘the distance between problem-solving abilities exhibited by a learner working alone and that learner’s problem-solving abilities when assisted by or collaborating with more-experienced people’ (Lave and Wenger, 1991).

The term scaffolding could be taken to infer a ‘one-way’ process wherein the ‘scaffolder’ constructs the scaffold alone and presents it for use by the design student. Rather than through the donation of a scaffold as some kind of prefabricated climbing frame, scaffolding is created through negotiation between the instructor and the beginning design student. The key question here seems to be with respect to where the ‘hints’, ‘supports’, or ‘scaffold’ come from. Are they produced by the instructor or are they negotiated? Vygotsky is unclear on the matter.

Vygotsky never specified the forms of social assistance to learners…He wrote about collaboration and direction, and about assisting students ‘through demonstration, leading questions, and by introducing the initial elements of a task’s solution’…but did not specify beyond these general prescriptions. (Moll, 1990, p. 11)

What Vygotsky was suggesting, however, was a process of social formation in the development of educational ideas. His belief was that disintegrated individuals can achieve unity only as the dominant energies of community life are incorporated to form their mind. He saw teaching and learning as conditional and contingent. For Vygotsky teaching and learning were collaborative activities in which there were no uniform methods, only a process of scaffolding that could arise from and be shaped by particular social circumstances.
Beginner’s *Praxis* Workshop:

The city is a deep structure. It is complex. This is the rub. This fact leaves the architect with the intractable problem of how to produce working procedures that can model, more effectively and appropriately, the complex and transforming nature of the contemporary city.

(Rhowbotham, Kevin Field Event/Field Space, p. 23)

In order to engage the field (the community), a ‘working procedure’ was introduced to Design 2 students integrating the ‘iteration’ with what Langer and Applebee (1986) identified as Vygotsky’s five key factors considered to be effective scaffolding. The iteration as defined by Rhowbotham is a self-similar but non-identical repetition betraying a drift in form which bears a certain similarity to its origin but which, nevertheless, avoids identity. Iteration is a transformation, under conscious control, moving out from familiar formal territory to the unfamiliar ground of dissimilar invention by means of a series of linked steps. The iteration is non-identical repetition: a kind of slow transformation in small jumps. It has a striking resemblance to scaffolding theory.

**Iteration.01 ownership** (of the activity to be learned):

Referencing Rhowbotham, a series of five characteristics were isolated as vehicles for this FIELD SPACE study: point, line, grid, territory and net. Each was set into a matrix format and, by utilizing the notion of iteration, a number of transformations were made by cross-referencing each characteristic within the matrix; hence point to point, point to line, point to grid, etc…were compared across the matrix. Each vertical row in the matrix was to be considered an additional transformation stage and take into account the proceeding stage, hence Transformation 1-10. The field was considered at its greatest density when it was empty in comparison to the object or figure…as the presence of the object/figure increased through iterations, the field density decreased. Transformation processes included: visual weight/spacing/direction; enlargement/magnification; positive/negative reversal; line type and grey scale. Each student was expected to produce a matrix of carefully considered and drawn iterations that evolved from general, group discussion of terms to a personal graphic vocabulary.

![Fig. 2. Iteration.01](image1)

![Fig. 3. Iteration.02/.03](image2)
**Iteration.02 appropriateness** (to the student’s current knowledge):

Iteration .01 perceived the five characteristics as pictorial figure, opposing the flat background of the drawing. A second way, which conceives the flat field as an expansive void in which the fragments are scattered, was the world the students were next asked to explore in ASSUMED PROJECTION OF SOLIDS INTO THREE-DIMENSIONAL FIELD SPACE. When one perceives the drawing as flat, objects insinuate a measured, relational space; as if they are seen from above as in plan view or from the sides as in elevation. The relational field maintains only nominal value. When the drawing is conceived to extend beyond the clustered fragments, the relational field acquires a dynamism which forces the fragments to oscillate perceptually, giving a palpable experience of a specialized field. The students were asked to select one vertical and one corresponding horizontal sequence from their Iteration.01 matrix. The sequence was to be enlarged by 50% and explored in plan oblique both as plan and elevation.

**Iteration.03 structure** (embracing a “natural” sequence of thought and action):

PROJECTION OF SOLIDS INTO MATERIAL GESTALT SPACE introduced the student to gestalt – the predominant compositional paradigm of twentieth century Modernism that depends on the association of abstract objects or figures displaced against or contrasted with a neutral, non-figured, empty background. Object is defined as a form, or collection of forms, which sustains identifiable figuration in contrast to an undifferentiated, formless background. Seeing architecture as having been primarily a game of objects, their relational ground, the field, is conventionally discounted as the un-theorized category space. And space, per se, remains effectively an indistinct, residual quality, without material substance or form. Students next explored interpretations/readings of their Iteration.02 axonometric drawings structured into material form. They were specifically directed to explore the deeply intertwined natures of the objects to their respective fields concentrating their explorations on the complex binding of these two together in ways that reverses the conventional preference of the object as the primary figure.

**Iteration.04 collaboration** (between teacher and student):

A strategy emerged in Iteration.03: that the possible extension of the relational field and the masses of the fragmented objects within it, their various juxtapositions etc., remain ultimately indeterminate. Each student was asked to “fix” one of these potential readings of GESTALT SPACE in order to realize this potential for one space in time. In TERRITORIAL FRAGMENTATION INSTALLATION Iteration.04, the students were finally asked to explore the body and full-scaled immersive construction. Each student was asked individually to carefully select one sequence in their Iteration.03 and enlarge it to 5"w x 7"d x 10"h plan/section/elevation understanding it to be scaled at 1"=1'-0" (the size of one scaffolding bay). They were each asked to insert their body (a Xerox sufficed as a surrogate) into the drawing and they began speculation on the “construction” of their drawing in relation to this scaling device.

Simultaneously, they were asked, as a group, to visit and investigate the assigned scaffold sites located around the Buena Vista Building on the downtown campus of the University of Texas at San Antonio; to draw them in plan/section/elevation at 1"=1'-0" scale; and then to construct a 1"=1'-0" scale model of the scaffold/building/wall/walkways. As this group work proceeded, students were asked to explore path/space/adjacency criteria in each of their individual drawings and determine specific placement of the sequence in relation to both the 14 bays of scaffolding and the adjacent classmate’s proximity. In such a way, they began to understand how the TERRITORIAL FRAGMENTATION is capable of engendering readings of FIELD EVENT/FIELD SPACE.
Iteration.05 **internalization** (via a gradual withdrawal of the scaffolding and transfer of control):

Finally, for FIELD EVENT/FIELD SPACE the 1” scaled models were translated into full-scale construction in the instructor’s warehouse and then transported for final installation during the second day of the Beginner’s Design Conference. Materials were 2” x 2” wood frame, cardboard and fasteners as required, with additional materials to be used if substantiated by the student and approved by the instructor. All installation work had to be sensitively designed, constructed and installed in such a manner that the existing site, building and vegetation were not harmed or disturbed in any way. Upon completion of the installation, the site was returned to its original state as if the installation had never occurred.
Conclusion:

It is worth noting especially that Vygotsky did not recognize the presence of some separate reality containing only the teacher and student. He singled out and studied the dynamic social surroundings that connect the teacher and the student (that is, the other adults and community with whom a given student actually studies, lives and interacts). According to Davydov (1995, p. 17), the teacher’s work is particularly complex because, in the first place, the teacher must be well oriented to the regularities of the student’s personal activity, that is, know the student’s psychology; in the second place the teacher must know about the particular social dynamics of the student’s social setting; and in the third place, the teacher must know about the possibilities of his or her own pedagogical activity to use these sensibly and thus raise to a new level the activity, consciousness, and personality of his or her charges. This is why the work of a genuine teacher can never be stereotyped or routine; the teacher’s work always carries a profoundly creative character.

If it is true, as Lev Vygotsky theorized, that "learning is a constructivist activity", then this includes all the functions and activities that a beginning design student can perform only with the assistance of this scaffolding process. Knowledge within the discipline of architecture is important, but solving problems that encourage the beginning design student to go beyond their current individual skill and knowledge level into their social communities furthers development of higher functions beyond the discipline. By implication, new knowledge can be built.

BIBLIOGRAPHY:

A Beginner’s Mind

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Stephen Temple, editor

Conference held at the
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Gumption and the Beginning Designer

STOEL BURROWES
W KEVIN WYLLIE

Virginia Commonwealth University

I didn’t expect that...
I don’t know how to continue...
I have too much time…I’m board...
I can’t take the cover off, the screw is stripped...
I have to go to the store again...
I am running out of time...
I am too comfortable to move...
I’ve lost all my GUMPTION! I’m thinking of not going on...

We have a thousand and more rational reasons to lose some or all of our gumption. The word gumption, and why we are comparing how this obscure word can relate to the process of making a designer was inspired by Robert Pirsig’s book “Zen and The Art of Motorcycle Maintenance”, and his classic discussion of values.

In a recent re-reading of this book we were struck again by the applicability to the design process and the author’s essay on the word “gumption.” We have all come across the word gumption from time to time, but we may not have really ever understood what the word is trying to be. Pirsig relates to this in the following passage:

I like the word “gumption” because it’s so homely and so forlorn and so out of style it looks as if it needs a friend and isn’t likely to reject anyone who comes along. It’s an old Scottish word, once used a lot by pioneers, but which, like “kin” seems to have all but dropped out of use. I like it because it describes exactly what happens to someone who connects with Quality. He gets filled with gumption. The Greeks called it enthousiasmos, the root of “enthusiasm” which means literally “filled with theos,” or God, or Quality. See how that fits?

A classic example of Gumption in our history would be a quote from a speech given by President John Kennedy on September 12, 1962 at Rice University: “We choose to go to the moon! We choose to go to the moon in this decade and do other things – not because they are easy, but because they are hard.”

Gumption can be a powerful motivator and help bring a nation and mankind together.

The history behind this Gumption statement is also an example and how this positive motivation added momentum that provided us with enough energy to overcome the Gumption traps of expectation, myth, weight, fuel, trajectories, consumables and other daunting obstacles that sometimes hindered that design.

Pirsig’s main subject matter of gumption analysis in his story is motorcycle maintenance. As professors of design, we are enthused by the parallel between understanding a machine and understanding the design education process. By following Pirsig’s examples of ‘gumption traps’ in motorcycle maintenance we have attempted to extrapolate ‘traps’ awaiting both the beginning and the experienced designer.

Courage, enthusiasm, faith, confidence, chutzpah, boldness, common sense, ambition, and knowledge…all these words express an attitude designers need to carry out their work. All these words express something we need in balance to keep going even when the way seems
steep or difficult. Gumption for many holds the meaning of all these words with humility and grace. Gumption is a thing we have a lot or a little of. We can lose gumption like a plug pulled out of a drain or we can learn to replace the plug, stop the loss and refill the container. We can teach ourselves as well as our students to recognize a gumption trap from the past, present or future. We can assess the development of a student’s gumption not just by their ability to finish a project but also by their finishing well...or as Pirsig would say...with quality.

Each gumption trap encountered does not have to be an end, but if understood properly, each gumption trap can introduce the designer to a new and perhaps better solution. Design is a small % concept and a large % quality execution. We learn to get around and gain form the natural gumption traps that await us in both concept and execution.

There are many gumption traps we can discuss. However, we are only going to introduce a short list that Robert Pirsig mentions and try to relate them to the world of design. Pirsig describes two basic categories of Gumption traps 1) “External Traps” or “Set Backs” and 2) “Internal Traps” or “Hang ups”.

An example of a “Set Back” Gumption trap would be when one of our colleagues spent several hundreds of dollars of billable time designing a very expensive reception desk only to find out that it was too big to fit into the freight elevator. This colleague went up that elevator dozens of times! How could a designer not figure the size of the opening into the design program! The solution entailed carefully dismantling the reception desk on site in order to relocate it in pieces into the elevator later to be rebuilt again. The cost of this was only time and a little embarrassment. This trap experience has nothing really to do with the quality of the design, nor the quality of the fabrication. It had to do with the relationship of future experience verses present predictability through past experiences. Getting over the set back traps is an example using the past trap to help predict the future, but in order to take advantage of that knowledge, one has to experience failure to a reasonable degree.

External Gumption Traps may include the following:

External Trap # 1 “The out of sequence reassembly trap”

The “Out of Sequence Trap” is to often a problem for a beginner. The out of sequence that we see most often is the charming design solution that comes about quickly before considering the programmatic, who, or how the object or environment would be used. An example would be a furniture design student who might design a 21st century mailbox basing the entire program design on what they presently need in a mailbox and never considering that a future mailbox could temporarily store things such as food, or even be used for the recycling of junk mail. Another example would be the understanding of the use of a template or jig in the fabrication process, which would actually help eliminate some sequences of the production of an object. Careful observation and study of design process, natural processes and self-awareness mitigates any encounter with “out of sequence setbacks”.

External Trap # 2 “The intermittent failure setback”

We are always teaching the awareness of the unintended consequence or unanticipated use. For example, the considerations of Universal Design are anticipation a variety of uses. If a design is well along in its development only to discover an unconsidered problem, the design is set back. Whether demanded by code, ethics, universality, project statement or client the redesign can severely impact the gumption of the designer. This example would be when a student spent several weeks designing a reception desk with a wonderfully poetic use of materials and form just to have a visiting critic during a design development jury say; “By the way, where would a person in a wheelchair sign in?” Now the student has to rethink the entire object and program while maintaining the poetics of the form.
External Trap # 3 “Insufficient Parts Trap”

Making a list and checking it twice is usually not enough. We address the tool and parts issues by challenging our students to make a piece of furniture. Our students are learning to be interior designers. Materials, construction documents, light and color take on a different demand when the students are challenged to complete their own design to a functioning object. The manageable, individual size of a furniture project with an emphasis on quality and completeness brings forward many gumption traps. Most of the time, students don’t have any idea what parts they need to make the furniture until they need it. Because of this, our students are encouraged to build full size mock-ups of their pieces to encounter this trap before it’s too late. Such a project also coincides with the Sequence Trap mention in external trap # 1.

If that material is the last at hand before an important deadline, your chances of mistakes are increased. Once again, you have to learn to not let that be the last piece at hand. If it is the last, then the student has to respect it as an athlete does with only one last chance to win. At this point, the student should stop, take a deep breath and be mindful of their focus at the moment. If they are ready, then cut. If you’re not ready, then don’t cut. This is only a process of knowing yourself. Students who are athletes seem to know this tension and tend to use it to their advantage more than others.

Internal Gumption Traps may include the following:

Internal Trap # 1 “Value Traps (rigidity, ego, anxiety and boredom)”

These are traps that throw you off the quality track by conditions that are primarily within yourself. These traps are especially predictable with beginning design students and our projects have been designed to force the students to engage in these traps. For our program’s furniture design class we assign the students to design a useful object for their living environment that they will be able to use in 25 years. This project injects Ego directly into their bloodstream on purpose. Robert Pirsig best describes the predicted pattern of the student behavior as follows. “If you have a high evaluation of yourself then your ability to recognize new facts is weakened. Your ego isolates you from the quality reality. When the facts show that you’ve goofed, you’re not as likely to admit it. When false information makes you look good, you’re likely to believe it.”

In a specific case of another student project, the student thought that just because the design of this multi-functional object looked simple, then therefore it should be simple to create. It was only after the student found out through experience that simply butting the corners together with some glue and nails wasn’t going to resist any lateral load applied to it. That was when the Anxiety Trap replaced the Ego Trap. Pirsig states:

“Anxiety is sort of the opposite of ego. You’re so, so sure you’ll everything wrong you’re afraid to do anything at all. Often this, rather than “laziness”, is the real reason you find it hard to get started. This gumption trap of anxiety, which results from over-motivation, can lead to all kinds errors of excessive fussiness. You fix things that don’t need fixing, and chase after imaginary ailments. You jump to wild conclusions and build all kinds of errors into the machine because of your own nervousness. These errors, when made, tend to confirm your original underestimation of yourself. This leads to more underestimation, in a self-stroking cycle.”

Virginia S Lee unknowingly relates to the Ego Trap in her article titled Unlearning: A Critical Element in the learning process,(Teaching Excellence, Vol 14, No 2, 2002-2003). Ms. Lee states; “Prior knowledge is arguably the single most important factor in learning. Unless we as instructors engage prior knowledge – the good, the bad and the ugly, we risk sabotaging the new learning we work so hard to put in place. Don’t we marvel at the misunderstandings students embrace with conviction despite ample classroom instruction and readings to the contrary (e.g., Harvard University’s Private Universe project)? And any tennis player who has attempted to
retool her backhand or golf player his golf swing will attest to the recalcitrance of prior learning. Before the new and far more devastating backhand can emerge, the older, less effective one must wither and die. Paradoxically, unlearning allows new learning to take hold."

Design students tend to get swell headed. We are, after all, designing the best thinkers and doers around. But, as an old school craftsman might say; “On scaffold work never step back to admire your work.” We work up high but we need to stay humble. A slight loss of momentum can seem overwhelming if we are full of our own ego. Beginning designers must learn to see the positive aspects of any setback and that is why we encourage as many development critiques as possible. Forcing this attention to the student’s Gumption ego makes us pay attention to their individual balance between ego and anxiety. This also helps us build up their confidence if they suddenly need to defend their pattern of thought. Sometimes we do not recognize their own poetry until they have to defend it.

Another internal gumption trap is boredom. Pursig says simply, “When you’re bored, stop.” We won’t do good work. What we do we will probably have to redo. Change routine; take a moment or a lifetime. If a student thinks design is boring, then ask them why they are here? Ask them to separate purpose from fashion.

On the other hand, Rainer Maria Rilke (the German poet) expressed the value of boredom as the feeling that hides the unconscious. When we are bored we should stay at the desk/work table. Find out why we are bored. Let the boredom be the wall behind which may be our most creative solution. Walter Benjiman (in “Illuminations”) says (I paraphrase) “Boredom is the nest egg of the imagination.”

Internal Trap # 2 “Truth Traps (mu)”
In motorcycle maintenance truth is often the machine not running. In design truth is often less obvious, more like a machine running better or worse. Truth is in the quality and integrity of the design and its outcome. Usually a design is influenced by an abundance of information. Evaluating information for truth is a part of a design process that is too often misplaced (out of sequence) and/or short changed. “Mu” is the Japanese word for the state of “not on – not off.” In a non-dualistic pattern of thought we can accept and even depend on the generative quality of “mu”.

Internal Trap #3 “Value Traps:
The inability to see the importance or value of a small part can drain away our desire to find a solution. The small, unseen fastener holding the cover plate onto the motor part that needs our work will not yield until we are able to recognize its (the small fastener’s) value. Similarly, our sketchbooks may have one or fifty beautifully drawn concepts. The mistaken mark at the edge of the one sketch may be the leading mark to our most fruitful solution. Are the beautiful drawings more valuable than the mistaken mark? If we assume we know the value of all we see then we are trapped by those values. The relative value of all aspects of our design will impact both concept and execution.

At Virginia Commonwealth University, “The Design through Nature” project is the first assignment given to the sophomore beginning design students. This project confronts numerous gumption traps. Students choose two natural objects, “The Fruits and Vegetables”. At the initial project introduction values and egos are challenged. “What does this have to do with interior design?” is not an uncommon attitude. Issues of craft are emphasized through naturalistic drawing, cutting the fruits for plan, section and elevation, into abstraction and model building. Our emphasis on craft confronts the “external” gumption traps of sequence, anticipation, materials, parts and tools. At the same time the simple “truth – mu” is awaiting the sophomore’s efforts at abstraction. The simple truth and attention to detail are brought into a final set of models.
incorporating space, function and circulation. Students are challenged to balance creativity, craft, form and function.

Though a project is set out to confront hazards, we do not lecture on “Gumption Traps” as an idea that the students should keep in mind. Facing more than one problem at once, students are forced to find traps through experience. Our job in small groups or one on one is to help students see avoidance of and/or alliance with gumption traps as their job.

Gumption is a willingness to fail. Even though we might fail over and over again, Gumption will be our fuel to continue a task no matter how daunting. Gumption traps, on the other hand are the energy sinkholes that can take away, a lot or a little, a designer’s willingness to proceed.

As inviting and romantic as this rationalization of Gumption and Gumption Traps can be, a student of design needs to be conditioned with appropriate challenges that will introduce them to these traps in a controlled environment so that they can experience critical feedback as to the direction each took when presented with each un-forecasted trap. The process of design involves more than just images on paper. The reality of design must be applied into actual physical context to understand the full breath of all of the realities that must be solved for each particular problem. Also, one must learn to discard all preconceived images or solutions to a design problem. Every living being on the planet faces design problems everyday, and as designers we face them for a living. One of the single most defining characteristics of quality design is how we deal with the ever-present un-forecast snafus in design executions. If we can teach beginning designer’s to recognize, avoid and even use these Gumption Traps of the design process, then we can help them develop Gumption.
A Beginner’s Mind

PROCEEDINGS
21st National Conference on the Beginning Design Student

Stephen Temple, editor

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Making is Thinking: 
Emphasizing Inquiry Through Technique in the Beginning Design Studio

MARK CABRINHA  
Rensselaer Polytechnic Institute  
KEITH WILEY  
California Polytechnic State University, San Luis Obispo

“A composition is nothing other than an exact law-abiding organization of the vital forces which, in the form of tensions, are shut up within the elements.”  
Wassily Kandinsky

A student's first design studio can be particularly challenging as the creative learning that takes place in the studio is frequently at odds with the less explorative format of more traditional education. However, the freedom to explore is also frequently met with confusion, as students at this early stage are not yet accustomed to solving problems without a set methodology to follow and therefore certain methods are necessary to excite the act of making. This paper describes a focused series of exercises that build on the skills learned in the first year, but transitions from skills to intention by employing the idea of technique as inquiry through applied skill. A series of daily and frequently intense assignments were given in which the students were required to apply a method of inquiry through specific operations to a series of original artifacts, first in the form of drawings and then ultimately leading to three dimensions. Inquiry was presented not as a function of thinking then doing, but thinking through doing. In this way, technique and inquiry are not mutually exclusive, but correlated.

In the context of this design studio, we presented skill as the methods used to represent ideas, such as sketching, drafting, and model making. Technique is applied skill with purpose - in this way, technique doesn't answer, "what I am trying to do?" but begs the question "what/why/how are you doing this?" Our assertion in the design of the projects for this studio is that skill could be taught through technique, and that by giving projects where the students could understand what influence a particular technique could have on the forms being created, they would be more engaged in the understanding of technique, as applied skill, as a vehicle for exploration, and not just a means in and of itself.

The emphasis of process has clear roots in the early modern movement, and yet continues to be prevalent today. As is well known, Wassily Kandinsky, in his basic course for the Bauhaus, sought to develop a student's critical eye through the application of techniques of drawing and

Fig. 1. Operation One: Inkblot Section

Fig. 2. Operation Four: Speculative Composite
making while also emphasizing the utmost in craft and precision.\textsuperscript{1} For Kandinsky, the techniques of drawing, known as analytical drawing, were not simply a skill to be employed in the workshop such as mechanical or projective drawing, but a training of simultaneously thinking and making. “The teaching of drawing at the Bauhaus is an education in looking, precise observation, and the precise representation not of an external appearance of an object, but of constructive elements, the laws that govern the forces (=tensions) that can be discovered in given objects, and of their logical construction.”\textsuperscript{2} Developing an inquisitive attitude in the student is contingent upon developing a critical eye, yet the critical eye cannot simply be learned intellectually, but is learned through the act of drawing. However, the role of the motif still plays heavily in Kandinsky’s thinking: “Generally speaking, the analytical drawings are geometrical simplifications and abstractions of the motif, and as such they have their roots in both certain nineteenth-century academic drawing techniques and in some innovations of the early modern movement.”\textsuperscript{3} This abstraction of the motif is a means of exacting the “essence” from the subject which is most clearly seen in the well known diagram of the leap of the dancer Palucca in Kandinsky’s \textit{Point and Line to Plane}. It is for this reason that analytical drawing has been coined an “ideal” drawing. Yet, a critique of this ideal drawing is appropriate when it is employed in the design studio as a creative activity, as is exemplified by the fact that Kandinsky attempted to apply these techniques to his own paintings, but only after the painting was complete.\textsuperscript{4}

The introduction of Kandinsky’s Basic Course at the Bauhaus is presented here to suggest one fundamental difference: the difference between the analytical and the generative. It is interesting to note that the still-lifes were frequently composed by the instructor, not the students. Whereas the motif still played heavily in the composed still-lifes that Kandinsky’s Analytical Drawing drew from, it was a means of understanding and expressing the “form of tensions shut up within the elements” but was not necessarily an act of composing itself. In this way, one can draw a distinction between the analytical/visual description of \textit{composition}, versus the generative/media based development of \textit{composing}. It must be emphasized that both understanding composition and composing, both the analytic and the generative, develop through techniques of making. Following from Kandinsky, is it possible to carry through the concepts of forces, tensions, and contrasts expressed through geometrical composition without reference to an idealized motif?

As in the introduction to the studio and the sequence, each of the thirty-six students was required to come on the second day of class with ten completed “inkblot artifacts,” in which paint was applied to paper without the surface being directly contacted by the student. Inspired by Kandinsky’s description of the point, in \textit{Point and Line to Plane}, the inkblot was used as a fluid medium devoid of any representation. Rather, the inkblot reveals the dynamic play of fluid medium and static paper plane: “The point digs itself into the plane and asserts itself for all time. Thus it presents the briefest, constant innermost assertion: short, fixed, and quickly created.”\textsuperscript{5}

While a playful attitude in creating the inkblots was expected, the process of making the inkblot was not to be overlooked. There were three variables the students had at their disposal: the viscosity of the black tempera paint, the height and force of which the paint was poured/dropped/flung, and any tool/vessel which would distribute the paint. As these were to be a series, a methodical process and observation was emphasized. The first few drawings were to be considered experimental: they were to observe the results of how the media reacted to differing techniques, such as how droplets of paint looked when poured from one foot above the paper, and how this differed from pouring the paint from five feet. Using this knowledge, they could begin to assert a rudimentary control over the remainder of the drawings based on their observations. Students compared notes on viscosity as it quickly became apparent that paint right out of the bottle was ineffective, and surprisingly, generating a compelling inkblot was not related to the slight of hand, but required technique. For example, they were encouraged to experiment with different methods of delivering the paint to the page: pouring, dripping, flicking, and spraying,
using their fingers, brushes, stick, straws or whatever they could think of. Additionally, they were asked to visualize their motion before actually doing it, perhaps inspiring a kind of inkblot choreography. Although quick, messy, and fun, the first step introduced a spirit of play with a (somewhat) critical method.

On the second day of studio, each of the 36 students hung their 10 inkblots, covering the walls with a field of work. Unrehearsed by us, these apparently mundane artifacts were a tremendous source for discussion, which revolved around three themes: the names of the inkblots, why certain inkblots were more appealing than others, and a taxonomy of inkblots into sets of certain compositional strategies. While the requirement to name their inkblots encouraged a critical look at their inkblot, it also offered a ready means for the student to discuss their work. While there were certainly a fair share of “untitled” works, names were generated on certain groupings: after a figure of what the inkblot looked like, an emotion which the inkblot evoked, or simply the process by which it was made. To be sure, these groupings of names, including the conscious use of “untitled”, are all exemplified in art history from representational, to minimalist to conceptual art, and this was discussed as well. Of the 360 inkblots on view, students were asked to identify which was their favorite by placing a small post-it note on the inkblot. There were clear champions, and students were asked to articulate what qualities were appealing to them, introducing the importance of a vocabulary by which to discuss their work. Immediately it was obvious there was no “right” answer, but through certain results, intended or not, certain works were more compelling than others, and we all took our turn in articulating what we saw in these random events. This lead to discussing visual concepts and vocabularies including order, harmony, balance, unity and contrast as well as density (clustered/expanded), boundary (contained/bleed), and tension (static/dynamic).

One of the important aspects of this class discussion was that it set the tone for a concept we would continually emphasize throughout the term: that one of the benefits of a rigorous process is that it produces not a singular solution, but a body of ideas that can be analyzed individually, or more importantly, as a group of possible solutions, the investigation of which can uncover tendencies and relationships that can be further explored. The inkblot would become the very medium for future development, generative as much as analytic. A series of techniques, we coined “operations”, were presented as different ways of looking at the inkblot, extracting the “vital forces” “dug” into the plane. In contrast to the messy fluidity of the original inkblots, the operations were to be exacted with the utmost precision through ink and mylar drawings.

The first operation was intentionally prescriptive to get the students started on an equal footing. To avoid the obvious mimesis of the inkblot, a sectional grid or field was developed from two distinct areas of interest in the inkblot, one vertical or cross section, the other horizontal, or longitudinal section. Sectional thickness was to be counted as 3 contour lines parallel to cutting plane moving toward the center of the page. In contrast to the precisely drawn section lines, the thickness of the section was to be poched on the back of the mylar with charcoal, contrasting the precise with the messy. Then as now, this was easier diagrammed on the chalkboard than in words. The mylar size of 12”x18” was intentionally larger than the 11”x14” size of the paper, to introduce the idea of composition on the sheet and encourage the understanding of the role of the margin. As process was a major emphasis of the studio, students were encouraged to work in the margins as a kind of palimpsest, marking the origin of their work. It should also be noted, that the prescriptive technique allowed the student to also focus on the craft of drawing with ink on mylar for the first time. As would be the case with each of the four operations, on the next studio meeting, each drawing was hung precisely on the wall using a string as measure of level. Without exaggeration, every single drawing was exquisite, and the students could verify for themselves generating a very productive and enthusiastic atmosphere in the studio. These drawings focused discussion on field condition, center of interest, and symmetrical versus asymmetrical composition as a result of where the section was cut. As a field condition, these
drawings were visually stunning, but did not contain the singularity of action, emotion, and fluidity of the original inkblot artifact.

Operation two was likewise a prescriptive operation, but now relied on the student’s craft of pen and ink drawing to carefully capture the boundary condition of the original inkblot and focus on the space between through figure/ground drawing. Although a simple step, it was also a dangerous one as was discussed: to not kill the life of the inkblot through inattentive simplification. Unlike traditional figure/ground drawings, as a result of working both sides of the media, ink on mylar with charcoal on back, the boundary stood subtly out, and character was given to the infill as a result of the charcoal. The result was that the drawings showed another layer of information besides the contrast of the forms to the surface. The bold edges of ink became hierarchically emphasized over the areas of charcoal, which became grey because of their location on the opposite sides of the sheet. Unlike the section grid operation, these drawings bore a strong resemblance to the original ink blot artifacts. We discussed the idea that some methods of analysis can reveal entirely new forms or merely emphasize the subtleties that exist within a visible condition. Both of these were shown to have the potential to be equally powerful. Furthermore, these more figural drawings were laid over the previous section grid operation. The transparency of the mylar began to imply a visual resonance between grid/field and figure/boundary suggesting a synthetic relation between drawings rather than idealizing either one.

Operation three departed from the prescriptive techniques of the previous operations requiring the student to develop a critical eye by pulling a geometric structure from the random inkblot artifact, documenting relationships of axis, datum, vector, and boundary. This operation not merely asked the students to reduce the forms in their ink blot to their essential shapes, but to examine the relationships between the forms through such criteria as tension and framing. The resulting drawing showed the visual forces and structure at work within the composition, rather than idealizing the form. It should be noted as well, that this was perhaps the most difficult of the four operations, as certain structural relationships were implied by us in introduction, but had to be discovered by the students as each inkblot was unique. Students began to see that this process of analysis could not only be applied to a singular object, but a grouping of objects with regards to their relationships in space. Many of them expressed disbelief that a drawing it took them minutes to create could yield so much information. As with the last two operations, the third operation of geometric analysis was overlaid over the previous two operations. As opposed to idealizing or favoring one drawing over the other, this introduced a concept of layering techniques which would become the focus of operation four.

Whereas the three previous operations always used the original inkblot as an underlay, the fourth operation marked a shift from analysis to generation. To explicitly remind the students that this was not about the inkblot, the students were asked to put their original inkblot artifact in a desk drawer. The goal of operation four, named speculative composite, was to create a composite of the three previous drawings, selectively bringing to the surface qualities of each of the prior operations. As each layer was brought forward into one final drawing, a technique of synthesizing and interrelating each layer was required. Students were asked to judge which combinations of elements from each layer could be effectively combined into one composition, a process of editing the disparate formal qualities of each operation into a cohesive composition. Here as before, working the front and the back of the mylar surface was critical in developing hierarchy and layering, or sense of depth, within the thinness of the mylar sheet. While each of the three previous layers needed to be present in the final operation, there did not have to be a precise registering of each of the three previous layers introducing the idea of cropping for emphasis, the relation of scales, and the registration of grid with geometry. Fragments of grids collided with curvilinear edges which responded to patterns of structure.

The composite, by utilizing all of the previous pieces, provided an excellent summation of
the process and a logical conclusion to the two-dimensional phase of this sequence. The rigor in which these assignments were executed provided insight into a design process which was non-linear, especially in that each of the drawings were exercises that did not relate to each other until the final step. Each operation was a potential avenue for ongoing exploration by themselves or in combination with other assignments. The drawings produced were not about representing an idea, or mimicking the original, but through executing a series of operations – acting upon, exerting force upon, producing effects from – were developed into a new set of works through the exploration of material and technique. The success of this synthesis appears readily in the final drawings.

It was important in presenting this process to the students that the ultimate goal was to take these steps into three-dimensional work, and not be a series of drawings for the sake of drawing. Despite the exquisite craft of the drawings, it was emphasized that these drawings were part of the process: artifacts developed from the media employed as much as being material for future development. The relief composite project was seen as a transition not only from 2-D to 3-D, but between the restricted media of the drawings into issues of tectonics and materiality of a crafted object.

To continue the focus on the final drawing and to move into three dimensions, reliefs were developed from the final drawing operation. This was a process of extrapolation and interpolation, not only adding to what was there, but filling in the gaps by critically judging the spatial implications of the lines they had drawn. The margin between the 12x18 mylar and the 11x14 window was introduced as a frame, or proscenium opening. The rigidity of the frame helped to pick the object up with multiple views, instead of simply looking down on the model placed on the desk. To further distract the student from simply building up their 2d drawing, the frame was used to suggest that their relief would have two sides, and the ability to literally look through the relief was desirable. Whereas in the previous operations three media were employed, ink, mylar, and charcoal, the reliefs were likewise restricted to three materials: basswood, chipboard, and museum board. Craft in modeling was emphasized, though there were no prescriptive techniques used, but rather, a limitation in relief thickness at 3 inches.

While the previous 2d drawing techniques could be incrementally developed as a series of layers, moving to 3d proved to be far more than an incremental step, but a giant leap. It became immediately apparent that moving from 2d to 3d was far more than a simple addition of dimension, but required a means to slowly work into three dimensions, perhaps developing more prescriptive means to introducing three dimensions.

Furthermore, as drawing operations had an inherent abstractness to them, the students had no problem regarding them as objects unto themselves and not representing something else. With the leap into models, many students began to try to make it into something: a building, a

Fig. 3. Operation Five: Relief Model  
Fig. 4. Operation Six: Mobile
landscape, or a picture. Even with the relatively shallow depth of the relief, many started to assign scale to the object, visually inserting themselves within the forms of the project. This may have not been so problematic if the ultimate goal was the representation of an architectural space, but the next phase involved the creation of a full scale object, so we found ourselves trying to steer a number of students in the class away from regarding the relief model as standing for something else but a means for exploring non-representational space.

Despite the challenges in the previous operation, each of the reliefs had spectacular moments of connection, overlap, layering, etc. Students were asked to critically evaluate their reliefs searching for potentially rich moments for further development. The culminating operation was to focus on three dimensional space and material connections. While the reliefs were confined by the frame and used model based materials, the final assignment was to engage three-dimensional space through developing a mobile made of wood, metal, and/or concrete. While the original inkblot artifacts were made through applying a force, the mobile in free space, would now be subject to forces being applied to it, coming full circle.

As opposed to the direct connection between all of the previous assignments, the design of the mobile employed no strict method of translating the forms of the previous project in the current one. The mobile, by its very nature, is a structured composition: forms are joined to an armature in a way that allows the pieces and the armature to move, and this assembly is anchored by a base. In the mobile, balance is as much functional or programmatic, as it is compositional. The work that the students produced to date was not seen as a linear process resulting in a final project, but a body of work which to use as a source of inspiration and generation.

The mobile culminated a process which began with a liquid medium, and ended in a full size tectonic exploration in wood, steel and concrete. With the final operation concluding in the wood shop, the inspiration from the Bauhaus is undeniable. However, the liquid medium employed at the onset of the studio was used to emphasize the improvisational character of media rather than focus on ideal representation nor universal essence but focus on developing technique. More prescriptive techniques were introduced while introducing precise media such as ink and mylar, leading to generative and synthetic integration techniques as their skills developed.

By posing the projects in such a way, the students were asked to discover the skills inherent in the media, tools, and methods of application appropriate to the task at hand. The liquid medium of the inkblot artifact introduced them to the sensibilities of inquiry through making that we hoped to instill in the studio. The difference between how we posed the problem and a typical skills-based project, was that the subject of the project was not an end result, but the discovery of a process gained by engaging in the performance of making. The outcome of developing inquiring through technique is clearly evident in the care of the artifacts the students created, and ultimately displayed in the show that the students curated without any coaching from the two of us. In conclusion, technique is not simply the application of skills, but an application through intention, criticality, and improvisation. Technique then is not a function of thinking then making, but of thinking through making.

NOTES
2. Clark V. Polig, *Kandinsky’s Teaching at the Bauhaus* (New York: Rizzoli), pg. 110.
3. ibid., pg. 124.
4. ibid., pg. 128.
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Constructing Passages:  
Accommodations for Diverse Learners in Architectural Education

JASSEN S. CALLENDER & STACY A. CALLENDER  
Mississippi State University

Over the past two hundred years, architectural education coalesced from its earlier amorphous form, became formalized, and, over the course of the twentieth century, diverged into three relatively autonomous branches. The Beaux Arts with its focus on compositional strategies as both instructional and architectural content typify the earliest of these formalizations. While the Bauhaus and its various imitations across America disdained the historical content of the Beaux Arts, the modern movements adopted the primacy of formal compositional clarity wholesale. In the 1960s and 1970s as the work of phenomenologists such as Husserl and Merleau-Ponty found an audience outside academic philosophy, architectural pedagogy dedicated to bodily engagement began to appear. In reaction to the diminishment of symbolic content by both the post-Beaux Arts formalists as well as the phenomenologists, a conceptual or narrative architectural pedagogy emerged in the 1970s exemplified by Tschumi’s or Hejduk’s later works.

These three approaches – formalist, phenomenological, and narrative – are still with us in the twenty-first century; they are present in varying degrees in most schools of architecture leading to many, if not most, of the ideological arguments that pass as pedagogical debate in this country. We argue among ourselves over how best to train beginning design students; formalists call for a focus on techniques, phenomenologists for sensory experience, and narrative-oriented faculty for transmission of ideas. But how profitable are these arguments? Whom do they serve? Our attempts as educators to assert a narrow conceit as a foundational pedagogy, to elevate one branch of architectural education among many to a position of prominence, fail to consider how learners shape their own education based upon personal beliefs and preferences. Considering the range of incoming students’ backgrounds and experiences, it is highly unlikely that they would approach architecture as a field in the same way. Furthermore, what do our pedagogical conceits imply about our attitudes toward our students? Do we assume that our conceits are theirs? Perhaps we conceptualize young learners as blank slates and, worse, assume the universality of students’ receptivity to the approach that best suits us.

Transitions in the Student Population

Even if a pedagogical correspondence between teachers and students could have been assumed during the early history of formalized architectural education, the make-up of universities has grown increasingly diverse over the past few decades. More women and minorities now attend college and seek to participate in professional fields. In addition, the numbers of students who speak English as a second, or even third, language have grown as the population has shifted and opportunities for international students have expanded. Furthermore, student populations now range considerably beyond these obvious characteristics: increasing numbers of students come from rural and economically disadvantaged neighborhoods questioning many long-held assumptions of the prevailing middle-class suburbanites whom commonly fill the academic ranks. Although teachers easily recognize and may attempt to address the differences in worldviews among those readily identified as diverse, it is the students with hidden diversities that present particular challenges that may go overlooked.

Sociologist Pierre Bourdieu spent much of his career exposing the unacknowledged and unspoken biases upon which we base our most loudly spoken evaluations. He coined the phrase ‘cultural capital’ to express the accumulation of privileged experience that advantaged people
value. As educators, our preferences for particular pedagogical philosophies may have the unintended consequence of rewarding students with similar cultural capital while dismissing the perspectives of those who are dissimilar.\(^1\) At eighteen or nineteen years of age, beginning design students may have developed limited means through which to comprehend architecture. Students with cultural capital in the form of a background in dance or ceramics might be more receptive to a phenomenological approach while students steeped in literature might perform best in a narrative-oriented studio. Yet, this will depend in large part on whether or not the ceramics, dance or literature is of the same (Western) type as that valued by the teacher.

Of course, changes in the student population are only half of the diversity issue. The profession itself has also changed. Not only do schools of architecture draw more diverse students, but also the practices in which these students will engage require performing a wider array of tasks, for a wider audience, using a wider range of technology. Dramatic shifts in clientele have led professionals to take larger roles in searching for design solutions for low-income and developing-world populations while simultaneously meeting the demands for higher quality designs for the middle-class. Students aware of and sympathetic to these trends may have difficulty accepting instruction that fails to address these changes in favor of narrower pedagogical presumptions. In this way, our tendency to view pedagogical approaches as either-or selections with quasi-moral consequences make it difficult for incoming students with differing perceptions to incorporate new information and ways of seeing.\(^2\) As students repeatedly encounter these disconnects between the instruction they receive and their own cultural capital, they may internalize the conflict and abandon the field entirely.

**Analysis of Architectural Pedagogical Literature**

To ultimately discover better ways to educate diverse beginning design students, we decided to review the existing literature of pedagogical approaches used in design studios and reinterpret previous studio projects as a way to demonstrate the benefits and challenges of tailoring instruction to the learners. To this end, we reviewed the past twenty years of articles from the *Journal of Architectural Education* from 1985 through 2004 inclusive. We hoped to find articles from various theoretical approaches focusing on beginning design studios that we could reexamine using learning theory and that doing so would give us insight into how instructors may connect with and accommodate diverse learners in studio courses.

In our review, we initially categorized the articles as education-specific (e.g., articles suggesting course content, explaining instructional approaches, or describing studio projects) or non-education-specific (e.g., articles discussing building or graphic technology, reviewing buildings, or general theories/approaches to practice). Despite the journal’s title, the majority of articles were not education-related. In fact the percentage of education-specific articles varied from a high of 42% to a low of 11% of the total number of articles for any given calendar year and only averaged less than one quarter over the entire twenty years. While this scant amount of resources would be troubling enough, we were particularly disturbed to find that the past five years included the lowest proportion of education articles (see Fig. 1).
We further examined the education-specific articles to distinguish between those that detailed actual instruction in studio courses from more general discussions of pedagogical theory including articles that addressed suggestions for particular course content. Of the 135 education-specific articles, only 55 articles recorded actual instruction in the studio setting and a mere five addressed design studios conducted with first-year students. Although we did not expect to find an extensive literature on this limited topic, we were astonished to find such a dearth of records across a twenty-year span. However, one comforting trend was noted in that articles describing actual studio instruction were increasing out of the few education-related articles printed. We hope this trend is driven by a positive intention to share ideas and techniques in a less dogmatic way and not a retreat from discussions of more general pedagogical theories.
In an attempt to determine trends in pedagogical philosophies, we examined the 55 studio articles as to the approach used. While the overall figures for the approaches did not vary much (for the phenomenological, formalist, and narrative approaches there were 15, 18, and 17 articles respectively), some interesting trends did emerge (see Fig. 2). Articles documenting formalist and narrative approaches have been published most consistently across the years; however, articles describing narrative approaches peaked in the mid-1990s with few only two publications since that time. Articles relying on phenomenological approaches are much more recent with only one publication before 1998 and now comprise the majority of pedagogical articles published. Given the limited number of articles actually published on studio instruction, it would be impossible to generalize these trends to the actual instruction delivered in studio coursework. It may be that instructors’ distaste for writing along with the preferences of the various editors have led to spurious findings; however, it does appear that phenomenological approaches are gaining prominence in general theoretical discussion of design.

Introduction to Constructivist Learning Theories

In seeking new ways to address the increasing diversity of architecture students, we sought out ideas from educational psychology that can inform instruction by understanding how people learn. We found extensive research documenting individual and group differences in learners as well as the effects of instructional strategies and approaches on academic engagement and receptivity to curriculum. In particular, we felt that the ideas of constructivist learning theory, which addresses ways learners actively create and frame their knowledge as well as how they incorporate it into their identity, was useful in understanding how students learn in creative fields such as design. The underlying assumptions of constructivist learning theory are that (1) learners are actively engaged in tasks not passive recipients of knowledge, (2) knowledge is constructed rather than acquired, and (3) learning occurs through engagement with cognitively challenging tasks in a social environment not through the unidirectional transmission of information. Two leading constructivist theorists, Jean Piaget and Lev Vygotsky, proposed that as learners engage in cognitively demanding tasks that are beyond their current skill level, they must make shifts in their thinking processes and engage with more skilled persons to expand their understanding. Such that as learners engage with the world, they develop multiple ways of knowing that in turn shape their receptivity to new information.

When constructivist theories guide instruction, classrooms begin to look much less like the traditional lecture halls and much more like the problem-solving labs or studios. Initially instructors must determine what content knowledge and skills students currently have and what kind of learning outcomes they desire. Then instructors can plan instructional approaches that maximize the types of social interactions that lead to these desired outcomes. According to constructivist thought, instruction is best targeted toward new skills that are just beyond the students’ current level of functioning, referred to as the zone of proximal development, as this includes the content and skills in which the student will next progress. Furthermore, instructors must consider whether the content and skills to be learned, or outcomes of instruction desired, are the same for all learners, convergent learning, or different for each learner, divergent learning. Depending upon these desired outcomes, different cooperative learning strategies can be employed to ensure the necessary social context for the construction of knowledge. Moreover, as the learning process evolves, constructivist instructors conduct several formative evaluations of students’ progress as the result of their instructional approaches and make adjustments as needed to attain the desired outcomes rather than traditional summative evaluations that only assess student outcomes at the end of the learning task.
Application of Constructivist Theories to Studio Projects

As we, the authors, have not personally wedded ourselves to a particular theory about design, nor do we intend to speak only to those who would share our approaches, we have chosen to examine how constructivist theories may be applied to any of the three previously discussed approaches to design instruction as these ideas can help educators meet the more general goals of all architectural education programs—that of producing unique artists who will meet their clients needs in innovative ways. Of the five beginning design studio articles identified in our literature review, three relied on phenomenological approaches and one each relied on formalist and narrative approaches. From these we selected one article from each approach that we would examine through a constructivist lens to determine what underlying assumptions can be discerned about the learner and knowledge in general and what match exists between the instructional practices used and the expressed goals of the instructor. After brief descriptions of these studio projects, we will detail ways the projects mesh with or differ from constructivist approaches and offer suggestions for improved integration of constructivist theory to improve student engagement for these studios. These projects, selected as typical examples, can serve as models of how constructivist ideas can be incorporated into educators’ instructional practices.

Formalist Beginning Design Studio Project
The sole example of a beginning design studio project utilizing a formalist pedagogy was MIT’s “The Building Store.” This studio was a kit-of-parts project in which students were presented with a limited range of wood blocks, sticks and panels from which they were to solve simple design problems such as a renovation of a backyard swimming pool or workroom. Students were intentionally given too few blocks to construct their solution in its entirety so as to encourage an incremental design process and introduce drawing as a method of recording that process. In this project, the instructor(s) used constructivist approaches in that students were assumed to be active constructors of knowledge in their responses to the design challenge. Furthermore, the instructor(s) focused on providing opportunities to explore multiple ways of gaining knowledge rather than transmission of specific information. However, the instructor(s) utilized only individual instructional approaches forgoing the benefits of cooperative exploration and failed to formatively evaluate their instructional strategies and approaches incorporating feedback from the students’ successes and failures in achieving the goals of the project. Furthermore, despite their stated goals of divergent outcomes, the instructor(s) explicitly stated expectations of convergent learning in the development of “spatial perceptions in use, structuring principle, and the mechanics of language” as a result of this project.

Our suggestions for incorporating constructivist theories in this project include changes in both instructional and evaluation strategies. First we suggest an initial assessment of students’ zones of proximal development by informally inquiring about past experiences with the design problems given (e.g., knowledge of and experience with backyard swimming pools) and a formal arrangement of cooperative groups based on differing levels of this initial knowledge. Additionally, group interaction could be facilitated by giving students different wooden components; thereby, necessitating collaboration for exploration of design solutions. Lastly as part of the evaluation process, we would encourage educators to provide opportunities for students to share the knowledge gained from the project and reflect on it.

Narrative Beginning Design Studio Project
The sole example of a beginning design studio project utilizing a narrative pedagogy was UC, Berkeley’s “House for an Ancestor.” The stated goal of the project was “to push students toward a personal engagement with history and culture” via construction of a “memory book” or
journal related to an ancestor (real or imagined) and by designing a house for that ancestor in clay.\textsuperscript{13}

In this project, the instructors used constructivist approaches in that students were assumed to be active constructors of both personal and cultural knowledge in their responses to the design challenge. As with the previous project, the instructors focused on providing opportunities to explore multiple ways of gaining knowledge rather than transmission of specific information. Yet more closely fitting constructivist approaches, in this project, the instructors expressly sought divergent student outcomes as a marker of success for the project. Again, though, the instructors utilized only individualized instructional approaches and thereby failed to capitalize on potentially enlightening dialogues among the students in cooperative groupings as they explored cultural and personal experiences. Furthermore, the evaluative strategies employed neither prescreened students to ensure that the task was within the optimal instructional zone nor did the summative evaluations focus specifically on the student outcomes, instead including inappropriate personal reflective comments about the physical characteristics and personalities of the students.\textsuperscript{14}

Again, our suggestions for incorporating constructivist theories in this project include changes in both instructional and evaluation strategies. First we suggest an initial assessment of students’ zone of proximal development by asking students to expound on their current depth of knowledge of their ancestry; this could be conducted using a simple reflective writing assignment. In addition, formal arrangements of cooperative groups could be organized based upon cultural dissimilarity as well as similarity. For example, initial pairings could be arranged with students of dissimilar cultures to explore cultural differences between ethnicities through juxtaposition while later pairings could be arranged with students of similar cultures to explore personal differences within similar ethnicities. Finally, the evaluation process would be enhanced by involving collective critiques among students and personal reflections by students of their increased knowledge compared to their initial writing assignment.

Phenomenological Beginning Design Studio Project

We found three examples of beginning design studio projects utilizing a phenomenological pedagogy. Because no project fits absolutely within the confines of one pedagogical classification, we based our selection on relative closeness of fit and selected University of Nebraska-Lincoln’s “Everyday Geometries.” The goal of this studio was to explore the concept of looseness-of-fit between geometric architecture and the activities conducted within the space. Students used a variety of techniques (e.g., photography, modeling, and 2-D mapping) to investigate and compare the physical space of a dorm room and the used and unused spaces within.\textsuperscript{15}

In this project, the instructors used constructivist approaches in that students were assumed to be active constructors of knowledge in their creative solutions to the problem of mapping experience of inhabited space. Yet again, the instructors focused on providing opportunities to explore multiple ways of gaining knowledge through learning mapping techniques rather than transmission of specific information; however, this knowledge was limited by the individual nature of the investigations. Nonetheless, this studio utilized the most constructivist evaluative approaches of the projects analyzed in that student outcomes were “determined in reflection, not \textit{en charrette}” as the students contemplated their investigate findings.\textsuperscript{16} Despite these individualized reflections, the instructors stated that they expected the students to develop convergent learning about the relationships between and among the fixed, occupied, and interstitial spaces in architecture as a result of this project. Furthermore, the instructors tended to anthropomorphize their descriptions of these spatial relationships minimizing the effect of personal interpretations on space.
Once more, our suggestions for incorporating constructivist theories in this project include changes in both instructional and evaluation strategies. First we suggest a formal arrangement of cooperative groups to enhance the richness of the investigations of occupied space. And second, we feel that when evaluations contain anthropomorphist comments, the personal nature of interpretation is denied and the beliefs of those in positions of power are accepted as reality. Therefore, we suggest that instructors become more willing to own their own thoughts and feelings about the content and knowledge to be gained submitting them for public scrutiny to allow students to develop their own interpretations.

Concluding Thoughts for Educators

From our analyses, we feel that the current practices in architectural education correspond well with the principles underlying constructivist learning theories. Further incorporation of these principles would allow educators to encourage students to develop more fully their unique voice in creating designs not limited by the constraints of current knowledge. So, as educators we need to become more aware of the benefits of using the social context of learning and formative evaluations in the development of divergent learning. Making room for students to explore ways of acquiring knowledge also validates the multiple pathways to knowledge giving power to those voices who have been traditionally silenced in architecture.

Notes

5. This idea comes more directly from Vygotsky’s ideas about cognitive development. For an introductory explanation of Vygotsky’s theories see Santrock, 51-56 and Slavin, 46-51.
7. Santrock, 51-52.
9. Many researchers have explored the use of cooperative learning groups to achieve many differing goals. Those interested in learning more about the essential components of cooperative learning groups are encouraged to examine the many works of David and Roger Johnson such as Learning Together and Alone (Boston: Allyn & Bacon, 1999) and Joining Together: Group Theory and Skills (Boston: Allyn & Bacon, 2003). Those interested in the various configurations of cooperative learning groups are encouraged to examine the research of Robert Slavin concerning mixed-ability groups using the STAD approach, Eliot Aronson concerning the Jigsaw approach, Shlomo Sharan concerning the Group Investigation approach, and A. S. Palincsar and A. L. Brown concerning Reciprocal Teaching.
10. For a more complete definition of these terms regarding classroom assessment, see Santrock, 522-523. For a greater understanding of assessment from a constructivist perspective see Thomas M. Duffy and David H. Jonassen, Constructivism and the Technology of Instruction: A Conversation, (Hillsdale, NJ: Lawrence Erlbaum, 1992).
11. Carmen Corneil, “The Building Store: Direct Modelling (sic) as a Studio Process” *JAE* 41, no. 1 (1987): 46-53. The article describes multiple versions of the Building Store project taught at various year levels. For the purpose of our research, we examine the studio only as taught to first year students.

12. Ibid.


14. Ibid.


16. Ibid., 32.
Offered through the Research Office for Novice Design Education, LSU, College of Art and Design, School of Architecture.

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Design/Build: Full-Scale Learning

ANSELMO CANFORA
University of Virginia School of Architecture

The involvement of a beginning design student in a design/build project makes pedagogical sense. In the context of an architecture curriculum, the design/build problem fundamentally works as a didactic tool. The design/build process permits an effective conflation of pedagogical and professional frameworks for the beginning design student to observe, experience, and affect. Most importantly, the process involves the student in an essential manner of acquiring knowledge and skills.

1. The architect should be equipped with knowledge of many branches of study and varied kinds of learning, for it is by his judgment that all work done by the other arts is put to the test. This knowledge is the child of practice and theory. Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing. Theory, on the other hand, is the ability to demonstrate and explain the productions of dexterity on the principles of proportion.

2. It follows, therefore, that architects who have aimed at acquiring manual skill without scholarship have never been able to reach a position of authority to correspond to their pains, while those who relied only upon theories and scholarship were obviously hunting the shadow, not the substance. But those who have a thorough knowledge of both, like men armed at all points, have the sooner attained their object and carried authority with them.

The Ten Books on Architecture by Vitruvius
Translated by Morris Morgan, 1960

Since the summer term of 1997 at the Taubman College of Architecture + Urban Planning and as of the fall term of 2004 at the University of Virginia, School of Architecture I have had a series of opportunities to contextualize the teaching of construction practices in a series of vertically integrated design-build studios, seminars, and independent studies. The design/build component of an architecture curriculum presents a vital way of extending and augmenting principles, practices, and the administration of construction through full-scale design problems.

There are a number of pedagogical concepts and practices that the design/build problem makes possible:

Active Feedback
The design/build problem unavoidably involves a process of active feedback. The notion of active feedback, at the heart of all constructional processes, describes the constant cycling of information between idea as speculation and execution as enterprise. Active feedback also describes the exchange of information as the transference of 'know-how' (one source of knowledge) between teacher and student. Working side-by-side, a student and instructor establish a “dialogue” through the work and not outside the work - it is tangibly immediate. A productive and instructive active feedback loop is made most effective by providing clear
instructions, rigorous supervision, and timely demonstrations. In addition, the student experiences the process of trial-and-error, understands the margin of error, and is held accountable for the tolerance of time and material. The notion of active feedback is most apparent when the student experiences material resistances and opportunities – material sources, management, manipulation, adaptation, and reconstitution all factor into the decision-making design process.

Reflection-in-action
The design/build problem promotes the notion of reflection-in-action described by Donald Schön in his book The Design Studio. The context of a design/build problem coupled with the assistance of the instructor affords the student numerous opportunities to be critical, to be decisive (however erroneous at times), and, in turn, to be reflective in the act of making. Additionally, the process involving reflection-in-action promotes responsiveness, on the part of the student, to skill development – new and established, material sensibilities, and attention to methodological and performative aspects of fabrication.

 “… reflection-in-action is not at war with the instrumental problem-solving that we are used to associating with professional competence. Rather, reflection-in-action on the problematic situation at hand may convert “messes” into well-informed problems to which research-based techniques can be applied.”

The Design Studio by Donald Schön, (pp. 27 – 28)

 “… the ways in which thought may be exercised, or expressed in, the activities of making things have very largely to do with how the maker relates his thought and his actions to, on the one hand, his materials and on the other to the object itself that he is making. The latter, while importantly an “object” in the sense of being a “thing” is at the same time “the object of” his activity, but, of course, the materials of which that thing will, if the maker is successful be made, will also be “objects of” his attention in his activity of making.”

Making & Thinking by Andrew Harrison (p. 18)

Research ± Application
Managed properly, the design/build problem sets up a strong link between the finding of information and the implementation of information. The student understands research as the application of found information in service of making informed design decisions. Material specifications, performances, and costs are considered simultaneously with spatial, morphological, and constructional strategies. The information gathered from the internet, product brochures, code manuals, and conversations with manufacturing sales representatives is folded into the design process and the student begins to learn how to coordinate the multiplicity of variables that make up the design problem. Through this experience the student has the opportunity to reflect and react critically to the information – consistent discussions with the instructor across details, material samples/specifications, and cost estimates asks the student to argue the viability of one solution over others. This form of argumentation is essential for the student to see how decisions are affected by down-stream variables and effect up-stream possibilities.
Graduated study $\approx$ Accelerated learning

Building up a knowledge base and fundamental skill sets is best achieved through synchronic and graduated assignments. As the exercises build in sophistication through synchronization, learning accelerates.

"Is not, by its very nature, any subject, history, a modern language, physics, algebra just what we mean by a 'study'? Conventionally and traditionally it is. But study and a study are different things. A study has come to justify just a definitely aggregated body of subject-matter isolated from others and treated as a unit by itself. But study is studying. The physician may study 'medicine' in the medical school, but in practice he studies many other things, such as his patient and how to succeed. [...] A similar duplicity is found in the word 'learning.' It signifies an accumulated and transmitted body of knowledge, and it also signifies the acts of apprehending, understanding, and retaining in and for subsequent use.

In this difference of meanings within the terms 'study' and learning' is implicit the point I wish to make. The titles we find in a school program, such as history, geography, algebra, botany, assume that learning is already at hand, set in proper summaries and needing only to be divided into proper doses. They assume that this material which is unified through its isolation from other things is the natural occasion for the act of studying. This assumption has broken down through the expansion of knowledge and modes of expert skill; this breakdown has caused the immense variation in actual subject-matter which has come about even when the nominal titles remain the same. The content changes; titles persist. The persistence of names is of little account. What is important is that segregation also persists."

The Way Out of Educational Confusion by John Dewey, (pp. 12 – 14)

The design/build problem is a study in collaboration. Coordination and sequencing are emphasized consistently throughout the process and the student understands the architectural design problem as an integration of a variety of trades, types of expertise, and experiences. The design student doesn’t work in isolation from other members and facets of the project, on the contrary, the student is charged with a set of responsibilities that fundamentally entail seeking out multiple variables of a problem and to begin making viable connections between such variables. The student quickly realizes that a successful solution requires, not only a firm knowledge of the constituency of variables and factors, but more interestingly, an awareness and command of their inter-dependencies. Processes of synchronization and coordination also challenge the student to develop sound communication skills – particularly when asked to argue as advocate of possible solutions in a meeting with multiple interested parties – client, code official, colleagues, and instructor. Conviction and accountability is required of the student in such a circumstance and the method of representation (drawing, model, prototype, and/or specifications) is emphasized as the vehicle of the proposition. This demands rigor and familiarity of the overall design/build project. It is important to note that this experience is one that requires a gradual introduction of the student to such a dynamic, and at times, confrontational situation, on the part of the instructor – I invite the student should become increasingly involved in meetings and discussions allowing for layers of confidence and knowledge to grow with the range of their observations and experiences. The student’s thoughtful presence is singularly the most important aspect of this experience. It is the instructor’s responsibility to gradually and judiciously prepare the student for this degree of involvement by assigning responsibilities while offering encouragement through empowerment.

Fabrication atelier

The projects I have executed over the last eight years have assumed a great range and complexity of scale, scope, and cost and have successfully involved students from all years of
study and levels of construction experience. I see the design/build program as a modern day ‘fabrication atelier.’ The notion of the ‘apprenticeship’ is very much a part of the daily process and involves a great deal of tutelage. It is also very important to promote those students with more maturity and experience to the role of assistant instructors – vertical integration ensures a network of instructions. Everyone learns from everyone. When everyone commits to the act of problem-solving, different approaches and experiences begin to produce multiple awarenesses – even in the most experienced student. In turn, the fabrication process highlights the viability of one idea over another while the beginning design student witnesses and affects the progress or relapse of an idea. Moreover, the ‘fabrication atelier’ should consistently promote rigorous and disciplined making as all involved are held accountable for the quality of the end product.

**Middle-out**

The University of Michigan clients have included the Taubman College of Architecture + Urban Planning on two occasions, the School of Art & Design, the School of Public Health, the Information Technologies Central Services Department, and the Michigan League, a division of the University of Michigan Unions. Currently, the University of Virginia and Charlottesville clients and projects include the Architecture School, the Newcomb Hall Theater, lounge, and student center, a theater for virtual reality for The Institute for Advanced Technology in the Humanities, the new UVa Digital Collaboratorium at the UVa Foundation North Fork Research Park, the Italian, Spanish, and Portuguese Department, and the Charlottesville Live Arts Center. Although most of these projects begin within the insular walls of the University, they quickly expand out into the surrounding community. It is essential for the beginning design student to develop first-hand relationships with local community fabricators, trades, and subcontractors. It challenges the student to understand and take part in their community – however temporary. The design/build problem gives the student a salient opportunity to contribute and influence their own physical space while leaving the place they found a better place when the leave. Bureaucracy challenges all involved – from the administration to local businesses – to engage each other. All the relative dynamics between institutional, commercial, pedagogical, professional, industrial, and artisanal entities are literally brought to the table in a discussion and in service of a common goal – it is important for the design student to witness this exchange and to learn how to contribute to it in a positive way.

**Disciplined practice**

Factors and requirements concerning material specifications, structural efficiencies, and code requirements affect the design process in real time and as a result of actual budgetary constraints. I see these aspects of the design/build problem as an invaluable venue in which students can participate and affect the relationships between theory, research, technology, construction, and practice. I ask the student to be critical and to explore new modes of production while questioning our practice as a set of historical and conventional parameters. The design/build problem promotes the necessary collaboration and coordination between disciplines – architects, artists, designers, engineers, material scientists, manufacturers, and artisans – and makes it a fundamental part of the student’s educational experience.

“*The scholastic and the actual now almost sustain an inverse ratio to each other. If we take a glance at only the titles of the latter we come upon many which are designated with hyphens: astro-physics, bio-chemistry, and so on. And there are many more where an adjective is prefixed to the noun that names the old subject-matter, such as physiological chemistry, physiological psychology, physical chemistry, etc. These names also testify to the breaking down of dividing walls between subjects.*
“What has been said about the interdependence in branches of knowledge holds equally well in those technical activities of use of knowledge that we call industrial or practical arts. In operation they are often immensely specialized in detail. But back of the operations there lies a concentration of knowledge derived from many sources, an integration of many processes which originated in separate arts. Consider the multiplicity of problems that have to be met by a city architect, problems not just of building, but of lighting, heating, plumbing, ventilation, elevator service, perhaps electric power, decoration, and so on. The individual architect may not be master of them all but he has to know enough to coordinate the activities of specialists in these departments. The illustration is typical of what goes on in every modern factory.”

_The Way Out of Educational Confusion_ by John Dewey, (pp. 16 – 17)

The hard work and unwavering dedication of many individuals from different facets of the University of Michigan, the University of Virginia, and the Charlottesville community who participated and continue to participate in these projects make the design/build experience possible. All the projects offer invaluable lessons; above all, the process teaches us as educators and students – at all stages of learning – builders and users that the desire to improve our physical environment beyond commonly accepted and expected standards may, at times, be confronted with adversity. And, this very pursuit often generates a great deal of self satisfaction and enjoyment. Clearly, the challenges and promises that continually surface throughout the design/build process are in themselves a reward and a source of inspiration and learning. The design/build pedagogical model is ultimately a highly demonstrable agent in teaching the complexities, nuances, and discipline of our profession to the beginning design student.

“Competence in practice, as we are increasingly coming to see, demands a marriage between problem-setting and problem-solving.”

_The Design Studio_ by Donald Schön
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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Beginning with Site in Architectural Education

SHANNON CHANCE
Hampton University

“Buildings do significant environmental damage, both locally and globally. ...almost 40% of the 7.5 billion tons of raw materials annually extracted from the earth are transformed into the concrete, steel, sheetrock, glass, rubber, and other elements that make our buildings. One quarter of our wood harvest is used for construction. And buildings consume about 40% of the world’s energy production and produce 40% of the sulfur dioxide and nitrogen oxides that cause acid rain and smog.” (Talarico, 202.)

Humans are quickly consuming materials, energy, and land - and producing tremendous waste - through the construction, operation, maintenance, retrofit, and demolition of buildings. Architects’ choices directly influence the future health and prosperity of humans and of human habitats. Since society has charged architects with leading the building process, architects are ethically obligated to find effective ways to manage consumption and mitigate construction-related waste. U.S. architecture schools have been particularly slow to address environmental issues, as evidenced by the fall 2004 Laboratories for the 21st Century sustainable design competition was open only to North American architecture students:

“It is worth noting that five of the eight winning and honorable-mention teams came from Canadian schools, including two of the three winners. Even the first-prize submission was designed by a student from Virginia Tech who was educated primarily in Germany. Do these results say anything about the curricula and attitudes of U.S. programs and students? What would have happened if the competition were open to students from outside the United States and Canada?” (Monti, 3.)

Our profession cannot effectively serve humanity’s needs by treating basic environmental issues superfluously. Those of us who educate tomorrow’s architects must move ecology from the periphery. We must prepare our students to address a mounting consumption crisis, in order to produce buildings that more effectively use nature’s resources.

Hampton University has implemented a number of curricular changes that emphasize “site” and “environment” throughout its architecture degree program. Ecological issues now form the basis of the second year Design Studio, and re-emerge throughout design and support courses in subsequent years. Students begin second year with co-requisite Architectural Ecology and Basic Architectural and Environmental Design courses while they are also studying history, representation, and physics. The architecture courses are carefully cross referenced, with the
Studio-Ecology set helping steer discussion and assignments in the other architecture courses. This course structure places basic site issues at the forefront of design decision-making. In short, Hampton University has instituted a new five-and-a-half-year Master of Architecture curriculum where design grows from “site” and “environment.” This paper presents results of the co-requisite Studio-Ecology courses conducted in the fall of 2004, our pilot semester.

While the first year Pre-Architecture program concentrates on basic design, drawing, and visualization skills, students officially enter the Master of Architecture degree program in the fall of their second year. Their first architecture studio (Basic Architectural and Environmental Design I) integrates the content and coursework from the co-requisite Architectural Ecology course, and successful completion of both Studio and Ecology is mandatory for continuing into the next studio (Basic Architectural and Environmental Design II). This first “M.Arch.” semester acculturates students to the rigors of the architecture curriculum while developing their spatial understanding through projects that grow out of site context. Completing Design Studio and Architectural Ecology alongside History of Architecture I, Theory and Practices of Representation, and Physics requires students to deal with science, design, history, and theory (and all four architecture courses touch on all of these modes of thinking). Pedagogically, cross-referencing course content strengthens student skill and helps us meet an ambitious set of goals in one semester.

Figure 2. Shadow studied produced in Architectural Ecology like these by Bruce Firestone, informed the Studio design projects, like this one by Lucia Kapisinska (below).

This paper describes the Studio projects, and then explains how assignments and presentations in Design Studio and Architectural Ecology were synchronized to reinforce student ability and understanding. All activities and projects in the Studio-Ecology component emphasized site design and environmental conservation issues. Assignments required students to analyze, consider, and design with regard to topography, sun light, climate, natural elements, perceptual site factors, and eventually built context and circulation.

Their first set of Studio-Ecology projects (of three conducted fall semester), stressed topography. Students used the basic site principles covered in Architectural Ecology to analyze and re-grade a site on their campus waterfront. They were directed to treat the site as solid, and to carve and shape it to receive a small tectonic structure - in this case a tree house originally designed for a Minnesota exhibition that would theoretically be relocated to Virginia.
The existing site, located along the campus’ waterfront, is composed of clay fill retained by seawalls. After measuring and drawing the outline of the existing footprint, students explored telluric concepts by modeling and “carving” the site. They were encouraged to reference lessons on ancient carved temples and tombs from Architectural History class. Then, the students were directed to design their own new “tree house” or “temple” to reflect their new topography. They were allowed a very limited kit of parts for the small tectonic structure. In Architectural Ecology, students produced Sun Angle Studies using the contour models they had developed in Studio.

With increasing respect for climate, topography, and life cycles, students began their second Studio design project through two parallel activities: a joint study conducted concurrently in Representation and Studio courses, and a formal Site Analysis Report conducted in Ecology and Studio courses. The project was located on a campus annex property, again on the waterfront. First, students analyzed the overall waterfront site. Later, they each selected, staked,
and diagrammed a small plot that would serve as their individual building site. Each student was allowed a site with a maximum 164-foot perimeter, and was required to “touch the ground lightly” and to orient each new structure to best reflect and utilize existing site conditions.

Instructors presented a range of precedents, including traditional Korean houses, housing projects from the Rural Studio, and Anne Cline’s *A Hut of One’s Own*. In *Representation* class, students analyzed and drew other precedent cabins, and also modeled and drew a variety of hinge connections. Finally, each student designed a small wood frame structure that integrated their found hinges as well as object reclaimed from the site. Each cabin provided sleeping and drafting space within a maximum 64 square footprint, utilizing available light, shade, wind, topography, and views.

The third and final project of the semester was sited in the courtyard of a 110-year-old building adjacent to our architecture building. The project program required students to design using the concept of penetrating existing layers in order to create a series of outdoor gathering spaces for students, staff, and faculty. Through *Studio* and *Representation* courses, student teams modeled the historic building, and then each student investigated the courtyard’s existing geometries using physical and Form-Z models, and Photoshop layering tools. Both courses emphasized structural grid systems and the history of perspective representation.

Figure 5. Courtyard designs (bottom center) by Deborah Deck-Suarez and Taneisha Lockwood reflect coursework on perspective construction from *Theory and Practices of Representation*.

Overall, the *Design Studio* emphasized each building site as a physical place with its own unique properties. Students discovered qualities of the natural environment that affect architecture, and integrated site characteristics into various design projects by utilizing available sunlight, wind, water, earth and stone, construction materials, and other natural resources. The design projects became vehicles for applying “science” from *Ecology* and *Physics* to the “art” of building. The projects required students to develop processes for integrating “technical” site data into design. To better understand “design process,” we read and discussed chapters from Simon Unwin’s *Analyzing Architecture* and Eiler Steen Rasmussen’s *Experiencing Architecture*. Readings and exercises for *Theory and Practices of Representation* were selected to enhance understanding of *Design Studio* issues. In addition, the first studio project continually referenced ancient artifacts that the students were studying in *History of Architecture*. 
All three *Architectural Ecology* projects tied directly to *Design Studio* projects, and continually emphasized diagramming as a tool for learning and communicating information about site. The *Architectural Ecology* class provided students with technical, scientific, and theoretical knowledge and techniques necessary to design within the three *Design Studio* project sites. *Architectural Ecology* course lectures were organized around the book *Site Design* by H. Paul Wood (a study guide for the Architectural Registration Exam), and described aspects of topography, climate, natural elements, circulation, legal and economic factors, and perceptual factors. The instructor assessed student understanding of technical issues through examination and the three projects discussed earlier - a Sun Angle Study, a comprehensive Site Analysis Report, and a Summary of Internet Research about a sustainable technique, material, or product.

While the first half of the *Ecology* semester was entirely dedicated to building technical understanding (to directly inform the students’ *Design Studio* projects), the second half of the course concentrated on ideas. In fact, students had been fairly enthusiastic about learning the technical aspect of site design following a series of three warm-up reading discussions. J.B. Jackson’s “American Public Space,” Kevin Lynch’s “Waste of Place,” and Ian McHarg’s “On Values” enticed students to invest the time to learn the drier, more technical content.


Readings and class discussion explored sustainability theory, investigated how humans conceptualize and relate to the natural environment. Students submitted written questions, generated from the assigned readings, prior to each class. The questions formed the basis of class discussions. This pedagogical technique of individual inquiry followed by group discussion effectively prompted critical thinking. These discussions proved insightful and popular, as reflected in course evaluations and strong participation. The student-generated discussion effectively engaged students to enthusiastically confront and redefine their values based on new information and ideas presented in the readings. Students actively determined the relevance of new information in their own lives, rooted the ideas in their own reality, and built personal appreciation and a sense of responsibility for preserving our natural habitat.

The faculty and students involved in this integrated curriculum remain intent on producing design that grows from local context and enhances the natural, social, and built environment. With the success of this pilot program, Hampton University’s Department of Architecture is effectively developing its design identity around issues of urban and environmental sustainability. Addressing “site” and “environment” fits well with our department’s socially-oriented mission, which advocates leadership and design, to improve urban conditions within local communities while respecting our region’s most dominant geographic feature, its water’s edge. Future iterations of this program will incorporate more service learning and collaboration. Our student body responds enthusiastically to our service mission, and eagerly links issues of social justice with sustainable design. They are further motivated by learning that:

“Low income populations have a great deal to gain from the use of green building techniques. In reducing utility bills by as much as 35%, these techniques can make a real difference in family budgets. Similarly, the positive health benefits of green building can greatly improve their quality of life.... There are many low-cost techniques that can be used to make a development project more environmentally friendly. These include choosing a site that is transit accessible; reusing existing buildings or building...
components; orienting buildings to maximize their southern exposure; and clustering buildings to minimize infrastructure and damage to the ecosystem.” (Noonan, 129, 132.)

Hampton University’s Department of Architecture is committed to developing student ability to create environmentally sustainability design. To reach this goal, we have focusing our beginning Design Studios and support courses around mastering “pre-design” and “site design” issues. Our pilot semester provided a sense of accomplishment, with a plan, and with renewed hope for the future. As second year student Quandra Gray stated at the end of the Ecology course: “The most important thing I learned in this class is that I may be able to do something to save the earth. Before I came to this class, I thought I would have no choice as an architect but to do as the rest of the architects, and that is to build, build, build, without any consciousness about consuming. Learning about sustainability has definitely informed me that I can make good architecture without destroying our planet.”

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Exploring the Gap – or What Lies Between Interior Architecture Work and Its Artifacts

ROBERT MICHEL CHAREST
The University of North Carolina at Greensboro

Identifying the Gap
The crux of this investigation focuses on the intricacies of a gap – sometimes perceived as a mysterious ravine – most often associated with a linear, unidirectional projection between the represented and fleshed artifacts of design work. Though the attempt was made to focus on the artifacts of interior design, it rapidly became evident that all making disciplines share a similar modus operandi. When relevant, significant overlaps or parallel moments between potential and practicable architecture (understood as academic apprenticeship and professional practice) are underscored, since it appears that this gap stems solely from a prescriptive translation of the former towards the latter. This paper’s sometime discursive claim is that this presumption is far from accurate.

In addition, the exploration follows a slant carved from my passion for the art of making, born of a life-long apprenticeship as a craftsman alongside a master-builder – my father, and a deeply rooted interest in what can be referred to as philosophical inquiry. Many of my questions pertain to the awkward, but paramount, alignment between drawings and their constructed incarnation. The essence of this condition can be traced to the broader idea of Greek techne – if techne never signifies “making” per se, only the knowledge of making, how then does one gain it without touching, feeling or manipulating fleshed materials? The first part of this paper maps traditional tenets associated with design/making: narrative, ritual, metaphor and the sensual flesh of our world. The second is an account of design/built work by students in the studio/shop at Université de Montréal, The University of Texas at Austin and The University of North Carolina at Greensboro.

A Summit of Druids – Narrative and Design Work
Sketches are usually associated with a designer’s conceptual work and most often discounted as a relevant means of representing work to be built in live space and materials. The tendency to associate “artistic” or intentional sketches with creative work – seen in the studio as significant to peers but never precise enough to communicate design concepts across disciplines – and conventionalized drawings with tools of prescription necessary to construct a fleshed artifact. This condition has produced a widespread polarized view between representational devices, especially when one juxtaposes “potential” alongside “practicable” design work. This paper argues not the legitimacy of one form of representation over the other, but rather questions the presumption that “conventionalized” drawings embody immutable clarity and finiteness.

Let us imagine that students and professors, where design is the primary subject learned, are “apprentices” and “master” Druids. And, let us accept that learning design to a large extent means to gradually grasp the techniques and skills necessary to clearly depict imagined concepts. Such a scenario underscores the unwritten rules of engagement in design education – that is, the prevalence of a hermetic discourse accompanying design work rooted in intention. As Druids or archimists we accept the intangibles of design work and discuss their merits during our summits – also known as reviews or critiques. Here an apprentice’s opus is “tested” against a master’s grasp of the representational devices before him and their alignment with the author’s intent, which is usually narrated in one way or another. We evaluate, from our professional horizons as made Druids, the apprentice’s intent and its correspondence to a set of questions...
posed by the work’s program. The constant here is that our evaluation of the *opus* takes place within the interpretation of a represented artifact – one accepted to remain as such but also expected to comply with certain projected physical realities. Though some maintain that potential design should always represent itself clearly, the belief here is that the narrative accompanying any design is a key part of the work. Rightfully so, since during the summit of Druids much of the *opus* is engaged through the paradigm of language – spoken, negotiated back and forth between the participants.

Admittedly, the idea of narrative in our field is easier to reconcile with potential design than it is with practicable design. One may argue that “intentional” narratives can be helpful agents in the design process, but that in professional practice their lack of prescriptive clarity makes them awkward at best. On the other hand, rarely are design projects ever executed in complete *silence* or without back and forth negotiation between participants. The issue here is not the inadequacy of narrative in design work but the nature of the discourse spoken. During the unfolding of a project various types of narratives emerge and become a crucial part of the process. Much of the “instructing” that takes place between the participants – craftsmen, site supervisors, sub-contractors, designers, work-givers, contractors and clients – occurs within the paradigm of spoken language rather than a “silent” exchange of conventionalized documents. Nonetheless, at the time a project is released towards its fleshed incarnation, often a blind “trust” in conventionalized modes of representation is adopted. It is often believed that what is projected beyond “conceptual” design work implicitly relies on the prescriptive nature of these representations to align “drawing” with constructed “object”. Drawing on Wittgenstein’s philosophy, it can be inferred that language and architecture, taken in its broadest sense, are *events par excellence*³. If so, is it wise to assume that what lies beyond conventional representation escapes an *eventful condition*?

**The Hegemony of Modern Clarity**

In the western world, our faith in a coinciding alignment between representational artifacts and their fleshed alter ego stems from trading a system of *Truth* based in metaphysical metaphor for another rooted in an epistemology of modern science⁴. In architecture, a reduction of this ontological shift is often typologically interpreted as architectural language – from the Renaissance to neo-classical “styles”. However, it is not architectural language – a strange utterance still widely broadcasted as having significance grounded in semiology – which is *spoken* of here. It is rather the drastic shift from an “*architecture parlante*” of Etienne-Louis Boulée and Claude-Nicholas Ledoux towards an architecture of reason proposed by Jacques-Nicholas-Louis Durand. A shift inscribed within a much broader frame, a trade of systems, unfolding very slowly between the early Renaissance and the Enlightenment. Durand, nearly 100 years before LeCorbusier, is telling us that architecture is a “burden”, that it must be functional, economical and “not painful” in order to offset this plight. The *Précis des leçons d’architecture* is arguably the first treatise proposing prescriptive tools to compose efficiently, economically and “without pain” buildings. Though the Ten Books by Vitruvius, as well as its many editions during and after the Renaissance are often interpreted as a prescriptive manuals, they on the contrary, are far more metaphoric and in tune with a pre-Enlightened world⁵. It is significant to note the *précis*’ resonance with Diderot’s *Encyclopedie*, especially the manner in which they are illustrated. A correlation best seen in Diderot’s book on the natural sciences, where the phases during which a tadpole becomes a frog are painstakingly illustrated, against Durand’s exhaustive depiction of typological elements – both *treatises* are “modernly” taxonomic. Durand is a modern, he is not a proponent of *alchemical* narratives or formal metaphors from the *old school* – they are far too superfluous and lack clarity.

For a craftsman, the perceived “surgical” precision of projection drawings, originating from descriptive geometry, underscore far more what is not revealed than what is. In contradistinction,
when plans, elevations and sections are understood as schema, instead of prescription, they open the possibility for design explorations beyond representational borders. A critical recovery of the act of making and its productive contribution to design work is at stake here.

This side of the revolution, faith in the hegemonic clarity of science is prevalent in design – especially in terms of structural and formal edification. Although this is clearly obvious in the work of Eco, Jencks, Colquhoun, Lefebvre and others who have critiqued architectural structuralism and semiotics, one of the greatest impacts of modern clarity on design apprenticeship is the virtual bracketing of fleshed work. The drastic shift from past-modernism to present modernism has brought upon us the gradual acceptance of hyper-reality as a mode of being – where epistemologically, representation and fleshed objects gradually collapse into one entity. Conversely, for the designer/craftsman what takes place on the “site” of implementation is design work. What lies in lieu of the gap is a mediation between intent, program and site. It is simply work that takes place in a different mode of representation – in fleshed space and with fleshed materials. For the craftsman, it is understood that the conventionalized representation of artifacts is not meant to correspond “1:1” with a fleshed artifact.

**Between Painting and Architecture**

When addressing theory and making in interior design, theatre (as a place of theatrical representation as well as the unfolding of everyday life) is the thread that situates it within the arts as well as the adjacent disciplines. Making, meaning and representation within interior design find their roots firmly grounded between the art of painting and of architecture – namely, in theatre set design. Positioning interior design in this manner outlines its legitimacy and significance within and without neighboring fields. Where interior design celebrates its condition associated with surfaces, event and the ephemeral – the flesh of our world.

Since the work expounded in this paper deals with interior design, it is important, even if parenthetically, to underline particulars related to this field. Henceforth, the essence of interior design is defined as setting places for human ritual. This, in turn sets-up a fascinating dynamic between artifacts of representation and those that are fleshed and dwelled in. Within interior design the relationship is skewed, partly because of the confounding similarities between represented and fleshed artifacts. It is different from the perceived relationship between scaled representation and urban object in architecture or the thing itself in painting. Interior design’s fleshed and represented worlds seem often to cohabitate, where the difference between artifacts is sited-ness and the ephemeral events taking place. Usually in interior design, the artifacts of representation (drawings, photography and memory) are the vessels of permanence and sited-ness is analogous to a theatrical set. In contradistinction, the artifacts of architectural sites or painting convey a sense of permanence through tectonic robustness for the former and preservation in the case of the latter. The mode of representation “de choix” – perspective – also suggests a strong corollary between interior and set design. As testament to this, Alberti’s *costruzione legittima* in *De Pictura* emphasizes the relevance of accurately drawing “how we see”. For Alberti, in the early fifteenth-century, emulating what we see suggests a level of illusionary representation, reserved for painters and set designers, that is obviously not rigorous enough for architects. To underscore the paradigmatic significance of Alberti’s claim it is necessary to restate that modern “truth” has migrated towards a collapsed surface of perspectival simulation.

The culprit here is surface, though it is celebrated in graphic work – especially in perspectival representation – its legitimacy remains dubious in incarnated places and objects. Because of this, interior design is often blamed for being on the surface. On the contrary, interior design is invested in both surface and poché, not a passive poché, but one akin to Marcel Duchamps’ *inframince*, loaded with heat, smells, colors and textures. Our proximity with surfaces allows us to dwell intimately in the places set for our everyday rituals. This is the chief reason for
pursuing design exploration beyond the borders of representation, into the gap, where the *inframince* of fleshed materials and the narratives of making co-exist.

**Beyond Potential Design for Students**

Initially, studios that emphasize the study of construction methods, such as *tech-com* or *sound building*, rather than spatial or formal oriented venues were investigated as possible models to pursue this work. These studios are popular in many architecture schools and offer an opportunity to address structural, material and systemic related issues in lieu of treating these as passive *poché* or reducing them to ancillary concerns. Nonetheless, these valiant efforts remain within the realm of represented potential design. Case in point are student designs resembling Ando’s proposal for the Tate Museum Gallery of Modern Art or Mies’ New National Gallery in Berlin. Both represent diametrically opposed means by which *poché* can convey the intent of a structural expression. On the one hand, Ando’s model brackets the structural prowess required to make his project viable, while on the other, Mies’ expresses a structural simplicity that actually conceals the incredible complexities necessary to make his building stand up. The exploration of structures and systems in design schools is productive not because it renders a “potential” project practicable, but because it promotes an in-depth pursuit of another important aspect of this project. These are analogous to formal and spatial explorations of potential architecture, because they remain in the realm of representation.

Clearly, the primary objective is not to create a design-build environment right from first-year studio. Like all aspects of design education, from historical surveys to the visual communication sequence, the art of making should be addressed progressively in a holistic manner. What lies beyond our gap is also a very important part of the design process, and moreover, making should never be proposed as a literal transcription of conventionally represented work into a fleshed artifact.

In the course of design-build projects, the central concern is always to promote the art of making as design explorations undertaken within the fleshed world. Achieving this usually requires the devise of new curriculum while taking full advantage of resources available in design schools. Though it may seem natural to undertake these explorations within a design studio, it should be pointed out that some of the investigations were originally conjured in theory seminars, as well as materials and methods courses. The participation of dedicated shop masters and co-faculty at Université de Montréal, The University of Texas at Austin and The University of North Carolina at Greensboro was imperative to the success of all the projects. Implementing a critical design-build culture within school walls implies the effort of many dedicated souls.

In order to avoid flattening the critical nature of this endeavor, we refrained from simply incarnating in material form conventionally represented potential designs. All the projects include a critical questioning of the intended object or space and a creative programming phase. Group interaction and a “site” of reception for the work where also paramount in every exploration. Working in groups promotes a dialogue between apprentices, while challenging them to negotiate and mediate their design decisions. Because of these necessary negotiations, apprentices rapidly realize the [miss]alignment between representation documents and the artifact they are producing. Project *sited-ness* is intended to challenge apprentices to think contextually rather than focus solely on an abstracted object. This is especially productive within interior design, where context is often overlooked and replaced by a footprint representation of the site. The experiments of these apprentices revealed fascinating facets of *sited-ness*, especially in their work on exhibits and ephemeral events.
Design/Build Explorations

Time, Light and Color as Instruments for Revealing Site

An exhibit of Jim Hodges’ work at the Weatherspoon Art Museum in Greensboro, North Carolina sparked this charrette in the Fall of 2004. The selected site was a sunken courtyard of the Petty Science Building, which houses the Department of Interior Architecture at the University of North Carolina at Greensboro. The final incarnation was the in-situ installation of a simple program – to reveal “something” from this site through the use of time, light and color. The project parameters were, a maximum defined space of 300 square-feet, work to be accomplished in teams of 5, material choice was open and, since the installation was intended as ephemeral, a recording of all or part of the event was expected.

This group proposed a wall designed to frame an existing condition on the site (see Figures 1 and 2). A wall that did not explicitly reveal time, light or color, but rather encouraged the many passers-by to take notice of the wonderful spectacle taking place under the womb-like space of a mature magnolia. The installation was built of metal studs, masonite panels and twine. The ritual of tracing and spiking the artifact into the site was very much part of the design process. The geometry also was negotiated in situ to create an appropriate aperture and afford secure bracing.

A Door For Battle

The premise here was to conceive and build a temporary, yet permanent, door for Battle Hall at The University of Texas at Austin School of Architecture. More than a simple door, the artifact proposed was intended as a tool for craftsmen or occupants during the renovation/restoration of this National Registry building (the only one on campus). The project was divided into three inter-weaved parts, a mapping of the thing called door (as the “all-purpose” device and as its in situ raison d’être), a creative programming exercise, and a CAD/woodshop-intensive design-build effort. It should be noted that this project was conjured in the AutoCAD course of the visual communication sequence during the spring 2004 semester.

After a design charrette, where students proposed ideas for the thing called door, a CAD sketch integrating the essence of all submitted proposals was devised. Students in the shop worked in teams of four; horizontal, vertical, panel and special components (see Figure 3).
Investigating the Thing Called “x”

These investigations took place in the Materials, Methods and Technology Course at The University of North Carolina at Greensboro during the Fall of 2004. What is the thing called “public bench” initially generated a handful of intricate designs that however circumvented the idea of sitting in public. Armed only with preliminary sketches, these students entered the woodshop with the intent of creating a bench for five people that could be manipulated like a series of contiguous drawers. The idea of replicating the conventional thing called “bench” was left aside and the students went to work devising a beam-like base with a series of extrusions that allowed each seat to cantilever off of each other and create impromptu “groupings” (see Figure 4). Truth be told, the last iteration was not very convincing in terms of creating intimate seating arrangements in a public condition. However, the overwhelming desire for the public to play and participate with the sliding seat/drawers became its unexpected success.

Exhibit and Vernissage of Student Work

In the Spring of 2003 a crew of twelve students under my direction designed, built and set an exhibit for the graduating class in Interior Design and Landscape Architecture at Université de Montréal. A reverse camera-obscura condition was devised for the space and backlight “floating” boxes constructed to display the work. Students across the curriculum actively participated in all aspects of the design-build installation, including carpentry, cabinetmaking, finishing, electrical work, lighting and plumbing (see Figures 5 and 6).
Beyond the End of the Day

Not merely celebrating the tactile virtues of making in this paper was deliberate, since little needs to be said for the wonderful experiences associated with touching, smelling, manipulating and discovering fleshed materials. The revelations that occur from experiencing the sensual particularities of wood, steel, concrete, plastics, etc., speak for themselves. As do their dynamic response to our milling, shaping, cutting, pouring, heating or molding them. It is also obvious that such tactile phenomena are never revealed in conventionalized or mediated representations on paper or LCDs – even during hyper-real simulations. The objective is never to simply dwell on a *alignment* between represented and incarnated work during early apprenticeship. The agenda is to challenge the current idea of design process, by juxtaposing its components – representation and making – in a way seldom seen. To promote the act of design by making fleshed artifacts from potential work and ultimately helping apprentices appreciate the holistic nature of their métier.
Notes

1 Philosophical inquiry here is intended in the following manner: "Philosophy makes little progress. It deals with simple things. It deals with being, with knowledge, with man. The questions it asks, moreover, are simple questions – simple and therefore permanently alive." Alexandre Koyré, Three Hundred Years After Descartes (Boston: Serendipity Press, 1987).

2 Greek *Techne* as intended by Martin Heidegger in The Origin of the Work of Art.


4 Alexandre Koyré, From the Closed World to the Infinite Universe (Baltimore: The John Hopkins University Press, 1957)

5 See the work of Alberto Perez-Gomez.


7 Jean Baudrillard, Simulacres et Simulation (Paris: Galilée, 1981)

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Pedagogy of the Cult:
“teaching as one was taught and perhaps why one shouldn’t”

ERIC CONNELL
East Carolina University

Abstract
To approach the discipline of teaching without bilateral evaluative assessment can lead to pedagogy of the cult. Teaching as one was taught without examining the existing context of the learning relationship between the teacher and student may not yield the intended quality educational experience for beginning students. How does one access the beginner’s mind? The presentation of two teaching scenarios will demonstrate that even the best of intentions can lead to a failure in reaching the desired effective teaching in beginning design students when instruction becomes rote and continues without an occasional reflective evaluation.

Introduction
The question is; what is it about a cult that attracts us?

Figure 1. Team think is efficient.

Teaching as one was taught is likely the approach that many of us use with beginning students. We draw upon our past experiences. Many of us may have had an influential instructor or a memorable educational experience and as a consequence attempt to provide the same for others. Teaching as one was taught when it leads to an unexamined repetition of work or lacks a component of reflection on the part of the student and the faculty can be the onset of Pedagogy of the Cult.

No matter how long you have been teaching and no matter how well you have developed an exercise for learning, even with ‘apparently’ good results you may not be teaching appropriately. Appropriate in this context is to achieve the most effective teaching possible. By effective I am assuming you have in mind that the efforts and plans you initiate for any learning is based on having some outcome in mind. To teach without a bilateral process of assessment and a self-critical examination of teaching you may be involved in a situation you never intended.

When students are unable to articulate their ideas yet produced excellent work graphically, when design projects are said to “speak for themselves” in lieu of students doing the speaking, where final juries are only in front of the same faculty who taught the studio, then perhaps one should become suspicious. When the rationale for design projects is “we are a professional school”,

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when the theory of design is “that’s the way we were taught” and most discussions revolve around “the good ole days”, you may find yourself situated in Pedagogy of the Cult. These statements may seem extreme to some of you, unfortunately I suspect that for others, they may have a ring of familiarity.

Cult, from culture, in the abstract is not necessarily a problem. In fact one could argue that design teaching attempts to create a culture in beginning students; it is often said among teachers of studio. However when teaching become rote and learning is based on a predetermined set of expectations regardless of any existing circumstances, when flexibility is a derogatory word and diversity of approach is deemed counter productive this type of cult is a hindrance and learning suffers.

If one teaches in the same manner as one has always taught, without an assessment of whether teaching is consistent with intentions then one might be following a path of the cult. Teaching as one was taught is problematic when an instructor unknowingly imposes his values over those with whom he or she is teaching as the measure of success over the actual learning (my way or the highway) and it is not much different if you do so knowingly, except perhaps that students then may have a choice. Teaching without some type of self-critical assessment of the teaching process can be a sign of pedagogy of the cult. These situations can occur when changing disciplines or when moving within a different area of a curriculum.

This is not to say that we should not have boundaries related to the field of study. Alan Paul-Johnson claims we cannot do without demarcation; however it does not require that we ignore, silence or marginalize differences we find in the classroom. In fact, knowing what others value can make you a more effective instructor, in that you can guide learning by understanding and find a way to connect it to the student rather than by dominance or fear. When acknowledging the diverse nature of the beginning student, a teacher can draw upon the uniqueness of those individuals. When an instructor ignores differences it can have the effect of reducing the novel student to the generic.

Recounting these cult-like conditions of teaching make them obvious but the problem is that they have a way of being ‘subtle’. As with all things subtle, Pedagogy of the Cult is not overtly stated, it may not be known to those who practice in this context, but that also does not excuse it either. One usually has the sense that something is wrong.

Good teaching, authentic teaching, is a discourse. It involves a give and take of information from both parties engaged in the educational setting. Particular to studio/lab education is the open-ended nature of problem solving being implemented for learning. Teaching in this manner is a bilateral and inclusive process of knowledge/experiences which involves no less than two persons who must interact in order to yield a productive learning environment.

**Figure 2. Interactive Learning Performance**
Teaching is a dynamic and interrelated activity. It helps to know who you are teaching, why you are teaching the topic, what the limits of learning might be and how you intend to influence the student, all the while knowing you will have to determine by some means, if you in fact DID achieve what you had intended. It is not uncommon to teach as you were taught, however one must remain vigilant to prevent the educational experience from becoming rote and then lose much of the original relevant quality.

Two beginning classes; a design studio in architecture and a lab in construction management are the teaching scenarios that are compared. In each scenario I found differing levels of the “Pedagogy of the Cult”. My initial speculation is that it stems primarily from the basic inclination to teach as one was taught. In both cases I hope to draw attention to issues that you may identify with to some degree, and then to suggest ways to improve teaching effectiveness by avoiding Pedagogy of the Cult. At this stage in the education process, the beginning levels, it is especially important and difficult because we find the greatest diversity and most impressionable students. To ignore this situation is to teach inappropriately and warrants reconsideration.

Context
ARCHITECTURE
Beginning design studio typically entails six sections of freshman students. Each section of the studio is assigned a design instructor. Each instructor works with his/her section of the studio for ONE of the six major sequential steps of the design project. Upon completing each part of the design exercise, the instructor moves to the next section of students for about 2 to 3 weeks at a time. The process of changing sections does not allow any one instructor to overly influence the students and is rationalized as being ‘objective’ and a necessary requirement of the ‘team teaching’ approach. Each of the nearly 100 freshman student’s work on the identical design project, with the identical schedule and have identical requirements for presentation, displayed on identical predetermined template boards.

The design project was developed in sequential steps from beginning to end with each interim step leading to the next exercise. Basic 2-D graphic compositions evolve over the semester into 3-D abstract space models. The same beginning design curriculum has been in place for over 20 years and is considered by the majority of faculty as a direct result of the schools design success. To question the beginning design pedagogy is interpreted as an inability to understand (if it has to be explained then you are not going to ever get it) design teaching. However, 7 of the 8 instructors all had their education under the very same curriculum they were currently teaching. The manner in which they were teaching was based on tacit knowledge of the project. Even though faculty provided typed written handouts that at times were 15 pages in length there were often uneasy about any questions relating to the project goals, purpose or intentions. Teaching as one was taught was clearly failing in this context.

In order to assure consistency, each student is graded not only by his/her instructor but by no less than two other instructors, even if those instructors had not interacted with the student during the design exercise. The students are not permitted to present their design intentions verbally but only ‘visually’, where the work would “speak for itself”. The process assured that a faculty member was not unduly influenced by the interactions with students. Team grading was done in an effort to be more objective. The grade issued by the instructor responsible for a particular section, was averaged with two other instructors grades, all which were teaching the
identical project but may not have worked with the students during the exercise. The grades where then accumulated and the average grade was issued to the student publicly, assuring fairness. It was explicitly stated that; the process of team grading, where one instructor who essentially knew nothing about students design intentions yet evaluated their work, made the grading process more fair and balanced, and ultimately more ‘objective’. If grades were too disparate during the grading process faculty deliberated until the difference was minimized and then posted publicly for all students to view. The public posting of grades, that is, posting the name of the student next to a grade, for all to see, was considered a teaching tactic that helped students learn to discriminate between good and bad design. It was thought of as “seeing for themselves” and did not require faculty to waste time talking about design when you can produce yet another project. The final semester grade was the average of all six stages of the design process.

The biggest challenge in this school was raising issues related to design teaching with individuals who themselves were a product of the educational process without them personally taking offense. There is little hope of teaching students to be interactive with their education when the faculty who teach them are reluctant to being interactive. Clearly I did not understand.

CONSTRUCTION MANAGEMENT
Students in Construction Management take the Architectural Documents course after having one previous semester’s of lab where they learn to draw. The lab is a similar setting to a studio in that there are only 16-20 students and the teaching involves much one-to-one interaction between the instructor and the student. Many aspects of the instruction are demonstrated by example and critiqued at their desk side. The differences are worth noting as they have implications for the type of teaching that can follow. The lab meets twice a week for two-hours each meeting (compared to design studio 3 times and 3-4 hours per meeting) over the course of 15 weeks. The total contact hours are 60 compared to design studio’s 135 on average. Further differences are that the labs in my construction school have hot desks, whereas design studios have cold desks. Students in design work on drawings beyond the contact hours as do construction students but it is not nearly the same length. This is significant as to how much time can be spent on an exercise and the corresponding learning that goes with the effort. Here is a clear difference of values, where actions speak volumes, the time spent on acquiring the skill of drawing/understanding drawings is nearly four times greater among design students than it is construction management students.

The primary source for drawing understanding is taken from a printed set of architectural documents, modest in complexity. The content of the architectural documents is introduced to the student in the same order as that of the building construction process. The course starts with site construction, foundations, structural frame and concludes with architectural finishes and details. Supplemental information is provided in the form of slides presentations and site visits to buildings.

The type of exercises given to students is intended to help students learn to visualize a building from the perspective of the construction of components of a building. In the beginning of teaching this course, students were given exercises that required them to (1) show their ability to translate the verbal information into verbal responses; a question is answered about some facts pertaining to the project and (2) translate graphic two-dimensional information into verbal responses; a question is answered about the nature of a drawing from the set.
After my expectations were less than satisfactory in terms of student’s abilities as demonstrated by the exam results, additional exercises were implemented to further develop their abilities. The supplemental exercises required that students; (1) translate two-dimensional graphic information into two-dimensional abstract diagramming - a schematic drawing is made from an existing drawing in the set, (2) synthesize two-dimensional graphic information, i.e. take separate details and put them into a correctly assembled two-dimensional drawing - a building section is from many related but partial details. A semester long exercise was introduced into the course curriculum with the requirement to identify and photo-document physical components of a building currently under construction associated with drawing details from the course reference drawing set. This exercise had the intention of facilitating ‘abstract to concrete’ understanding. An assessment was made of students performance and it was determined that construction students are experienced at making things and that it would be more effective to draw upon this ability and a variation on the ‘abstract to concrete’ exercise was made. The students were required to make a ‘concrete’ three-dimensional model of an abstract two-dimensional detail found in the course drawing set, i.e., a physical model was constructed.

![Figure 3. 3-D model created from a 2-D abstract representation.](image)

The challenge for construction management students is to translate abstract and symbolic 2-D graphic data into a visual image, visualizing the object/building in 3D. The pace in which I was able to see students gain ability with these exercises was slow. The presumption was that the students coming to the course already had ability since they had a previous course in drawing and CAD. It was not until the exercises were given did I began to question my approach. Without knowing, I was ‘teaching as I was taught’. I had taught drawings directly for three years and indirectly for over ten years and I was using the teaching strategies that had worked from my previous experience. However, having moved into another discipline, from Architecture to Construction Management, I rationalized that the problem of learning was a result of students lacking ability. It was mistaken to believe that I only needed to teach as I was taught and this attitude yielded frustration on the part of students and me. I was able to teach more effectively only after I examined the values and experiences of construction students and questioned my presumptions about their abilities in light of the course objectives. The steps needed to improve my results in the classroom required that I was interactive with students’ abilities and values. It also required that I examine my teaching in a reiterative process to isolate strengths and weaknesses of approach. If I relied only upon ‘teaching as I was taught’ as pedagogy the result of the educational experience would have been far less than it was.
Both scenarios, the one from Architecture and the other from Construction Management, show how "teaching as one was taught" fall short of providing quality learning experiences for the "beginner’s mind" even with the best of intentions. One is bias by history; a 20-year school tradition of teaching beginning design, the other has the bias of personal experience, 12-years in a related but different discipline. The less maligned problem, yet problematic all the same, occurs when teaching from one perspective so long that it is difficult to recognize personal internalized bias; the ideology has become tacit. Most of these situations are ‘subtle’ and can only be avoided if a self-critical process of teaching is in place. Pedagogy of the Cult can only exist if nothing is questioned and is sustained when a unilateral approach to teaching is the only choice. Prejudice is never apparent to the perpetuator as it is to those it is being afflicted upon.

**Findings/Suggestion**

How do you avoid “teaching as one was taught”? What can an instructor do to avoid the negative influence of experience or tradition? How can a teacher become cognizant of his or her effect on students? How do you determine a student’s value system in terms of specific discipline learning? To begin with it is important to understand that simply being motivated does not necessary mean you are prepared to learn, you have to have the proper abilities before working on certain projects. Likewise and less spoken about is, you can have the proper preparation but if you are not motivated you have an ideal educational experience.

To understand the difference in values between architectural and construction students multiple forms of information and assessment were undertaken. A biographical sketch, inferred multiple intelligences based on Gardner’s ‘Frames of Mind’, an assessment of thinking style from Harrison research on inquiry modes and unique characteristics of the respective disciplines provided the basis for determining differences between the two disciplines. When examining the initial findings of the thinking style of architecture and construction students some notable differences emerged.

<table>
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<tr>
<th>TYPE</th>
<th>ARCHITECTURE</th>
<th>CONSTRUCTION</th>
<th>GENERAL POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesist</td>
<td>19%</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Idealist</td>
<td>19%</td>
<td>7%</td>
<td>37%</td>
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<tr>
<td>Pragmatist</td>
<td>21%</td>
<td>11%</td>
<td>18%</td>
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<tr>
<td>Analyst</td>
<td>52%</td>
<td>61%</td>
<td>35%</td>
</tr>
<tr>
<td>Realist</td>
<td>19%</td>
<td>32%</td>
<td>24%</td>
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*Figure 4. Comparing Inquiry Mode results between students in the two disciplines against the general population.*

The preferential decision making approach, i.e. the valued way of looking at problems, ones “world view”, differs between the two groups most significantly in terms of two thinking styles, Synthesist and Realist. Construction students (32%) value the Realist mode of thinking more than the general population and the Architecture students (19%) value it less than the general population. Contrastingly the Construction students (7%) valued the Synthesist mode of thinking less than the general population while Architecture students (19%) valued it more than the general population. When we are working with beginning students common sense would have you believe their values should be closer to the general population, but in this anecdotal survey it suggest a difference worth further examination. This information alone suggests that it
is our interest to understand whom we are teaching and beginning students are not perhaps what we think they are.

This information helps an instructor realize the complexity of teaching design thinking to beginning students. According to Rowe, “there is no singular step by step idealized design process”, therefore we have to consider many factors, not just visible abilities, or stated philosophies but something that even students themselves may not be aware of, including the interests of others. Understanding the values we as instructors prefer is also significant to prevent favoritism for those inquiry modes similar to our own. This evaluative process of both self and student is a bilateral approach to teaching that will improve the need to multiple approaches of problem solving, a necessary skill that professional designers must develop. We must teach students the value and necessity of multiple perspectives, not just from an attitudinal perspective but from behavior conduct. Daniel Meinig’s article the “Beholding Eye: 10 Views of the Same Landscape” makes the point with everyday examples. Personal interests or values will influence what you see in the landscape and or how you construct meaning from things you have an interest in. What you see is a product of what you are interested in seeing, and that is clearly influenced by the values you hold, resulting from the experiences you have had.

Gardner’s proposes seven different intelligence clusters, and Harrison states it as inquiry modes that affect our “world views”. The preliminary comparison of architectural students and construction students noted earlier reveals some noteworthy information. Kathryn Anthony points out ….. “All you have to do is to give the professor what he/she wants and you will do well in that class”. This is an indictment against “teaching as one was taught” and valuing only one approach to teaching, “it’s my way or the highway!”

A conscientious teacher will implement many ‘informal’ assessment techniques that effectively do the same as the structured approach referred to here. That is not the problem; those learning contexts have developed a quality learning environment. It is those that teach with an attitude of ‘presumed’ understanding and use authority to impose a limited approach that is of concern, believing in one way only is an issue. What I am suggesting is how you can break the cycle of repetition or tradition if there are signals that something is amiss.

Deliberate with students at the beginning, throughout and in the end about the learning that took place. Allow students to speak without showing disapproval or any other sign of disagreement. This will allow you to see if from there perspective. Create a means to evaluate the effectiveness of the stated goal of an exercise and determine how that might be improved. E.g. if space is the object of learning then examples of work should be about containment, boundaries, orientation, etc. not form, composition and color. If you are looking to understand how objects are put together then there might be a level of complexity, the parts and pieces should be apparent and not obscured etc. Ask students to speak about or highlight the goals of the exercise and listen for those pertinent items to determine if you they are consistent with intensions for the exercise. This is really nothing more than open and equal communications between student and faculty in a shared learning environment. I provide the strategy to help look beyond the surface of teaching and offer the argument for consideration of ideas that are more than just a personal approach but one that can be used my others with what I believe are going to be useful results.

Speculations/Conclusions
There are certainly other forms of Pedagogy of the Cult that you may have experienced. When having to make the choice, I would place the emphasis on quality over greater numbers of projects. Slow down to give the needed time for interaction. Good teaching is involved and takes time. Knowing your values and those of your students does not mean you can teach all things to all individuals but it means you can be apparent about what you do and that allows students to have empathy with you and what you bring to the classroom. In an ideal educational environment learning is continuous, validation and respect for multiple perspectives is valued and encouraged. The learning environment is a place where a trust and respect are built and everyone grows from the exchange.

“What is it about a cult that attracts us?”

IGNORANCE.
That is the first suspicion, we do not realize what we are doing, it's just the way things have been done and we followed, however it relinquishes us of culpability and is perhaps acceptable for children and adolescents, but not so for adults.

TIME.
There is so much to do and so little time. We are competing in a continuously changing and more complex world, we have to produce more and if we all just work together in a team approach we can get more done in less time. Time has never changed only our use of it.

FEAR.
We join a cult to sustain a mythic view of the world. Exposing a myth can instill fear in the believers who realize its lack of relevance. Myths provide comfort where ignorance exists. The design myth of the “ultimate” solution, “universal” design, the “absolute” answer or the “definitive” theory, is undermined when we learn of other worlds, diverse worlds, different from our own.

Figure 5. Fear of changing our mind. (Image from University of London, Birkbeck)

How do we avoid the cult? Resist fear and remain relevant, take time and offer authentic educational experiences.
References

A Beginner’s Mind

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on the Beginning Design Student

Stephen Temple, editor

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Psychoanalytic Transference and the Student / Teacher Relationship

ELIZABETH DANZE
The University of Texas at Austin

The psychoanalyst / analysand relationship

The dynamic and complex relationship between psychoanalyst and analysand in many ways mimics and ultimately sheds light on the relationship between studio instructor and student. At the heart of both relationships is the desire and need to create together. By looking more closely at one aspect of psychoanalysis - transference and specifically the therapeutic alliance and the analytic process, we see many revealing parallels to the studio teacher/architecture student relationship.

Psychoanalysis is a two-person interaction, primarily verbal, in which one person is designated the help giver and the other the help receiver. The help giver is the analyst and the help receiver is the analysand (patient). The desired outcome of an analysis is to illuminate characteristic problems and patterns of behavior to affect behavioral change in the analysand. Principles of mental functioning and techniques developed by Sigmund Freud are used as primary tools in the psychodynamic relationship. The teacher/student relationship is obviously not an exact parallel to the analyst/analysand relationship. While we sometimes feel as though we are "therapists" to our students, we are not. As teachers we are not “treating” our students. We might suppose that we have specific knowledge to impart or give them, especially to beginning students. A psychoanalyst on the other hand helps the analysand to look introspectively, to draw out from the inner workings of the mind in an effort to understand how the mind of the patient works. (A much larger discussion might ensue her concerning the imparting of knowledge versus the drawing out and analyzing). While we assume to impart knowledge through basic design studio assignments of composition, form, rhythm, etc. (the fundamentals of design), we are also beginning the process with our students; of helping them find their own, authentic voice. This can be done within the context of the very first studios working through the very specific and personal memories that each student possesses. We shall return to the use of memories and the analysis of them on the part of the studio instructor and student but first we must look to the definition of transference and its very particular and important role in the psychoanalytic relationship.

Transference

At the center of psychotherapy is the concept of transference. Transference assumes that we construct our present relationships by reproducing emotionally important aspects of past relationships. Psychoanalysts believe that transference is a part of all our relationships making this concept particularly important. In transference “memories from various relationships are superimposed one on another and what we observe on the surface is determined by the subtleties beneath the surface, out of conscious awareness.” The analysands past experiences are then revived and not only belonging to the past but are now directed at the analyst in the present. Transference is also a repetition, a new edition of an old object relationship; it is an anachronism, an error in time. A displacement takes place. Parallel to the psychoanalytic transference concept, in design, is for a student to draw inspiration from all prior experiences and transfer those previous associations and connections, or even misconnections to their current work context. Furthermore, this is essential to the development of an individual students unique and authentic approach to design. Design springs from our past experiences, embedded in our specifically constructed and culturally experienced internal landscape.
The quality of the ‘working alliance’, the relationship the analysand has to the analyst, is essential to an effective analysis. “The analyst’s constant emphasis on attempting to gain understanding of all that goes on in the patient, the fact that nothing is too small or obscure, ugly or beautiful to escape the analyst’s search for comprehension; all of this tends to evoke in the patient the wish to know, to find answers, to find causes. This does not deny that the analyst’s probing stirs up resistances; it merely asserts that it also stirs up the patient’s curiosity and his search for causality.” The parallels to the role of the design instructor are obvious. The teacher is standing by as a waiting, intermittently interjecting helper; like the analyst ready to interpret, re-direct, and explain, but mostly to help reveal and bring visible that which is internally hidden.

Memory

Recollecting the past, with memory as the vehicle, is an outcome of free association and is encouraged and expected by the analyst of the analysand. Free association relies on the patient embracing the expectation to say whatever comes to mind, unhampered by judgment of any kind. The therapist listens acutely to associations looking to understand the undercurrents of what is said. The depth of interpretation and the range of exploration is a result of this willingness to let the unconscious emerge.

Urging students to rely on personal memories—particularly memories of spatial situations (with their attending sensual qualities and characteristics) is a powerful way for students to come to a design problem initially with a sense of authentic, unique authority. Using memory to propel a specific architectural condition(s) or desire is a powerful way for the student to begin. The studio critic then works with the student to analyze the architectural potential embodied in the memory put forth by the student in the two and three-dimensional manifestations of it. See fig. 1-3.

Fig. 1. Early spatial memory. Scott Vandever.
“The process of creating—whether it be writing, speaking or building, is making manifest, in an outward expression that which we imagine within.” 6 In her research, Frances Downing has found that images architects draw upon carry emotive, experiential and objective information. These images have strong sensual qualities—light, color, texture and scale. “The mental image is a self-portrait of secret wishes and desires, as well as ground for common cultural values and assumptions. The mental image presents a personal biography as well as a vehicle for the designer to manipulate future projects.” 7 The student (and the analysand) is going from and through memory to thought— to analyze the many manifestations and associations of specific and
overlapping memories. Qualities such as atmosphere, context, spatial configuration, material context, and social context are analyzed for potential insight.

Analyzing

In the studio relationship between instructor and student, we might then think of the initial conceptual drawings, the very first drawings, ideas and models and studies, as free associations. As the project progresses, and the instructor talks with the student and looks at the work, or picks up a pencil to sketch along with the student, free association occurs in several ways. The design critic brings to the students’ work being analyzed, personal knowledge, past experiences, biases and many associations. The work presented stimulates in the instructor and the student associations that are unique to each of them at that moment. The combination of criticism and work together is never exactly the same. Each encounter is unique. After listening for months and years to a patient free associate, the analyst sketches mentally. Pulling together pieces of information, thoughts, intuitions, and facts, this mental sketching is analogous to pencil sketching or even note-taking, speaking, and writing by the designer.

Discussing, interpreting and mastering listening is crucial on the part of the teacher in deciphering and understanding what the student is saying. Psychodynamic listening by the analyst involves curiosity, listening to the meanings, metaphors, sequencing, and nuances that the analysand puts forth. The analyst pays particular attention to feelings and wishes of the patient, conveyed in the stories told. This is not unlike what a studio instructor might do in trying to understand what drives a student’s work. What desires underlie a particular formal expression or conceptual idea? What desire is imbedded in the organization of a scheme or proposal? Understanding the intentions supporting design decisions is similar to understanding the characteristics that provoke particular behaviors in an analysand. This is similar to looking very closely at a student’s work not for what is overtly present but what is invisibly held but present nonetheless. What are the sensual qualities of a project for instance? The building when realized will embody and invoke all the senses whether consciously or unconsciously conceived and experienced. Helping the student analyze the work and identify the potential for the invisible, ephemeral qualities of their work is analogous to the uncovering and examining of the invisible, but fully active, unconscious terrain of the analysand.

Conclusion

That which is created in both relationships, the teacher/student and analyst/analysands, is both verb and noun - an act and an object or outcome. In an analysis, what is created is a new way of seeing, knowing and interacting in the world in response to the effects of past experiences on present behavior. While not materially tangible in the same way a creative architectural collaboration is, its affect is powerful and life altering. An architect alters the physical world spatially, formally, and sensually, the psychoanalyst, in ways that offer a greater understanding of who we are in the physical world. These physical, emotional, and mental worlds are not exclusive of one another as our experiences are a continual merging of these and it is impossible to separate one from another in the way we perceive the world.

Following are three short assignments given to students in an Advanced Design Studio using memory as both the beginning and the catalyst for subsequent work.

Assignment 1

MEMORY

Consider this passage by Peter Zumthor in his book, Thinking Architecture:
“When I think about architecture, images come into mind. Many of these images are connected with my training and work as an architect. They contain the professional knowledge about architecture that I have gathered over the years. Some of the other images have to do with my childhood. There was a time when I experienced architecture without thinking about it. Sometimes I can almost feel a particular door handle in my hand, a piece of metal shaped like the back of a spoon.

I used to take hold of it when I went into my aunt’s garden. That door handle still seemed to me like a special sign of entry into a world of different moods and smells. I remember the sound of the gravel under my feet, the soft gleam of the waxed oak staircase, I can hear the heavy front door closing behind me as I walk along the dark corridor and enter the kitchen, the only brightly lit room in the house.

Looking back, it seems as if this was the only room in the house in which the ceiling did not disappear into twilight; the small hexagonal tiles of the floor, dark red and fitted so tightly together that the cracks between them were almost imperceptible, were hard and unyielding under my feet, and a smell of oil paint issued from the kitchen cupboard.

Everything about this kitchen was typical of a traditional kitchen. There was nothing special about it. But perhaps it was just the fact that it was so very much, so very naturally, a kitchen that has imprinted its memory so indelibly on my mind. The atmosphere of this room is insensibly linked with my idea of a kitchen.

Now I feel like going on and talking about the door handles which came after the handle on my aunt’s garden gate, about the grounds and the floors, about the soft asphalt warmed by the sun, about the paving stones covered with chestnut leaves in the autumn, and about all the doors which closed in such different ways, one replete and dignified, another with a thin, cheap clatter, others hard, implacable and intimidating…..

Memories like these contain the deepest architectural experience that I know. They are the reservoirs of the architectural atmospheres and images that I explore in my work as an architect.

When I design a building, I frequently find myself sinking into old, half-forgotten memories, and then I try to recollect what the remembered architectural situations were really like, what it had meant to me at the time, and I try to think how it could help me now to revive that vibrant atmosphere pervaded by the simple presence of things, in which everything had its own specific place and form. And although I cannot trace any special forms, there is a hint of fullness and of richness which makes me think: this I have seen before. Yet, at the same time, I know that it is all new and different, and that there is no direct reference to a former work of architecture which might divulge the secret of the memory-laden mood.”

Places with all of their sensuousness are obviously recalled within the context of memory and imagination. Place of some kind is always involved in memory as backdrop or context having a more active- or passive role. Recall your earliest memory where specific (even if you barely recall) spatial qualities are implicated. Capture; re-present (and/or re-interpret) its essence in two dimensional study drawings, photographs and a three-dimensional study model. How do the method, materials and form of representation coincide with the spatial remembrances conveyed?

Assignment 2
a place of agoraphobia / a place of claustrophobia

You are to design a place for two people. One has a condition we might describe as having an abnormal fear of crossing or being in open or public spaces. The other person has an abnormal dread of being in closed or narrow spaces. They each have their own “room”. Additionally they have a space that is shared by both of them.
The site is not flat. One side of the site opens to a public space, the other side to a more private space. You have the two optional site conditions: a.) water could be introduced on one side of the site and b.) one side (not the public or private side) may be attached to an adjacent building.

Fold in at least one aspect of your just completed Memory assignment. What were the spatial qualities uncovered in your specific memory? What spatial qualities did you pursue in response to that memory? What other architectural qualities did you explore? What ideas were embedded in your memory investigation? What architectural elements were there?

Once again, how do the methods, materials and form of representation coincide with your design?

Documents to be produced:
- model at ¼”=1’
- 3 vertical sections ¼”=1’
- 3 horizontal sections ¼”=1’
- 3 empathic drawings
- other(s)

Assignment 3
You are to design the space shared by a psychoanalyst and an analysands - the analytic setting. Approach the design from three points of view; the design of the interior space as perceived by the analysand, the design of a freestanding structure containing this space (for the purposes of this exercise this one space will be the primary function of this structure), and the required sequence of transition from inside to outside and vice versa. Consider the following:

1. The idea of state change and/or attitude.
State change (or phase change) refers to a change from one state (solid or liquid or gas) to another without a change in chemical composition. The word attitude is defined both as a feeling or emotion toward a fact or state as well as the arrangement of a body or thing in space. This double meaning might apply to the analysand and the couch. The physical shift in attitude (position) initiates and encourages awareness and change in attitude (feeling and emotion). In this new position on the couch the analysand hovers in space and place, transferring and alleviating a sense of gravity and of the "weight of the world". The experience of hovering and suspension is profound and this new position, and new point of view, transforms the space of the room from a passive container to a full participant in the work (think inward desire or drive).

2. The above describes a primary space built around a powerful intimate experience. We might think of the space described above as being perceptually expansive and even transcendent but in an external setting forcing it into an object- having an inside and an out. The protection and enclosure of the primary interior space will be manifested as a building in a public setting, specifically in this case, on the bucolic grounds of a medical campus.

3. Consider transition from one realm to the other(s).
Fold in again or continue at least one aspect of your just completed Memory and/or Agoraphobia-Claustrophobia assignments. Again, how do the methods, materials and form of representation coincide with your design?
NOTES


2. Ibid., p.109.


5. Ibid., p.208.


7. Ibid., p. 23.
A Beginner’s Mind

PROCEEDINGS
21st National Conference on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Archetypes

SCOTT G. DIETZ
Savannah College Of Art and Design

Introduction

This paper will discuss issues related to program and context, as well as a method resolving the inevitable conflicts between the two. In discussing these topics, it seems necessary to describe the course goals or context as it relates to the project or program. The goals of this beginning design course concentrate primarily on informing an architectural proposal through the study of human behavior and aspiration. Students research and analyze human behavior to develop the ability to solve simple architectural design problems with the understanding of the body’s interrelationship in form, space and function.

As a way to accomplish these goals, first an exercise titled Door Window Stair (DWS) introduced the students to some of the fundamental elements of architecture by asking them to reconsider these seemingly ordinary objects and their affect on spatial experiences. This resulted in the development of a simple qualitative program. The next exercise, the students considered context, Site Body Context (SBC), through the affect of human behavior in defining architectural space. In this project the bodily gesture, the ideal figure, and the space between developed a site and context. Together the synthesis of these formations, the DWS and SBC, represent the notion of Archetype. Overall, the project aimed to help students develop the ability to create meaningful architectural design proposals through analysis, decision-making and synthesis in a process of abstraction that results in a concrete spatial/formal outcome.

Program

This project focused on the typical architectural elements of door, window and stair, each having a direct relationship to the body and its experience in architectural space. A process of analysis and translation reconsiders the archetypes by liberating their attributes from the their physical object and positioning them as generators of a programmable sequence of spaces. This provides an opportunity to examine an internal spatial structure with respect to the operational nature of each archetype through the application of fundamental linking strategies. Simultaneously as these relationships are reconciled internally, an outward trajectory or force emerges imprinted with the attributes of each DWS. This force then engages external limits that temper its potential and complete the transformation of the DWS. The physical qualities of the DWS translate into the experiences of the body in an architectural space.

Vocabulary and Translation.

Through vocabulary research and translation, a reconsideration of each door, window and stair revealed spatial potentials. This method studied them as spatial operatives rather than accepting their “thingness”. In other words, questions such as What are its attributes? and What is its space?, were employed to begin the liberation process. A word list then developed using a criterion that describes the qualities of each element respectively while placing importance on the translatable aspect of each. A change ensued as the vocabulary progresses into a spatial analogue.

Fig. 1 Translation Process
Spatial Details

A common understanding of the detail in a construct is that it has the capacity to communicate the whole in a design. Most often, this refers to the poetic expression of how individual building elements come together to communicate meaning or what Kenneth Frampton would refer to as “tectonic meaning”. In this exercise, the detail and its meaning were reinterpreted and were explored as a sequence of constructed spatial relationships rather than material attachments. The operable qualities of the DWS initiated this exercise and developed as variations on threshold or the “inception of change”. Using study models, each DWS developed independently to reflect its observed qualities. This step served as a process of spatial clarification for the initial DWS (the detail) and occurred before their assembly into a sequence of spaces (the whole).

In the process of spatial clarification, the word(s) or attribute(s) generated for each DWS became the motive and the word-to-space migration was not necessarily one-to-one. It was critical however to establish a link from the moment of conception to the completed construct. An additional consideration using multiple words created a layering of qualities in the formation of the detail. This fostered a multiplicity of reductive interwoven systems preparing each construct for the event (program).

Although not considered complete, the constructed details are singular and specific to each archetype. The constructs are also considered “open” to a larger system of space(s) and are read for their potential to inform or be informed through the linkage of other details. The project continues to draw from this internalized focus and the persistence of the outward trajectory is critical in the next exercise in the formation of a spatial sequence. As each detail is developed, its spatial qualities or attributes become suggestive of program and as such, the reading fuels further possibilities and combinations.

Spatial Formation, Sequence and Programming

This exercise, implemented a strategy that focused on the connection of the DWS details. This strategy, through a process of reading, attempted to understand each detail in terms of its connective qualities and how they related in a sequence. At that time, the abstraction began to solidify, as the experience of the body in space became a main consideration with respect to the event. The internal investigation continued to move outward, defining an itinerary that began to question the scale of space relative to the body. This lead to the generation of a unified program statement in the form of a three-dimensional drawing that intended to clearly define three spatial moments and their interrelationships. These interrelationships re-present the details as a whole but not necessarily complete. The sequence can only define the program and it exists without an external context. Again, the system is “open” and persists with an outward projection reflecting the qualitative research.
of the DWS as well as the infusion of the space defining terms (functions) of arrival/departure, pause and exchange. Reading the functions through the qualitative sequence led to the emergence of programmatic seeds.

**Context**

After concluding the programming phase, context was next. It began with an independent construction of context without the impurities of programmatic influence. This disjunction was important in setting up the implementation phase by ultimately creating an unbiased site that emulated conditions in architectural practice. Inevitably, the site is in conflict with the program, which challenges the designer to resolve the predicament. In this exercise, defining context was not only its physicality but also its cultural meaning. This information when synthesized became a site for work.

**Site Body Context**

The context in this project related to the proportions of the human figure. However, unlike accepted representations of the human figure idealized by Le Corbusier’s Modulor or Da Vinci’s Vitruvian Man, each student used their own body to be the determinate for design decisions in the emergence of the site. The initial development of the context was the ideal xyz dimensions of each student respectively. This was a conceptual construction holding these limits in the form of an axial framework, a volumetric framework (cage) or three mutually perpendicular planes. After deciding on the ideal construct, research into body gestures took place and focused on their cultural meaning as a counterpoint to the ideal. Then a method to map the overlaid gesture (meaning) onto the ideal body form (measure) initiated the formal outcome of the context. The coincidence of this condition/dialogue reflected a beginning of place or “genius loci” and embodied this essence through the placement of points and vectors amongst the ideal body form. Ultimately the points and vectors led to frameworks, planes and voids as they eroded the purity of the ideal into a context of the carnal measured against the spirit or vice versa. Drawn from the recognized disparities between each condition, context began to reveal the possibilities of site. The site was “open” for programming.

**Implementation**

The implementation phase began by considering both the program and the site as open independent systems that held the potential for synthesis. Again, the program or seeds formulated the given functional requirements as well as those ideas gleaned from the DWS exercise. The layering of program then became a carefully thought out synthesis/resolution that negotiated conflicts while emphasizing reciprocity.

**Conflict and Resolution**

This exercise continued as the programmatic seeds layered into the potentials of the site construct. The incorporation of this information entered into the site in three different ways. Embeds, grafts or permeations are used initially as a strategy to begin a reciprocating process.
Each strategy listed suggest touching the site in a different way and one or a combination of strategies is used to develop the site with consideration given to the reciprocating potential of each. Potentials range from an aggressive approach such as embedding which amplifies juxtapositions through conflict or a passive approach such as permeation, which reconciles a conflict without delineation.

The functional program was given as either a spiritual dwelling (church/temple) or an educational dwelling (library/media center) each with aspirations of enlightenment. At this point program selection resulted from site definition influences and the possibilities derived from the cultural meaning of the chosen gesture. Each program required a ritual or sequence of spaces to be define as a minimum of three programmed spaces as well as the threshold spaces associated with the qualitative programs developed in the DWS exercise. By placing the qualitative programs between the functional programs, the archetype comes full circle and again the door, window and stair become the inceptions of change.

![Fig. 5 Final Construct](image-url)

**Conclusion**

This project accomplished the goals of the course using a circuitous method that led the students through a process of discovery and decision-making. The assignment of this project in a beginning architectural design studio does create some difficulties in balancing abstract thinking with concrete outcomes in terms that are accessible to the students' level. However, once balanced, it becomes an excellent exercise in self-actuating the student to define program and site. Door Window Stair and Site Body Context become the familiar strangers as the student constructs from these abstractions a plausible architectural proposal that facilitates their design learning. It asks them to consider not only the “things” of architecture but also more importantly the space of things. After all, we exist between things not inside them.
Notes:

1 Nina Hofer, Design Studio Three Course Outline (University of Florida, 2002)


4 Gilles Deluze and Felix Guattari, A Thousand Plateaus (Minnesota, University of Minnesota Press 1987)

A Beginner’s Mind

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2-D Painting De-Construction and 3-D Sculptural Re-Construction

ELIZABETH LEWIS DOBSON, AIA, LEED AP
Florida A&M University School of Architecture

Reproducing Two Dimensional Visual Art in Various Media and Re-Constructing Three Dimensional Interpretations into Sculptural Constructions

Whereas the culture of art interprets the visible world, architecture adds drama to this with the elements of form, space and light. Design education is well served by crossing the implied disciplinary boundaries of architectural pedagogy by incorporating more cultural connections such as literature, art and music. The “transitioning years” of these eager minds should saturate them with a broad knowledge of culture and a thirst for creative explorations endowed with energy and mystery. Exposing this “first year mentality” of students to explorations of “big ideas” and looking at projects, problems and concepts from many different angles and points of view will expand their horizons and spark their interests. Both the creativity involved in the abstract, and the concreteness of skills acquisition are necessary for this well rounded view.

The design student must begin an early exposure to the many skills and abilities needed to succeed in today’s design environment. The ability to visualize directly in three dimensions, to construct well crafted models, the abilities of both technical and freehand drawings and being literate in computer graphics are all lessons that cannot be covered too early, too often or too thoroughly in one’s design education.

Beginning students in architectural education often have erroneous preconceived ideas of what they will be doing in their early studios. Many are nervous and apprehensive relative to their own level of skills and competency within the studio culture. This perception applies to both two and three dimensional works involved in the typical beginning studios. The difficulty of putting the first creative “mark” on the paper, canvas or screen is a challenge for all of us. The first cut or bend in the chipboard or the earliest carving of plaster or wood is often the hardest. Having a concrete starting point from which abstract creativity can spring is often the solution for this dilemma, much like answering a question one has been asked. Projects which foster a desire for inquiry, self-development and competency are crucial to the student’s sense of self-confidence. A positive psychological edge can be achieved when an opportunity for “feel good” satisfaction and pleasure results from a project. This can renew a sense of inquiry, eagerness and self-confidence.

Understanding the elements of two-dimensional design readies the student to develop a visual understanding of three-dimensional spaces and forms. Transferring two-dimensional planes and shapes into the depth and perspective of the third dimension is what we begin to explore in this abstract and colorfully complex exercise. The process and design development phases of this project consist of two dimensional analyses, media exploration and reproduction and then three dimensional analyses, exploration, design development, media exploration, design finalization and presentation.

The two-dimensional works of art by designers such as Lissitzky, Diebenkorn, Moholy-Nagy, Le Corbusier and Klee are often not known by the beginning student as well as those of the more famous and commercialized Kandinsky or Picasso. These particular artist’s paintings reveal concepts and elements relative to the design lessons to be explored such as: compositional structure, dynamic relationships of form in space, simplified precise forms, visible elements of drawing, symbolic importance of color and line, fascination with transparency and light, and an exploration of the world of physics and geometry. Students are given a selection of works with
many possible interpretations relative to layering in spatial relationships. A knowledgeable interpretation of the specific work expands as the student researches the artist and their works as well as the political, social or economic factors of the time.

Fig.1. First year student Chin Cao’s 3-D interpretation of Laszlo Moholy-Nagy, A18

Fig.2. First year student’s 3-dimensional wood and Plexiglas interpretation of Wassily Kandinsky’s Black Spot
Students first analyze and study the basic design elements organized in the paintings, such as line, direction, shape, size, texture, value and color. Then looking in more depth, observations are made as to the aesthetic order or structure in the paintings. Principles such as repetition, gradation, balance, unity, dominance, contrast and the relationships between these are explored and questioned in each work by means of quick sketches. These sketches explore the possibilities of spatial layers and relationships. The painting may be seen as a section through space, an elevation, a plan, a rotational view or combinations thereof. Circles in two-dimensions can become spheres, voids, cones or cylinders in three-dimensions. Lines become edges of planes, voids, cracks in planes, hints of things behind planes, threading through planes, etc. Shapes become positives or negatives, massaged organics or rigid geometric forms, mass or void, convex or concave, floating, anchored, disappearing and reappearing behind other shapes. The designing student brings new form and vitality to the work, all the while working on a sequential abstraction of the painting with step by step simplification. (Figure 1)The process of development must establish relationships for all the elements in the painting before being designed into an elegant three-dimensional sculptural interpretation. The students are taking the preserve pf asymmetrical balance of the abstract expressionist painters and making a conscious intention of asymmetrical balance in three-dimensional form.

Simultaneous to analyzing the elements, structures and principles in the paintings, the students create an exact two dimensional reproduction at a reduced scale of the original. First the painting is divided in parts to explore the suitability of various media such as Prismacolors with solvent, oil and acrylic paints, pastels, collage, charcoal, watercolor, etc. The visible energy and combinations of colors, transparencies and textures are explored before the final reproduction is started. These matted reproductions become a great source of pride for the students as they master the different mediums used.

At this point three dimensional models begin to exist at the heart of the design thinking. The elements, objects, areas and shapes identified are now explored as embryonic ideas of three dimensional forms. The transition to working and thinking three dimensionally comes quickly as numerous study models are used as unrestrained tools for engaging various aspects of the design. These models convey an immediacy and excitement of working in a new design dimension for the students. Numerous opportunities and spatial interpretations relative to layering and intersections are re-constructed. Students build sequential exploratory models dissecting the elements of design such as: forms, orders, organizations, textures, size relationships, colors, directions, shapes and proportions. (Figure 2)

Media to be used in the final model such as Plexiglas, stained glass, metals, clays, wood refine and resolve the connections and form and increase the “build-ability” of their concepts while achieving constructonal unity. These simple exercises are a way of expanding and imbedding the student’s craft-making and architectural language skills. Once moving from 2-d to 3-D, the deviations in positions are linked to the phenomena of gravity. The asymmetrical principle of leverage is explored to create a sense of equilibrium. The immediate actions and reactions of parts require interventions to restore balance. Horizontality, verticality and leverage are fundamental factors which govern the balance of a composition.

These models are modified, refined and transformed into a new physical existence bringing a new and exciting dimension to the design skill of the student.(Figure 3, Figure 4) The important role of the physical model continues from the design process models to their transformation and metamorphosis into the final elegant sculptural model. Final presentations often are accompanied by the student’s choice of music or poetry which they feel echoes their design concept.

The final three-dimensional sculptural “Re-Construction” becomes the student’s own interpretive design and requires both elegance in design and craftsmanship while at the same celebrating the timeless work and contributions of the original artist. (Figure 5, Figure 6)The
freedom of imaginative creativity, the explorations of balance and order, consistent design development, skills of craft and materials, transformations from 2-D shapes to limitless 3-D forms are some of the many outcomes of this project. By far one of the most valuable lessons students have gained is the value of consistent work, freedom of imagination and self-confidence which increases with each design.

Fig. 3 Student’s Plexiglas, clay and wood interpretation of Red Spot II, 1921

Fig. 4. Student’s clay, metal and foil 3-D of Composition, 1942, Le Corbusier
Fig. 5. First year student Ken Evert’s 3-D bronze and stainless steel interpretation of Pablo Picasso’s *Head*

Fig. 6. William Santiago’s 3-D interpretation of Wassily Kandinsky’s *Yellow*
A Beginner’s Mind

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Word and Image: A Learning Community

MATTHEW DUNN
T L RITCHIE
RENEE MAJOR
Louisiana State University

Learning Community

"Any one of a variety of curricular structures that link together several existing courses---or actually restructure the material entirely---so that students have opportunities for deeper understanding and integration of the material they are learning, and more interaction with one another and their teachers as fellow participants in the learning enterprise."

The Word and Image Learning Community consisted of two sections of a first-semester design studio and an introductory literature class. All students were enrolled in both the literature class and a design studio. Instructors for the design studios and the literature class coordinated syllabi and assignments for the two classes.

In the LSU Design program, students participate in an arts foundation level during the first year, taking courses in art structure, technical drawing, and drawing/composition. It is only after they have been accepted into the program through selective admission that they begin taking core courses in the Interior Design curriculum. The first semester sophomore students are the LSU equivalent of beginning design students. Although these students must meet the university's General Education humanities requirement, there is currently no required writing-intensive course in the design curriculum.

Purpose

We envisioned the learning community as an intersection of word and image, a learning environment designed especially for students whose primary work is with graphic images and the design of physical spaces and who need to develop their skills in critical reading, writing, and reflection.

Students entering the design curriculum often do not understand reading and writing as processes that inform their design work. They also often lack a basic vocabulary with which to discuss their ideas and designs. Although design students usually have a more developed visual acumen and are acquiring skills and experiences with graphics technology, introductory General Education literature classes rarely encourage students to bring these skills to their reading and analysis of literary texts. The goal of the learning community was to create a dynamic cycle of critical thinking, discussion, reading, writing, and design application that would enable students to recognize connections between their work in the design studio and their work in the literature classroom.

Among questions we encouraged students to explore were the following: What similarities might there be between the structure of designed spaces, both domestic and urban, and the structure of poems and stories? What is the relationship between graphic images and verbal imagery in creative expression? What might students gain by regarding literary texts and their own writing as designed spaces? How might literary and design studies intersect and enrich each other?
**Framework**

As the foundation for the remainder of their formal undergraduate design education, the first-semester design studio teaches students a basic design vocabulary and design principles. Students are pushed to develop concepts with multiple layers of complexity. They must also acquire a specific language for articulating their concepts and communicating them to others. The linchpin of our interdisciplinary collaboration was language, specifically, the parallels between the vocabulary of spatial design and the language of literature and vocabulary of literary analysis.

Those parallels were highlighted for students in the comparison of two texts: the first, a brief passage from Francis DK Ching’s *Architecture -- Form, Space, and Order* about the power of a three-dimensional form to “articulate the volume of space surrounding it and [to] generate a field of influence or territory which it claims as its own” and, the second, Wallace Stevens’ poem “The Anecdote of the Jar,” which in remarkably similar language describes a jar which, placed on a hilltop, “took dominion everywhere.”

In the literature class, students began with a basic vocabulary for describing and analyzing poems by Wallace Stevens and contemporary poets Lucille Clifton and John Taggart. Finding that proportion, scale, balance, harmony, unity, and variety were principles of poetic structure as well as of physical structures led students to see that poems are also designed spaces and that design principles hold them together and link one idea to another. Students also examined the thematic functions of representations of domestic and urban spaces in fiction by an assortment of fiction by Nathaniel Hawthorne, Wallace Stegner, Edgar Allen Poe, Susan Glaspell, William Gass, and Italo Calvino. Finally, students explored the complex relationships of visual and verbal communication in bimodal texts like comics and graphic novels.

**Process**

Students investigated the connections between their design studies and their study of literature in a series of coordinated assignments that required them to bring their reading into their graphic and spatial studio projects.

In the literature class, in early assignments after reading John Taggart’s *Pastorelles*, students considered poems as aural and visual spaces by reading the poems aloud and also noting patterns of words as they appeared on the printed page. The class paid particular attention to line lengths, repeated sequences of words, and the use of white space on the page. Again, drawing on Ching’s definitions from the students’ studio exercises, the class considered similarities in language and structural principles readily transferable from spatial design to the structure of poetry. Ching’s definition of rhythm, for example, proved particularly useful for thinking about the function of repetition as a structural device in Taggart’s incantatory poems. The passage reads: “The repetition of elements in space and time... not only creates visual unity but also induces a rhythmic continuity of movement that the viewer’s eyes and mind can follow along a path, within a composition, or around a space.” (*Interior Design Illustrated* p. 150).

In their essays, students traced patterns of verbal images repeated in various forms in a poem or sequence of related poems by John Taggart and discussed the ways that these motifs created rich visual images for readers and contributed to meaning. After writing about repetition, rhythm, and metamorphosis as functions of visual images in Taggart’s poems, students began a studio assignment in which they rendered their own interpretations of a Taggart poem in a short video. Many of these videos proved to be powerfully imagined interpretations that demonstrated a level of engagement and sophistication not usually seen in General Education introductory literature classes.

In an essay on the ways that students process images and verbal text in educational materials, Jennifer Wiley cites several studies that demonstrate that students’ “active construction of a runnable mental model” significantly improves their comprehension of any dynamic systems. Wiley writes too of “the sense of intimacy and intensity” that students experience when they
recreate in their own imagination scenes depicted in literary texts like novels and poems. Students’ video renderings of Taggart’s poetry were just such mental models. To create them, students were forced to examine Taggart’s language and imagery and to find corresponding images of their own, not to illustrate the poem so much as to illuminate their understanding of the texts. In the process, students arrived at innovative, personal, and often striking readings of the poems that in initial class sessions had seemed weird or inaccessible to them.

The corresponding aspect of the film project in the studio began by asking the students to analyze the selected Taggart poem. The objective of their project was to explore meaning and structure in word and visual images and the perception of time and space through the media of film vignettes, abstraction and progression to linear space making. The project evolved in stages.

Ching’s seven design principles served as a guide to the visual structure for these graphic poems. Students compared Ching’s principles of proportion, scale, balance, harmony, unity and variety, rhythm and emphasis to the ordering devices used in Taggart’s poems. These were devices such as rhythm, repetition, euphony, cacophony, and discord. The visual relationships of design elements create recognizable patterns and thus meaning for the user, just as the structure of words creates meaning for the reader. In their videos, students explored and even exploited the parallels between the word images and the visual images.

In the first stage of the project, students were asked to divide their poem into seven distinct parts. Some of the longer poems broke down easily by stanzas, where the imagery changes from stanza to stanza; shorter poems had to be divided within stanzas to obtain seven changes in thought or imagery.

Next, students were introduced to the concept of storyboarding, their first graphical representation of the transformation of word to image. The seven distinct divisions of the poem would become their seven sequences for the film. The students produced an overall storyboard of eight blocks, their seven sequences and one title/introduction sequence. Students sketched their visual interpretations for each sequence including as much detail as possible.

For the next step, each of the seven main sequence blocks was given its own eight-block storyboard. This allowed students to further explore and visualize the sequence. Again the students sketched out the series of shots that made up the sequence. It was during this process that the students were to investigate and refine the manner in which the seven studied of design would inform their film sequences.

The storyboard proved to be a critical step in the process of translating word to image without losing the structure and refinement of the poetic. The students were eager to film without any idea or framework for the film content, assuming they could begin filming and fill in the storyboards once they had all their footage. It was imperative to rigorously return them to the original steps of the process, allowing each step to inform the next. The desired outcome was to expand beyond the representation of the narrative by visually illuminating the intent of the poem in form and structure.

After the first version of the student films was finished, students critiqued each other’s films in the studio. Students were encouraged to discuss what aspects of the film worked and to analyze areas where the meaning and imagery were unclear or underdeveloped. Next, the students created a second version of the film. Some reworked the same footage, while others added new film sequences to strengthen their final version. Critique and revision allowed students to become actively involved in the project and developed their skills in articulating design principles.

These first stages of the Taggart project immersed students in the connections between their developing spatial vocabulary and the language of literature. The similarities in structure formed a foundation for further exploration. In the design studio, the remainder of the projects to be discussed investigated an expanded methodology explored in the sophomore interior design studio pertaining to the relationship of the time-space sequence in the experience of architecture.
The investigation was given a new injection of creative energy from the learning community by utilizing literature to enlighten design.

In this regard, the next stage of the Taggart project required the students to select seven stills from their films. The stills were to be chosen for their interest in composition and meaning and their potential for representing spaces. The images were abstracted into figure/ground or positive/negative imagery using the lines and shapes contained within the frames. The seven stills were to have characteristics that could be developed from two-dimensional initial shapes into three-dimensional forms or spaces. For example, the circular opening of a guitar in the still has the possibility of becoming a tube or tunnel in space when extruded in the third dimension. Therefore, the first step in the process stopped movement in time to obtain the stills. Then the next step manipulated those images into seven distinct abstract forms, which later were extruded in time through a series of sections to make spaces. One does not know a space in a single view. The knowing evolves from the movement through the space, the time inherent for observing as one passes various vistas and the memory of the views on that path.

Through this series of exercises the students learned to abstract, deconstruct and reconstruct shapes, forms, and volumes from three dimensions through two-dimensional manipulations and back to three dimensions again. This had the effect of simplifying the forms and gave students an opportunity to re-evaluate the composition and structure of elements within their designs. The exercises were in part to analyze the space-time relationship, to apply and build on the foundation developed in the previous project stage and also to introduce the powerful manner in which students’ critical reading and writing can inform their design work.

The final project used Calvino’s *Invisible Cities* as the premise for a series of projects in both classes. Both the literature and the studio classes were immersed in the text for the duration of the project. In the literature class, students began their study of Calvino’s text by considering the author’s own statement about its narrative structure: “I built up a many-faceted structure in which each brief text is close to the others in a series that does not imply logical sequence or hierarchy, but a network in which one can follow multiple routes and draw multiple, ramified conclusions.” In journal entries, students were encouraged to consider what could make a city visible or invisible and to think about parallels between the narrative structure of Calvino’s text and the structure of the cities that he described. Students also wrote an essay in which they reflected upon the character of one of Calvino’s cities and discussed their strategies for representing that character in their studio maps and models.

In the studio project, students created a series of drawings that illustrated a city they selected from Calvino’s descriptions. They started with a figure ground city plan and site plan. Preserving the character and essence of the city, the students were asked to go beyond the text and add a new space to the city. The students explored creating space using only sections to make the volumes. The volumes were to be abstract in nature. The students explored the three-dimensional qualities of their spaces using two methods. First, they created a physical model made of multiple chipboard sections. Next, they created a similar virtual section model using Autodesk 3D Viz. After building the virtual model, students created walk-through animations, in which they could explore the space. Their purpose was to represent a defined space not necessarily a real location or physical structure. The design of these form/space interventions was to generate an interesting sequence of experiences, defined by the spatial vocabulary explored in previous assignments. Informed by the characteristics of the city from the Calvino novel, these spaces were enriched by the spatial relationships and ordered by the spatial organization studied in the Ching texts. In a final project, students brought their work in the two classes together in the construction of a bimodal text, an adaptation of a passage from Calvino’s *Invisible Cities* in words and graphic images.

The investigation of experiential space-time phenomena is often used in the beginning design studio but the surprising result in the learning community was the increased sophistication
of the designed spaces. The complexity in meaning and form was noticeably enhanced by the literature base as a springboard for the design project.

Results

The following excerpts from students’ reflections on their experience in the class suggest some initial results and articulate the student perceptions of outcomes from questions posed at the beginning of the semester.

“Although poetry can be very complex and hard to read sometimes, the important concept that I gained from studying word and image in poetry is that a poem in itself is a design.”
—J. Detiveaux

“Being able to talk about your work is one of the most important things to be able to do in becoming a successful designer. Designers create ideas that can be seen visually but they have to be able to explain them clearly to the client. With the writing completed in this literature class, I think I have learned to clarify my ideas through the use of words.”
—J. Herring

“Not only did this crossover help me as a designer, but as a reader of literature as well...In the future, creating a visual design in my head of what I read will probably help me through any work of literature I read.”—M. Brown

“I no longer see a poem as short lines of text on a page. I see a section of writing that has a message, something that I can relate to, even if it is in a way not intended by the writer.”
—J. Champagne

“This assignment challenged us to look deep into the poem, and translate these elements into a different medium. At times the ideas in poetry can seem obscure, and the ability to grasp the hidden layers and textures of meaning will be invaluable thinking skills in working with clients in the design field as we translate their ideas into design elements.”
—A. Flores

Both disciplines in the learning community set about meeting the fundamental course objectives of each through recognition, understanding and analysis of the important basic elements of design and literature. The teaching of these devices was immersed in the readings, design and writing journals, assignments and projects in both courses. The weaving of learning, articulating and applying the new knowledge is not unusual in either discipline and is supported by the evidence from cognitive literature. What emerged and reinforced the faculty’s original premise is that the synthesis of the elemental principles in structuring the student work was reinforced by the complimentary analysis and translation from the opposite discipline. The act of constructing the parallel works enhanced the understanding each.

The second notable outcome was the success in which the two disciplines seamlessly intersected, informed and enriched each other. The visual representations of complex ideas encouraged the student readers to consider more aspects of the literature and to pursue multidimensional relationships of those aspects. The student designers stimulated their imaginations when the design process was nourished by the details of the poetic. The dual perspective of the learning community participant provoked a merged vision much like the 19th century stereo viewers or the mid 20th century 3-D glasses. The resulting perceptions acquired the attributes of depth and dimension absent in the mono-vision or the ordinary myopic.
Assessment

In the short-term, this learning community was assessed by midterm and end-of-semester evaluations completed by students. In addition, students were required to complete a reflective essay on their perceptions of the learning that had taken place in the linked classes. Faculty colleagues and peer student reviewers were also asked to view and assess the students’ semester work. Initial effects of the linked course work’s learning environment were evident in the students’ presentation and discussion of their work before a critical audience.

In the longer term, the results of the collaboration will be assessed through focus group interviews conducted with the students by the LSU CELT (Center for Excellence in Learning and Teaching) Assessment and Evaluation Center. The true test of the interdisciplinary collaboration will be in following the progress of these students as they move through the studio sequence. Will they actively seek reference and inspiration outside of design to inform their work? Will they also extend their knowledge of design principles and literary devices, and the strength of their structuring capabilities, to other fields of study and research?

NOTES


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Bridging the Gap: Guiding Students from Known to Unknown

MARGARET FLETCHER
Mack Scogin Merrill Elam Architects

Introduction

The first year of design school is fundamental for learning to bridge between what is already known and seeking out what is yet to be understood. The task of instructors is to place students on a balance between what they know is real and the unknown of potential design. Often instructors begin by creating an environment of abstraction in the studio where objects are described at their base existence—a wall becomes a vertical plane, etc. This abstraction, however, limits the student’s ability to use physical existing knowledge in the pursuit of understanding design. The question becomes this: How can instructors establish projects that allow students themselves to bridge this gap between the known and the yet to be created?

Prior to the beginning of the spring semester, I was given a project statement for the students that stated “Design a Window for . . . (one of the examples given was ‘reading’).” We were also given the following as objectives-guides for the project: Section; the wall section is the site for the design project as well as the scaffold for the design exploration. Body; the body is the agent, bringing with it a host of issues: scalar relationships, ergonomics, cognitive and sensory perception. Activity; the action or operation that the body performs. This activity brings with it its own requirements: choreography, process, action, etc.

I took these ideas and worked through them with the following objectives in mind. I was trying to figure out a way to get students at this early stage of their design education to be able to use basic information they already know without relying on it to guide them. As an example: “Design a window for reading.” This phrase alone conjures up a distinctive image—a window for certain—perhaps any variety of glass and frame construction; it could be a double hung, it could be a curtain wall but either way it is most likely something the student has seen before. “Reading” gives a direct image as well, perhaps where or how they themselves like to read—in bed, at the kitchen table, in a comfy chair, at the library, etc. At this level of design thinking the student tendency is to use and reference those items (window, activity of reading) and ideas to rearrange concepts they are already familiar with rather than a more true exercise in original creativity.

So the challenge was how to set up a project statement that followed the ideas of the original problem statement (wall section as site, window consideration, activity studies and body interaction) while allowing for the development of original creativity. How could the students use what they already know about walls (vertical plane with A and B surface, inside and outside), windows (an opening in surface) and any activity (registers the body with activity) and be able to have vision beyond what their minds conjure up automatically. How can I help them create something they haven’t even thought of yet, something they’ve never seen before?

Working through the problem statement, I believed the fundamental objective for the students was the basic understanding of a wall and an opening in that wall. I established the “activity” as some version of seeing, literally, as directly related to the act of looking through, around, onto, etc. Second, I removed “glass” or any such material in the problem. The issue became focusing on “what is wall vs. plinth” and how will you create an opening in that wall or will you even need an opening. These two ideas were the basic physical parameters of the project.

Several additional objectives were embedded within the studio/project in an effort to facilitate the success of the initial objective stated above (guide students from known to unknown).
1. Provide linear sequence of investigation.

As explained by Edith Ackermann in her article, “Tools for Constructive Learning: Rethinking Interactivity,” “No doubt, interactivity is essential to learning. However, this should not lead us to consider that hands-on activities alone will make for meaningful experience or constructive learning.” The biggest breakthrough in a child’s development is not the ability to act per se, but rather, to inhibit, transform, or defer action, whenever its consequences are perceived as unsatisfactory. The basic law is … if good, then do it again. If no good, then stop, replace by other, or defer. While Ackermann is directly speaking of a child’s development, the principles apply in any learning environment.

The idea of being self-referential, of interacting between what is known (system of rules) and what could become (thinking outside of the system of rules) becomes an important notion regarding the relationship the exercise has to enabling the information learned to influence further creative discoveries outside of this exercise. “The scientific method itself can be viewed as such a dialogue between fact and fancy, between what could be true and what is in fact the case.”

This linear process by the very nature of its own set of rules creates a separation from task that allows creative freedom in a safe environment in which to explore. It defines a make-believe construct that the student can work within and provides a testing ground for ideas to be developed further in other areas of study. The linear system sets guidelines and limits (rules). These rules will create room for play as well as creative freedom in a defined separation from task.

The goal of this type of scripted path for the exercise is the idea that if you do the work/drawings in this order as instructed you will get somewhere with your design. It is providing a structure so that there is no time spent wondering what should be done next and there is no resistance to trying new types of drawings/model (exploratory work). Each step is heavily scripted in terms of deliverables. The emphasis is to produce required deliverables and without a doubt there will be something to discuss within what is produced. This method also introduces the idea of multiple schemes and self-critical evaluation of work.

2. Incorporate rigor of process.

Students are asked to move between drafting--section, axon, elevation, exploded axon--to sketch series, to trace overlay, to sketch models, to final basswood models. The examples shown in class are from graduate thesis students and the expectations are high. Multiple schemes, multiple trace overlays, varied view studies, are all critical in this exploration.

With early design students in general I have found that sketch ability is low but the ability to build both functional and well-crafted models is high. A force-switch between these modes enables students to find something that is working for them.

3. Remove use of plan as a design tool--instead work entirely in elevation, section, axonometric, and model.

The plan view is often the most relied upon view/design tool for the beginning student. Students will spend weeks organizing the plan while dreaming or pondering other elements of surface, section, or materiality. What usually develops is a plan extrusion with little developed thought given to the experience of the section or wall section.

Using the plan as a design tool students show heavy focus on poche and void, grasping at pattern making and recognition. Of issue here is that there is primarily two-dimensional thought--pattern making--with reduced grasp of influences to other elements of the design. Even if the student recognizes that there will be some mode of integration with the third dimension it is often disregarded by the student for particular troubles of representation or of understanding how things fit together. Students tend to spend time
creating drawings that particularly hide that which they have not solved or that which they do not understand.\textsuperscript{16}

This project, by eliminating the plan, forces the students to work through the section in order to develop the issues raised in the studio.

4. Intersperse full-scale operational objects with scaled operations.
   This objective incorporates an object designed at full scale that has to work (it is about figuring something out) using yourself as the test (i.e.: will I be able to hold it?) and building it at full scale (making it work). It also removes some of the abstraction of the scaled drawing or model activity that is present in this type of exercise. There is nothing to hide behind.

5. Move within a continual switch between a known/familiar task and a directly abstract task.
   This is a direct exercise in pushing beyond current understanding. It enables students to move beyond what they are automatically assuming.

6. Integrate the absurd so the solution is not easily imagined.
   The objective is just as it is stated. Provide a project description/task/language so that the end result is not easily imagined by the student. The goal is to generate a fuzzy mental picture— an idea of a thing—not the thing itself. This is important.

Fig.1. Final wall models, Stephanie Radbill (rear and side view), Sara Tison (side and front view), Nadine Kashlan, and Benjamin Denzinger.

The Studio

"wallbodies|optical apparatus|visual prosthetic" is a project constructed for first year design students and pursues these objectives. The project at its fundamental base is the understanding of a wall and an opening in that wall. Students move between scalar activities beginning with a wall assignment, moving to a working pinhole camera, and concluding with the integration of the two systems. This paper will disseminate the pedagogical objectives as they unfolded during the course of the semester and the "wallbodies|optical apparatus|visual prosthetic" project specifically. The project consists of three parts and three procedures.

Parts: (1) Section: The wall section is the site for the design project as well as the scaffold for the design exploration. (2) Body: The body is the agent; consider scalar relationships, ergonomics, cognitive and sensory perception. (3) Activity: The activity is the action or operation that the body performs. One of the following activities will be investigated: to view, to examine, to spy, to scrutinize, to survey, to watch, to inspect, to glimpse, to investigate, to scan, to peek, to gaze, to observe, to record, to discover, to study, or to perceive.
Procedures: (1) Understand the Wall Section: students spent time drawing in section, elevation, and axonometric dissecting and reassembling their assigned piece of wall. (2) Understand the Activity: This section consisted of two parts first with the walls section exercise and then with the pinhole camera exercise. First, design a wall that encourages one of the activities listed above. What kind of opening is required? Is an opening required? Create the condition that generates the response. Second, design and build a pin-hole camera. This camera investigation is an extension of the studies that involve how one sees. The images produced with the pinhole camera must represent those ideas that are being studied. How do you make the camera “glimpse”--how will this idea be represented in the printed image? (3) Integrate wall section site and activity: Insert your camera and its activity into the wall-section site. The wall section-site must accommodate the body and camera performing their respective activities. The camera should be accessible to the body in order to change the film and operate the shutter mechanism. If the camera needs additional positioning in order to perform its activity, the body may not hold the camera but can operate an attachment or prosthetic.

**Fig. 2. Studio pedagogy diagram, Fletcher.**

**Project: Part One A (duration for Part One A and Part One B: 7 days)**

Students randomly selected wall sections and were given “to scale” axonometric wall sections from Edward R. Ford’s, *Details of Modern Architecture*. They were instructed to draft at 1 1/2” = 1’ an elevation and section from their assigned wall section axonometric. They had to calculate dimensions based on relative proportions of construction materials represented in the section that they were familiar with (example: door height, width, etc.) The students at this point were already discussing their wall in terms of the primary material and were asking questions like “Can my project be a house wall with shingles?”

In order to try to turn this phenomenon around, students were asked to draw the “edge of the air” around their wall sections so that they had a somewhat abstracted shell representation of their wall section. It was no longer so much about the insides of the wall section but rather was focusing on the shape/shell--on what happens on the edge of the wall section. I then told the students that they should slice their “air section” in half vertically and decide which surface they
wanted to keep. The other surface was pinned up on a separate wall. They drew numbers from a hat and could then choose whatever other half they wished from the “extras” wall. At this point they could reassemble their wall section. Either side could have any orientation and any scale. They drew this assemblage as their new wall section site and constructed it in axonometric (both sides) as base information—the site.

Project: Part One B

At this point we began to discuss the activity they would be studying. Basically, the wall section is the site; the activity is the thing that the body does in conjunction with the site. We spent some time discussing “what a wall is” and using proportioned drawings to get at the point at which a wall becomes a plinth/platform or decidedly not a wall. This was in an effort to maintain clarity on parameters of site and project and also helps to keep the scale manageable while adding another guide to reign in the scope. For the initial phase of the activity section, students selected five activities from the following list to pursue: to view, to examine, to spy, to scrutinize, to survey, to watch, to inspect, to glimpse, to investigate, to scan, to peek, to gaze, to observe, to record, to discover, to study, or to perceive.

They were instructed to design five walls that inspire the body to perform the selected activity at the space of the wall. For example: design a wall that glimpses, or a wall that scrutinizes—what would that mean? What kind of opening is required in the wall? Is an opening even required? Create the condition that generates the response.

The students worked in study models, sketches and written descriptions to try to get at their personal standpoint on each activity. After pin-up review, the students selected their three most promising/interesting studies and focused on those.

Using the base site information previously drawn, \( \frac{1}{2} = 1' \) drawings of section, axon of surface A and axon of surface B, students were asked to draw twenty built up trace overlays for each of the drawings listed above incorporating the ideas generated from the study models, words, and activities. The additional requirement was placed that the studies maintain genetic familiarity. This was to emphasize that the trace overlays should be utilized to develop page to page from the original wall section site. They needed to show and trace as project requirement the movement from trace to trace as each item develops in the project. This would help to insure that the trace was being used as a development tool specifically addressing one sheet to the next rather than being used as an alternative material for sketch pad type drawing. The final tally of drawings was twenty each of three different studies for a total for sixty trace drawings.

Fig. 3. Genetic familiarity section study, Meredith Harman.

The ideas were then narrowed down to two rather than three and for two more days the students continued to develop both of these ideas in either sketch, trace studies, or study models. At this point this phase of the project was put on hold and we moved to the pinhole camera exercise as a way to interject a full-scale object which would help with understanding basic body/scale issues as well as offer another vehicle to study their chosen activity.
Project: Part Two (duration: 7 days)

The assignment for this part of the project was to design and build a pinhole camera. I did not have access to darkroom facilities or materials so I devised a way to use Polaroid film for the pinhole process. The students were instructed to make a “beautiful camera obscura of museum quality” (it was assigned as such to try to drive up quality of work). Early emphasis was on quality of craft. Once we were in the field many cameras needed electrical tape modifications so actual usable cameras became field objects.

From the project assignment: This camera investigation is an extension of your studies that involve how one views. Keep in mind while you are designing and building your camera those words you are investigating in your wall study. The images you produce with the pinhole camera must represent those ideas you are studying. How will you make the camera “glimpse” -- how will this idea be represented in the printed image? Investigate: the recorded image as a translation or abstraction of the image/situation in real life, the focal length and size of the pinhole in relation to the clarity of the image, materials, connections, joinery, and the economy of means. Materials: should proclaim economy and innovation, should be appropriate to the task at hand (image making), should be easily manipulated and adapted. Shutter: You must devise a shutter mechanism to open and close over the pinhole to control the entrance of light. Film: We will be using Polaroid 669 film for this project. Cameras must be able to accept the Polaroid film-holder apparatus. Think about this: How will you hold the camera -- does it have soft or hard lines? How will you balance the camera? The film holder is really back-heavy. Can your camera produce more than one kind of image? What sort of apparatus/attachment/prosthetic will be required to make your camera produce an image representing your ideas? How will you test your image taking ideas?

The real challenge with the camera was the introduction of the Polaroid film back unit. It is a physical limitation/requirement to the project. Also the camera must work. Seems like an easy enough issue but prior to this exercise the students had not been held accountable in a similar fashion for any of their work. Also at this point in the exercise, the introduction of something to design that is full-scale was critical. We had just moved away from the wall section as physical site portion of the exercise and brought the exercise up to the hands (literally) for another type of “viewing” exploration. The idea again was the creation of something that could not be readily imagined, a camera that takes a picture of a “glimpse” is not something that any student had seen before. So though they understood the camera and its mechanics, adding the unknown of the designed image -- an experiment in image making -- not only was challenging for the students to understand what they were going for in regard to the images, it was also challenging to understand how to achieve it.

Fig. 4. Final cameras, Jessica Wood, Sara Tison, Kenneth Cherney, Mark Parsons (collapsed and expanded focal length).

The interesting thing that developed was the energy that was generated around the development of the camera. I was surprised at how “into” the assignment the students were. The cameras and attachments with the prospect of the resultant images and experiments got everyone re-interested and excited about the original “viewing” words they had chosen at the start of the project.
Each student had a roll of Polaroid film to test their cameras. They paired up and began the experimentation. Making adjustments to their attachments after each image students recorded exposure time, sunlight placement, attachment use with each image. Some students had successes; some students never managed to produce an image at all. This phase of the exercise ended with a weekend assignment to draw an exploded axonometric explaining the construction of their cameras.

**Project: Part Three (duration: 14 days, 7 days for sketch exploration and 7 days for final project development)**

The students at this point were instructed to focus on one idea for their final wall section project and were told: You now have the challenge of inserting your camera and its activity into your wall section-site. Now the wall section-site must accommodate the body performing the activity as well as the camera performing its activity. The camera should be accessible to the body in order to change the film and operate the shutter mechanism. If the camera needs additional positioning in order to perform its activity, the body may not hold the camera but can operate an attachment/prosthetic in order to have the camera accurately perform.

As ridiculous as this sounds, the idea was to have the students use the camera exercise to help pull appropriate issues of scale and activity back to the wall section-site. The idea of the absurd is at work here with the final product no longer readily understandable to the student. What they had decided was their project prior to the camera exercise could not be relied upon to fulfill the last requirements of the project. Basically the camera should be able to record the body’s experience with the wall.

In this last phase of the project, I incorporated a multiple series sketch assignment to reconfirm sketching as a design tool. The focus was to work through all of the design ideas regarding the camera, its insertion into the wall, its attachment/prosthetic, the body at the wall, the openings/apertures required for the chosen activity, etc. The students were required to produce eight sketch series. Each series consists of ten to twenty unique sketches. Each series was formatted similarly for whatever method worked best for that particular series. In other words for axonometric or elevation studies trace overlays may be best, for camera insertion studies charcoal may be best. The student decides. For each individual series the formatting must be the same, all on same size sheet of paper, same medium. The big idea/main point of all of this sketching is to get everything designed and figured out prior to the last week of the assignment which is reserved primarily for drawing and building.

Required sketch series were as follows: axonometric sketch series of interior surface of wall, axonometric sketch series of exterior surface of wall, elevation sketch series of interior surface of wall, elevation sketch series of exterior surface of wall, sketch series to figure out camera insertion (attachment/prosthetic) into wall, sketch series of how the wall meets the ground or surrounding site, sketch series of movement activity diagrams for body activity, and sketch series of movement activity diagrams for camera activity. The students had the option of proposing additional sketch series if necessary to understand what they were trying to accomplish.

Final requirements were simple, a precise and detailed model of the designed wall at $\frac{1}{2}'' = 1'-0''$ made of basswood, axonometric of wall surface of your choice at $\frac{1}{2}'' = 1'-0''$, elevation of wall surface not shown in axonometric and a minimum of two section drawings at $\frac{1}{2}'' = 1'-0''$. 
Conclusion
The strength of this project became evident with the increasing interest and dedication from the students. Working between various modes increased productivity and ideas while scale variations (scaled exercise versus full-scale exercises) increased fundamental understanding of concepts and functional requirements of construction. While the project was rigorous in both schedule and production, the resultant plethora of design objects (drawings, sketches, models) was crucial to the student understanding of their own skill and potential.

Notes
1 The material for this paper was taught at the first year second semester of the Common First Year Program at Georgia Institute of Technology. “The CFY is an interdisciplinary studio setting for architecture, industrial design, and building construction students. All undergraduate students entering the College of Architecture proceed through the Common First Year. The goal of the CFY is to foster a critical curiosity about the designed and built environment. The curriculum is structured to give students the tools with which to engage the world around them. The shared threshold offered by the CFY provides an education that is both empowering and edifying. Students not only get a sense of the different disciplines but they also become aware of the overlaps and connections between them.” Georgia Institute of Technology website, www.arch.gatech.edu.


3 Ackermann.

4 Ackermann.


6 Fletcher.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
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A PEDAGOGICAL STRATEGY FOR DESIGNING  
AND BUILDING ARCHITECTURE  

NILS GORE  
University of Kansas  

Abstract  
This paper looks at design studio pedagogy that emphasizes direct experience with real materials. It argues that innovation takes place when a student “plays” with real materials and adopts a critical attitude towards craft. Recent studios demonstrate a pedagogy that leads students to discover forms, strategies, and techniques unlike those discovered by a student when working to scale in drawing or model. An essential aspect of this teaching is the emphasis revealing to the student the critical thinking inherent in the activity of making. Some argue that there is inherent architectural value in that: “…a rethinking of maker and means inevitably involves a rethinking of what architecture ought to be.”1  

In orthodox studios, students work primarily in paper and pencil, cardboard and glue, making representations that stand for other things, typically a building, to be fabricated by others, in another frame of time, at a different scale than the representation. In the studios discussed in this paper, students develop projects using real materials for a real purpose, in real time at full scale. Students build and rebuild their projects for critical review and group discussion. The paper reveals the pedagogical approach used to help students: 1) rethink attitudes towards “craft”; 2) develop achievable expectations through hands-on experimentation; and 3) discover design solutions that couldn’t plausibly emerge in the absence of such experimentation.  

1. Establishing an Attitude Towards “Craft”  
Many schools are instituting design/build programs to explore the value of learning by doing.2 Some argue that there is inherent architectural value in that: “…a rethinking of maker and means inevitably involves a rethinking of what architecture ought to be.”3  

In orthodox studios, students work primarily in paper and pencil, cardboard and glue, making representations that stand for other things, typically a building, to be fabricated by others, in another frame of time, at a different scale than the representation. In the studios discussed in this paper, students develop projects using real materials for a real purpose, in real time at full scale. Students build and rebuild their projects for critical review and group discussion.  

A project example  
Consider the following project statement from a recent studio:  

Make a vessel out of concrete that will hold and pour a gallon of water. Critique, revise and repeat.  

Embedded in this seemingly simple statement are numerous key principles: the idea that the student uses her own hands, drawing on her own skills and resources, to fashion something out of raw material; the idea that the thing has a typological correspondence to things already existing in the world; the idea that the thing is made with a pre-defined material, with its own behavior, history, technical requirements, body of research, and cultural memory; the idea that the thing has some kind of use that is ultimately testable; the idea that the thing has a haptic relationship with a human being; the idea that the thing is of an approximate size, capable of being picked up,
examined, and passed around; the idea that the student is reflective and self-critical; and the idea that the project has numerous cycles of repetition. There is a complex set of aesthetic, technological, economic, functional, and ergonomic issues in this assignment that a student must consider when carrying it out. By approaching it in a repetitious cycle, the student engages in a long conversation with the subject, and comes to know it intimately. By the end of the term, the students had made dozens of vessels, each with its own special qualities and characteristics.

Developing a Critical Approach to "Craft"

The word "craft" should be considered very broadly, meaning any human transformation of raw material into another object. This making can happen by hand, with the assistance of machine tools, or through the agency of automated manufacturing equipment. Every human or machine-made artifact that exists in the world has been made by craft. One important opportunity to develop a critical attitude towards craft and a critical awareness of agency occurs as students design and make.

David Pye was an English woodworker and design teacher who originally trained as an architect. His book The Nature and Art of Workmanship gives us an important and useful set of principles regarding craft and workmanship. Pye uses the terms "workmanship of risk," and "workmanship of certainty" to describe two different approaches to making that are distinguished by whether the result is predetermined and unalterable once production begins. "An operative, applying the workmanship of certainty, cannot spoil the job. A workman using the workmanship of risk, assisted by no matter what machine-tools and jigs, can do so at almost any minute." There is a qualitative difference in the objects made by the two methods, however most things that exist in the world are made with varying proportions of both types of workmanship.

Consider the veracity and implications of "risk" and "certainty" in this case: Imagine joining two wooden boards together in a 90-degree angle. You could use a pocket-knife to whittle the boards at the requisite angles, and then join them with some sort of fastener. This would be a "risky" technique because any slip of the hand would "spoil the job". Alternately, using a power mitre-saw with pre-machined detents set to prearranged angles involves a workmanship of certainty making the result "predetermined and unalterable once production begins." Imagine other techniques which exist between the two examples given: for instance, how a hand saw, free-cutting a pencil line, falls between a work of risk and a work of certainty. There is no perfect certainty nor perfect risk, merely a sliding balance between the two.

Now consider the potential qualitative difference between the two techniques. Imagine the whittled joint, perfectly executed, so that it could not be distinguished from the machined joint; it would be a notable feat if a person could pull that off. If the two joints were compared side-by-side, and we were told how they were made, then we would probably hold the whittled joint in higher esteem. Thus, we see the qualitative difference between artifacts made with certainty and risk. "There is something about the workmanship of risk…which has been long and widely valued." The artisan-made, hand-thrown, ceramic coffee cup tends to be more highly valued than a machine-produced cup, because of an appreciation of the "risk" embodied in the former. Furthermore, there is a sense of the hand of the maker and evidence such as fingerprints, wobbles, and scratches of the risk that went into it: an immensely various range of qualities, "without which the art of design becomes arid and impoverished." In this way, objects have quality whether precisely predetermined or evidently crafted. In some cases, from a design standpoint, precision is highly desirable, in other cases, it might not be. A designer could propose an artifact that has a sort of looseness to it. For example, rough, rubble masonry would be "spoiled" by executing it with too much precision. Pye defines good workmanship as "that which carries out or improves upon the intended design. Bad workmanship is what fails to do so and thwarts the design."
This is a critical point. Architects often imagine a pristine ideal of straight lines and square corners generated by drafted lines on paper: "In a designer's drawing all joints fit perfectly." Even in a computerized, highly-technologized world all things, from handmade to industrially-produced, from small handicraft to big building, are made with degrees of certainty and risk, of roughness and precision.

Imagine, once again, joining two boards together at a 90-degree angle. There are a number of possibilities to choose from: a 45-degree miter, a 90-degree butt joint, a half-lap joint, an overlapping joint, a dove-tail joint; you could lash them with rope or use a variety of fasteners. Each of these options has implied precision and roughness. Available tools, skills and materials influence critical decisions about plausible outcomes. For instance, the 45-degree miter is capable of making a highly precise joint but is relatively difficult to achieve without supplementary jigs, clamps and tools. It has a tight dimensional tolerance; miss by a fraction of an inch, or a few degrees in angle, and the appearance, strength, and integrity of the joint can be ruined. There are big differences between it and, for instance, the lashed joint, which is less dependent on dimensional accuracy. Instead, it is dependent on a different set of skills such as knot-tying and assessment of rope quality. From a craft standpoint they are very different propositions, as they may be from a strength standpoint. The differences in character are also likely to be very pronounced. In this simple example, there are implications in making a (seemingly) simple design decision: implications about workmanship, resources, strength, time, skill, character, cost and so on. The critical designer takes these into account while making decisions.

In a third-year undergraduate design studio in 1999, students designed and constructed a park in a small town in Mississippi that included an arbor, benches, stage and a retaining wall. None of the students was an expert craftsman and it was essential for us to find a way whereby students could design park elements that they would be able to build. No one in the group could construct to the tolerances imagined (naively) on paper and in models when originally working in the isolation of the studio. Material experimentation, coupled with critical discussion of notions of workmanship, led to development of a tectonic strategy that did not depend on extreme precision for success.

The arbor is the best element to demonstrate how this way of working determined the construction language of the park. The arbor is a 10' x 70' steel frame structure that supports wisteria plants for shading the space beneath. It consists of seven 10'x10' bays with 1/2" steel bars bent into "groin" vaults over each bay. Through a series of mock-ups, fabrication experiments, and critical discussions, the students decided to make the arbor's columns out of 1-inch thick steel re-bar.

Each column is made of three bars "lashed" together with 1/2-inch round steel rod. Steel is heated with an oxygen-acetylene torch and, as it is softened by the heat, it is wrapped smoothly around the vertical bars in a fluid fashion. There is a high degree of risk in the wrapping of the steel; it depends on good timing by the worker holding the torch and the person doing the wrapping. It was not clear at the outset what the language of the wraps should be: Should they be tight or loose? How many turns should they make? Should they be made with smooth bar or reinforcing bar? Students made mockups of a range of wrap-types and determined through consensus, based on actual results, the final design and fabrication of the columns. With practice gained in experimentation through repetition, the arbor team developed the skill necessary to wrap the steel with consistency. In other words, they achieved good workmanship: a good fit between design intention and outcome.

The columns were fabricated at the school and then placed on site-cast foundations. A system to ensure "certainty" was required so that the columns would fit on the cast-in anchor bolts in the correct orientation. Jigs and fixtures were developed to position the column legs accurately while wrapping, and then to locate the steel baseplate in its proper orientation. This method brought a desirable degree of certainty to the fabrication process. Once the columns were
on-site, leveling nuts on the foundation anchor bolts permitted the columns to be plumbed vertically.

The groin vaults were fabricated and installed in a similar fashion: the basic profile of the vaults was defined by panels built on jigs (for certainty), while the smaller members were installed "by eye" with a high degree of risk. The tectonic language of the vault is based on an approximately 12-inch overlap of the horizontal, perpendicular members. Since this spacing does not require a high level of precision, the overlaps could be off by even a few inches. The character of the final arbor is that of a vegetated and vegetative steel structure, a unique artifact constructed with equal measures of risk and certainty, executed by novice builders. Critical discussions about theories of workmanship allowed the students to develop the character of the final built work through experimentation and making. This degree of innovation, I believe, could not have developed on paper nearly as well as it did with a program of experimentation with real materials that included a critical approach to workmanship. Furthermore, it was realized as a group activity, with much give and take, and with a spirit of camaraderie, invention, discovery and adventure. It demonstrated an attitude of work as serious play.

2) Develop Achievable Expectations Through Hands-on Experimentation; and Experience and Learning through Serious Play

Exploration with materially-based projects, crafted by hand, promotes the development of a critical discourse between maker and object, and between maker and critics/colleagues. Students discover ideas about form and tectonics by expanding their recognition of material possibilities. Students interacting directly with materials learn a host of things. The bodily senses understand mass, texture, smell, resistance to deformation, sound, and color; the subtle interplay of these things with each other, and with other materials and processes. Direct experience promotes learning that is fundamentally different than, but not necessarily more important than, indirect experience.12 This educational approach fits into what might be called the “process” tradition of thinkers and philosophers such as William James, Charles Sanders Peirce, George Herbert Mead and John Dewey.13 In the early twentieth century, Dewey suggested that contact with any new material “…must inevitably be of the trial and error sort. An individual must actually try, in play or work, to do something with material in carrying out his own impulsive activity, and then note the interaction of his energy and that of the material employed....” He championed direct experience to improve children’s education where “…it is found, even with comparatively indifferent modes of instruction, that children's inquiries are spontaneous and numerous, and the proposals of solution advanced, varied and ingenious.”13 Dewey argues that learning comes from thinking, and that direct experience forces to students to think about the subject in more complex ways than with the “peculiar artificiality (that) attaches to much of what is learned in schools.”14

Design is a specialized form of learning, in the sense that, as one designs, one learns increasingly more about what it is that is being designed. There is a complex relationship between designer and designed: one learns about the object itself, about one’s intentions for the object, and about others’ reactions to the object through the act of design. Design itself is a form of argument, creating a “persuasive argument that comes to life whenever a user considers or uses a product as a means to some end.”15 Richard Buchanan argues that there are three important elements to a design argument: technological reasoning, character and emotion. Technological reasoning engages the functionality of the thing; character deals with qualities such as “good sense, apparent virtue, and goodwill toward the audience;” emotion evokes things like aesthetics, and the degree to which a user is “persuaded that it is emotionally desirable and valuable in their lives.”16 Thus, there is an inherent complexity of argument in design, embedded in, and communicated by the actual things we design. Craft embeds these arguments in material objects.
Reversal theory—a general approach in psychology dealing with motivation, emotion and personality—provides a way to think about play in two phenomenologically opposite states: Telic play, the "serious" state of play (from the ancient Greek, 'telos', meaning a goal or purpose) and paratelic play, the looser, more frivolous state (incorporating the ancient Greek word, 'para', meaning alongside). Different benefits accrue out of each type of play, and we pursue each type for different reasons. They are not oppositional; they are reciprocal. Each cycle feeds the other. Consider, for instance, a dancer simply enjoying the pulse of the music, swaying to its rhythm, (paratelic play) and "discovering" a certain movement that has some emotional or physical resonance, and which ends up being transformed into serious choreography for a public performance (telic play). The telic mode of play allows one to achieve purpose, accomplish goals, satisfy a competitive need, and the like. The paratelic mode of play permits one to operate in a protected zone of psychological safety, because the stakes are entirely different. In telic play, one might say that the end justifies the means, in paratelic play, the end is the means.

When an architecture student plays with concrete (or any other material) they might approach it telically, or paratelically, depending on his or her purpose. Ideally, there should be a cycle of learning from paratelic to telic to paratelic, and back again, starting with a period of loose experimentation within the protected, paratelic frame, then a purposeful application of lessons learned, and then a looser experimentation again, on a slightly different trajectory, in a continuing cycle of experimentation, discovery and learning. "...(W)here thinking is not controlled by the tyranny of some exigent and overriding goal, it can more easily take new paths which can lead to discoveries."18

The Success of Failure
The telic/paratelic cycle in these material investigations is dependent on the reality of the situation. This is because some series of critical judgments needs to be made to advance the work. A thing made can be evaluated by the maker and by others for what it actually is, not for what a representation merely purports it to be. It stands there (or it doesn't), it looks good (or it doesn't), it meets expectations (or it doesn't). The maker is not dependent on the authority of an outside critic to predict the future success or failure of the thing made. At a fundamental level, the thing is its own best critic. It is self-confirming for the maker in a way that lies outside of the realm of mere opinion. When a maker knows he has truly succeeded (certainly in his own eyes, and perhaps in the eyes of outside critics, but most importantly by the silent testimony of the object made), it breeds a feeling of self-confidence that can fuel production of future work (both made and represented). When a maker knows that she has failed, the failure tells her that she has found the edge, that she can return to the point of failure, and make good on it in future revisions. It is important to appreciate the breadth of notions of “success” and “failure”: to succeed in one of these projects is to develop a critical discourse with it; to establish "mastery" over it, to meet one's expectations, to learn—and abstract—lessons from it. It is possible to succeed in the project even if on its face the project didn’t turn out as originally intended. Knowing one has failed is useful, positive knowledge. In a paradoxical way, failure also builds self-confidence, in the sense that it helps the maker understand the idea of limits: the maker’s limits, the limits of materials, techniques, plausibilities. Understanding the limits of one's knowledge is an oft-cited definition of wisdom. The important thing is to provide the right time for failure to happen: the paratelic play cycle is where failure wants to happen so that it can still become part of the knowledge base (ready for deployment when it really counts), but while inside of the protected frame.

As an example, as students work on the concrete vessels they go through these paratelic/telic cycles, they (ideally) make progress; they innovate. In cycle one perhaps they come up with an "interesting" mix of concrete; in cycle two, they might discover that the mix flows well
into small cracks; in cycle three they might discover that the cracks sponsor a beautiful texture of ridges on the surface; in cycle four they might develop a way to optimize the mix for intensifying the texture, in cycle five they might discover that the addition of color intensifies the texture, and so forth. With each iteration, the student develops design ideas and, just as importantly, develops the craft skills, techniques, and procedures for carrying out the work.

A small project recently assigned to third-year undergraduates illustrates these notions of telic and paratelic play. In this particular assignment, the students drew a slip of paper from each of two hats. One slip named a nominally-rigid material, the other a nominally-flexible material. They were asked to begin the project by making three joints: an "overlapping" joint, an "abutted" joint and a "separated" joint. Though some of the materials were orthodox construction materials (wood, concrete, brick, building felt), others were not (lace, insect screen, bubble wrap). And the combination of the two was likely to be highly unorthodox (brick and lace). An iterative design process over the course of two weeks led each student to develop 1) numerous joints—the ostensible purpose of the project as assigned; and, 2) an abstract understanding of the problem and its solutions—the actual purpose of the project which came out in class discussions, and which is transferable to other design projects.

For instance, one student, confronted with the task of joining brick and lace, after a frustrating struggle with the apparent dissimilarity between these materials (when considering them at "full" scale), finally found a solution when she broke the brick apart, zoomed in to the micro scale, and acknowledged small fissures in it that were highly compatible with the delicate lace tendrils. Reflecting on the lessons learned in the project, she writes,

During the extrusion processes that formed the clay into its block shape, larger particles are scraped across the soft surface. The striations left in the clay are evidence of the path which the particles have traced....A hierarchy of structure to the lace was identified, allowing the top layer of threads to be unwoven from the underlying structure....By looking to the striations, enormously more precise and efficient connections could be made. Each thread fitted neatly behind a particle which had scraped across the surface. Continuing to pull at the particle in the prior direction of force allowed the thread to act as a hook when set in place...21

On unfamiliar turf, this student, in "playing" with the materials over the course of two weeks, gained an intimacy with them that revealed their hidden structures to her. Dissecting the lace allowed her to understand the hierarchy in the lace sample she chose (a consequence of its construction). Breaking the brick apart, and examining it at a micro scale, gave her insight into the brick's extruded manufacturing process. By playing paratelicly, she discovered a compatibility between the materials that led to a more purposeful and meaningful joining of them.

3) Discovering Design Solutions that Couldn't Plausibly Emerge in the Absence of Such Experimentation.

By the end of the process, the student has designed and built an object that couldn't exist in the absence of this process. The work didn't happen exclusively in the space of the mind. It happened in real space, real time and with real materials, in a process of architectural design driven by serious play, described by Mark West as, "an abiding faith in chance, the free fall of imagination, and its emotional pulse; a solemn study of 'natural law;' and an embrace of what can be called a 'builder's sensibility.' These lines are entwined and knotted through the discipline of architecture in a search for new forms and approaches to architectural design."22 The critical feedback from the reciprocal cycles of telic and paratelic play join together in a synergistic way to propel the work forward. Play leads to innovation, discovery, and the development of new ideas, forms and techniques in architecture.
Understanding the complex relationship between ideas of craft, workmanship, play, discovery and innovation is not a uniquely contemporary problem. It may be exacerbated by the accelerating nature of our industrial culture to introduce expanded and precise ways to fabricate, and faster and more accurate ways to draw. In the end, the evidence of these inputs (intentions, representations, materials, workmanship) will be apparent in the resultant physical artifact. It is important to recognize that these change very slowly compared to the apparent speed of the culture. Play is a fundamental human trait, and its creative potential can be brought to bear on the problems of architecture and construction, as well as other problems in life, as evidenced by Galileo’s thoughts on the subject: “But if by digressions, we can reach new truth, what harm is there in making one now, so that we may not lose this knowledge, remembering also that we are not tied down to a fixed and brief method but that we meet solely for our own entertainment? Indeed, who knows but that we may thus frequently discover something more interesting and beautiful than the solution originally sought?”

Notes
3 Piedmont-Palladino and Branch, p. 14.
4 Pye received an architectural education at the Architectural Association (AA) in London, then spent three years practicing as an architect, until World War II intervened. After a stint in the Navy, Pye first started teaching at the AA, then the Royal College of Art, where he was Professor of Furniture Design until his retirement in 1974. From: David Pye: Woodcarver and Turner, (London: Crafts Council, 1986) p. 13.
6 Ibid.
8 Pye, Nature and Art, p. 30
9 Ibid.
10 Ibid., p. 31. Or now, on a cathode ray tube where all joints fit perfectly to a one-thousandth of an inch tolerance.
11 The studio was taught by Nils Gore and Shannon Criss at the Mississippi State University School of Architecture.
12 It’s important to promote indirect experience in these projects as well. For instance, library research into the scientific properties of concrete.
15 Ibid., p. 13.
17 Ibid., p. 101-103.
20 Partial credit for the idea of an assignment about joining incompatible materials is due to Rachel McCann and David Lewis, at Mississippi State University.

21 Julia Ng, (unpublished class writing assignment.) 2003. Having students write reflectively about lessons learned at the conclusion of a project is beneficial for both them and me.


A Beginner’s Mind

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on the Beginning Design Student

Stephen Temple, editor

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“Deep Smarts”: a Confirmation of Studio-Based Pedagogy and, more particularly, Design/Build

JEFFREY S. HARTNETT
Portland State University

Part One

“To know and to act are one and the same”.¹

“Think with the whole body”.²

Your deepest and most needed body-of-knowledge as a studio instructor can’t be transferred onto a series of PowerPoint slides or downloaded into a data repository or be transferred to others via distance learning. It has to be passed on to the student in person -- one-on-one, and slowly, patiently, and systematically. This is the message and implication of “Deep Smarts”, an experience-based mentoring concept, developed by Dorothy Leonard and Walter Swap of the Harvard Business School, which claims to help explain the most effective way that senior members of an organization or profession can pass on their deepest knowledge or, even more importantly, their “wisdom”, to the next generation.³

When one of our students sizes up a complex situation within a design studio project context, and then comes to a rapid conceptual or formal/spatial decision that proves to be not just good but brilliant, we react by thinking, “that was smart!” After we’ve watched him or her do this a few times, we realize that we’re in the presence of someone special, someone with a type of design wisdom. It’s not simply raw brainpower or information-at-their-fingertips, though that helps. It’s not only emotional intelligence either, though that, too, is often involved. It can be described as “deep smarts”, the stuff that produces that mysterious and highly desirable characteristic, good design judgment.

Those that have deep smarts can see the whole picture and yet zoom in on a specific problem others have not been able to solve, or even recognize or diagnosis. Almost intuitively, they can make the right decision, at the right level-of-inquiry, and with the right people. Their insight seems to be based more on know-how than on facts per se; it is comprised of a system-view as well as expertise in particular areas. Deep smarts is experienced-based, but it may not be particularly philosophical – it’s not “wisdom” in that sense – but those with deep smarts come as close to wisdom as the real world of action and decisions and production gets. Because it is experienced-based, it can’t be produced overnight or imported readily or simply explained to others, but with the right techniques, this sort of knowledge can be taught and thus passed on through time.

Some design educators possess deep smarts, and the following discussion will now focus on them as a group. Their judgment and knowledge – both explicit and tacit – are stored in both their heads and hands.⁴ Their judgment and knowledge is essential to the institution; it cannot progress without them and this wisdom they inherently possess. It is important to understand the concept of deep smarts, how it can be cultivated, and how it can be transferred from one person to another.

Very few institutions and administrators manage this human asset well, perhaps because it is difficult to pin down and measure. Much of their insight is neither documented nor even articulated. But to, therefore, conclude that one can mostly neglect it is risky, probably even...
foolish. Also, at most institutions, deep smarts develops more by chance than by intent – and often in spite of leadership or mentoring practices rather than because of them. It is neither efficient nor effective to cultivate experienced-based know-how in an ad hoc fashion or to simply rely on an institution’s existing procedures for transferring knowledge. One should consider how people, both faculty and students, actually learn.

Think about something you are really, really good at doing – chess or cooking or design or whatever. Chances are, if you are not just competent (and so easily satisfied!), but truly expert, it took you many years, probably decades, or more to develop that expertise – in which time you’ve come across countless different situations, each inherently unique. With many experiences under your belt, you have likely found some common ground and discovered a few rules-of-thumbs that predictably work. However, as an expert, you have the perspective to go beyond generalizations and respond to unusual situations. You know facile ideas don’t apply, because you have seen so many exceptions. When confronted with a setback or a surprise, you can modify your course of action by combining elements from your menu of familiar options. In short, you can exploit an extensive experience repertoire. Experts who encounter a wide variety of situations over many years accumulate a storehouse of knowledge and, with it, the ability to reason and operate swiftly and often without a lot of conscious effort. Those with deep smarts can rapidly determine whether current cases fit any patterns that have emerged in the past; they are also adept at coherently (though not always consciously) assembling disparate elements into a whole that make sense. They can identify trends and anomalies that would escape the notice of less experienced individuals. The act of synthesis that is architectural design certainly fits within this type of activity. When asked to explain a decision, experts often cannot re-create all the pathways their brains checked out and so cannot give a carefully reasoned answer. They chalk up to gut feel what is really a form of gut knowledge.

As educators, one of our two fundamental responsibilities is to transfer our knowledge to someone else – our students. We also sometimes need to access bits of wisdom accumulated in someone else’s head (or hands). But before we can even begin to initiate such a transfer, we must consider how our brains process incoming information.

What we already have in our heads is a prime determinant in how we assimilate new experiences and attempt to extract knowledge from those experiences. Without receptors – hooks on which to hang new information – we may not even perceive or process that information. For someone to capture complex, experienced-based knowledge, his or her brain has to contain some frameworks, domain knowledge, or prior experiences to which current inputs can connect. Otherwise, the messages and information sent remain relatively meaningless data, even “chatter”. Without these receptors or frameworks, some individuals, because they are adaptive or because they’re “quick studies”, can sometimes be successful. However, usually this type of sink-or-swim strategy is inefficient or, even worse, ineffective. It is far better strategy to deliberately create receptors by providing frameworks or tools or other types of mental structures to which new experiences can be tied.

Receptors, however, are not enough. The most valuable component of deep smarts is the tacit know-how that a person has built up over many years of experience. This knowledge cannot be easily documented and handed over in a set of files or on a CD. But the preponderance of PowerPoint slides, web sites of best practices, repositories of project reports, online training, or even in-person lectures for the goal of transferring this knowledge is largely a losing set of strategies. Even the smartest and well-intentioned people have inherent difficulty gaining insight and knowledge, much less wisdom, from such materials and techniques, because so much of the knowledge they really need to absorb is tied to specific contexts and has tacit dimensions.
Part Two

“‘I’ve never built a ship’, Paxmore said quietly. ‘I’ve never learned’. ‘A man learns how by building it’.”

What is tacit knowledge? This concept is familiar to those who have read Donald Schoen’s book *The Reflective Practitioner*. However, the person who coined the phrase “tacit knowing” and who has introduced the most complete description of this concept is philosopher Michael Polanyi through his book *The Tacit Dimension*. Knowing tacitly means, “we know more than we can say”. Often condensed into the saying “learning by doing”, tacit knowing is a way of knowing the world; it is the primary way, as implied by Leonard and Swap, that architectural knowledge is transferred. The theme of Polanyi’s book echoes, at least to my ears, the underlying basis of studio teaching in general, and in design/build experiences in particular. There is a difference between “knowing what” (theory) and “knowing how” (practice). However, an important distinction of Polanyi’s thesis is that these two categories are not so tidily divisible; the “what” and the “how” inevitably talk to and directly relate to one another. As he explains it, “an explicit integration cannot replace its tacit counterpart. For example, the skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar; the knowledge I have of my own body differs altogether from the knowledge of its physiology; and the rules of rhyming and prosody do not tell me what a poem told me.” Tacit knowledge is the arena of design in general and design/build in particular, with its “. . . problems and hunches, physiognomies and skills, the use of tools, probes, and denotative language.” In design/build, a key instrument of knowing is the hand and its extensions, tools. The hand and its extensions operate at every level of architectural study. Instead of our brains telling our hands what to do, our hands return information to our brains, and often include surprising, even revealing, messages. Polanyi tellingly quotes an engineer whose dissertation topic was juggling: “Simply telling someone the idea won’t do. No matter how sincere the inquiry, a great deal of practice, and a special kind of practice, is necessary for real understanding.”

A central paradox in transferring deep smarts is that constantly reinventing the wheel is at least somewhat inefficient on its face, but fundamentally people learn deep smarts by doing, by the act of making.

Leonard and Swap have identified a number of techniques used by what they call knowledge coaches – experts who are motivated to share their deep smarts with protégés (in our case, primarily with our students). However, instead of the traditional mentoring role, to help one’s naïve protégés navigate the institution or provide personal advice, the knowledge coach primarily serves as a teacher transmitting his/her experience-based expertise and tacit knowledge.

Approaches vary considerably in how effectively they address this central deep smarts paradox and set-of-requirements. Most of these modes are well understood and are not revelations. However, learning-by-doing methods are not as familiar to many. They require active engagement from both the teacher and the student, they take (more) time, and they usually happen one-on-one. Of course, these final characteristics are distinguishing elements of almost any design studio-based learning experience, and more particularly with design/build.

If a list of teaching techniques were developed, moving in order from passive reception of knowledge to active learning through experience, it might look like the following:

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Recall now that the concept of deep smarts is based on an extensive experience repertoire. It's true that merely describing experiences to people, or telling them what to do or giving them rules, may create some mental receptors or scaffolding upon which to hang experiences; rules help people make sense of their experience but they do not serve as a substitute for it. The tacit dimensions of an expert's deep smarts have to be re-created and then experienced to take hold. That is, the novice needs to discover the expert's know-how through practice, observation, problem solving, and experimentation – under the observation, direction, and critique of a knowledge coach.

As the list above states, various forms of guided experiences work well to develop deep smarts. This simply means learning-by-doing, with feedback from a knowledge coach, which helps create deep understanding. As discussed earlier, this works especially well when the subject matter has many tacit dimensions, so even an expert may not be able to make them all explicit. Guided experience works especially well when the knowledge is context-specific, so it's appropriate to be alert and adaptive, rather than to apply general formulas. And this works well when the situation is new, and so there is great uncertainty and/or ambiguity.

Part Three

"... very few people are aware that in each of our fingers, located somewhere between the first phalange, the mesaphalange, and the metaphalange, there is a tiny brain. The fact is that the other organ which we call the brain, the one with which we came into the world, the one we transport around in our head . . . has only ever had very general, vague, diffuse, and, above all, unimaginative ideas about what the hands and fingers should do. For example, if the brain-in-our-head suddenly gets an idea for a painting, a sculpture, a piece of music or literature, or a clay figurine, it simply sends a signal to that effect and then waits to see what will happen. Having sent an order to the hands and fingers, it believes, or pretends to believe, that the task will then be completed, once the extremities of the arms have done their work. The brain has never been curious enough to ask itself why the end result of this manipulative process, which is complex even in its simplest forms, bears so little resemblance to what the brain imagined before it issued its instructions to the hands. It should be noted that the fingers are not born with brains, these develop gradually with the passage of time and with the help of what the eyes see. The help of the eyes is important, as important as what is seen through them. That is why the fingers have always excelled at uncovering what is concealed. Anything in the brain-in-our-heads that appears to have an instinctive, magical, or supernatural quality – whatever that may mean – is taught to it by the small brains in our fingers. In order for the brain-in-our-head to know what a stone is, the fingers have to first touch it, to feel its rough surface, its weight and density, to cut themselves on it. Only long afterward does the brain realize that from a fragment of that rock one could make something which the brain will call a knife or something it will call an idol. The brain-in-the-head has always lagged behind the hands . . . [and so] the fingers still have to summarize for it the results of their tactile investigations, the shiver that runs across the epidermis when it touches clay, the lacerating sharpness of the graver, the acid biting into the plate, the faint vibration of a piece of paper laid flat, the orography of textures, the crosshatching of fibers, the alphabet of the world in relief.

In our world characterized by acceleration and tectonic shifts in cultural norms and expectations, one might think that guided experience, in whatever form, is perhaps passé at best, or at least too costly. How many of us have heard the grumbling from those in central
administration about the inefficiency of studio-based teaching, often followed by questions such as, “why can’t you do studios through distance learning?” “The days of the one-on-one apprenticeship is over”, is perhaps also commonly heard. Yet many who share this view will nonetheless willingly spend lots of money and years of planning and effort and precious resources on formal training workshops and computer systems and multi-media projection systems and the like. All such investments are not wasteful. But the claim here, based on the work of Leonard and Swap, is that **guided experience** is the only way to cultivate deep smarts – and those-in-charge need to be realistic and rational about how much tacit, context-specific knowledge can be created or transferred, or not, through what might be described as other more “pragmatic” or technology-driven pedagogical means.

We need to educate those-in-charge about this **best practice** of teaching an experienced-based profession. No one questions why medical students, after becoming thoroughly book-smart, need to spend years working closely, elbow to elbow, and laboriously with experienced and giving doctors in order to become effective practitioners of medicine. We must make that analogy clear, and provide the clearest justification for such a claim. The concept of deep smarts can help in the making of an effective argument.

Guided experiences increases value exponentially – it promotes dual-purpose learning and builds on all that we know about how people accumulate and retain knowledge and wisdom. How can we afford not to (continue to) invest in it?

**Part Four**

*The brain asked a question and made a request, the hand answered and acted.*

Guided experiences, in terms of architectural education, occur most frequently and directly in the context of design studio courses and, more particularly, in design/build courses.

This business/psychology-based concept of deep smarts generally parallels the studio-model of architectural education; thus, helping to affirm studio-based pedagogy as an effective means for our students to cultivate “design wisdom”. It also questions whether lecture-type courses, now usually passively-received bullet-pointed information via PowerPoint, are effective in helping our students develop the gut knowledge and feel and instincts needed to operate effectively in the architectural arena. Professional design knowledge is of limited value if one has no gut feel about how to bring it to an effective realization out in the body of the physical world.

The conventional wisdom in beginning studio pedagogy is that one begins with the general and gradually works toward the specific; this is usually accomplished by introducing students to abstraction and new notions of form/space as a means of detaching them from their familiar world and to open their minds to another. The concept of deep smarts, however, calls into question this common means of beginning one’s design studio experience. The actual lived-experiences of each of our students, importantly always within the enveloping ether of the designed/built environment (unless the student was a feral child) can be one of the most effective “hooks” on which they can hang new knowledge. It is important to remember that for someone to capture complex experienced-based knowledge, his or her brain has to contain a sufficient framework, domain knowledge, and/or prior experiences to which new inputs can effectively connect.

In conclusion, in our academic environments, increasingly intolerant of “slow and patient” methods of teaching, an understanding of the science of the most effective methods of passing on deep smarts, absolutely necessary for professions such as medicine and architecture (both of which operate by actors intervening within a physical body in order to increase its wellness), can effectively serve as a sound argument for and defense of the hands-on studio-based model of pedagogy.
Perhaps one of the best illustrations of the power and relevance of experience-based pedagogy to develop deep smarts comes from this passage from the Introduction to the book *Rural Studio: Samuel Mockbee and an Architecture of Decency:* “Architects have long criticized their profession’s defining educational experience, the studio, where students, working under an established architect, are given a design problem, come up with a solution, flesh it out with floor plans and elevations, and defend it in a public session called a crit”. Sound familiar? Josh Cooper, a 1997 Auburn graduate, recalls that what he learned in class did not make sense until he began working on the Bryant House in Mason’s Bend as a second-year student at the Rural Studio. ‘Rather than drawing a window and not having a clue what I was drawing’, he says, ‘there was now a client standing there, and that window had to work for him. On a different level, I gained a lot of confidence knowing I could make that window work’  

As an educational experience, that approach seems to be both deep and smart, and worth explaining and defending.

Endnotes

1 samurai maxim, from Zen to Go, Jon Winokur, ed., p. 35.
2 Taisen Deshimaru, from Zen to Go, Jon Winokur, ed., p. 35.
4 For a helpful perspective on the “intelligence of the hands”, see Jose Saramago’s *The Cave*, the story of an old potter living within an unsettling changing culture and a transforming physical setting.
6 Ibid.
7 *Chesapeake*, James Michener.
10 Ibid, p. 4.
11 Ibid, p. 20.
12 Ibid, p. 29.
15 Ibid.
16 *The Cave*, Jose Saramago, translated from the Portuguese by Margaret Jull Costa, pp. 66-67.
17 Ibid, p. 68.
A Beginner’s Mind

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Stephen Temple, editor

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Sex, Stereotypes and *Queer Eye for the Straight Guy*: Media and The Identity Quandaries of the Beginning Design Student

LUCINDA KAUKAS HAVENHAND
Virginia Commonwealth University

Based on my experience interviewing prospective design students, it is safe to say that most are recruited today not by universities but by the media. The plethora of design shows such as *Trading Spaces*, *While You Were Out*, *Queer Eye for the Straight Guy*, and *Divine Design*, (to mention only a few) in addition to America’s present preoccupation with transformation and “re-do” has inspired many high school students to consider design as a career. In addition, media characterizations of designers, such as the interior designer Grace in the sitcom *Will and Grace*, George Costanza’s impersonation of an architect to impress women in TV’s *Seinfeld*, and Michele Pheiffer’s architect/mother role in the movie *One Fine Day* often give these students their first expectations about their future professions. Since most high schools have no consistent design or architectural curriculums and dependence on the media is pervasive as a prime source of cultural information in the United States, chances remain strong that entering design students will continue to be inspired by these sources.

Therefore, a major challenge to the design educator is dealing with the disconnect between what beginning design students believe their education will be about based on these portrayals, and the reality of our various curriculums in interior, industrial, and architectural design. In most cases, the strategy of many educators has been to ask the student to simply discard these inspirations as superficial. A student who expresses an interest in “decorating,” for example, soon finds out the ramifications of uttering this word. Stereotypes and departmental identities (i.e. the academic distinctions and hierarchies between fields such as interior design and architecture) may further exacerbate the student’s conflict between his/her preconceived perceptions and the realities of academia.

The first part of this paper asks--can the spark of interest inspired by the media, particularly T.V., be used to motivate and engage beginning students in the processes of design and their education? Should design educators ask students to discard their preconceived notions about design they gain from these programs? Should and could design education use the media as an educational tool particularly for the beginning designer?

To consider the answers to these questions this author was forced to do the unthinkable: watch all the current T.V. shows that focus on design. I found that on a given day one could view over 10-15 programs about design that broadcast practically hourly, day and night. The gamut includes programs such as: *While You were Out*, *Trading Spaces*, *Trading Spaces Family*, *Queer Eye for the Straight Guy*, *Design on a Dime*, *Design Remix*, *Decorating Cents*, *Design Challenge*, *Clean Sweep*, *Design to Sell*, *Curb Appeal*, *House Hunters*, *Painted House* and *Surprise Design* to mention just a few. A recent addition to the line up, which may be of particular note to design educators, is *Designer Finals* in which a soon-to-be-graduate of a design program is called upon to re-do a specific space and is then graded on their results.

The general format of these programs is fairly similar. An existing condition is presented that is undesirable: a space too small, too cluttered, and too un-aesthetically pleasing. A team of designers, which may include trained design professionals, the owners, their neighbors (who have “traded spaces” with them), contractors, carpenters and a variety of tradespeople, then work together to transform the space. The team almost always has time and budget constraints and is often forced to recycle materials, use found objects and/or shop carefully. The denouement of
each episode is when the team reaches some kind of conclusion to the project and the owner and/or unknowing surprise view the transformation. For the most part the owners of the spaces are emotionally moved by the result. A wide variety of screaming, crying, and “shock and awe” are usually demonstrated. The programs, however, leave the viewer fully understanding that design is transformative and can improve peoples’ lives if not only to just make them happy.

While at first these programs were limited to specialty cable channels about design like Home and Garden TV, other more general channels like The Learning Channel, the Discovery Channel and Bravo soon came on board. Recently this programming has expanded to prime time national networks with ABC’s Extreme Makeover: Home Edition. The design problems have expanded in scope as well, from one-room projects to whole communities with the debut of The Learning Channel’s new program Town Haul.

The preponderance of this kind of programming points to the rising public interest in design. Therefore, the chance that our incoming students have regularly viewed or at least seen one of these programs is high. As a professor in interior design, I find it common for entering or potential students to tell me which one of these is their favorite show.

But what exactly makes these programs so appealing? And more, what are our future students identifying with in them that inspire them to want to become designers?

Educational theorists Kristin Congdon, Marilyn Stewart and John Howell White state in their article Mapping Identity for Curriculum Work: “Our individual identities are constructed through our interaction within overlapping and intersecting communities to which we belong.” Religious, gender, geographic, family, age, economic, political, recreational, aesthetic, racial/ethnic, occupational are identified by them as the categories of these communities. Although many or all of these kinds of identifications could be represented in the media design shows, the most prominent has to be occupational. These various design shows motivate our students to identify occupationally with design. Since this identifier is chosen rather than inherent (such as race and gender) it can be assumed that the viewer/student must be seeing positive benefits from this choice of identification. Something in these programs motivates our students to want to make design part of their identity.

I want to speculate here as to what they are responding. First and foremost the design programs clearly promote the idea that design is transformative, helpful, and life enhancing. While some programs focus merely on aesthetics (Trading Spaces, Painted House), others focus on improved function (Clean Sweep, Queer Eye). It is also evident that there is a trend to foreground design’s social responsibility. In ABC’s new – Extreme Makeover Home Edition, an abjectly poor extended family living in a dilapidated house in southern Los Angeles was chosen to have their home made over. A crew of designers and crafts persons analyzed (quite melodramatically) their existing conditions and decided to pull the house down and rebuild two houses so that the son of the family (a rising basketball star, now a paraplegic due to a drive-by shooting, who was planning to be married) could have his own place. Although the inherent racism and elitism of having a team of educated white people “saving” a poor struggling African-American family was a bit too heavy handed, the theme of design as a tool to do things for people less fortunate was clearly highlighted. Regardless of the T.V. dramatics overlaid on this scenario, this trend has to be viewed as positive. Any student wishing to make an impact on the world and to create positive change would respond to this portrayal. As educators we can build on that desire.

Second, the design shows seem to highlight diversity. The image they present is that design is for everybody, and every kind of person can do design: men, women, gays, straights, people of various ethnicities, older people, younger people. What’s more stereotypes of these groups seem to be purposely challenged. Model-like girls are carpenters; jock-like men are identified as decorators. Girls with power tools frequently can be found instructing seemingly mechanically challenged males. In one episode I watched the male carpenter make a big deal about asking the woman designer/seamstress to teach him how to sew. “It’s something I’ve
always wanted to do," he stated and later beamed with self-accomplishment when he was able to sew a window covering. The historical association of architecture with men and decorating with women is disrupted here.

Andrew J. Mahoney, in his study of gifted learners has identified that in order to work to their potential the gifted student must experience “affiliation” and “affinity,” i.e. they need to know that someone understands their uniqueness and to relate to others like them. These criteria could be applied to any student. Because of the plethora of kinds of people who are portrayed as talented and successful in these design shows, almost any student, from any background can find affiliation and affinity. Students who may not have considered design in the past, based on their preconceived notions of what it was and who could be involved, may now understand that it is a possible career for them as well. This potentially could bring more diverse students into our classrooms with greater probability that they will challenge boundaries and stereotypes.

Third, and maybe most importantly from the student perspective, is that this media portrays design as contemporary and hip. Whereas the idea of becoming a lawyer (an perhaps even an architect) may conjure the image of wearing button-down shirts and bow ties and entering the rigidity of a corporate structure, becoming a designer here is presented as not requiring a transition to a conservative mode. While there is a level of professionalism portrayed, the people involved in design activities on these programs look like our students and act like our students. The men are shabby chic, dressed in jeans and tee shirts. The women sport current clothes styles and hair. They have personas more like rock musicians and athletes. They are hip and “super cool.” By doing design they have stardom and success, fan clubs, and commercial endorsements. Take Ty Pennington, the star of Extreme Makeover: Home Edition for example. Ty, is described on his web site as a “Jack of all Trades and Master of None, a “home design guru,” “off the wall” and “hunk-of-a carpenter”, who “sings and plays the guitar in his spare time, still enjoys his boyhood passions of surfing, skateboarding and playing soccer.” The message is clear here-- no lifestyle adjustment is necessary to enter this real-world scenario. In addition to being the author of Ty’s Tips, a successful how-to book, Pennington has just signed an exclusive multi-year agreement to partner with Sears in a broad range of activities,including product design and development, merchandising and advertising, and is their ambassador for the Sears American Dream Campaign. The message is clear--yes, design can bring success and financial security. In these days of American Idol and other Cinderella stories these portrayals can’t help but be appealing to our potential students. The end result for us is that more are applying to our programs than ever before.

And so if this is what gets them to want to be designers, what may we as educators expect as a result of it? First, we should get students who believe in design. As the sheer number of design shows tell us, design is being perceived as interesting, evocative, challenging, exciting and transformative. Because of T.V. design media, students come to our programs because they think that design is exciting and will allow them to make an imprint of their own individuality on the world. It seems that enthusiasm and belief in design is something that we as educators can never get enough of in our students.

Second, more practically, it seems like educators could expect that student inspired by the design shows should respond well to the educational format of the charette. Since the design shows all consistently use a format of a compressed time frame (which is enhanced by the media itself), the idea of completing a challenging project that requires all of your attention over a short duration of time should not seem overwhelming, but rather be appealing to these students. It at least suggests that the charette could an especially appropriate educational strategy for today’s beginner designer.

Third, use of materials and construction methods are highlighted in the T.V. programs, often by an instructional moment, in which a cast member takes time to show the audience how they are building something or using a specific technique. A variety of materials are introduced,
considered and explained. Students who watch these programs should then have better understanding of the possibilities of materials and construction. It may indicate to educators, that more experiential projects in real spaces would be more appropriate for inspiring today’s design students and that they would particularly be interested in building real things in real time with real materials.

Fourth, these media presentations should inspire a willingness to do team work and push disciplinary boundaries. An almost consistent practice of every T.V. design program is putting a variety people, including the clients, together in groups to work on the project. Carpenters, plumbers, designers, architects, and owners all work together to create the design solution. Each brings a different expertise and experience to the job ranging from degrees in interior, graphic, industrial, and architectural design; semiotics, scenography, fine arts and film as well as job experiences in construction, the movie industry, education, and theatre. Design is portrayed as a multi-disciplinary event that allows an individual to share his particular talent and learn new ones. This may indicate to educators that using a more interdisciplinary educational approach and pushing our students to explore disciplines outside our own may be a good strategy for teaching today’s design students.

Fifth, the T.V. programs emphasize that design is a process and demonstrate its various steps, from site analysis, to programming, ideation, schematic, revision, and construction. In each episode a team creates a plan of attack and organizes the conditions necessary to reach a desired end. Students watching these programs should gain a sense that design is about not just the end product.

Finally, the media presentations of design perhaps overemphasize, but emphasize nonetheless, a human and emotional connection to design. It seems that having students that want to respond to human needs and have it inspire feeling can only stimulate their involvement in the design process and their education.

Of course the media presentations of design are not without their shortcomings. The compression of time required for a T.V. time slot cannot indicate what the full effort of the project must be. Nor does it reflect the daily reality of design in which it may take months or years rather than two days to complete a project. In doing so the T.V. programs tend to support the need for instant gratification that is generally characteristic of current students. This deserves a caveat. Along with this, the programs do not stress skills development or the fact the people participating actually went to school and/or had to practice for a while to be able to do what they do. At the same time that they inspire students by their characterization of designers as cool and hip, they also tend to emphasize the idea of being a “design star” which may cause the need for some attitude adjustment in a typical academic studio scenario. Knowing that these shows may breed these kinds of attitudes, however, is helpful for us to understand and remedy potential student problems.

And so I believe this research has provided useful insight not only as to how design is being portrayed in the media, but also as to what our students will bring to the classroom from that experience and how we might use it to our advantage. However, by far the most useful thing I discovered through this exploration was a clearer understanding of my own ideas about design and design education.

Although I have been fascinated by this phenomenon of design on the media for a long while I had never actually watched any of the T.V. programs until I started this project. When my paper was accepted for this conference my first thought was “Damn, now I’m going to have to watch these stupid programs.” I did start watching them, therefore, under extreme duress and with great skepticism. Something in my training and experience made me feel like I was lowering myself by doing this. I even made excuses to my husband when he came in while I was watching these programs and asserted, “I’m not watching this. I’m doing research!”
Then slowly I watched myself get sucked in. I began having my favorite programs and characters. I started cheering like a sports fan for the team to get the project done on time, and yelled at the T.V. concerning my perception that mistakes were being made. And yes, once or twice, a tear came to my eye at the unveiling of the end product. This of course, I am ashamed to admit here. And I would guess that what causes my shame is the same thing that makes us reluctant to admit these venues have any value to us as design educators. This realization poses my second question: is design education embedded so strongly with its own stereotypes and preconceived ideas that make it overly resistant to outside portrayals and outside influences?

Since the majority of my research has concentrated over the years on deconstructing stereotypes about design I was aghast at realizing my own rigidity in this project. For years I have been interrogating the perception that interior design is inferior to architecture by posing theoretical deconstructions. I realized though this project, however, that perhaps television was doing more for interior design than I was with my esoteric ramblings. Architecture, interior design, industrial design, art and decorating are not differentiated in these programs. The designers are from diverse backgrounds but they work together in the way that founding fathers of the Bauhaus dreamed of. The design shows have made design the interdisciplinary effort that my theories have long proposed but not been able to actualize.

However, our students who have watched and perhaps been inspired by these shows, then come to us and are divided by interdisciplinary boundaries of academia and the profession. They must realize very quickly (do we teach them this?) that each has a separate identity, a stereotype, a place in a hierarchy, and more often compete than work together. It seems that although, as this analysis clearly points out, design is a transformative process, design education is itself resistant to transformation. We teach our students that we must interrogate the status quo consistently to be a good designer, but yet we as educators seem to be reluctant to apply that method to ourselves.

For the most part, we continue to teach as we were taught, to transmit the values taught to us, to use the same resources and methods we are comfortable with. As my reluctance to do my own research demonstrated to me, we do so because other options sometimes seem to risk upsetting something that is seemingly very important to our self-identity, self-worth, legitimacy and “superiority”. In this case, although T.V. is one of the most dominant forms of information distribution in our time, we may not consider a viable educational tool because it does not seem serious enough or worry that its use may somehow threaten our profession’s credibility. But do we miss an opportunity in this?

As educators I’m sure we have all used the method of asking beginning designers to turn their model upside down so that they can see their work in a new way with new potentials. Isn’t time we took the chance and turned the model upside down for education? If T.V. has something to offer shouldn’t we take it? Or any of the other new venues out there? (Internet, X-box, movies, theater) --just to see what the potential could be for us, for our students, and for design education in this new millennium. By doing so it seems we have only to gain the potential of better understanding of the needs and hopes of our students as well as the needs and hopes of contemporary society for design.

Notes


2Although cast members education is not mentioned specifically in the programs, their websites overview their education and experience.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Inserting a Design Culture into a Multicultural Environment

W. EIRIK HEINTZ
American University of Sharjah

Introduction

Unlike most other disciplines across the college curriculum, design introduces its students to a way of thinking and learning very different from what they experienced in their previous education. This difference is even more pronounced for students entering design foundations at the American University of Sharjah (AUS) in the United Arab Emirates. The school provides a co-educational, multicultural environment unlike most other universities in the Middle East and very different than what most students have experienced in their secondary education. While many of these students share many traits and values with students from Western cultures, there are fundamental cultural differences that challenge the way these students engage their design education. This paper examines methods of instruction that build upon the established culture and examine learning impediments that these students face at the beginning of their design education. Some of these impediments are culturally based while others come from a student’s prior experience with a model of education that stresses memorization and recall rather than critical thinking skills. This paper also utilizes an AUS foundations student survey that was administered to assess how this diverse student body engages this transition into a design culture.

Background

The United Arab Emirates is different than most countries in the Middle East in that roughly 80% of its population of four million is expatriates.\(^1\) This expatriate population is made up of people from all over the world who have moved to the Emirates to work in various industries. Most countries of the Gulf Cooperation Council (GCC) rely on expatriate labor to sustain economic development but the UAE is perhaps the most culturally diverse country of the region. Students in the foundations program at AUS come from 21 different countries. The largest single population, that of UAE nationals, makes up only 15 percent of the total student population in the foundations program. GCC nationals make up 29 percent of the total foundations student population and 66 percent are of Arab decent. The rest are from Asia, Africa, Europe and North America. The one-year foundations program at AUS includes students who will major in architecture, interior design, visual communication, multimedia design and design management.

Many universities in the GCC segregate men and women. The government-funded universities are generally for nationals only so the student populations tend to be very homogenous. One primary aspect common to both the educational system in the Middle East and Eastern cultures is the emphasis on community. This has both positive and negative outcomes in Western design education. Independent thought is often discouraged and conformity is praised. The United Nations Development Program (UNDP) “Arab Human Development report:2003” stated that some researchers have argued that the curricula taught in Arab countries seem to encourage submission, obedience, subordination and compliance, rather than free critical thinking. In many cases, the contents of these curricula do not stimulate students to criticize political or social axioms. Instead, they smother their independent tendencies and creativity (Munir Bashour, background paper for AHDR 2).\(^2\)
Many students entering AUS have little experience thinking for themselves. They are used to parents making decisions for them and teachers directing them as to what to do. Research conducted through the Emirates Center for Strategic Studies and Research notes “Education in the GCC countries is criticized for its emphasis on routine learning and memorization, for its high attrition and for repeaters’ rates which have reached 31 percent in some secondary schools. Schools are accused of graduating more and more low achievers who are functionally illiterate and lack a minimum threshold of competence.” The methods of instruction students are exposed to also limit the types of learning experiences many of the students have. The UNDP report notes that “there are various means for conveying information: lectures, seminars, workshops, collaborative work, laboratory work and many others. In Arab countries, however, lectures seem to dominate. Students can do little but memorize, recite and perfect rote learning. The most widely used instruments are schoolbooks, notes, sheets or summaries. Communication in education is didactic, supported by set books containing indisputable texts in which knowledge is objectified so as to hold incontestable facts, and by an examination process that only tests memorization and factual recall.”

At the end of the first semester of study at AUS, only 20 percent of the foundations students surveyed stated that their secondary education prepared them for their foundations courses.

There have been significant efforts in the last two decades to increase the quality of education in the region. Private universities like the American University of Sharjah have been established to provide an education equivalent to what one would typically find in the West. Because of the growing globalization of the economy, English has been the preferred language of instruction, which has posed a problem for many students who lack the English language skills needed to effectively engage in a teaching environment that often involves complex issues and theories. Many students must spend extra time devoted to reading to reach a level of comprehension adequate to pass the course.

Social and family obligations are a priority in regional cultures and often compete with study and work time. Forty-seven percent of foundations students at AUS say that family obligations conflict with study and studio work time. Far too often the family structure has created an environment that also limits students ability to think for themselves. The UNDP report states “Studies indicate that the most common style of child rearing within the Arab family is the authoritarian accompanied by the over-protective. This adversely affects children’s independence, self-confidence and social efficiency, and leads to an increase in passive attitudes and the deterioration of decision-making skills, not only with respect to behavior, but also to how the child thinks. For, starting in early childhood, the child becomes accustomed to suppressing her or his inquisitive and exploratory tendencies and sense of initiative (al-Sweigh, in Arabic, background paper for this report).” Social time spent visiting and talking to friends is even more of an issue for foundation students at AUS, with as many as 70 percent saying that social time with friends conflicts with study and studio time.

Establishing a Design Culture

The AIAS Studio Task Force report on The Redesign of Studio Culture has been instrumental in the examination of design culture at AUS. The report states, “To design a healthy studio culture, we have laid forth five essential values: optimism, respect, sharing, engagement, and innovation.” These values are essential in a multicultural learning environment that aims to bridge Eastern ideals that focus on the collective and Western ideals that focus on the individual. The report goes on to say, “A challenging studio learning environment contains many aspects: relating knowledge to student experience and vision, a multiplicity of pedagogical and learning styles, a variety of student-faculty and student-student encounters, an ability to take risks, and an opportunity to share power to construct new knowledge and transform thinking.”
multicultural environment, these aspects must address cultural and social issues in a way that allow all views to be heard and valued equally.

Creating an environment that promotes learning, social and intellectual development and positive engagement is the first step to establishing a healthy design culture. Thomas Cassidy reports in his essay on Arab education, “Practices based on the individual pursuit of rote learning and memorization must give way to practices that encourage teamwork, critical thinking and problem-solving; methods that assume that people learn in similar ways must also give way to methods that understand that people often learn in very different ways.” 6 It is critical that the design student understands the role they play in their own education. They must understand from the beginning that they are ultimately responsible for their own learning. This doesn’t mean that educators no longer play an important role in shaping the student’s future. It implies an engagement between faculty and student that allows for flexibility, openness and trust. The AIAS report talks about the problems associated with the establishment of a studio instructor as an authoritarian figure stating, “When a studio culture places an instructor in an unquestioned position of power, we believe that learning is compromised. Design instructors are leaders, critics and facilitators...In an environment where educators create master/student relationships, students are less likely to take risks, think critically, or communicate successfully with instructors.” 9 Students need to feel empowered especially if they come from a background where their role within their own education has been passive. However, with this newly found freedom, students must also learn that they have responsibilities and that if they ignore their responsibilities that there will be consequences.

The foundations year is often difficult for students because they must transition to a new educational environment where the subject and manner of inquiry is different, and must adjust to a different work and study schedule. Students also have difficulty with the system of grades at AUS. Most students that come to AUS are used to being in the top 25 percent of their class, and were able to achieve that level of success by only studying a few hours in the afternoon. Immediately on entry to the foundations program at AUS, students find that to get above a C, they need to work evenings and weekends as well. Students have stated that while it was typical for them to get straight A’s in high school, they are getting C’s in many of their classes and it is hard for them to cope. Unfortunately, this has created an environment where grades seem to dominate the foundations student’s agenda. Like in many schools in North America, acceptance to second-year is competitive, based on GPA and space availability. Sixty-five percent of foundations students at AUS stated that they were concerned they will not get into second year. Students also feel a great deal of pressure from their parents to make good grades. Fifty-six percent of students said that their parents would be upset if they got a C in any of their classes. The report of the AIAS Studio Culture Task Force comments on the pressure surrounding grades: “Grades reduce risk-taking, reinforce conformity and generally lead students to avoid challenging themselves in the studio.” 10

Because students spend a great deal of their time in each other’s company working in the studio, they should be encouraged to engage each other as part of the learning process. Students seem to understand the value of working and studying with a diversity of other people. This type of engagement seems to be as relevant to the profession as it is to education. In describing the studio culture that was established at Umbra Ltd. in Toronto, Paul Rowan states, “Sustaining creativity requires a continuous infusion—not only of new ideas, but also new people.” 11 The establishment of a design culture is a good way to connect academic and social experiences. If this happens in a studio space that is utilized by a diversity of people, learning through an unscripted engagement with others naturally follows. The value that is placed on social relations is also integrated into how design is taught. Small-scale critiques and collaborations allow students to “help each other.” This plays into the strong sense of community prevalent among the cultures represented on campus. Rowan observes, “It is our consistent experience that creative
work thrives best in a collaborative environment.” Communication is also encouraged between year levels as an informal mentoring system. Ninety-four percent of foundations students at AUS reported that they discussed their work with other foundations students, 63 percent reported doing so on a consistent basis, and 60 percent stated that they discuss their projects with upper-year level students. This collaborative atmosphere is also facilitated by the openness of the classrooms and the proximity of different majors to the foundations area. This arrangement encourages collaboration and interaction not only among students, but also among faculty.

The learning objectives of the foundations program must be balanced between objective skill-based learning outcomes and knowledge-based learning outcomes that deal with process, critical thinking and innovation. The establishment of a design culture must primarily evolve out of the pursuit of knowledge-based learning. The report of the AIAS Studio Culture Task Force, states, “If future architects are to perceive new opportunities as well as give them form, architectural education must depend less on skill-based learning and more on the dissemination of knowledge. The critical knowledge to be disseminated and assimilated is not all internal to the discipline.” The establishment of this type of focus must be integrated into the very beginnings of a student’s education.

Students at AUS have an enormous amount of trouble managing their time because punctuality and deadlines have not been emphasized in their previous education. The AIAS report states, “Learning successful time management skills is essential. Students must truly understand the value of their time.” This is addressed through both the teaching environment and types of projects given to foundations students. Projects that last through more than one class period are broken down into segments that allow students to gauge how and what they are to accomplish by the next class period. This tends to help students engage the project objectives better but unfortunately doesn’t help them to begin to learn time-management skills. One method used to confront this issue is to assign a time sensitive outline at the beginning of the project that the student must create/design as a means to plan their time to effectively complete the required work. This way, the student is ultimately responsible for planning and organizing his/her time. Because the time management outline is created by the student and not imposed by the instructor, a certain amount of flexibility is created, which allows students to plan for family obligations or other assignments that might compete with study and work time. Additional time management and study skills training are available through a study skills advisor dedicated to the school. This advisor primarily works with beginning design students who are struggling academically.

Most AUS students don’t have the confidence to make independent decisions at the start of their design education. The integration of projects that have some degree of experimentation builds confidence and encourages independent thought. This type of project is often characterized by having a defined set of objectives, but an undefined or vague outcome or the final “product.” This is often balanced against the necessity to create a structured process that allows for a focused investigation. Structure is important because it helps students deal with time management issues and keeps them focused on project objectives but it can be an impediment to the development of independent thinking. This has been confronted through a balanced structuring of the process and development stages of the design project that allow students to develop design intentions and variations on a theme that is personally unique. Critical thinking skills are integrated into exercises through simple analysis, process articulation and verbal communication of design intentions. Students use the design vocabulary and representation skills that they have learned to design the project around their own interests. This is important in that it nurtures student’s creativity and gives them some element of control. Rowan writes, “Creativity is often described as ‘making the familiar unfamiliar.’ Looking at things from a different perspective.” The multicultural environment of the foundations studio at AUS certainly allows for
the examination of multiple perspectives but only if students are encouraged to express their personal views and experiences through their work.

In establishing a healthy design culture, students must be comfortable having their work critiqued and critiquing other student’s work. After one semester of study, 89 percent of foundation students at AUS said they felt comfortable having their work critiqued but only 63 percent said they felt comfortable critiquing other student’s work. Students need to understand the importance of the critique as a learning opportunity. Many students misunderstand the critique as a personal commentary on their abilities. Students that feel uncomfortable critiquing other students work often don’t want to offend or say anything negative about that work as they fear it will create a hostile environment. Learning how to critique other students’ work and the student’s own work is an important learning objective that is too often left to the student to figure out on their own. If the critique is integrated into the design process and students are encouraged to participate throughout, the critique process becomes part of a larger discussion and avoids the particulars of individual critique that may be irrelevant to the group. Critiques that focus on the particular aspects of individual projects are perhaps more relevant to a one-on-one desk critique, which should be very different that a group critique. For either instance, the instructor has an obligation to teach students how to critique.

Lastly, students should understand that the work they are doing in foundations has value. It may involve basic design and drawing techniques, process and development, but its value is relevant to the design profession. At AUS the value of the work produced in foundations is reinforced through the display of the work in public areas of the architecture and design building. These shows are designed to encourage students who have produced something noteworthy and as a learning opportunity where exemplary work can be discussed on its merits. The foundations year ends with the Foundations Juried Exhibition, for which students submit up to three drawings, models or designs produced in one of their foundations classes. The show is competitive, generally accepting only about 30 percent of the submissions. The work is then exhibited in the main gallery and judged by three invited outside critics who choose four awards and honorable mentions. The entire faculty of the school selects to award the Faculty Choice Award and the department chairs and the dean choose special awards as well. This event is advertised all over campus and draws students and faculty from outside the school as well as the chancellor of the university and some local media.

**Conclusion**

The establishment of a healthy design culture in any school of design is one of the first steps to ensure consistent academic quality and achievement. It is this context that is one of the most important learning objectives. The UNDP report states “Ultimately, the quality of education does not depend on the availability of resources or on quantitative factors, but on characteristics related to the organization of the educational process and the means of delivery and evaluation.”

Within a multicultural environment, the design culture has a unique ability to absorb cultural, social, political and religious differences in a way that promotes quality, innovation and respect for other points of view. The establishment of a positive collaborative atmosphere has the means to produce an environment that combines educational objectives, social opportunities and growth. If it is to be successful, students must be drawn to the design studio because it provides a type of learning that they are unable to achieve in isolation.
ENDNOTES

1 http://www.uaeinteract.com/news/?ID=134
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7 Ibid: 16.
10 Ibid: 16.
11 Paul Rowan, “Creativity and Education: Personal Reflections on Achieving Success by Working Outside the Box,” Education Canada. Toronto: Fall 2003. vol.43, Iss. 4; pg. N/A.
12 Ibid
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15 Paul Rowan: N/A.
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The University of Texas at San Antonio
24-26 February 2005
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The Beginner’s Mind: Incorporating Educational Psychology and Creativity into the Foundation Design Education

RODNEY CULVER HILL
Texas A&M University

“The student is not a vessel to be filled but a fire to be kindled.”
-Mestrius Plutarch

“You cannot teach a man anything. You can only help him discover it in himself.”
- Galileo

The act of creation is the crux of meaningful design.

“At critical points in history, those rare, dedicated few who discovered, remembered, or were taught the way to operate the channel to their deep unconscious (idea processor) seem to have been intuitively led to produce knowledge and change the existing domain.” - Willis Harmon

Unless the beginning design student was fortunate to have a musical, drama or sports teacher in high school that was tuned to help the student create “flow” for optimum behavior, the student may have difficulty fully engaging the act of creation in beginning design. The aware teacher wants to develop the “Intreprenuer” within. An “Intreprenuer” is a person that is aware of his/her inner processes and is cognizant of his/her ability to achieve “flow”, the “zone” or “white moment.” Educational psychologists, psychologists and sports psychologists have been contributing to the development of Intreprenuers for several decades. All Olympic training centers spend 90% of the time developing the athlete’s ability to get into the “zone.” When an athlete or performer is in the “zone” or “flow” state, everything clicks. Their skills are matched with the challenge and they blend with the moment. Everything feels harmonious, holistic and effortless.

Over the years, I have adopted several methods to help the students discover the Intreprenuer within. Since tension inhibits creativity, I incorporated progressive relaxation exercises developed by Harvard Medical School in the 1920’s for patients that need to reduce blood pressure and were allergic to medications. Every counseling center at every university utilizes these exercises. Students can more easily access “flow” in a relaxed state. With the lights off, students recline on the top of their desks and over a period of days go through six progressive relaxation exercises. Sports psychologists, drama teachers and musicians use centering exercises to focus the student’s mind on specific activities before an event, I am using centering exercises to visualize designs in the five senses and have written centering exercises that also incorporate progressive relaxation exercises. These exercises also help students overcome design preconceptions and utilize aspects of environmental psychology. Baron and Taylor in their book, Scientific Creativity, state that it takes 3-5 years for a person to recover from their University experience before they create any new knowledge. I have a series of lectures and exercises on creativity that guide the students to discover how they personally get into “flow”. There are many ways to achieve “flow” and each student must realize what is effective for him/her.

Music with words is to be avoided as words trigger images in the brain that can conflict with the creation of an original design. Some students must have total quiet to continue to maintain “flow”. Different sensory stimulations effect students thus enhancing or diminishing “flow.” The act of creation is a self-involvement and is usually not a public performance. Aloneness is usually required for the student not trained in the art of “flow” which is why many
students are more creatively fluid working nights when they have more opportunity for uninterrupted “flow.” Students who started the beginning design class often had difficulty generating ideas since most had no background in getting into their idea processor through “flow.” About midway through the class, students began to recognize what triggers their individual “flow” and by the end of the semester, the biggest problem they have is choosing which one of the many ideas they have generated. This inner skill is carried into all their classes, not just design classes. Relaxation and “flow” help maintain optimum behavior even in rote memory classes and their grades in all their classes improve. Students in my beginning design class have received the majority of the scholarships and archived projects in their sophomore, junior and senior year. By discovering the path to their personal “flow”, they have gained confidence in their own ability to create.

In concert with the design classes and to open up the process of creativity to the rest of the campus, I created a lecture/design class on creativity and future studies that encourages students to be constantly creative in their daily life. The course established an environment for students in any major around the campus to create knowledge. Instead of reproducing knowledge, students are stimulated to produce soft innovations, hybrids and inventions. Students are challenged to constantly think of innovations that could improve existing products, services or processes. Students are made aware of accelerating change and the necessity to be creative in this century. The class is open to all majors within the university resulting in a rich mix of ideas.

Each student has to sign a nondisclosure statement to get into the class. The nondisclosure statement protects any idea presented in class for a year. There are individual and group projects that require the students to produce knowledge. Groups of six were selected by mixing majors and gender, Mid-terms and finals are mission impossible take home problem solving essays where they must document their thinking processes and use multiple creative problem solving techniques covered in class. Automatic “A’s” were given to individuals or groups that sold their innovations, hybrids or inventions to an established company. Licensing and Patent experts were brought into class and students had to check their inventions against the US Patent Office computers.

In addition, each week students wrote down as many ideas that might be developed with new technology in the future in the form of an “Ignorance Journal”. Groups could share their ideas to create current projects. Centering and progressive relaxation exercises were utilized as well to help students discover what encourages their own personal “flow”. The act of creation occurs in a “flow” state. The students are given examples and instruction throughout the semester to be mentally prepared to recognize the state of mind for their own act of creation. During the class, student groups debate questions like- What could be invented today that will put you out of business tomorrow? Will their domains even exist 10, 20 or 30 years. Hence two thirds of the jobs that will be available in 2020 have not been invented yet. It will be knowledge creators that invent the companies and services of the future.

The class has 165 students representing every College on campus and enrollment fills in the first 9 hours of a three-week registration period with a majority of honors students. It is the first class to fill on campus. The College of Business and the College of Engineering have asked for slots for all their honors freshmen for next semester. The Honors College is considering requiring the course as part of their core curriculum.

Creativity happens in the same part of the brain in every individual. It doesn’t matter if the person is an artist or a scientist. The self-discoversies students make in this class helps them in all their courses and in their confidence to be a creative individual. The cross pollination of ideas from every major gives students an insight on how others think and the benefit of morphing between majors to create new and novel ideas. After every lecture, groups debate possible future alternatives utilizing knowledge from their disciplines. Any pop quizzes are creative problem solving challenges. Students can debate with
me on alternative answers in the open class. Students have to present their soft innovations, hybrids and inventions in class and the class votes on which projects have commercial possibilities. One of the real thrills of teaching this course is when students who felt that they were not creative, suddenly discover that they are an idea factory.

**Notes:**


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Constructing Curriculum... 384 Hands on Learning

MICHAEL HUGHES
University of Colorado

The design-build studio is an excellent setting for students to be “total architects”, to learn to work with others in teams, communicate with clients, reach compromises, and shepherd a project through the complete building process.

*Building Community*, Ernest Boyer, pg. 87
(Carnegie Foundation: Princeton, 1997)

Ernest Boyer’s comprehensive report, *Building Community*, examined the state of contemporary architectural education and found a disturbing trend toward professional isolation. Boyer identifies the design-build studio as a model for integrating an array of design, technology and organizational lessons in a comprehensive, educational setting. This inclusive model for teaching architecture confronts students with a broad spectrum of interdependent, real-world criteria and responsibility. In its most familiar format, derived from the paradigm developed in the first-year Building Studio at Yale, a design/build studio consists of 8 to 18 students, along with a faculty member, working directly, at full scale, on all aspects related to the design and construction of a small building project. Typically these projects occur at the scale of a gateway, picnic pavilion, or small house and span the duration of a single, academic semester. This hands-on experience mimics aspects of the “real” world and provides a rare opportunity to confront the complexities of thinking and making architecture within the academy.

In an attempt to address perceived deficiencies in design education vis a vis the integration of building technology and construction, many schools have introduced some variation on the design-build format. However, this remedy remains largely tangential to the core curriculum of most, if not all, schools. Design-build tends to serve a relatively small percentage of the student body, focusing almost exclusively on upper level students.

 Attempts to widely implement design-build throughout a curricula have encountered significant logistical hurdles. For example, extraordinary financial and time commitments from the participating clients, faculty, and students combined with legal concerns at the administrative level conspire against widespread implementation. The most common format for the implementation of design-build courses locates a single, annual studio course open to advanced students at, or near, the end of the education. Given the logistical hurdles involved in providing even one of these classes in any given year we can expect, at best, only 10-25% of the typical student body will have the opportunity to participate during their academic career. As a result, design-build has had a compelling, but ultimately limited impact on the fundamental organization and delivery of architectural education.

In addition to these logistical issues there exist curricular structures and delivery formats in the technology course sequence that hinder the implementation of design-build. Specifically, the ongoing segregation of design and technology classes combined with a dearth of innovative instruction in core technology courses impedes that the type of integrated and incremental instruction necessary to achieve the desired level of sophistication and “finish” in our student’s work. Compounding the problem, technology courses tend to rely on conventional, less than engaging, instructional methods utilizing passive, text and image-based, lecture formats. In these courses students are introduced to technology and construction through overly reductive
abstractions: Formulas, diagrams, construction details, and building sections disassociated from the act of design. These abstractions obscure the pedagogical potential residing in tactile discovery implicit within design-build. Realizing the potential extant in the design-build paradigm requires a thorough reexamination of the pedagogical hierarchies that exist in the structure of traditional curricula. By identifying new opportunities for technology to be integrated into comprehensive learning settings, the essence of experiential, hands-on learning, currently limited to the design-build studio, could be expanded across the curriculum.

In response to both the logistical and infrastructural limitations, my research/project entitled *Constructing Curriculum* attempts to identify and implement opportunities for hands-on, material education inspired the design-build paradigm. This ongoing *Constructing Curriculum* effort seeks to augment, rather than supplant, existing educational methodologies by integrating issues of technology, tactile experience, construction and full-scale material manipulation into a wide variety of existing instructional formats. The goal is to present integrated alternatives to standard technology courses and design studios by weaving direct, material exploration into existing, required classes. As such, these pedagogical experiments confront a general, curricular avoidance of tectonics and challenge the fragmentation of design education by presenting materiality as one of several primary design tools.

Where the typical design-build studio occurs as a pinnacle event for a small group of upper-level students, *Constructing Curriculum* directs specific attention to classes at the beginning of the curriculum sequence. Engaging students at the beginning of their design education attempts to reintegrate acts of thinking with those of making and acts of representation with those of sensory experience. Hands-on, full-scale exercises in making and detailing are presented alongside traditional lessons related to abstraction, graphic communication, analysis, precedent study, and composition. In this way drawing, computer representation, scale modeling, and full-scale material exploration are introduced as equal and complimentary tools in the designer’s toolbox. In addition, courses with large enrollments have been targeted to increase student access and exposure to tactile, material lessons.

The following case study, as part of the ongoing *Constructing Curriculum* research, confronts questions encountered in one of the most challenging pedagogical environments for educational initiatives inspired by design-build methodology. How do you embed lessons inspired by design-build methodology in the core curriculum? How do you address the huge enrollment numbers and large, auditorium-based delivery formats typically encountered in the Intro to Technology sequence? Can you introduce issues of tactile materiality in a lecture class?

The architect should be equipped with knowledge of many branches of study and varied kinds of learning….This knowledge is the child of practice and theory. Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing. Theory, on the other hand, is the ability to demonstrate and explain the productions of dexterity….

Vitruvius, *The Ten Books of Architecture*

This case study documents an attempt to confront our avoidance of materiality and tectonics in the early stages of architectural education. In this case, the role of material friction, (resulting in prolonged, sometimes agonizing, engagement), was explored to test the potential for direct, full-scale material exploration within the core technology sequence. This course engaged the largely uncharted hazards and opportunities presented by full-scale construction and tactile experimentation within a very large, (170 students), introductory Materials and Methods lecture course. In this example, an attempt was made to combine pragmatic, construction knowledge
with a broader, academic dialogue encompassing the historical, theoretical, and social themes influencing both contemporary tectonic and architectural discourse. These course objectives are expressed in the syllabus through four, interrelated course topics:

1) Social Constructs
The parable of the *Three Little Pigs* suggests a profound relationship between tectonics and societal valuations, (norms, ethics, and morals), that underpin our inherited notions of “good” architecture. Working back from this observation, the course attempts to locate the source and subsequent codification of these value judgments within the framework of construction theory, i.e., the social, tectonic, and formal considerations involved with the act of making. This examination allows us to discover how our culturally ingrained sense of convention and propriety affect the often subconscious associations spawned by particular materials and methods of construction, e.g., “CMU looks cheap”, “galvanized metal is for barns”, “stone is fancy”, etc. Fundamentally, we will be examining the ways in which inanimate objects take on significant social, ethical and/or moral value while simultaneously addressing the effects these values exert on our design decisions.

2) Pragmatics
Intertwined with theoretical questions addressing the “why” of building lie a myriad of pragmatic questions that address the nuts and bolts of “how” we build. Clearly, alternative materials and methods abound in our pluralistic, technologically advanced society…yet convention and tradition exert a powerful psychological, as well as economic, influence over how we build. Where do these traditions come from and how do they affect contemporary tectonics? What are the traditions and conventions of building construction and how are they evolving in contemporary architectural practice?

3) Critical Practice
In an attempt to develop critical thinking skills this course will focus on the ability to frame specific, thoughtful questions that advance speculation, stimulate discussion and foster a spirit of curiosity. In place of categorical pronouncements we will delve into the complex web of influences that structure our tectonic expectations and perceived responsibilities in order to broadly understand the issue of tectonics. When encountered, “facts” will be treated as relative conditions within a spectrum of potential solutions.

4) Thinking + Making
Working in teams of four, students are required to produce an exquisite 8”x8” cube using metal, wood, concrete, or recycled material. During the semester long project students explore the specific traditions, characteristics, capacities, construction techniques/conventions, and detailing options as they attempt to articulate a definition of exquisite relative to their chosen material. An exhaustive series of sketches, interviews/fieldtrips, drawings, computer renderings, 3-d models, fabrication research, precedent analysis, and most importantly hands-on experimentation combined with research into the histories, techniques and traditions of a particular material aim to establish a high level of intellectual and tactile familiarity.

These four, course topics blur the boundaries between the conceptual and practical aspects of architectural education and practice. The format of the class challenges the contemporary fragmentation of Architecture into separate categories of design, theory, history, detailing, and construction.
It seems to me that in those arts that are not purely mechanical it is not sufficient to know how to work; it is above all important to learn to think.

Marc-Antoine Laugier, *An Essay on Architecture*

Looking beyond the “purely mechanical”, the class frames the examination of material selection and construction methods as a complex, academically challenging subject affected by a wide range of historical, conceptual, and theoretical issues. Readings in the classic, tectonic theory texts, (Vitruvius, Laugier, Semper, Le Duc, Pugin, Ruskin, et al), are examined alongside Edward Allen’s *Fundamentals of Building Construction* in order to explore their relevance to, and impact on, contemporary material selection, construction standards, and cultural propriety. Simultaneously, students are learning about particular materials firsthand. This integrated learning environment empowers students by increasing their mental and physical dexterity. Ultimately, the course, and the underlying pedagogical position, must be placed within a larger, curricular debate related to emerging models of education and practice. The question of outcomes, or what we expect from our architecture graduates, must be seen against the backdrop of an evolving profession in which success will be determined less by static proficiency than by intellectual dexterity.

Fig. 1: The Cube Project
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Familiar References of Art and Design versus Unfamiliar References of Everyday Life: Comparative Analysis of the First Year Pedagogy of the Marmara University and the University of Cincinnati

INCI ILGIN
University of Cincinnati

The most common aspect of the first year programs of the Interior Design Department of Marmara University (MU), School of Fine Arts in Istanbul, Turkey and the School of Architecture and Interior Design (SAID) in the University of Cincinnati (UC), is that both postpone “the disciplinary design activity” until the sophomore year and aim to build critical thinking and creative mind as well as observation, communication, and team work skills through various channels of analogy. However, the programs differ in methodology.

The first year program at MU, whose curriculum was first established in 1957 based upon the Bauhaus principles, emphasizes basic design, basic art, and technical drawing skills in separate but interrelated courses where contemporary art and design fundamentals are introduced through familiar references. The First Year Design Lab of the UC, SAID, on the other hand, focuses on unfamiliar connotations and juxtapositions of everyday life issues emphasizing social, cultural and spatial aspects of it through interrelated short exercises supported by drawing skills and computer skills labs as well as series of movies, lectures, and field trips. Moreover, while, the MU, ID program utilizes analogy emphasizing non-functional exercises, the UC, SAID program intentionally keeps students away from direct disciplinary involvement [exposure to design process and terminology] in order to encourage new possibilities and new reconfigurations that may possibly engender innovative functional formations.

Skills to Communicate

In the first year program of the MU, ID, students are immersed to the fundamentals of art and design through three interrelated foundation courses, Basic Art, Basic Design and Technical Drawings. Basic Art course is formulated by the Basic Art Education Division, which is a separate program within the school that is responsible developing the first year basic art curriculum incorporating with each major’s individual objectives. The purpose of the course is to endow students with strong drawing, rendering, presentation and crafting skills, as well as creativity and critical thinking. The course is structured so as to expose students to the principles of classic and contemporary arts. In addition to studio assignments, students are encouraged to visit galleries and follow national and international art events regularly. Exercises in this course are mainly two-dimensional with small amount and scale of three-dimensional studies.

Basic Design, the second constituent of the foundation curriculum, aims to introduce the principles of space making. The course comprises series of two-dimensional and three-dimensional explorations. Through the execution of these exercises, disciplinary and functional connotations are deliberately postponed to draw attention to mainly compositional arrangements (Fig. 1). Spatiality is explored through serious of model making and color-material-form explorations. The third constituent, Technical Drawing, develops analytical drawing, comprehensive drafting skills and vocabulary. In addition to multi-view drawing, perspective is specifically emphasized and students are exposed to various techniques of perspective drawings.
Thinking and Making

UC, SAID’s first year Design Lab builds its curriculum upon unfamiliar connotations and juxtapositions of everyday life. Drawing Skills, Environmental Studies Seminar, Computer Skills and Arts and Society courses as well as strengthening students’ theoretical foundation and skills structured so as to correlate and reinforce the issues that are introduced in the Design Lab. Three quarter long program is based on a linear sequence: inquiry and disassembly, body and composition, and transformation, which explores the ways various systems, objects, cultures are arranged and formed.

Throughout the year each exercise relates and forms the next one. Food is the theme of the fall quarter where inquiry and disassembly are emphasized. The quarter starts with the visual analysis of the movie “Babette’s Feast” and continues with the study of ethnic cuisine, which involves analysis of restaurants and eating culture in different cultures. The restaurant exercise allows students experience the space, the meal, and the cultural peculiarities. Ethnic cuisine exercise leads to another short exercise, graphic analysis of a popular magazine, where composition is explored. Pages of the magazine become inspiration for the next exercise, collage. Kitchen utensils are created using various fragments from the pages of the magazine. Intention is while keeping the integrity of each fragment assembling pieces so as to create a new entity, a kitchen utensil. Kitchen utensils are followed by the systematic disassembly and documentation of large kitchen appliances. The last exercise of the quarter is creating a musical instrument using the pieces of the kitchen appliances.

In the beginning of the winter quarter, students form teams to compose music with their instruments. This exercise is celebrated through a musical performance where families, friends and the entire college are invited. After composing music, the human body and proportions become the center of attention. Students study major proportional systems and create robots representing their individual proportional and personal characteristics. Subsequently in “the robots cubed” project, robots become inspiration for the nine square. Students utilize proportional characteristics of their robots to create compositional system for the nine-square project, which forms an 8 x 8 stairs. As in the case of other exercises, nine-square project as well emphasizes composition. The study also aims to draw attention to interaction between body, objects, space and urban site. It’s an interactive project which inspires users to modify and change layers as they use the stairs. Collaboration and teamwork is another important aspect of the project. The design process initiates with collaboration of team of two and concludes with combined force of three teams. As David Lee Smith, professor and coordinator of the first year program reflects, in most of the projects “students take an idea and give it to someone else…it’s not your idea but you are to develop which relates to professional life.” Then the spring is study of light, making space… experiencing real space consistently thinking of space as distinct from objects… every thing we do is try to get you inside and experience what’s in…(Fig. 2).
David Lee Smith, argues that the program teach students in the manner of the Karate Kid they learn indirectly how these things work. He reflects: “we take appliances we learn about systems…when we do the lighting we do construction…it is very important sometimes when you give them a real assignment it becomes so obvious….but this way I think in certain ways they learn better…”

**Areas of Emphasis**

Defining the first year experience in both programs as a “surprise” for students would not be much of an exaggeration. In each school, students arrive to the first year programs with keen aspirations to involve with disciplinary design projects. In contrary, they find themselves either immersed into artistic engagements such as abstract paintings, installation works, digital arts, non-functional spatial explorations (MU) or non-disciplinary explorations such as disassembling kitchen appliances, creating and fabricating individual clones and musical instruments (UC).

In their first year, through exposure to fine arts and design fundamentals, MU students develop strong freehand and technical drawing skills as well as awareness to color and material. While drawing, technical and presentation skills are assured, most of the projects are executed individually, which foster self reflectivity and confidence; however equally overlooks strength, productivity and richness that come from collaborative teamwork studies. On the other hand, the first year experience at UC allows students to build up comprehensive awareness to everyday and socio-cultural issues. Learning about various systems is a valuable experience that introduces different ways of thinking and finding inspiration from unfamiliar and unexpected. Teamwork is a constant emphasis, which prepares students to professional life. Even thought freehand and technical drawing skills intensely emphasized, UC students develop stronger skills in the areas such as teamwork, problem solving, critical thinking, making and building, and computer skills.
Fig. 4. Comparative analysis of the first year programs of each school

Second Year Experience

Remarkable shift occurs in each program when students move to the second year. In MU, transition from non-disciplinary projects to disciplinary occurs progressively and space is not explored until the third year, however, its basic components, furniture is the focus of attention throughout the second year. Small scale projects are executed in the Furniture and Architecture Studios. Studio projects are supported by Basic Design II - Construction Techniques - Computer Skills as well as theoretical courses. Short non-disciplinary projects are injected to the curriculum to create awareness to other disciplines. This ranges from a graphic and textile design to any form of artwork.

The first quarter of the second year, Immersion Studio, at UC on the other hand is considered as the continuation of the first year and therefore architecture and interior design students continue to team up. In many ways immersion is a typical architectural studio where students are introduced for the first time to a disciplinary/architectural design process. One of the unconventional aspects of the Immersion is that courses such as Representation Skills, History-Theory-Criticism, Construction and Environmental Technology are integrated under the roof of the Immersion studio to support the studio topics. If any drawback is questioned in this application, the answer would be the sudden jump from the first year’s three quarter long non-disciplinary and non-traditional explorations, which encourages free expression, to a real building that requires intense problem solving and complex programming.

The first year curriculum of each program reveals that UC students grow to be great team workers with highly creative abilities and complex problem solvers who are conscious of socio-cultural issues, while on the other hand Marmara University students develop great freehand and technical skills and creative and artistic abilities. One may argue that any program which integrates and addresses all of these skills in their curriculum would foster holistically equipped future designers.

Note: Special thanks to David Lee Smith, coordinator and professor of the first year Design Lab at UC, for his valuable contributions and other diligent professors of the first year Design Lab team, Dennis Mann, James Postell, Vincent Sansalone, David Lee Smith and Melanie Swick for their inspirational teaching and fruitful discussions during our weekly meetings.
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The Black Box Projects: 
Ways to Reintegrate Sense Experiences in the Design Process

SANDA ILIESCU
Assistant Professor of Architecture and Art, The University of Virginia

A young man talks on a cell phone while walking across the University of Virginia campus. It is a beautiful spring day, yet his eyes stare blankly ahead and his brows wrinkle. He is evidently engaged in a heated conversation – so engaged that he fails to notice the telephone pole blocking his path. He crashes into it. His body reels backwards and he nearly falls. The cell phone lands with a crack on the sidewalk. Notebooks fly from his backpack. Loose papers glide through the air...

This humorous encounter raises serious questions. Aside from practical dangers (for example, an increased number of car crashes due to cell phones), what are the subtler yet no less dire aesthetic and ethical consequences of our incessant use of devices such as cell-phones, television, or computers? While connecting the young man with a distant voice, technology also diminished his awareness of his immediate environment. His perceptions of the intense blueness of the sky, the smell of grass, the rhythmic shadows of trees across the sidewalk, as well as the silhouette of the telephone pole, were compromised. This simple observation gives me pause, making me wonder about my work and role as “visual” artist and design teacher. Am I, like many of my students, becoming less likely to perceive deeply and attentively? Does my carelessness amount to an ethos or way of life that privileges utilitarian goal-oriented actions (such as decoding of phone signals or reading e-mails) over complexly layered, multi-sensory experiences? As perceptual nuances matter less, am I still able to inhabit a particular place, or do I live by merely traversing sense-less, generalized domains? While I may “know” where I am, often I do not simultaneously “sense” this awareness. Either narrowly focused or muted, my perceptions are severed one from another: what I see is disconnected from what I hear, smell, touch, or taste. I have become skilled at separating my consciousness into distinct, isolated compartments. Habitually, I disconnect my “senses” from my way of “making sense.” Logical thought or what the ancient Greeks called “nohta” (inmaterial things that cannot be apprehended by the senses) is severed from “aisqhta” (material things directly related to sense experience or “aesthesis”). As intellectual concepts become remote from sense experiences, I am inclined to pursue design ideas (or ideologies) that have little to do with the process of making or the aesthetic experience. With no serious counter provocation, I may engage in intellectually sophisticated theory for theory’s sake. Conversely, I may over-aestheticize the making process, stressing glamorous visual impact or flashy manipulative surface at the expense of critical thought. Unchecked, the sense of sight becomes dominant—a kind of “visual candy” with no tactile or other sensory reverberations and no balancing critical or ethical development. Unchallenged in its hegemony, sight itself is impoverished. I “loose sight.” I forget that the plastic arts (painting, sculpture, architecture) are richest when they are simultaneously felt and understood, when aesthetic forms parallel intellectual and ethical functions.

My work with beginning design students seeks to redress this situation and test ameliorative, constructive solutions. A series of related Black Box Projects are a response to the young man’s cell phone experience: primitive antidotes to daily activities that suppress and isolate our senses, or overemphasize the visual and sever aesthetic experience from intellectual
content. Perceiving fully takes time and requires concentrated, sustained attention. The Black Box Projects slow down and focus observation. Black Boxes often involve the most mundane of subjects and events: listening to bird songs with one’s eyes closed, touching and re-touching the contours of ordinary household objects, describing a walk across campus as a linear sculpture whose smallest increments represent footsteps. Through such exercises students discover the richness and complexity of everyday experiences. The process of discovery resides not in seeking new landscapes but in having “new eyes,” which of course means “new skins, noses, ears, taste buds….” In working with black boxes students act as scientists, proposing hypothesis, testing relationships, building and re-building models. The studio is just as much about visceral emotions and immediate perceptions, as it is about sustained, systematic study. The Black Box Projects nurture habits that transcend the boundaries of visual art and architecture. They cultivate patience, self-awareness, and reflection—a desire to imagine disparate phenomena as interrelated. How we see something is connected to how we might touch it, as well as how we might mentally organize it. Perception and conception are not locked in immutable, irreconcilable conflict, but exist as overlapping, transparent planes of consciousness.

While exploring the phenomenology of perception, Black Box Projects are never purely formal. Their fundamental premise is that aesthetic qualities can emerge from ethical choices—that, although conceptually distinct, our cultural, aesthetic ideas of beauty and our notions of ethical harmony or appropriateness can on occasion overlap and enrich one another. Students test ethical implications of aesthetic choices; they construct personal metaphors linking issues of “ethos” (the daily habits and patterns of their lives) to issues of “aesthesis” or formal composition. Students consider how the selection of certain forms or materials can suggest particular ethical meanings, for example the conservation or waste of resources. Purely ethical choices, such as the use of discarded or recycled materials, can lead to exciting aesthetic ideas. Certain fabrication techniques, for example gluing, weaving, or stitching, can either celebrate or suppress the process of making. Results are not always successful. Links between ethics and aesthetics remain individual as well as situational and cannot be rendered prescriptive or universal. Students learn that a worthy ethical process does not automatically guarantee a successful formal composition, or the other way around.

The following Black Box projects represent work from three courses I developed at the University of Virginia: Lessons in Making (a first-year introductory design course), Drawing as Ethical Metaphor (an upper-level art seminar), and Painting and Architecture (a fourth year architecture studio). While the last two are conventional studios of 16 to 20 students, Lessons in Making is a larger lecture course including 150 students (about 60 architecture majors and 90 liberal arts students). Twenty teaching assistants lead individual weekly sections as part of an upper level Teaching Experience Seminar. My collaboration with these talented and dedicated assistants is an essential, enriching component in the development of this course.

**Touch Boxes**

“A blind man can make art,” writes conceptual artist Sol LeWitt, “if what is in his mind can be passed to another mind in some tangible form.” Although sometimes interpreted as a dismissal of visual perception, LeWitt’s statement is not a simple argument for art’s mental rather than physical apprehension. The word “tangible” suggests instead a radical emancipation of all
our senses. For LeWitt, just as conception becomes equal to perception, so the “tactile” rises to the level of the traditionally dominant “visual.” The idea that blindness (literal or imagined) can have exciting visual consequences did not originate with conceptual art. Kimon Nicolaides’ classic manual The Natural Way to Draw¹ features a sculpture by Clara Campton, an artist blind since birth. Although sculptures by Constantin Brancusi are often accompanied by “Do Not Touch” museum warnings, we nonetheless “touch” them in our mind’s eye. Brancusi exhibited his Sculpture for the Blind inside an opaque sack with sleeves through which viewers would pass their hands to feel the form within.⁴

By foregrounding our sense of touch and its essential connection to vision, Touch Boxes suggest that to isolate or privilege vision is an inaccurate way of describing real, lived experience.⁵ Since they cannot see their drawing subjects, students are less likely to follow visual clichés or preconceived, hence limiting notions of visual beauty or accuracy. In this exercise, each of two Touch Boxes contains a teapot: Graves’ conical Alessi design, and the squatter, rounder Nova pot. Alternating vertical and horizontal slits in layers of cloth lined with feathers form apertures through which students pass their hands to the interior of each box. Unable to see, they become meticulous detectives uncovering clues. They touch contours; feel textures and temperatures; assess relative weights; measure dimensions with palms and fingers; test musical possibilities. Students note their discoveries first as written text, then as preliminary outlines superimposed across the dominant field of words. Words and contours are written, partially erased and re-written again, a process that involves patient, repeated rubbings of the paper. Inspired by the Greek “palimpsestos,” combining “palin” (again) and “psen” (to rub), drawings become palimpsests of written and drawn layers. While drawing the same contour several times, students touch and re-touch the paper in different ways: lines are smudged, scratched, and marked with various hand pressures.

Since Touch Boxes have no privileged viewpoints, representations from a singular perspective are not necessary. Students are free to depict not one but many “views” and details imagined from different “observer’s locations.” Multiple views fill the page, the drawing becoming a layered imprint of temporal experiences. Repeated cross-sections describe overlapping “views” (in this instance top and side). The same outline is drawn several times, each new take a bit more detailed. Black Boxes require repetition, students having to touch the same contour many times before gaining even rudimentary “insight.” Drawings have the look of sketchbook pages, of studies rather than definitive presentations. Occasionally, accumulations of writing and drawing convey an atmosphere of murkiness, an inadvertent analogue to the visual obscurity of the Black Box. Repetition can also suggest certain characteristic representations, in this case a top view for the round pot, and a distorted “bird’s eye” perspective for the conical pot.

Gaining insight through touch is a perpetually unfinished process (colors, for instance, remain unreachable). Drawings themselves become open-ended, ambiguous, unpredictable. After much scoring and rubbing, this student re-affirms the overall shape through erasing, a carving out of drawing deposits that render the pot at once bold and ghostly flat. In contrast, another student’s bellowing, many-spouted teapot takes on a fantastic specificity. Unlike the previous bellowing pot, these two drawings have a cool, precisely calibrated touch, resulting from patient, meticulous observation. Touch Boxes lead to a wide variety in the temperament (or temperature) of drawings. Un-encumbered by a visual picture or the need to replicate visual constancies, students are less self-conscious and more instinctive. They focus on ways of touching or marking the paper, and on the sounds they hear while drawing. Less mimetic, drawings become analogues or metaphors to multi-sensory experiences.
Microscopic Landscapes

Aspects of things that are most important for us are hidden because of their simplicity and familiarity. Wittgenstein’s phrase applies to our dulled, impatient perceptions, to our difficulties in perceiving the beauty of familiar things. To illuminate the complexity and richness of modest, mundane subjects, students design and build primitive microscopes: portable chambers that focus and intensify vision. These simple, self-contained vision chambers include eyepieces fitted with magnifying lenses, light filters, apertures, and baffles. They take time to build and adjust; perhaps in part because of this, students draw with more patient, sensitive eyes. Common surfaces and objects (a straw matt, a piece of bread, an egg) are seen with uncommon intensity.

Having themselves constructed the interiors of black-box microscopes, students pay particular attention to negative spaces. This drawing is composed entirely of modulated background grays, while figures are left as entirely unmarked paper. Students compose with light, orchestrate dark to semi-dark sequences, and refine the shape of views. In this process, small adjustments matter. This lesson carries over to the drawing process: students work with delicate qualities such as paper texture. Black Boxes can become complex objects. Brilliant surfaces collect ambient light. Translucent screens filter interior light. Mirrors double perceived distances. In this example, the egg is placed right next to the eyepiece at the narrow end of the funnel shaped box: we see not the egg, but its mirrored reflection at the far end.

Illuminated in particular ways, common rubber bands become an intricate set of spatial relations. Sometimes the rubber band is barely recognizable, a pretext for studying light and shadows. At other times, the subject insists on remaining the recognizable, familiar object. Occasionally, the rubber band becomes a piece of calculated abstraction. In the end, the subject hardly matters: curved paper, discarded fragments or odds and ends serve equally well. What matters is the intensity of perception.

Colored Light

In the late 1850’s James Maxwell built a “portable light box” to prove white light is a combination of three primaries (red, green, blue). Maxwell’s box showed the existence of three color fundamentals, refuting Newton’s earlier suggestion that each portion of the spectrum is unique. In fact both Maxwell and Newton are correct. For the physicist each color has a unique wavelength that cannot be re-created by other wavelength combinations. In this sense, there are infinitely many color-fundamentals. Yet, from a perceptual, physiological standpoint, Maxwell is right. Our eyes have only three types of retinal cones, each with its distinct wavelength sensitivity.

To most human eyes, appropriate combinations of only three fundamentals can mimic any color. Similar to Maxwell’s “light box,” these Colored Light Boxes employ mirrors, controlled light apertures and eye-pieces fitted with color filters. Inside students place colorful fruits and vegetables. Magnification and carefully cropped views transform these fruits and vegetables into landscapes of crevices and gullies, peaks and plateaus. In some boxes, sequences of removable filters modify light. At times, intensely radiant colored light brings intimacy. Students study the same formal arrangement under sequences of related color conditions. They discover that in a darkening interior chromatic perception diminishes at different rates for different colors: greens fade very quickly while reds persist longer. Students experience the perceptual pre-eminence of black/white contrasts, they experience the fact that compared to our 120 millions rods, our human retina has only 7 million color sensitive cones.

After drawing (as well as smelling, touching, and tasting fruits), students focus on color alone. For convenience, simple rectangles replace complex curved forms. We ask ourselves whether color by itself can suggest tastes, smells and textures. Readings from the history of color informs our work. Aristotle believed proper mixtures of black and white paint can produce any
hue. This outrageous idea does not seem quite as irrelevant after working with *Colored Light Boxes*, which suggest such things as absolutely neutral blacks or whites are perceptual impossibilities. Aristotle’s black (“melas”) is not quite black, but the dark essence of *blood, freshly plowed earth, the sea and wine*. Similarly, his white (“leukos”) is not an abstraction, but a perceptual distillation, the essence of *blond hair, sand, snow, ivory and clear water*.

It is possible to move from two-dimensional color explorations to three-dimensional form making. This idea goes back to a simple numerical coincidence: both color and volumetric forms have three degrees of freedom (Maxwell’s three color fundamentals, and Munsell’s value/chroma/hue are the x, y, z axes of color space). Students can invent principles whereby a chromatic composition generates a three-dimensional solid. Based on earlier color studies, students make white unfolding constructions. While the earlier introverted boxes belong to Aristotle’s “melas” of the dark sea, the latter suggest the “leukos” of clear water. Like drawings, they are logically “drawn out” or derived from earlier more empirical and emotional experiments. Inside these cerebral boxes students discover compelling perceptual events: radiant rooms seen from dark antechambers, alcoves and balconies, walls reflecting pools of light.

**The Black Box as Experience**

The design of optical instruments leads to an appreciation for the poetic possibilities of function. With movable or hinged panels, spy-glasses, handles, and rotating platforms *Black Boxes* can themselves become a subject. In this architecture design studio I asked students to transform their original optical boxes into sculptural compositions. The spiky exterior of Kirsten Deegan’s box contrasts with its planar, closed chamber. Her prickly box is difficult to hold and touch. Yet, its single view to the interior has a soft, floating quality: light is filtered through transparent blue cloth over tiny star-like apertures. Susan Meisner’s box became an abstract representation of a walk. Each layer of corrugated cardboard represents one footstep along the way. Photos and text comment on the sequence of walked-upon surfaces: concrete, earth, brick, stone, and asphalt. A drawing documents the progression of sound intensities (reds), and degree of spatial enclosure (greens). This information in turn determines how individual “footstep” pieces are cut and positioned.

In this design studio, students designed walled chambers to display specific literary texts. Selena Linkous chose an essay by Brenda Ueland on the importance of listening to children. The box, closed at first, then opening, is Selena’s metaphor for listening. Her wall is a large, unfolded box. Smaller, also box-like compartments may be opened to reveal finger-painted text. Kafka’s short story *The Law* inspired Brian Brook’s introverted wall. The text is stenciled on interior surfaces and may be partially glimpsed through various apertures. Parts of the wall pull out and become footstools or chairs. Narrower at one end, Brian’s monolithic wedge accelerates perspective. It is simultaneously plane and object: a surface with vertical rhythms and horizontal eye-level cornice, and an enclosed, box-like chamber.

Although at times compelling sculptural forms, *Black Boxes* are primarily important as experiences, not objects. This is why the efficient, modest, and commonly available form of the box seems most appropriate. Hidden inside one chamber of Bettina Scheidt’s double box are identical lumps of wax, iron, wood, and plaster. You are asked to feel them then make sand-drawings of each texture. Hidden inside one chamber of Bettina Scheidt’s double box are identical lumps of wax, iron, wood, and plaster. You are asked to feel them then make sand-drawings of each texture. In Marissa McInturf’s box hand apertures lead to invisible grids of strings. Taught and dense at one end, strings get progressively looser and sparser towards the other end. Hand movements cause powdery graphite from strings to drip onto sheets of paper creating visual imprints. Nicole Triden’s boxes explore differences between the left and right hands. In the first box, your right hand experiences a field of sharply pointed cones, while your left touches curved, soft spherical shapes. The second box reverses left and right fields and provides a mirror experience. Alissa Ujie’s sound box contains a collection of mechanical and digital clocks, suspended behind a flexible opaque screen. Through a listening cone you hear a
cacophony of ticking, overlapping sounds. As the cone moves, some clocks come into listening focus while others sink into the background. Ink markers fitted to the cone trace an automatic drawing onto removable paper. To experience Erin Hannegan’s foot boxes you must take off your shoes. Through black stockings, your feet touch a wide variety of materials: sands, mosses, pebbles. Some sands or soil mixtures feel cooler than others revealing that our feet, more than our hands, are sensitive to minute temperature changes. Ulla Sepaneen’s project is perhaps most tantalizing. Each box contains a different seed: poppy, fennel, sesame, rice, mustard, and pepper. Openings accommodate one finger only. Because the seed is so tiny the finger does not immediately find it, and we are likely to think the box is empty. The shock of experiencing something so small and subtle, yet, once discovered, so pronounced is thrilling.

I will end with a few projects that do not directly involve black boxes yet show their effects. These two collages by a first year design student imply a sense of touch, the memory of surfaces felt, rather than seen. After working with Black Boxes students no longer ignore common, everyday materials. Plastic drinking straws become a sculpture; pitted concrete inspires ways of cutting recycled cardboard. Hana Kim understands vision as an accumulation of overlapping sensations. Her palimpsests of transparent, acrylic paint layers, some painted, others drawn, scratched or dripped, are a metaphor for the way we see. Like faint smells, Hana’s subtle whites (bluish, golden, and lavender white) are at the edge of our ability to perceive, recalling Aristotle’s “clear water, blond hair and snow.” Kate Snider develops her palette by dying her canvases with tea, wine and molds. She stitches cloth with thin threads, also died in tea or wine. After pouring wine onto an assortment of household objects, Kate placed her painting in a cellar, letting molds make an imprint. Everyone wants to touch Kate’s field of straight pins arranged in meticulous progression. Moving your hand downwards along hundreds of pins produces a cool, gently rippling sensation.

The Black Box Projects can lead to sensitive artwork. Yet their most important, long-lasting effects go beyond the art and architecture studio. They encourage students to reflect on ways in which simple art activities (such as making a drawing or building a cardboard model) can broaden our understanding of ourselves and the ways we live. Black Boxes reveal perception as a layered, complex experience interconnected with our conceptual, and even ethical ways of imagining the world. They caution against perceptual isolation and lack of sensory awareness in everyday life. Students take more joy in discovering subtle threads linking sight to touch, smell, hearing or taste. They begin to write and make in more disciplined and nuanced ways. When reintroduced to the world in this way, students may become more patient and empathetic with even the most common, neglected aspects of our physical environment.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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Digital Assimilations: Novel Approaches to Integration

JASON K. JOHNSON
The University of Virginia
The University of Pennsylvania

“… trusting the formulations of the next generation that by definition defy the logic of the present. Education becomes a form of optimism that gives our field a future by trusting the students to see, think, and do things we cannot.”

-Professor Mark Wigley, 2004 Dean’s Statement

For the past three years our School of Architecture has explored the integration of digital tools, techniques and thinking into the foundation level of undergraduate design studio. Courses in design and computing are now structured to strategically intersect and interact throughout the first studio semester. A strong emphasis is placed on integrating digital processes into all phases of analysis, design, and representation. Assignments explicitly embrace a “messy overlap” of digital/analog imaging, drawing, diagramming and modeling. Critical to this approach is fostering an open-source long-term dialogue between students, faculty, and the world beyond academia. This paper/presentation attempts to elucidate the pedagogical framework of this approach with an emphasis on understanding its history and conceptual basis, as well as the practical aspects and future promise of “digital assimilations”.

One of the driving forces behind this paper is the desire to articulate how this approach might influence larger threads of exploration (curriculum) within our school, and beyond. From the beginning I have thought that a carefully considered approach to digital integration would only help to foster the education of thoughtful, articulate and experimental young designers. What were once considered “binary oppositions” are now territories of abundant speculation: traditional distinctions between analog/digital, natural/artificial, and physical/virtual are being contested on every intellectual and spiritual front of contemporary society. And, as I propose in this paper, it is precisely through a critical engagement with this “in-between zone” of contention – what Malcolm McCullough calls the, “Middle/Ground” or what Nicholas Negroponte simply terms, “Being/Digital” [to exist, to have life + electronic digits, signals] – that we may find the most fertile ground for the future of design education and practice.

as-sim-i-la-tion 1. The amalgamation [merging] and modification of newly perceived information and experiences into the existing cognitive structure. 2. Adopting the customs and attitudes of the prevailing culture.
in-te-grate 1. To unify, bring all parts together into a unified whole.

Background
The UVA Undergraduate Department of Architecture is a four-year Bachelor of Science program with approximately 300 enrolled students. Prior to 2002, all computer courses [including my own Introduction to Digital Design] were taught outside the structure of undergraduate design studios. These courses were limited to interested students and course content was highly specialized. In 2002, I initiated a restructuring of the 6-credit second-year design sequence into a “separate but integrated” 2+4 approach: 4-credit Introductory Design Studio and a 2-credit Introduction to Computing in Architecture course. The idea was that computing skills would be
critically infused into design studio work throughout the semester. Technical tutorials and hands-on practical training would take place one day per week and would reinforce/intersect with content and techniques being pursued within the design studio environment. At this point in time [new millennium, almost ubiquitous computing, etc.], the big question in our minds was not whether this should happen, but how would this happen? What would be the best, most productive, most resourceful approach? How would design computing participate in the rich weave of learning already fostered at the foundational levels of our school?

“The degree of personal participation, more than any degree of independence from machine technology, influences perceptions of craft in work.”

-Malcolm McCullough

Surveying Viewpoints and Asking Questions

In recent years there have been a variety of debates centered on the issue of integrating digital media into design studio culture. The recent “Binary Oppositions” dialogues published in the ACADIA Quarterly Journal [Assoc. for CAD in Architecture] epitomize the pedagogical dilemma, and influenced our approach to assimilating computing into our design studios. The question posed in Issue 20 (2001) was: “Should Introduction to Computing in Architecture be taught as a separate course?” There were two sides – one arguing that, “YES: a distinct subject deserves a distinct course … the ultimate purpose of CAD software is to improve the process and product of design … taking that time from studio can harm both subjects.” The other side argued that, “NO: By integrating CAD/graphics instruction into a studio, students become comfortable with the computer as a design and presentation tool, and will use their creativity to push the medium to its limits … And, unless one integrates the computers into the design process itself – and this is reinforced by the design studio critic – students may miss some opportunities to understand the capabilities of digital design processes.”

While both sides made compelling arguments, I was left wondering why we could not combine both logics? Why not separate the courses [techniques], yet integrate their content [ideas]? With coordination and cooperation between design critics, was a “separate but integrated” design-computing model the best approach? Would it be effective and what would we be compromising? Would a single required course in the second-year be enough to initiate the integration of computing throughout the entire undergraduate core sequence? How would it build on the rich set of skills (diagramming, drawing, building) and thinking they have previously explored in Arch 101 and 102? How would the skills and thinking be reinforced in other core studios, expanded in other courses, and supported by the institution? Would the course simply be assimilated, or would it actively seek to instigate new thinking and influence new approaches? How might such a course participate in our school’s strong emphasis on design thinking, dedication to issues of craft and precision, commitment to issues of design ethics and rigorous aesthetic engagement?

These questions assisted in the development of the course, and the three main ideas that underpin the pedagogical agenda of our (“separate but integrated” 2+4) approach:

1. **Get Messy** > We should be embracing overlapping complexities. [Design and digital processes should not be fully compartmentalized, rather they ought to be critically overlapping and intertwined. Allow all involved design critics to have direct input into the structure and content of both courses.]

2. **Converse and Multiply** > We should be fostering a dialogue with critical feedback loops. [We must look for opportunities to share information at all levels of our academic network. Tap into the collective intelligence of the school – ph1: teacher > student, ph2: student > student, ph3: student
3. Explore and plant seeds > We should rigorously explore new ways to foster intelligent design. [Embrace creative, productive and ethical changes ... seek to understand the potential of new design disciplines, driven by technology, metered by ethics. Schools need to cultivate students who are facile with cutting-edge technologies - not only to tap their potential, but also to explore and question their ethical use, efficacy and potential.]

Get Messy > Embracing Overlapping Complexities

“A right approach to tools may lead us toward more measured positions on technology. There may not always be a cutoff between tool and medium, between manual and mechanized, or between traditional and digital. We are likely to explore this middle ground.” -Malcolm McCullough

The principles and methods structuring our foundational curriculum embrace design as a critical practice of thinking, exploring and constructing the built environment with precision and creativity. The pedagogy of the digital curriculum is intertwined with this structure and has fostered a productive and critical dialogue not normally associated with an introductory digital media course. Most importantly, studio design critics regularly critique the digital work not only on the basis of technique, but also on concept and clarity of content. Analog and digital explorations are reviewed side-by-side with the goal of understanding how the chosen method of representation contributed to the conceptual and/or technical basis of the work. We begin with an exploration of the student’s own body – its various contours, layers, systems, scales, profiles, and material qualities – our students are asked to pursue conceptual ideas using both digital and analog tools. The students are initially asked to explore a variety of predefined techniques, tools, and generative logics. After a process of concentrated exploration, review and critical reflection, students are simply asked to move back and forth between tools, discovering what works best for them – what expresses their conceptual intent effectively, and with the most clarity. They are pushed seek the boundaries of what the tools might enable – and ultimately they are encouraged to question the tools themselves.

In addition to emphasizing customary analog studio tools [sketching, modeling], it is now standard practice for the majority of our students to bring personal computers into the introductory design studio. Wireless laptops sit intermingled with messy reams of sketches on trace, chipboard study models, laser cut material studies, et cetera. The studio environment has become a “lab” – an exciting place for peer-to-peer collaborations, productive interactions, accidental discoveries and learning.

The design studio is no longer a closed atelier sealed from outside influences. Rather, the studio is closer to the idea of a laboratory [a complex and intelligent ecology weaving multiple threads of design exploration]. Intrinsic to this notion are processes of research, exploration, fabrication, and communication. Highly productive laboratories are technologically diverse ecologies [relationships between organisms and their environments] – mixing fields of research, modes of exploration, techniques of production, and mixed tendencies of socialization and contact. When these ecologies are retarded in any way, the entire process suffers. For instance, when design studios are cut off from say CNC fabrication facilities, the accidental and innovative possibilities are severely limited. When design studios are rich, dense, and vibrant with ideas and potential – critical and exciting possibilities emerge. Mark Wigley [the Dean at Columbia University] has inherited such a place, and in his recent Dean’s Address he articulated it this way: “Up above are the dense and chaotic studio spaces bristling with electronics and new ideas. Somewhere between the carefully catalogued past and the buzz of the as yet unclassifiable
future, the discipline evolves while everyone else sleeps. Having been continuously radiated by an overwhelming array of classes and waves of visiting speakers, symposia, workshops, exhibitions, and debates, the students artfully rework the expectations of their discipline.”

**Fostering a Dialogue with Critical Feedback Loops**

**feed·back** 1. The process in which part of the output of a system is returned to its input in order to regulate its further output. The return of information about the result of a process.

**Converse and Multiply >** We should be fostering a dialogue with critical feedback loops. [We must look for opportunities to share information at all levels of our academic network. Tap into the collective intelligence of the school – Create productive synergy and digital integration will take on a life of its own.]

\[\textit{ph1: teacher} \rightarrow \textit{student [a241 techniques, tap into a201 ideas, reviews, day-to-day at the desk]}\]
\[\textit{ph2: student} \rightarrow \textit{student [informal reviews, symposia, web site, lectures by past students in 300, 400 levels]}\]
\[\textit{ph3: student} \rightarrow \textit{teacher [symposia dialogue, day-to-day at the desk, keep in touch with recent grads]}\]
\[\textit{ph4: teacher} \rightarrow \textit{teacher [allow other profs to audit the course, informal workshops, reviews]}\]

While students are eager to embrace new technical and conceptual approaches, the institution as a whole remains resistant to assimilating digital media into core pedagogy outside the foundation level. In order for instructors to effectively communicate with students using digital medias, teachers need to be equipped with some basic “digital” language and navigation skills. In addition to the loops initiated above [ph1: teacher > student, ph2: student > student, ph3: student > teacher, ph4: teacher > teacher], a series of informal workshops were structured to generate a dialogue between design critics (which ultimately benefits the development of student work). The workshops were structured around the following four themes:

1. **Ideas** for encouraging your students to use Imaging/Modeling Software as an instrument for analytical/visual communication in a design studio setting – not as a replacement for drawing or model building but as a complement to more conventional modes of design exploration.
2. **Tools** for enabling Design Critics to effectively navigate through a student’s 3D model and encourage a clearer, efficient and more legible dialogue in studio and during reviews.
3. **Strategies** for promoting the use of Modeling Software as an iterative design tool – as a way to investigate variable spatial configurations, explore variable lighting conditions, experiment with ideas related to time/progression, research multiple qualities of material transparency/reflectivity, etc.
4. **Suggestions** for how to assign specific work and what to expect of students.

It is students who ultimately push the use of technologies to new and exciting territories. A series of student + faculty symposiums were structured after each project to generate a critical dialogue across studios, share new ideas and exchange thoughts about possible trajectories for further exploration. Other structures such as the Arch 201-241 web site, student online portfolio/archive, open-source tutorials, etc. are also instrumental to sustaining and pushing each class beyond the next.
Rigorously Explore New Ways to Foster Intelligent Design

Explore and plant seeds > We should rigorously explore new ways to foster intelligent design. [Embrace creative, productive and ethical changes … seek to understand the potential of new design disciplines, driven by technology, metered by ethics. Schools need to cultivate students who are facile with cutting-edge technologies - not only to tap their potential, but also to explore and question their ethical use, efficacy and potential.]

While earlier generations of architect-educators express anxiety and hesitation over “digital assimilations”, the latest generation of young designers is fluidly intertwining analog and digital crafts without question or pause [but also typically without a critical “long-term” ethical, theoretical, sustainable viewpoint]. In order to keep things in perspective – schools should understand the longer-term trajectories of where contemporary design practices are heading. Making an investment in some direction is critical. Schools should at least attempt to articulate a vision: How are we going to positively ASSIMILATE [engage] technology into our design curriculum? Where do we see both the professional and other experimental practices heading in the long term? What models, or precedents can we look to?

Theorist John Rajchman wrote this: “ … there can be no thought without some critical relation to the future.” When I dream about the future, I often find myself thinking about the past – for example: The design process of the Colonia Guell Church (Barcelona, 1898-1914) holds some remarkable insight into the creative potential of a digitally assimilated design practices. [I use this example as a kind of fantasy of where design computing is headed, but also what it must surpass.] The design process revolved around a large funicular model suspended from the rafters of Antonio Gaudi’s workshop. This “virtual” model afforded the multi-disciplinary group of architect, structural engineer, sculptors and other collaborators the ability to share ideas in an abstract, immersive and parametric environment. This example of an early collaborative model is informative to our notion of “digital assimilations” on several levels:

First, the model was not created as a literal representation of the church. Rather it was constructed as a “working” operative wire frame – an abstract medium of cords, weights, skins and adjustable connectors. This framework was not understood as a “finished” design fixed in space, but rather as a flexible structural “underlay” to support diverse layers of active exploration. Thus, because of its operative simplicity, the framework became a shared resource for all levels of individual creativity and collaboration.

Second, the immersive nature of the physical model facilitated continuous feedback between idea and material, between virtual space and physical assembly. Within the limitations of the funicular system, spatial and material ideas could be tested in real-time using a designer’s own hands to manipulate dynamic parameters within the model. Ideas could be further developed using techniques at the discretion of the individual collaborator (For example, Gaudi sketched over inverted photographs of the funicular model to study both interior spatial conditions and exterior volumes.) This “active” method of physical and virtual immersion, fluid visualization, and integration of multiple tools and techniques, facilitated a versatile and open-ended design process.

Third, the hanging funicular model promoted an interactive “parametric” process where the results of small local design changes could be studied globally as the rippled through the larger system. If one collaborator decided to change a parameter through the redistribution of weights, the other members of the design team would see the implications instantaneously. Interactions between structural, spatial, material and organizational decisions could be studied within a single modeling environment.

The funicular model was at the core of a collaborative experimental design environment. Thus the Colonia Guell Church was not the product of a singular design vision, but of a
multifarious, highly conceptual, immersive and interactive process of design. This suggests that new modes of practice, enabled by similar, albeit enhanced, digital frameworks (much like Gaudi’s interactive funicular models) might change the very nature of design. As we learn to incorporate new technologies into architectural practice, the processes of design, simulation and production will converge. It is here that we can perhaps find the most promising future of a contemporary design practice. Through the embrace of a messy process of virtual and physical tools, techniques, models and materials, we will enrich the design process – open up new avenues for experimenting with richness, efficiency, variation and craft.

Conclusion
The notion that individuals will become “activators” or participants in the real-time generation of their environments is a compelling vision driving many emerging design practices. Architects might essentially become purveyors of generative codes – algorithms guiding the activation of their designs in space and time. Experimental projects by designers such as Jesse Reiser of Princeton University (his catenary space-frame experiments), and perhaps most poignantly, Mark Gouthorpe of MIT (the “Aegis” collaborative project) are actively pursuing new technologically-driven architectures where virtual and physical spaces are fluidly networked and animated – each informing and transforming the other. These experimental practices, defined best by their creative techniques and collaborative methodologies, are important models for the assimilation of digital tools, techniques and thinking in all design disciplines.

Dreaming about future modes of architectural practice [sustainable digital ethos: Physical Computing, Responsive Environments, Robotic Architectures] might help us to structure the present. Most importantly, through a critical engagement with contemporary technologies and practices, we might move design forward to where its “ethos” is defined by form, function, and meaning. It is my belief that through a careful, creative, and open-minded engagement with the “in-between zones” [analog/digital, natural/artificial, and physical/virtual] that we may find the most fertile ground for the future of design education and practice.

NOTES
[1] Mark Wigley “2004 Dean’s Statement” [Columbia University GSAP]

Interpretation of the “YES” (to computing should be taught separately) other main points:
1. “... we may someday have CAD systems that are so natural that they require no special instruction. We may have CAD systems so integral to design that it is impossible to distinguish between design topics and CAD topics. Unfortunately, that day has not yet arrived.” [but how will we know when that “breaking point” is?]
2. “... each coherent course (or sequence of courses); conceptually, this is THE reasonable way to divide up the curriculum.”

Interpretation of the “NO” (to computing should be taught separately) other main points:
1. Like learning to play a musical instrument (which is generally not accomplished in a lecture course) students learn best by doing.
2. The computer can change the design process itself as it offers new types of abstractions.
3. The computer is not only a tool for representation; it is a tool for designing. Image processing, painting, modeling, rendering and animation can all be integrated into the presentation and design processes.
4. The CAD/graphics knowledge and skills needed to design should be integrated at the very beginning of a student's design career, where he/she can learn to use them as an integral part of the process and not as a separate "add-on."


[8] Similarly, in the studio-laboratory of the structural engineer-poet-architect Robert Le Ricolais (at the University of Pennsylvania) this kind of interactive, immersive testing was the foundation of his design approach. His “Experimental Structures Workshops” (1954-76) continuously oscillated between the study of physical structural prototypes, sketching, diagramming, and abstract mathematical analysis. His emphasis was on having “some identity with phenomena” and “to start on the concrete and slowly converge with the abstract”. His interest in understanding dynamic formations (bubbles, spider webs, bone micro-structures, radiolarian, etc.) filtered into his experimental method of teaching and practice. Through a frenzied “integration” of differing tools, techniques and content, “Le Ricolais ingeniously bundled, "matter, materials, constructional systems, structural configurations, space and place..." into productive hybrid assemblies. See: *Robert Le Ricolais: Visions and Paradox* (Edited by Peter McCleary, Fundacion Cultural Coam, Madrid, 1997)


A Beginner’s Mind

PROCEEDINGS
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on the Beginning Design Student

Stephen Temple, editor

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Beginnings of a Designer's Mind in Children: 
The Psychology of Design in Early Childhood Education

CHUNG O. KIM
University of California at Berkeley

WILLIAM T. WILLOUGHBY
Louisiana Tech University

Introduction
Design has proliferated in contemporary life. As members of the developed world, every aspect of life today insists that we be consumers of design. Yet there exists a wide gulf between designers and the appreciation of design amongst the general populace. Design consumption expands, whereas people’s sensibility for quality design diminishes. Why does this paradox exist? Should we agree, as Donald Norman claims in The Design of Everyday Things, that the blame falls upon designers for the fact that the essential aim of their discipline is misunderstood by most people?

The existence of the gulf between designers and consumers of design can be remedied through education. The intimate connoisseurship for design develops in designers through both their education and the daily practice of thinking about design. Knowledge of design as a method for making sets a person up for appreciating good design. With this said, consumers of design need some introductory design education. Developing a sensibility for design logic is essential for adapting to today’s world. This leads to two critical questions: What is essential to design thinking and when should design education begin?

To improve the general awareness of design in our culture, we argue that early education is essential. Just as instructing children in the making of music increases their appreciation for melody, harmony, meter, etc. . . . so could it be for design. Elementary education teaches music, art, language skills, science and math – but nothing of design or the mental processes that underpin it. This essay suggests that there should be a push from designers and design educators to introduce design thinking during the early years of brain development – a time when thought capacity expands, one’s conception of the world begins taking shape, and the interaction of basic mental faculties develops.

What mental processes underpin design thinking? We argue that design merges the divergent qualities of purpose and meaning in the making of something. To develop the ability to design, or to even learn enough to appreciate design virtuosity, children must be educated so as to develop a sensibility for design. This essay explores such topics as early cognitive development in children, the structure of the psyche, and strategies for teaching design to children.

Seeing Purpose and Meaning: Perception and Intuition
There are two significant ways of ‘seeing’ the world – as purposeful and meaningful. Both methods aim to access reality. The search for purpose is based upon outer-perceptions (sensation) independent of human expectations. The search for meaning is conditioned by inner-perceptions (intuition) dependent on human expectations. Seeing with our eyes, coupled with our insight, forms for us a synthetic conception of the world. Both purpose and meaning rely on an awareness of the link between our inner self and the surrounding universe.

Yet it is in the best interest of design and architecture, as has been known since the time of Vitruvius, that an architect [cum designer] be armed at all points with thorough knowledge of both how things work and what those same things mean. Both inductive and deductive
capacities cooperate in the mind of the architect and designer. In order to design, the mind must develop the flexibility to move along a mental continuum that exists between intuitions (mind to inner self) and perceptions (outer senses to mind). The education of children should exercise the continuum's ends (perceptiveness and intuition) and the transactions between capacities important in just about all aspects of design. We believe that the current status of early education reinforces both ends, but not the necessary relation between perception and intuition as needed for design thinking.

Construction of Knowledge in Children

Design impacts a child's mind with greater effect than as it does adults. In fact, design is crucial to children at the early stages of brain development. A child's brain develops and matures through interaction with their immediate social and physical environment. Yet a child is not a passive organism bombarded by external stimuli. On the contrary, children are active agents in their own development by exploring, discovering, testing, and transacting with their environment. Brain development occurs through the dynamic interaction between child and environment in combination with the feedback received by the mind through perception. The patterns of design, when perceived and interpreted in early childhood, will linger in a child's mind for the rest of their lives. Design affects a subtle psychological influence on the development of deep mental structures.

Jean Piaget, the renowned child psychologist, presented hundreds of phenomena and questions to children that demonstrated fundamental distinctions between children's and adults' thought processes. Children 'see' (through their developing eyes) a world that is neither piecemeal nor an adult-driven discrimination of reality. Rather, children envision a whole universe filtered, reduced, and interpreted to a child's perspective. Hence children see and listen to the world in ways that differ vastly from adults.

Children act with inherent social, mental, and physical potentialities; children are self-active beings. Yet it must be recognized that though independent and active, children are acculturated from the beginning of life onward. The principal activity of children is adapting to the social conditions set by adults and impositions made by the physical world. Without acculturation by adults, or necessary adaptations to the world, a child would succumb to autism or even death.

The Development of Syncretic Schema

According to Piaget, knowledge about things implies action at two levels. First, children structure their world through psycho-sensory interaction with things. Through interaction, children adapt and organize schemes (or conceptual wholes) that promote the development of a total intellectual system. Second, through the assimilation of objects into schemes, children recognize or perceive objects. The application of schemes (through visual scanning, haptic manipulation, aural experience, etc.) gives meaning to our sensory experiences.

For Piaget, perception is based on the development of four fundamental concepts: object, space, time, and causality. Through perception we recognize and respond effectively to our environment. Schema is modified through both generalizing and recognitory assimilation (a sustained mental dialogue that vacillates between the construction of wholes and the inclusion of new parts). A child's development of 'syncretic schema' leads to questions about reality of a cosmogonic nature. Thus, a child applies a set of common behaviors to different objects (generalizing assimilation) as well as restricts certain behavior patterns to specific objects (setting 'realistic' limits on reality). A parallel notion to these processes is found in 'prototyping' (extending a common response to a diverse set of objects) and 'distinctive features learning' (responding to specific features of objects) advocated by information-processing theorists.

The Piagetian approach goes further than the approaches advanced by information-processing theorists. Piaget demonstrates that perception and other cognitive processes are subordinate to the development of an underlying intellectual schema. Information-processing theorists propose that perception is an initial activity to be performed within a sequence of events or a hierarchy of functions (as information) entering into the flow of brain processes. Although
information-processing theories are well-founded, they commonly presume that there is no general intellectual structure (in the sense used by Piaget) that offers comprehensive coherence while also loosely superseding itself by affecting perceptions of reality as a child develops.

Aspects of a Child’s Developing Memory

Once a child perceives, the object of perception must be represented in a comprehensible form, otherwise the child will disregard it. Developmental theorists, including Piaget and Bruner advanced watershed discoveries about how memory changes as children develop. Broadly defined, memory refers to intellectual schemes that shape the construction of memory and figure into its reconstruction when recollected. Because intellectual structure changes during child development, the content of memory also changes. Furthermore, followers of Piaget believe that three qualitatively distinct memories exist: recognition, reconstruction, and recall. These memories have different figurative components and different developmental onsets. Thus memory is reconstructive rather than eidetic.

Structure of the Psyche in Children: Interactions of Perception and Intuition

Perception inundates the mind with awareness of the surrounding world, re-contouring the brain over time, and aligning the psyche with the precepts of culture and environment. What the senses reveal of reality, we recombine in the mind’s sensorium. For children, the gradual shift from infantile indifference to perceptual differentiations of acculturated patterns and behaviors is the very basis for the development of self-consciousness.

Children are exposed to visual patterns replete with psychic discrimination. All children are in the process of experiencing patterns of nature and patterns of culture (human behavior, art, and manufacture) for the first time. Initially the child cannot differentiate stimuli and therefore acts without discrimination. During the earliest stages of human life there is no differentiated identity or ego-consciousness until syncretic schema first form.

Consciousness resides between an outer reality and an inner spirit (consciousness straddles these two). Perception forms the external skin of consciousness. The flip side of sensory awareness is a necessary inner-awareness we call intuition; where consciousness dialogues with an inner spirit (or unconscious) to derive meaning from things. Both perception and intuition (two mutually dependent capacities of mind) play a part in the reciprocity of reality and mind. This active dialogue between outside experiences and inner-awareness constitutes the immediate engagement we maintain with outer reality.

Consciousness is as if it were a mirror of lively awareness set upon the world. But, we must realize that is it a selective mirror – one that registers signs before blank ‘reality.’ We disregard what we have been acculturated to view as insignificant and only see that which we have been attuned to consider as significant. Vitruvius suggests, early in The Ten Books on Architecture that “In all matters [basic to the arts and design], but particularly in architecture, there are these two points: the thing signified, and that which gives it its significance.”

Perception, Imagination, and Signs

Vitruvius’ notion of signs can be traced back to the writings of Aristotle, specifically the treatise De Anima, or “On the Soul.” Aristotle’s treatise is essentially the first comprehensive work on psychology. Aristotle explores the relation between “reality” and “mentality” by simply and methodically exploring the stages by which an object is seen and imagined. As we receive the world through our sense organs (sight, hearing, smell, taste, touch [both receptive and proprioceptive]), we produce in mind an image of the thing perceived. Through perception of the surrounding world we induct experiences, and are thereby impressed by matter in our memory.

That which is without, corresponds though perception with that which is within as image. The ability of the mind to conjure appearances of the world through the recollection of images (taken from things now absent from the current sphere of external stimuli) is the very basis of imagination. The ability to imagine is the ability to conjure in the mind images and sensations of things now absent. All imagining is thinking in signs (a stand-in for something absent).
Imagination connects the mind’s ability to at once foresee while also the capacity to recollect perceptions locked in memory. Imagination is an essential attribute to signification; and signification is the very basis of both representation and design (to design, means etymologically to ‘conjure signs’). As Aristotle states, “Imagination cannot occur without perception, nor supposition without imagination.”

**Intuition, Storytelling, and Meaning for Children**

Intuition is a ‘paying attention’ to what is happening inside of the self. It constitutes an inner awareness of psychical processes connected to imagination. Through our intuition we evoke metaphor and construct meaning. For all times, humans have had a susceptibility to storytelling. We listen excitedly when stories are told; and we seek to digest their meaning in our lives. It is from stories and the suspension of disbelief that we gain their meaning. We learn to suspend disbelief when we are children. Belief becomes a necessary part of brain development. Believing opens the child up to evolving their imaginative capacities, which leads to the making of metaphor and symbolic thought. Through intuition, we develop an inner world of mental symbols and hone an inner-sense of what things mean.

Carl Jung asserted that a child forced into a concrete explanation of some notion considered beyond their years of worldly experience may in fact preclude further development of that child’s creative and imaginative skills. Some children prefer the fantastic (or spiritual) explanation over and above the scientific ‘truth’ of things. “Side by side with the biological, the spiritual too, has its inviolable rights.”

**Visual Appreciation, Making Things, and Design Education**

The appreciation of something leads to wonder about its making. To appreciate design we must possess a heightened visual and perceptive sensibility; something called ‘design literacy.’ When, if ever, is design literacy taught prior to the specialized schooling required at the college level?

To appreciate design you must know the ‘how’ of its making. Designed objects constitute a specific class of made objects that differ from objects of art and engineering. Designed objects are purposeful expressions. Designers suspend their disbelief and merge purpose with meaning. How can we, as designers, expect the culture at large to appreciate design if they are left largely in a state of illiteracy about design? If we define design practice as synthesizing needs and aspirations into purposes and meanings, then we must realize that no skill as such is encouraged or reinforced at any level of a child’s education. We must remember that design leaves an even greater and longer-lasting sense impression on a child’s psycho-sensory framework that afterward influences their habits and thinking.

To rephrase the main question of this essay: Should design skills be taught to children and become a component of learning at a time when such skills could have the greatest effect on brain development? The answer for every designer should be a resounding – Yes. To offset design illiteracy we must teach children design skills early; but most importantly, for the broader purpose of developing a lasting appreciation for design.

Friedrich Wilhelm August Froebel once said, “To receive the external world humans have senses. To give material expression to the world of the mind humans have physical powers and attributes. To grasp the unity of the spirit humans have intuition, heart and mind, and spiritual awareness.” Selected for discussion below is a model teaching strategy created by Friedrich Froebel that reinforces the basic mental capacities for design. This model which began as a generally applied method of early-childhood education in the 1850’s may have greater relevance in certain cultures today. As a system it heightens perceptive awareness, cultivates intuitive expression, and demands the facile interaction between awareness and expression.

**Strategies for Teaching: Friedrich Froebel and Frank Lloyd Wright**

Most designers have encountered the name of Friedrich Froebel through Frank Lloyd Wright’s book *An Autobiography*. Most teachers know him as a German early-childhood
education pioneer and founder of the Kindergarten movement. As a material part of a child's
development Froebel and his subsequent followers introduced the 'gifts', games for structured
play, and materials for the 'occupations' for early childhood and Kindergarten education.\textsuperscript{21}

Colored soft wool balls, block sets, colored parquet tiles, sticks, and 'peas' were part of a
system of 'gifts' intended to shape and inspire a young child's imagination through active play.
Frank Lloyd Wright said of Froebel's educational system: "... Froebel taught that children should
not be allowed to draw from casual appearances of nature until they had first mastered the basic
forms lying hidden behind appearances [the conception of wholes]. Cosmic, geometric elements
were what should first be made visible to the child-mind."\textsuperscript{22} And more, "The smooth shapely
maple blocks with which to build, the sense of which never afterward leaves the fingers: so \textit{form}
became \textit{feeling}.\textsuperscript{23}

The effect Froebel's 'gifts' had on Frank Lloyd Wright's developing perceptions and
intuitions of underlying structure in nature is best revealed in this quote, "I soon became
susceptible to constructive pattern [learned through play with Froebel's 'gifts' and 'occupations']
evolving in everything I saw. I learned to 'see' this way, and when I did, I did not care to draw
casual incidentals of Nature. I wanted to design."\textsuperscript{24} Concepts like proportion, visual pattern, and
spatial relationships were absorbed through structured play (using haptic, motoric, visual,
perceptual, and imagining skills). Similar to a child's encounters with design, early educational
experiences with Froebel's 'gifts' affect brain development and resound deep in hypostatic
memory.

Some of Froebel's main educational theories can be summarized as follows: the inherent
unity of all things revealed through awareness of inner-connections (a whole composed of
interconnected parts); children learn through self-activity and structured play; perception is the
source of all learning; physical activity should be part of the curriculum (because we learn of the
world through our active, sensing bodies); and most of all that education must come from love,
trust, and security (of home) usually found in the relationship fostered between mother and
child.\textsuperscript{25}

\textit{Gifts} and \textit{Occupations}: Perceptions and Intuitive Expressions

The 'gifts,' just as the word implies, are meant to be \textit{accepted} by the child, taken into
consciousness, and assimilated into the child's mental development.\textsuperscript{26} Each gift sequentially
builds upon the complexity of the former. The gifts are scaled relative to each other and therefore
can be used in combination (especially the four block sets of 'gifts').

The 'occupations' are meant to be raw materials that through structured play introduce
techniques inherent in all craft.\textsuperscript{27} Yet the 'occupations' offer a greater degree of self-expression
(an expressive 'giving-out') by creating new wholes that incorporate what was learned through
structured play with the 'gifts' (inductive perceptions). Knowledge gained through interactive play
with the solids, surfaces, lines and points of the 'gifts' returns in expressions made as
'occupations' by synthesizing perception, imagination, and intuition. As Frank Lloyd Wright said, ". . .the early habit of \textit{seeing into} and \textit{seeing from within} outward went on and on way beyond. . ."\textsuperscript{28}
Froebel's twenty 'gifts' and 'occupations' outline an elegant, unified system of play-
learning for the very young. There is a specific order of the 'gift' cycle: from soft shape to solid
form, from solid form to plane, to line, to point, and finally back to the skeletal framework of the
solid.\textsuperscript{29} Learning associated with the gifts is conditioned by organized play that teaches aesthetic
beauty, knowledge of form, color theory, and discovery of natural patterns during the years of
brain development.

Contemporary derivations of Froebel's 'gifts' proliferate in today's educational toy market
(Lego, K'nex, Ôli blocks, Wedgits, FroBloX, Clikits, Zone toys, Tinker Toy etc. \textit{ad nauseam}).\textsuperscript{30} Yet
missing today is Froebel's 'gifts' sequence that he so carefully considered relative to mental
development in children. The sequencing of 'gifts' and 'occupations' is essential to Froebel's
educational aim. Perception as exercised through activity and physical play (sensorio-motoric)
with the 'gifts' and the development of intuition though self-expression with the 'occupations'
materials creates a conjunctive system fostering harmonious development of both perception and
intuition. As Froebel said, “Collectively they form a complete whole . . . [Yet] each is a self-contained whole, a seed from which manifold new developments may spring to cohere in further unity.”

Impinging on Froebel’s gifts is that they are given sequentially and at crucial moments in a child’s psychic development (beginning with the first ‘gift’ at about three months of age). Most important is the sense of unity between ‘gifts’ (and the superseding of complexity from one ‘gift’ into the greater complexity of the next ‘gift’), and what they individually demonstrate about the interrelation between reality and the acquisition of knowledge. All that can be taught by the ‘gifts’ is accessed through structured play. We speak of children “absorbed in play” . . . play has its own rewards and intensities. Froebel calls play, “the highest level of child development.”

Aspects of Play in Froebel’s System

Play is never trivial; in fact, it seems to be the very root impulse of design. Play with the ‘gifts’ reveals the basics of all design: the basics of color theory, how parts are corporate elements of wholes, how wholes can be abstracted to constituent parts, notions of pattern and contrast, formal order and ordering principles, the basic characteristics of geometric forms, and the interactive potential of various geometries. The ‘gifts’ demonstrate how wholes at various stages of a child’s development are reconditioned into new and more complex syncretic schema. If offered in sequence, Froebel’s system purports a comprehensible structure for the growth of a child’s awareness of the world and awakens a potential designer’s ability to imagine, compose realities, and appreciate the world through hand, eye, and mind.

Conclusion

Design does more than fulfill the human need for functionality. Designers must balance necessity with aspiration, and combine the inherent beauty of purpose with expressions of cultural meaning. Design, in order to be valued, must be understood and appreciated. The appreciation of anything requires a period of inculcation. Logic, imagination, a sense of excitement (in the tension of problem-solving), and seeking expression of meaning all cooperate in the activity of design. To appreciate design we need to develop a critical ability to perceive with depth. The development of perception and its interplay with intuition is necessary for deliberate design. Design requires a continuum of mental capacities drawn forth from raw sensation to the inner perturbations of intuition.

Designers not only need a greater understanding of the brain and nervous system as instruments of perception, but also require a deepening of the mind’s intuitive skills. Though these two capacities of mind may appear contradictory (we are normally taught that ‘being objective’ conflicts with ‘personal feelings’) . . . they are actually complimentary. This paraphrases the physicist Niels Bohr, whose principle of ‘complementarity’ can be summed up as: what would appear to be contradictory at first may very well be complementary. Bohr has a motto: “Contrari sunt Complementa;” or “contradictions are complements” and therefore share a common truth. Design, so as to be made and appreciated, requires dialogic understanding taught an early age: where physical processes (science and play) merge with psychical processes (imagination and expression). Design requires all functions of the total person (a microcosm) in sync with their world (the macrocosm).

Froebel’s ‘gifts and ‘occupations’ represent only one culturally specific paradigm for design education. Froebel’s approach is not a pandemic solution for improving the understanding and appreciation of design globally. As diverse as cultures are, have been, and will continue to be . . . there are equally rich approaches available that target innate qualities specific to a culture. The sanctity of culture should not be usurped or convoluted by methods proposed by advocates of Froebel’s methods.

There are no universal strategies for design thinking that do not destroy the autonomy of the world’s various cultures. Diversity, as such, is bound to distinct locations; and a local design
aesthetic derives from closely guarded cultural biases. The native grace, beauty, and surprising vastness that can be seen in the range of things made by the world’s diverse peoples should always inspire one to broad-minded inclusiveness. However, what matters most is to understand the impact of design on our lives and greater impact design has on a child’s developing mind.

To improve a general awareness of design, early education is essential. To increase our culture’s level of visual literacy, begin by teaching children. As children develop their unique sense of wonder and aim, they reinvigorate ours, and teach us of things and capacities long forgotten. Through this exchange between child and adult, we forge a little more hope for a world where the future can be better than before.

Endnotes

1 A gulf, according to Donald Norman, can be defined as separating mental states from physical things. In this case, the “gulf” as we discuss here is the disjunction and distance between mental expectations and symbolical recognition skills of consumers of design and the physical aspects of design as conceived by designers. Donald Norman, The Design of Everyday Things, Chapter Five, (New York: Basic Books, 2002).

2 Piaget calls this the formation of a “syncretic schema” . . . which, by dictionary definition, is a combination of different forms or beliefs that all coagulate into a single, yet sketchy whole. See J ean Piaget, The Child’s Conception of the World (Totowa, New Jersey: Littlefield, Adams & Co., 1965) passim.


4 Essentially a notion adopted by many researchers and educators from the work and writings of J. H. Pestalozzi. See Gerald Lee Gutek, Pestalozzi & Education (New York: Random House, 1968) passim; but specifically “Chapter III: The Pestalozzian World View”. Friedrich Froebel (to be discussed later), along with other eminent educators of children, were influenced by Pestalozzi.

5 This insight is a combination of ideas from J ean Piaget and Howard Gardner. First, Piaget states, “. . . the child’s principal activity is adaptation and who is seeking to adapt itself not only to the adult who surrounds it but to nature itself.” Set this next to Howard Gardner’s rather bald statement, “Take away culture [from the developing child] and the result is autism or death.” Respectively found in J ean Piaget, The Child’s Conception of the World (Totowa, New Jersey: Littlefield, Adams & Co., 1965) 29; and Howard Gardner, Art, Mind, and Brain (New York: Basic Books, 1982) 205.


7 Schemata (the plural of ‘schema’) are the cognitive or mental structures against which individuals intellectually adapt to and organize the environment. According to Piaget, ‘assimilation’ is the cognitive process by which a person integrates new perceptions, motor skills, or conceptual matter into existing schemata or patterns of behavior.


10 Ibidem.


15 This assertion and some of these ideas were pointed out but not connected as such by David Summers in Real Spaces (New York: Phaidon Press Inc., 2003) 316.

16 Aristotle, De Anima (New York: Penguin Books, 1988) 198. Aristotle begins with material substance followed by an inventory of the senses, then he leads to sense-perception, and ends sequentially with imagination and intellect as the receptor of form (eidolon: also image, sign, phantasm, abstraction or idea). Though the notion of “syncretic schema” as derived from Piaget could be anachronistically construed as an aim of Aristotle, he (Aristotle) conceived of “schemata” as essentially the metaphysical basis from which all forms are derived.

18. Early in the development of this essay, the disparity between design excellence and popular insensitivity for design was discussed by the authors much in the same way that Glenn Murcutt in the video Touch the Earth Lightly (and other interviews) discusses the “visual illiteracy” that despoils our objects, buildings, and landscapes. In Australia and other developed nations, the general visual illiteracy of the populace leaves those without specialized training ignorant of ways of ‘seeing’ design. Most people are desensitized to how visual things are composed and miss the chance to gain pleasure from, or discover meaning within, the world of designed things. Thus the question: How and when do we counteract the trend toward greater visual illiteracy?

19. This idea is not original to us as authors. We would be remiss not to reference Dr. Sharon Sutton and the Center for Environment, Education, and Design Studies (CEEDS) and their work of bringing design education curricula to children. See the CEEDS website: http://ceeds.caup.washington.edu

Another source can be found in George E. Trogler, Beginning Experiences in Architecture (New York: Van Nostrand Reinhold, 1972) 9.

20. Friedrich Froebel, Friedrich Froebel: Writings, edited by Irene M. Lilley (New York: Cambridge University Press, 1967) 103. The quote has been adjusted to be read as gender-neutral by the authors.

21. Edgar Kaufmann, J., 9 Commentaries on Frank Lloyd Wright (Cambridge: MIT Press, 1989) 1-35. Also published by Kaufmann in this book are images of a brochure from 1876 summarizing the “Effects of the Kindergarten System” and a price catalog for “Kindergarten Gifts and Occupation Materials”. Froebel never developed his system into a marketable collection of ‘gifts’. All of that came after his death in 1852. Milton Bradley’s company made one of the first sets of ‘gifts’, sold game manuals, and materials for the ‘occupations.’ Ultimately, it was left to the followers of Froebel to develop the nature and sequence of the ‘gifts’ and ‘occupations’.


25. H. Courthope Bowen, Froebel and Education through Self-Activity (New York: Charles Scribner’s Sons, 1916) passim. All education begins with love. When it comes to making food, designing things, and rearing children . . . “Love is not only the most important ingredient; it is the only ingredient which really matters.” A quote from Edward Espe Brown, The Tassajara Bread Book (Berkeley: Shambala Publications Inc., 1970) 6. Furthermore, Heinrich Pestalozzi, who influenced Froebel, said in aphorism: “Without love, neither the physical nor the intellectual powers will develop naturally. That is only human.” From Pestalozzi, The Education of Man (New York: Greenwood Press, 1951) 33.

26. Froebel’s 10 ‘Gifts’ are listed here (the ‘gifts’ are always returned to their original form, and each fitted into its respective box):

1. Six colored yarn balls – red, yellow, blue (primary) and orange, green, purple (complementary) and their associated games
2. Wooden solids: sphere, cylinder, and cube (and associated games)
3. Wood cubes (one large cube divided into eight constituent cubes)
4. Wooden parallelepipeds (one large cube divided into brick-like solids)
5. Wooden cube further sub-divided into small cubes (27 total) with some bisected on a diagonal (forming 45-degree prism shapes)
6. Wooden cube further sub-divided into small parallelepipeds with some bisected on differing diagonals (as well as bisections on the perpendicular of both the length and breadth; forming slabs and columns)
7. Colored parquet tiles introducing surface-pattern, colors, and diversity of 2-D geometric shapes
8. Sticks and Rings (circular arcs and complete circles)
9. Beads (or points)
10. Peas and Sticks (meant to combine in skeletal constructions, ala Tinker toys)

27. Froebel’s 10 ‘Occupations’ (these materials are always modified and remain in their new form):

1. Perforating or piercing
2. Embroidery
3. Drawing (checkered patterns and free drawing)
4. Cutting paper
5. Weaving paper (plaiting and slat-weaving)
6. Painting
7. Intertwining paper (paper twisting, rope-making)
8. Origami
9. Box construction
10. Modeling clay


Here is a list of web resources related to the study of Froebel (from most informative to least):
The Froebel Foundation USA -- http://www.froebelfoundation.org/
Froebel Gifts -- http://www.froebelusa.com/
Froebel Web -- http://www.froebelweb.org/
The Froebel Education Centre -- http://www.froebel.com/
International Froebel Society -- http://www.roehampton.ac.uk/ifs/index.asp

In the last five years there appears to have been a resurgence of interest and inquiry into the work and methods of Friedrich Froebel. The resurgence of his strategies for early childhood education may be a reaction to the passive and mildly interactive forms of learning offered by television, videos, and computer games. Froebel stresses manual activities and physical games where children engage in tactile, exploratory learning with solid objects . . . not virtual objects manipulated by a mouse-click.

One example listed here, Öli blocks (created by architect Daniel R. Oakley), are a recent and unique detour from traditional children’s educational toys. His toys and puzzles take queues from organic connections (ball to socket joints and interlocking folds as examples). Oakley rethinks the problem of joining beyond the limits of Euclidian and Platonic geometries and ventures into algorithmic shapes. Öli blocks use forms and tectonics that relate more to molecular connections deriving from organic chemistry. What other insights and mental facileness might children develop after playing with these toys versus a toy like Lego?


For more on the origins, aspects, and limits of play, please see Johan Huizinga, Homo Ludens (Boston: Beacon Press, 1955).


There is a link between the theoretical science of Bohr and the psychology of Carl Jung. Wolfgang Pauli, who worked with Bohr, also collaborated with Jung. Pauli’s encounters with Jung began first as a patient in psychoanalytic sessions, and later as a collaborator on some important ideas basic to Jungian psychology. Their collaboration divulged some startling correspondences between the principles of quantum physics and the machinations of the psyche. Essentially, both Pauli and Jung share co-authorship of the theory of synchronicity. Therefore, it is not so unorthodox in this essay to invoke Niels Bohr’s principle of ‘complementarity’ when discussing the mental processes that underpin design thinking.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
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Offered through the Research Office for Novice Design Education, LSU, College of Art and Design, School of Architecture.

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Riding the Dragon: Harnessing First-Year Studio Culture

PATRICIA KUCKER and SAMANTHA PERKINS
University of Arkansas

Beginning Design Culture
The earliest concepts regarding teaching in the first years of the design studio relate to imparting a way of seeing and doing. It is the capacity for knowing how to see, and the skill for questioning what is being seen, as well as imparting a manner for deducing and proposing what can be seen. Nurturing the skill of seeing, Leonardo DiVinci’s *saper vedere*, is a capacity that is beyond observation. Initially, these design skills are employed in the service of aesthetic judgment, but soon are skills that can be transported to become the backbone of an analytical process of reasoning that fuels creative work. And, most if not all foundation design instructors will unite on the subject of “process” as a defining character of design acumen. Design studios are bustling places of activity and production and the beginning studios demonstrate that design is a language of both thought and action. Foundation design curriculum introduces an armature on which design inquiry will evolve and from which a design culture emerges.

The workshop character of the design studio is unique and vital to design culture. As an educational model, the studio has been discussed and lauded by many scholars and also compared in intensity to the experience of a medical internship. For most college freshman however, the studio is an exciting and often unsettling educational environment. Gone are the rows of traditional desks, facing forward with about twenty-five students. Gone are the blackboards and the teacher standing in the front of the room. While the joys of having a studio workspace of your very own are extolled, the workspace does not resemble any place previously held for homework or study. It is a space that is in close proximity to maybe fifty to hundred other similar desks, stools and cabinets. Have you ever noticed that foundation design studios resemble an environment that is a cross between an army barrack and a factory lunchroom?

When I walk into the first year studios after hours at Arkansas, I am on my way to a bank of soda machines. More than eighty empty desks fill the room. Washed in harsh fluorescent light, six students, are scattered in locations across this long and windowless room. When I enter, I
break the deafening silence and my eyes are quickly met by glances from those students. I am intruding. “Who are you?” their eyes ask in silence. And I gaze back wondering much the same.

A Typical School Setting
Vol Walker Hall is home to over three hundred students in the department of Architecture at the University of Arkansas. Vol Walker hall is a broadly handsome, neoclassical building that was constructed in 1935 for the university library. It has a grand reading room on the second floor that constitutes the building front. The large first floor public lobby space with grand symmetrical staircases is clad in a grey green Arkansas marble. The second floor reading room is a studio space for over two hundred architecture students. The reference and catalogue area of the original library is also on the second floor, and is also a grand, twenty-foot high, skylight room that is open to the staircases. This space now serves as an exhibit gallery and is host to final reviews, interim pun-ups, exhibitions and receptions. In the fall semester, the soon-to-graduate fifth-year class takes a comprehensive design studio that is typically offered in a modest studio space that is located off the main public entry on the first floor. These fifth-year students take their lunch and occasional cigarette breaks on the front entry steps of Vol Walker Hall. While many of the day’s activities are well serviced by promenade of public spaces, the freshman studio with a capacity of eighty-five students is in the basement, next to the wood shop and near the soda machine. While not a central location and with low ceilings and no windows, the freshman studio enjoys the camaraderie of exiled troops or the apparent hazing rituals associated with Greek Life. All freshmen begin in the basement. This is not an unusual allocation of space and many would describe this implicit hierarchy as a typical environment.

New Students and Faculty
Enrollment in the University of Arkansas can occur until the first day of class. “Rolling admissions” is the term that describes the nature of the admissions deadline and is one that predicts a staffing nightmare for first-year courses. As a default, history provides a measure for staffing requirements and there are two faculty that teach the freshman Design I studio during the fall semester. It is common practice to staff first-year studios at a 25:1 student-faculty ratio while a 15:1 student-faculty ratio is typical for all other studios in the curriculum. During July 2003, first-year enrollment figures were at capacity and by the end of the month, freshman enrollments were over 100 students and climbing. Plans for faculty staffing occur in late May and prior to the annual budget proposals that are due by the end of June. By late June, faculty-teaching assignments are well known and the typical compliment of adjunct faculty is under contract.

While my description is specific to a single institution, the scenario of rising admissions and first-year enrollments could occur, and likely does occur at many schools of architecture. This
is one aspect of a more complex and often obscure set of relationships that effect the first-year student and contribute to a formative studio culture that begins in the first-year.

**Myths and Traditions of Architecture Design Education: The Hidden Curriculum**

In a recent report made by the AIAS Studio Culture Task Force, titled the Re-Design of Studio Culture surveys current studio culture and reviews the history of architectural education and the climate of the design studio. The report advances a direct connection between the norms of the studio model and social and behavioral patterns in the design studio that are less than desirable, including those that promote social and cultural deprivation.  

Points made in the report include criticism of the well-known late night studio life and the designer's propensity for all night charrettes. While acknowledging the Studio Culture Task Force report, I would like to bring to mind the other cultural “structures: that are often unconsciously present with profound effect. In an essay titled, the Hidden Curriculum, Professor Thomas Dutton reminds us “characteristics of contemporary society, such as class, race and gender discrimination and other asymmetrical relations of power are too often reproduced in schools and classrooms, including the design studio.” Further, Dutton calls our attention to the work of educational theorist, Richard Shaull.

*There is no such thing as a neutral educational process. Education either functions as an instrument which is used to facilitate the integration of the younger generation into the logic of the present system and bring conformity to it, or becomes the ‘practice of freedom,’ the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of the world.*

The title of Dutton’s essay and Schall’s words connect to a body of research in education theory that has occurred over several decades and includes the work of Henri Giroux. The subject of the ‘hidden curriculum’ refers to an unstated set of values, attitudes and norms that grow from the social relations constituted by the classroom, the school, the course content and pedagogy. Compared to the formal curriculum, the hidden curriculum is also bound to the ideology of knowledge, and the structure and practices of the students and teachers. The hidden curriculum “comprises one of the major socialization forces used to produce personality types willing to accept social relationships characteristic of the governance structures of the workplace.”

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*Thomas Jefferson, The University of Virginia*

**The First Year Teaching Assistants Program: an armature for socialization.**

In an academic convocation address for at Texas A&M University, Princeton University president emeritus Dr. Harold T. Shapiro considered fundamental issues for education in this century. Shapiro focused on two points: “the ever-increasing knowledge of the natural world” and “the
construction of a cultural framework that anxiously seeks to accommodate the multiplicity of interests that arise from a wide diversity of individual circumstances, beliefs, and historical contexts." Recently, school of architecture dean Professor Tom Regan recalled Shapiro’s address and summarized it with two modest and profound educational goals: seek to understand how the world works and learn how we might better get along. These goals portray a commitment to the pursuit of knowledge and to the opportunity that educational settings have to create models for a just society. Such goals are at the heart of the first-year studio curriculum and the first-year teaching assistantship program at the University of Arkansas.

Clearly, the teaching assistant program developed out of a need to support first-year design studio faculty in the face of rising enrollment. Yet the benefits have surpassed initial intent. The full-time faculty member maintains a significant identity in the studio by presenting the curricular issues through a lecture and in the studio. Pairs of fourth and fifth-year students work directly with small groups of students (a studio section of ten students) to discuss and clarify the current project statements. The teaching assistants also give desk crits and commentary during public presentations. The full-time faculty typically operates as a floating critic and serves as both manager and mentor for the teaching assistants.

While a program that is still in its infancy, significant aspects of positive school culture have emerged and continue to do so. The following topics help define the role of TA and the emerging culture.

- Re-distribution of power in the classroom and developing (alternate) cycles of control for the class.
- Engender empathy, optimism and respect while encouraging and supporting risk taking, searching and controlled failure.
• Identify, nurture and activate leadership and mentorship roles.

To this end, student TA’s are encouraged to plan trips, or short exercises for their studio section. Field trips to a local practitioner’s office, or an afternoon of watercolor are examples that have occurred. Fourth and fifth-year TA’s have been known to share their first-year design work. Mentorship roles have a visible immediate impact, however for many TA’s this is the first experience they have in “supervising” the work of others. Supervising a team is an essential activity for an architect.

• Overcome the social stratification that is a product of the physical environment of the school. This cultural change has been clearly demonstrated as mentorship between the two groups emerges. First-year students climb out of the basement to seek the advice from those in the upper-level reading room studio. In addition, a growing population of fifth year students now attends first-year studio reviews. Recently a studio group of first-year students printed T-Shirts and donned them in support of their fifth-year TA’s during final reviews.

Conclusion

The first-year design studio work is rooted in rational practices with clear precedents for rules of operations and also combines a “hands-on” expressionism. This content and pedagogy affords the teaching assistants an opportunity to explain principles of composition as well as methods and technique. Both are clearly in the knowledge base of upper level students and are part of curricular structure of the fifth-year studio work. While these subjects are also conveyed and illuminated by resident faculty, they are subjects and skills that are growing part of the culture of the school. Acquiring, questioning and ultimately assimilating this knowledge base now grows from a variety of sources that includes both faculty and students. In this manner, a single ideology represented by the atelier model is replaced by a growing ethos that is defined by many. The design studio is not only a producer of “knowledge” but is also a social construct that models practices that have application beyond the classroom.

Notes

4
6 Harold T. Shapiro, Science, Meaning and Anxiety. Texas A&M Convocation Address 2001. (http://www.tamu.edu/conv/shap01.html) On October 4, 2001, Texas A&M University celebrated the 125th anniversary of its opening. The celebration included not only an Academic Convocation but also a special conference one-day conference on “Higher Education In and For a Just Society,” and a gala dinner dance. The Convocation featured a keynote address by Harold T. Shapiro, president emeritus and professor of economics and public affairs at Princeton University.
7 This remark was made at the University of Miami in February 2005.
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From Semper to Phenomenology: Making and Tacit Knowledge Acquisition in a Beginning Design Studio for Graduate Students

JEAN LA MARCHE
SUNY-Buffalo

Fig. 1. From hand to eye tacit transference (after El Lissitsky).

Over the past several years considerable attention has been focused on “making” in architecture. During that time, I have not found a convincing argument that explains the relationships between body, behavior and knowledge not to speak of the more difficult questions about those between action, the imagination and intuition. In this paper, I draw on recent research and theories to begin to lay the groundwork for a coherent argument in support of making as an important form of education in architecture. While this is only a piece of a much larger puzzle, it seems to suggest other extended arguments to map out the other more problematic relationships.

I am interested, for example, in the way in which the knowledge that arises from the experience of the hand is transferred to the eye. The two interact: visual interest is modified by experience. Drawing and building, for example, contribute to the shaping of the “desire of our eyes,” to use Le Corbusier’s phrase, although his argument is that it is mathematics or calculation and economy of means that emerges in a new and modern way of seeing. How do we explain this transfer from the hand to the eye or, more broadly, from the body to the mind and the other senses? What are the relationships between sense perception, knowledge, and imagination?

Before addressing some these questions, however, let me first give you an overview of the studio I have been teaching for the past few years to beginning design graduate students in our 3.5 year program. The broad objectives of this studio are to introduce students to studio culture, work ethic, discipline, and teamwork. In addition, the studio is intended to develop the students’ already nascent constructive imagination and to establish a vested interest in the rest of the curriculum. The more specific pedagogical objective, and the one that I will address in this paper, has to do with the relationships between the body and mind, the other senses, and the imagination, a complex array of entanglements that are somewhat organized around the
The concept of tacit knowledge. The studio is designed on 3 levels: 1) skill building in model making materials and assembly; 2) correlations between skill building exercises and full-scale building materials and construction techniques; 3) both are set against a background historical trajectory from the late nineteenth-century proto-modernist theories of the origins of architecture by Gottfried Semper to the late twentieth-century phenomenological theories of site, tectonics, details, and the bodily experiences of orientation and sense. The history/theory background forms the context to advance the architectural, cultural, and personal significance attributed to the knowledge and skills related to materials and construction techniques.

The first half of the semester is based on Semper’s theory that separates building into stereotomic foundation, tectonic framework, and skin. This lays the groundwork for an understanding of modernism. As Kenneth Frampton argues in Studies in Tectonic Culture, Semper’s theories preceded modernism and became a harbinger of later arguments about structural expression, the separation of structure and skin as in the curtain wall, and economy of means. The first eight weeks are devoted primarily to skill building exercises intended to introduce some of the various modeling skills and principles necessary to successful studio production and to the exploration of the students’ “constructive imagination” and intuition concerning construction practices. Students read Frampton on Semper and Frampton and Frascari on detail.

During this time, the students are given three exercises that afford the opportunity for thought and discussion about making and building, historical/theoretical interpretations of the acts of making/building as the basis for architecture, and the practices and processes in working with liquid, plastic, and stick materials. These exercises include tutorials in hydrocal and casting/mold-making, basswood and tectonic construction, plastics/ acrylics and sheathing, and wire soldering. Each of these exercises explores the material and spatial qualities of major building elements, their interrelationships, and their relationships to site (an artificial site made of a steel beam and two “c” channels on horses). Modeling exercises also make it possible to discuss questions concerning representation and, more importantly, correspondences between the construction of models and the construction of buildings.

Project I, Foundation, focuses on foundations, or “earthworks,” as both form and concept, and on the process and spatial ramifications of molding and casting.

Fig. 2: making, William Helm. Fig. 3: foundation, William Helm.

Project II, Framework, continues the investigation into space-making through the construction of tectonic frameworks. Students concentrate on interpretations of light frame wood construction techniques as a means of designing floors, walls, and roofs, using their foundations as a base.
Project III, Skin, asks students to use acrylic/plastic materials to sheathe their evolving designs, continuing to explore the spatial logic of the first two exercises.

Fig. 4: framework, William Helm.  
Fig. 5: skin, William Helm.

The second half of the term focuses on phenomenology. As an important late twentieth-century paradigm, phenomenology has had a significant impact on architecture in the last thirty years, especially on architects’ attitudes towards construction, tectonics, and the role of the detail (Frascari, Gregotti, Frampton) and site (Norberg-Schulz, Frampton, Pallasmaa, to name only a few). Students read Frampton, Norberg-Schulz, and Pallasmaa on the phenomenology of detail, site, consciousness, and the sensuous and bodily experiences of light and shadow, materials, and tectonics.

The Final Project, “Genius Loci,” asks students to move from the abstractions of the first three assignments to the “concrete” experience of a lakeside site in on the outskirts of Buffalo, New York. The introduction of a simple building program – “House” – makes it possible to advance model and building skills and knowledge while also enhancing their understanding of architecture in contemporary terms by initiating discussions of some of the cultural and psycho-social issues associated with domestic life.

For the final project, students were asked to construct a site model at ¼” = 1'-0” scale and to work as a team to construct the model. Questions of representation arise not only in relationship to models and real buildings as in the first three exercises, but also the reverse in the construction of a site model. After visiting the site and recording their phenomenological experiences, they assembled site plans and contour maps to aid them in building the site model.

During the construction of the model, the students began working on their own specific responses in the design of a house on the site.

Fig. 6: house, Joseph Carline.
Now to the questions concerning the impact of making on visual perception and the imagination. My primary source in developing this pedagogy are arguments that ground the popular concept of making and knowledge acquisition in broader concepts of embodiment, in particular, the ideas that Michael Polanyi has developed over the years in relation to his concept of tacit knowledge. The term “tacit” comes from the Latin tacitus ‘silent’, from tacere ‘to be silent’. The idea of tacit knowledge is understood as implied without being stated.

One of the fundamental assumptions in making is that the sensed conditions of direct experience and the knowledge accrued by means of bodily engagement are assimilated as tacit, implicit, and ineffable. Tools become extensions of our bodies, forms of prosthesis that extend outward the points at which we make contact with the things outside ourselves. These experiences make them part of us; they are incorporated or interiorized. As Michael Polanyi has indicated, “We pour ourselves out into them and assimilate them as parts of our own existence.” This sets up a dynamic spatial model of perception that also assists us in drawing correspondences with theories of empathy and projection that I will touch on at the end of my paper. Let me first describe the basic tenets of Polanyi’s assertions.

The first major assertion is that our attention in the acquisition of skills moves from what he calls focal to subsidiary.
When we use a hammer to drive in a nail, we attend to both the nail and hammer, but in a different way... The difference may be stated by saying that the ['feelings in our palm and the fingers that hold the hammer']... are not, like the nail, objects of our attention, but instruments of it. They are not watched in themselves; we watch something else while keeping intensely aware of them. I have a subsidiary awareness of the feeling in the palm of my hand which is merged into my focal awareness of my driving in the nail.6

The physical experience of the hammer becomes subsidiary to our focal attention to the nail and the fingers and thumb usually associated with this activity, a process also referred to by physiologists as subception.7

As a result of this observation, Polanyi concludes that the hammer becomes a part of our body; it is incorporated and our sense of our body extends to include it. He describes this spatially in his later book, The Tacit Dimension: “in an act of tacit knowing we attend from something for attending to something else; namely, from the first term to the second term of the tacit relation. In many ways the first term of this relation will prove to be nearer to us, the second further away from us.”8

His earlier characterization of this experience is that “we shift outwards the points at which we make contact with the things that we observe as objects outside ourselves.”9 Later, he would characterize this as an “expanding” of the body outward into the world:

Because our body is involved in the perception of objects, it participates thereby in our knowing of all other things outside. Moreover, we keep expanding our body into the world, by assimilating to it sets of particulars which we integrate into reasonable entities. Thus do we form, intellectually and practically, an interpreted universe populated by entities, the particulars of which we have interiorized for the sake of comprehending their meaning in the shape of coherent entities.10

The movement outward initiates a spatial model of dynamic perceptual experience in which we, or our sense of our body, expand to integrate the objects we encounter. This outward movement is consistent with other theories, such as those of Theodor Lipps (empathy [einfühlung]), Elaine Scarry (making), and, more broadly, Sigmund Freud (projection).11 In addition, it bears some similarities with Lacan’s and Foucault’s use of the mirror metaphor in which the self is split into image and body, here and there, etc. Although I cannot expand on these in this paper, I discuss these architectural spatializations in other publications to which I would refer the reader.12

In describing the expanding body, Polanyi also raises the second important point about his spatialization, i.e., interiorization. This is already evident in the subsidiarization of attention that takes place in the integration of the experiences associated with objects outside our
bodies.\textsuperscript{13} By this he means that when we move our attention from the body to the object, making the object the focus of attention and the bodily experiences subsidiary, we interiorize the physical experiences to which we are not attending.\textsuperscript{14} Thus, Polanyi's theory contains a double movement in which we gain knowledge by directly engaging the world and extending our body into it, an act that also is internalized.

The concept of interiorization is important for many reasons, most importantly in this context for the fact that it provides the means by which bodily experiences are transferred between the senses, such as the experience of the hand to the eye: "the way we see an object is determined by our awareness of certain efforts inside our body . . . ."\textsuperscript{15} I have explored some of the questions associated with the bodily impact on visual perception elsewhere focusing more specifically on Le Corbusier's "desire of our eyes" as a characterization of this condition.\textsuperscript{16}

The process of internalization affects not only the senses but also the ways in which we think: "tacit thought forms an indispensable part of all knowledge . . . ."\textsuperscript{17}

the structure of tacit knowing . . shows that all thought contains components of which we are subsidiarily aware in the focal content of our thinking, and that all thought dwells in its subsidiaries, as if they were parts of our body. Hence thinking is not only necessarily intentional as Brentano has taught: it is also necessarily fraught with the roots that it embodies.\textsuperscript{18}

It follows from these observations, that all knowledge contains our tacit understanding of the body's engagement with the objects of the world.

This endorsement of our native powers of making sense of our experience according to our own standards of rationality should also make it possible for us to acknowledge the ubiquitous contributions made by sense perception to the tacit components of articulate knowledge.\textsuperscript{19}

And, finally, the process of internalization reaches the unconscious.\textsuperscript{20}

This movement outward and inward transforms our senses, our ways of knowing, and, further, our ways of making sense of the world, our beliefs, values, ideas, and even our sense of truth.

A transition takes place here from a heuristic act to the routine teaching and learning of its results, and eventually to the mere holding of these as known and true, in the course of which the personal participation of the knower is altogether transformed . . . . Personal participation changes from an impetuous pouring out of oneself into channels of untired assumptions, into a confident holding of certain conclusions as part of one's interpretive framework. The driving power of originality is reduced to a static personal polarization of knowledge; the intellectual effort which led to discovery and guided its verification is transformed into the force of a conviction which holds it to be true - in exactly the same way as the effort of acquiring a skill is transformed into a sense of its mastery.\textsuperscript{21}

The experience of the hand, therefore, transforms the desire of our eyes, our visual perception, our constructive imagination, and our aesthetic interests.

In the studio I described above, we assume that the experience in making models as well as 'real' construction instructs the students' "constructive imagination," i.e., the imaginative engagement with basic construction principles such as molding and cast liquid materials, layering and repetition in linear construction systems and an introduction to connection systems. The act of making -- the weight, strength, and capabilities of materials and the tools and processes associated with them -- become a part of our visual interests. These experiences begin to transform the ways in which students attend to architectural works. Through tacit
knowledge we begin to map out a network of relationships between the hand, the eye, and the imagination.

NOTES
6 Ibid., p. 55.
8 Ibid., p. 10.
9 Polanyi, Personal Knowledge, p. 59.
10 Polanyi, Tacit Dimension, p. 29.
13 Polanyi, Tacit Dimension, p. 18.
14 Ibid., p. 24.
15 Ibid., p. 12.
16 Jean La Marche, Self and Surface: The Mirror of Architecture (Berkeley: University of California at Berkeley Person-Environment Theory Series; Center for Environmental Design Research, 1993) and Desire of Our Eyes (Berkeley: University of California at Berkeley Person-Environment Theory Series; Center for Environmental Design Research, 1992).
17 Polanyi, Tacit Dimension, p. 20.
18 Ibid., p. x.
19 Polanyi, Personal Knowledge, p. 98.
21 Ibid., p. 172.
A Beginner’s Mind

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Conference held at the
College of Architecture
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On Continuity

M. VICTORIA LIPTAK
Woodbury University

“Design is not an object of study; design is a mode of inquiry and exploration.”

0. Introduction

A few years ago at a conference on the beginning design student, my colleagues and I presented the work from our first-year, first-semester design studio. The course content had been developing for about three years, and had reached a state of maturity that merited evaluation and discussion. Since then, our program’s five-year curriculum has undergone strict scrutiny, first by our faculty in preparation for a NAAB accreditation visit, and then by the NAAB team itself. As first-year coordinator, I became interested in the evolution of the first-year architecture curriculum through self-assessment and in the role of continuity in architectural education.

Continuity means not re-inventing the wheel. It also means holding some things steady while others evolve. By varying what is held steady across time, every aspect can have an opportunity to evolve at some point. All our courses have syllabus templates that define the essential objectives and goals of each class. These templates evolve slowly, but they do evolve, as the faculty examine strengths and weaknesses in the curriculum. Meanwhile, each time a course is offered, instructors re-interpret how to meet the objectives and goals.

While in second and third year the coordinators change each semester, the first-year coordinator remains constant from fall to spring. In this position I have been able to get a longer view of how our foundation sequence works, and its role within the overall education of our architecture students.

1. Curricular continuity

We have adopted the principle of curricular continuity, within a year/level and across the five years, in response to program self-assessment and faculty willingness to strive for a cohesive and coherent architectural education at our institution. We conceive the first-year architecture sequence as a design-focused “First Year Experience,” introducing not only principles, processes, and skills of representation, but also ways of research and analysis, critical thinking as a design tool, investigation as a way of stimulating interests beyond the studio, and the establishment of architecture’s role in history and culture. This foundation provides multiple avenues for later faculty to continue developing students’ skills, knowledge and practice, and for students to continue their investigation and education as their interests and strengths develop.

Studio 1A, Principles and Processes, Bodies and Objects, comprises a set of progressive projects. Students work at full scale as they develop both an understanding of the principles of architectural design and a set of processes for launching a design inquiry. Projects become increasingly more difficult as students are asked to consider larger and more complex relationships between the body and its environment. Studio 1B, Natural Tendencies, continues the investigation of relationships while working at the scale of inhabitation, definition and enclosure of space. Studio 1B comprises five iterations of essentially one project: defining and creating a space of less than 300 sq.ft. for a specific human tendency (program) on a given abstracted place condition (site) and working with one of the five elements of Chinese cosmology (material and structure).
The foundation of architectural education is conceived across these two semesters. Studio 1A involves a certain amount of defamiliarization, as we ask students to reconsider what they think they know about architecture. The field and the inquiry turn out to be broader than they may have believed. Principles and processes from 1A are referred to directly in 1B, and students are reminded of work they did in the first semester as they struggle to conquer the second. In 1B, the repetition of the inquiry, with only a few parameters changing, encourages the development of depth and the habit of practice.

Concurrent with 1A in the fall, Design Communication 1 focuses on the tools of design, the conventions of architectural representation, and the communicative value of hand-drawn graphic expression. The studio drawing assignments rely directly on what is covered in Design Communication, which helps students understand the relationship between drawing and thinking and helps us postpone the development of the “studio is the only things that matters” attitude. Concurrent with 1B in the spring, Design Communication 2 focuses on the digital tools of drawing and design. Here the studio requires multiple media in presentation panels, to incorporate the digital techniques from Design Com 2 and to maintain the ability to draw quickly by hand in plan and section.

Curricular continuity appears in sequential studios as each builds upon elements of what came before. In 1A and 1B, students are required to produce an intentional text for each project, and this text is revised and used for presentation at the project review. Intentional texts appear again in 2A, and lessons about craft from 1A are also an important part of this studio. 2B takes up the issue of site conditions first explored in 1B, but moves from abstract place to actual contexts in the city. By third year the idea of writing an intentional text for a project statement is habitual, and while students are still grappling with what constitutes a “concept,” they are well aware of the need to cite influences, seek inspiration from precedents, and develop a clear verbal metaphor for their design ideas.

2. Pedagogical continuity

We have developed a strong pedagogical continuity in methods and models. The program seeks to integrate the strengths of “teaching as one has been taught” without promoting a singular style. Coordinating first year begins with the creation of a team of faculty from more than one educational and professional background, who are willing and eager to incorporate the best of their non-design educational experiences with their “lessons from studio” as we craft and re-craft projects and assignments to meet curricular objectives.

Several models of student/teacher interaction are established in the first semester, reinforced and reinterpreted in the second, and lay the foundation for the next two years of the program’s core curriculum. In 1A, students work with their section instructor for the whole semester, but each project review mixes students from all four sections. Instructors then have a greater understanding of work across the sections, and students understand that different instructors bring different points of view to the discourse. In 1B, instructors rotate within the four sections after each project. Students’ first and fifth projects are with their original section leader, but they complete the middle three projects each with a different instructor. Instructors get to work with all the students, and here, especially, the exposure of students to different pedagogies and different focuses enriches the educational experience.

We also establish pedagogical continuity and stronger program memory through progressive studio teaching assignments, having one instructor from each studio move forward with the students to the next in sequence. This means that at least one instructor from 1A also teaches in 1B, at least one from 1B will teach the following fall in 2A, someone from 2A also teaches in 2B, and so on through the core sequence. The continuing instructor brings his/her immediate experience of the group of students, the set of projects they undertook, the skills and knowledge they acquired, and the weaknesses of the class. This information helps the
coordinator develop an appropriate set of projects, and allows the sections to be constituted so that none is unbalanced with respect to strong and weak students. The familiar instructor also gives students an anchor, or a lifeline, as they attempt to make sense of a new set of issues and new perspectives.

Within a semester, strong coordination across sections is a cornerstone of continuity. Coordination requires diplomacy: making certain all instructors are on the same page, but not encroaching on their academic freedom. Coordination in first year is especially critical with respect to grading issues. We fight grade inflation, but it is difficult to contain one’s enthusiasm as an instructor when students make progress in leaps and bounds. The first-year coordinator sets the standards for grading, usually by consensus. This is made easier through the practice of having all instructors take part in reviews of students from across the sections. For the first two projects, we sit down together after reviews and quickly debrief each other, identifying the strongest and weakest presentations. After we have developed a common language of evaluation, we grade the next two projects independently, but share our grade range with each other. This assures that grades are fairly assigned throughout the class, and it also gives each of us the confidence to address a student’s grading issue should one arise.

The several types of team instruction we use in first year might raise some questions about academic freedom. However, because first year teaching assignments are seen a priori as construction of a team, and because each semester the team develops the particulars of the syllabus, each member of the instructional team has already bought into an effort much larger than her/himself. Individual class sessions are run as each instructor sees fit; one of our 1A instructors likes to take his section outside under a tree on gorgeous days. Review schedules are fixed, and we have all-studio meetings for announcements as needed, but each instructor develops an individual rhythm and repertoire. The repertoire might include small group critiques, desk crits, quick in-class exercises, peer reviews, and so on. Repertoires are not proprietary, and we frequently share with each other what has worked well (and what has not).

One final aspect of pedagogical continuity is the role the first-year coordinator plays as academic advisor. At Woodbury, each student’s academic advisor is a faculty member from the student’s major. The first-year coordinator advises a majority of first-year architecture students, and as advisor can check in on how a student is doing in non-studio classes. It’s one thing to say in the classroom “You must manage your time and not neglect your other classes,” but it rings hollow with the students when studio assignments are time and energy (and money) consuming, and the instructors seem to care only about studio. Because our community is small enough that we know all our students by name, it is essential to establish a relationship with the whole class, through its individual members, and promote the pursuit of education, not just grades, and especially not just studio grades. The incorporation of important reading and writing assignments into studio projects is not an abstract exercise in pedagogical experimentation, but a response to a deeper understanding of how our students are doing in their general education classes, what their strengths and weaknesses are, and how we can instill in them the idea of architect as educated person.

3. Continuity and community

The beneficiaries of intentional curricular and pedagogical continuity are the students, the instructors and the department community as a whole. Our objective for students is to give them a coherent educational experience. As the post-modern business model infiltrates the understanding of our social and cultural systems, applied higher education theory, too, has introduced notions such as outcomes-driven assessment, quantifiable objectives, and the identification of discrete learning events. Continuity as a principle opens a space of ideas in which we can step back from product-driven goals, examine our own best experiences, and consider how what we do contributes to the development of our students’ experience. Such focused self-
awareness may be a by-product of post-modernism, and this paper itself arises from the “need” to analyze the “intension” and “extension” of continuity, but I won’t slip any further into the theoretical ether.

Among the benefits of continuity that accrue to instructors, I have found that it offers the ability to look across instances of teaching the same course and to follow students as they progress in the program. At Woodbury, the processes of contract renewal and promotion for full-time faculty require self-examination. For all faculty, the arrival of student evaluations in the mail is a moment of self-critique. Not just “Did they like me?” and “Did they say good things?” but also we ask ourselves how effective we were this time, what we are sending these students forward with. With intentional continuity we have something to compare our performance with, and we can formulate approaches to strengthening course content, its delivery, and the art of pedagogy.

One of the more challenging aspects of coordinating our first-year curriculum is establishing and maintaining the interdependence and continuity of design studio and design communication across the two semesters. This is especially true as our department assesses new skills, tools and techniques related to computer-assisted representation and production, and how they will move into our curriculum. In a curriculum that already seems to want to burst at the seams of its ten semesters, how and where do we incorporate new techniques and technologies? Design Communication 2 has responded to digital advances by focusing on equipping the student with tools for design development, rather than on straight representational output. Students are introduced sequentially to Photoshop, Autocad and 3D Studio (or a similar 3D program), and then encouraged to move freely among them. Studio 1B is in turn evolving to reinforce the multiple tool method, and intentionally to assign exercises with the combined use of digital and non-digital representations.

4. Cycles

By holding certain aspects of the first-year program steady while others evolve, and then “turning the dial” and holding different aspects steady for the next round of evolution, we find that the student community feels a certain vested interest in what the “new crop” of students will be doing, and what will be changing. Returning students begin to feel invested in architectural education outside of their own experience, and they serve willingly as mentors to the new first-years. Dr. Ellen J. Langer, a Harvard psychologist whose work explores mindfulness in health, business and education, writes of the seven myths that undermine learning and teaching. She advocates teaching a healthy uncertainty to promote the acknowledgement of possibility. This includes the principle of variability to counter the myth of “canonical basics,” and is manifested in Studios 1A and 1B as one of the most important first lessons of studio, that there is no one right answer, no singular way of working that guarantees an A. Returning students therefore have all sorts of advice they are eager to give, and happily most of that advice comes in the form of possible ways of working or developing an idea, rather than “you have to do it this way to get a B+”. Returning students have an insight into the endeavor, not just into certain instructors’ preferences, and are surprisingly good at informal critiques with first-year students for design development.

Incremental evolution does promote a sense of tradition among students, and there was much disappointment among the higher years when this fall we changed the final project of the first year first semester. They saw it as a rite of passage – and of course, we did, too. But we saw “final project” as the means of passage, while they saw the particulars of the project as the rite. Continuity required a sufficiently difficult project that would challenge the students, but evolution required a rethinking of how the final 1A project tied into the 1B studio. The new final project passed its test run, and will be subject to the pulling and tweaking of next fall’s instructor team, but it does seem to fit the need for a threshold project into the next level of investigation.
In order not to leave a sense that Woodbury has its curriculum so neatly integrated and sequenced that every aspect of it is intentional, I will admit that there are both circumstantial elements of continuity and failures of continuity. Some things continue because of inertia, the tendency of bodies (or ideas) in motion to stay in motion, and those at rest to stay at rest. The 1A curriculum is provocative in its embrace of projects executed at full scale. But these projects need to be focused more strongly, especially at the beginning, on seeking and establishing systems of order. That is, the experimentation and defamiliarization could be geared toward designing within simple descriptive geometries as a base, and moving on to more complex geometries in later projects. This could have a two-fold effect: it would enable students to apply the lessons of architectural drawing conventions from Design Communication 1 in their studio drawings, and it could provide a literal framework onto which more complex systems could be mapped. Not re-inventing the wheel, or returning to pre-pneumatic tires, but truing up the spokes.

On the other hand, Studio 1B continually expands and contracts in the complexity of relationships repeated in each project. Some of this is the circumstance of losing instructional team members who were invested in some particular aspect of the course. Some of it is seeing a student cohort develop a mass response we had neither intended nor anticipated. The overall trajectory of 1B seems to be to simplify the number of relationships, and strengthen those that remain. Given the cyclic nature of course development, I suspect we will see new buds of growth in complexity soon. And we will re-evaluate the principles and lessons, and true up accordingly.

What is a failure in continuity? Since we have sought to establish connections between courses at a level and across levels, a sea change in a course can throw off carefully drawn intersections or links. Key faculty who are gone from their usual spot can cause such disruptions in continuity. These can be re-established or re-connected with faculty care. A more important failure is when course sequencing is subverted, a continuing difficulty when we admit transfer students or when a student falls out of sequence by failing a course. We have developed a few approaches to special types of transfers, such as those who enter with a single studio already under their belt, but in fact each transfer student is a unique case. Luckily we are still small enough to do a departmental evaluation for each student, and combine this with the academic advising I described above. But there are times when there is no neat fit, and the continuity of curriculum we have sought so carefully to create is experienced more as a multi-course dinner in which all the plates are brought at once, or the dessert precedes the antipasto.

A full assessment of continuity means looking ahead and looking back. Are the principles and academic practices established in first year still evident by the time of the capstone degree project in the fifth? So many lessons, so many skills, so many experiences have intervened that it is difficult to point to any one thing and say “Yes, that definitely comes out of first year.” But here is what I see when I look at our degree project students: they have not totally abandoned trace paper for the computer. They move easily and confidently from one instructor’s critique to another, and in fact seek out multiple voices. They can look for and draw relationships among entities and ideas that at first blush look like apples and oranges (ahh! fruits!). They understand that the process and the practice is the design – the mode of inquiry and exploration – and the products are representations of the design. They know that representations come in several media, including graphic, verbal and three-dimensional, digital and analog, and they know they need multiple tools both to conduct the exploration and to communicate their ideas. These are all principles of design inquiry established and practiced in the first-year architecture studio.

Since I have the good fortune and honor to work with degree project students in the spring as a project advisor, I also have the opportunity to consider what lessons from the fifth year I can re-interpret for the first. One lesson is the paradigm – in fifth year students are asked to investigate a set of practices, or a way of working, or a system of concepts or values, that shapes or defines a reality for its participants. An example would be analyzing a traditional dance for its event sequence, its necessary performers, its context, its history, and its cultural content for its
audience. Fifth-year students work from their understanding of the paradigm toward an approach to defining and/or working with the issue they have identified as the root concept of their degree project. This requires not only in-depth research but a sustained effort to interpret and re-interpret what they have found in relationship to what they exploring. I imagine that we might introduce the paradigm approach at the first-year level by carefully and intentionally exposing students to paradigms both within and outside architecture that have had effect beyond the original field or discipline. A primary lesson could be the degree of internal consistency of systems, and how open systems promote change.

The second potential lesson from fifth year is that each student must develop a set of criteria by which his or her success/progress can be evaluated. This could be seen as an extending of Langer’s principle of variability; each set of criteria develops from a particular viewpoint with a specific and well-defined approach to a design-based learning situation. In translating this requirement to first-year studios, we might ask students to begin to establish the habit of identifying their goals in each project. While at the beginning I suspect there will be mindless answers such as “I want to get an A,” “I want to do something different,” we can encourage greater aims, goals based on design principles and on critical inquiry.

Continuity works only as a partner of change. If our graduates can go out in the world, seek opportunities to apply their tools for critical thinking and design practice, and effect positive change, then we will have met our own criteria for success.

Notes
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Encounter with Materiality: A Graduated Approach to Design-Build

BRUCE LONNMAN
American University of Sharjah, School of Architecture and Design
GREGOR WEISS
American University of Sharjah, School of Architecture and Design

Introduction
A graduated approach to design-build raises issues about the things students build in the course of an architectural study, those objects whose characteristics are defined more completely or wholly as a constructed reality. These are constructed objects that demand a higher degree of workmanship and decision making than the surrogate models and other devices students use to study and reveal their design intentions; and whose essential value is as things themselves, rather than only representations of ideas.

This is a differentiation of the various approaches to design build based on an ideal pedagogical outline that has been developed from the authors’ collective experience, connected to a scale of orders of intent and meaning. Each level promotes specific aspects of reality based on the level of abstraction, and possessing differing values of fidelity or surrogacy. The graduated approach is scaled both in terms of skill and process development, but also in the way certain elements are pushed to the foreground in terms of real-world actuality and testing, while others are allowed higher degrees of representational ambiguity. An example would be a 1/2 scale model used to test structural behavior, with a high degree of fidelity with regards to its structural literalness, but less with regards to its scale and material. Alternatively, a student design-built house would in no way be considered a representation, since it possesses 100% actuality, and would have to exist and function completely within the conditions of the real world.

This paper will deal with the development and practice of these concepts from the Foundation through the middle and upper years in an undergraduate architecture program.

Encounters With Materiality
John Dewey’s axiom, “learn by doing,” is a corollary to his belief that knowledge, to have real meaning, must be a way of dealing specifically with authentic stimuli and situations. “Thinking”, says Dewey, “begins not with premises, but with difficulties ... in what may fairly enough be called a forked-road situation, a situation which is ambiguous, which presents a dilemma, which proposes alternatives.” Dewey viewed the variety of human activities as literally instruments evolved to solve problems of all sorts. Thinking, according to Dewey, arises from the direct needs of the individual, and it is always problem centered: human thought is the instrument of action. Ideas arise from experience and are plans of action to engage with the world. Knowledge, to have real meaning, must be a way of dealing specifically with authentic stimuli and situations.

This binds making, thought, and language together; and in even more important ways than may first appear. The act of making things inevitably leads to a series of encounters, each demanding decisions and further plans of action. This in itself is the critical component of any creative act, but the literal making of something pushes this to the very forefront by constantly forcing minute explorations and interrogations of the thing being made as well as the process by which it is being made. Making is preceded by idea and invention and vice versa; each small act begets and betokens another. This whole process may be described as creative, but it is clear
that it is composed of many real interlocking events that parallel the intellectual evolution of a thing.

A designer’s education is traditionally composed of a succession of projects, exercises, and experiences that use surrogates, drawings and models, which are abstract in nature, to learn and test assumptions about actions and their manifestations in the real world. The utility of this is a virtually unlimited freedom to explore speculatively. Hypotheses are tested through discussion and critique—the design jury, for example—where the many, and diverse experiences of the participants are brought to bear on a design problem. Language is used here as a vicarious reality, allowing a broad range of ideas and debate. Drawings and models, while more specific than a verbal description, are still less specific representatives of reality and thus open to the kind of searching inquiry that is essential to design education.

Hands-on making is not teaching design in the traditional sense, which involves knowing and judging a to-be-built reality through surrogates possessing different levels of ambiguity—since they are not and can never be the actual things. Making involves an essential activity of mind and thought, and each act of construction has ramifications involving processes, materials and even the choice of tools. The act of making something, of feeling and working with material and realizing its possibilities and limitations, transcends material and form to become metaphor and analogy for any of the other ways we may build in the future.

Design drawings (e.g., plans, sections), detailed models, prototypes, and the “real” built thing depict experience in very different ways. While products of the workshop are considered actuality, and literalness, and drawings and models more abstract; the referential qualities of the things we make are infinitely variable: “... no object is perceived and no action performed without an open-ended vista of analogues, which point to the most abstract guiding principles: and, inversely, when pure, generic shapes are handled, there reverberates in human reasoning the experience of particular existence, which gives substance to thought.”

In Visual Thinking, Rudolph Arnheim, describes the function of visual analogs and their importance in perception and thinking. Perception consists of the awareness of relevant characteristics, while thinking must be grounded in real things of the world. This provides a range of value and a range of response for the maker as well as the perceiver.

In order to describe this variable scope of meaning, the perceptual theorist J.J. Gibson provides a useful distinction between things and their referents in the terms ‘conventional’ and ‘non-conventional’ surrogates. Where writing and language require a knowledge and agreement among its users to function, pictures, models, and prototypes require increasingly less associative learning to understand because of their visual and/or literal correspondence to reality. But “both conventional and non-conventional surrogates may, of course, be relatively unspecific to their referent, and to this extent the resulting perception will also be unspecific.”

This is, in fact, an important feature of the kinds of depiction designers choose, allowing a sliding scale between pure abstraction (e.g., a diagram or symbol) and reality, with the ends of the spectrum providing very different qualities of perceiver input and insight—from fuzzy-logic ambiguity to the focused specificity of actuality. Distinguishing between concrete objects, places, and events on the one hand, and abstract properties, qualities, or variables of them on the other, “the more nearly a surrogate is replicative...the less is it capable of referring to abstractions and the more must its referent be concrete.” Conventional surrogates, however, do not have this limitation. “The more arbitrary a surrogate, the more is it free to specify anything, abstract or concrete.”

The designer and educator, Jay Doblin proposed a “Scale of Ambiguity,” which distinguished between kinds of representational artifacts in a scale of relative abstraction; as symbolic (associated) content increases, ‘real’ (authentic) content decreases. The ‘realness’ quotient of a construction holds a special range of meaning connected to how something is made and what it is used for in the design studio. Making anything demands proof of existence and
proof of some type of reality. Built into making is always a function of some sort, too. This existence can be that a thing *is*, in that it occupies space and possesses qualities that are for even a simple object, a highly detailed model, or a prototype, always concrete and literal. At the first stage, this may be the difference between a model of something and a drawing of it, in which the model has certain real demands: one must contrive to make the pieces, they must hold together, the dimensions must fit, etc. As a detailed model or prototype, more craft becomes crucial, along with increasingly greater concern with the analogous connection and materiality. While a crafted model is still only a representative of something real, it occupies real space, and contains its own reality which must function successfully as its intended analog. In the case of architectural and structural things, something can be seen to function as—a piece of furniture for instance—or actually work as a structure; it must “stand up”, and actually prove itself, such as a small building. Each kind of encounter promotes certain aspects of reality and of abstraction. The Graduated Approach is also a graduated approach in focusing those salient elements critical to each level of design.

**Design Language**

Experience creates language and thought and language uses experience to portray concepts, and the particular experience of making helps form language, which connects those engaged in the same activities. We are interconnected through the functions of language and process. In this sense, the character of our communications makes us ‘like minded,’ functioning more as a unified intellect, as in the design studio, where individual problems are analyzed by a consortium: a larger mind setting itself to a social process of design.

As fundamental as knowledge and a particular set of skills are to design, so is the language that beginning designers learn to communicate with and the ways in which that language is used. Design language is rich in analogy related to visual form: we point at a few marks on a piece of paper, or a hold up a rough cardboard model and invoke a universe of images and ideas by saying the name of an artist, architect, or building. These terms immediately unite us through our similar knowledge of them, and specifically in reference to a vivid reality the marks on trace paper or configuration of cardboard can denote. But in this is another, even more substantial involvement in the process of making which connects designers experientially and linguistically. We not only connect what we do through a common knowledge, but through the common experience of building things in what we do and how we do it. We ‘draw’ lines in the air to describe something; or act out the process of placing blocks to build a wall—using references and metaphors which are based upon the reality of assembling and making things. We also see the tools and the processes that are within. A designer friend described seeing a detail of an automobile design and simultaneously, the tool and the action used to sculpt the clay of the automobile prototype model. We look at a brick wall and feel the trowel pointing the grout. Or see in the wooden furniture the jointer, table saw, and dado blade. This is also part of communication embedded within the formation of concepts and a design language.

**Design-Build in the Studio—Application and Process**

As part of a desire to provide workshop experience to all students in the program and at every level, the scheme for a progressive introduction of building experience was conceived and is being developed in the School of Architecture and Design at the American University of Sharjah, U.A.E. The common denominator throughout is that the process of making something with actual materials, whether an abstract formal problem or a functional product or environment, involves decisions about fabricating and joining that transcend the limitations of working with the particular materials at hand or the available tools. Every workshop studio problem becomes a learning activity and a potent analog for situations encountered in actual building design.
For the beginning design student, the workshop studio provides the context for critical discussion about the intention, design and actual making of things (and ultimately, buildings) as an integral component of a design education. In the Foundation year the workshop studio introduces simple fabrication skills, basic hand tool skills to cut and connect wood, plastic, and metal. Projects may be at various scales but their complexity is constrained, for example, through the employment of prescribed components (a ‘kit of parts’). In the middle studio years this parameter is lifted and students begin to define the components and discover ways to fabricate them, demanding an increasingly more complex relationship between making, process, and product. More machine tools are introduced to increase the range of possibilities, and in the upper years, the workshop studio expands the scope of projects to include a broad range of design-build constructions, from small furniture designs to habitable structures. The student now has access to a wider range of machines and shop fabrication processes as well as the use of portable power tools for on-site work. This type of a graduated progression from simple to complex distributes skill levels, fabrication techniques, and construction details across the design curriculum to the place where they fit best. It is an alternative to the traditional design-build studio; typically an upper year class that takes on the challenge of designing and constructing a habitable structure at full scale (e.g., a pavilion or small house). This can be a daunting task, and most programs shy away from such exercises for reasons of time, cost, and liability. Those programs that have design-build studios are the exception. And in most cases the studio is an elective, providing this valuable experience for only a few students.

In order to provide a hands-on design-build experience for students at every level of the program, a strategy was developed to overcome the inherent drawbacks of design-build studio work. The Design-Build chart (Fig. 2) outlines the various problem types and identifies the constraints and limitations of each project. The scheme is based on three principles:

- The project must have appropriate limitations defining the scope and complexity of the work. These parameters should take into consideration the overall cost of materials and the amount of time estimated for completion of the project.
- The knowledge of workshop procedures and the skills needed to use various tools are to be developed progressively over time and an important adjunct consideration is to insure safety in the use of higher-level machine tools.
- The content of the design-build project should fit the studio design curriculum for the given term in which the project is proposed. For example, the 3d year studio curriculum in the
second term emphasizes building technology, specifically structures. A design-build project for this studio should relate to structure; e.g. the design and testing of a structural component.

<table>
<thead>
<tr>
<th>Type of project</th>
<th>Materials</th>
<th>Fabrication</th>
<th>Tools</th>
<th>Typical Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructions</td>
<td>Small Dimensional Lumber 1&quot;-2&quot;s</td>
<td>Cut to length, drill holes, bolts and screw fasteners, no joints</td>
<td>Hand saws, screwdrivers, small wrenches</td>
<td>Full scale 1-1/2 meters high</td>
<td>Small dimensional materials using simple hand tools and no forming of material beyond basic cutting, drilling, and simple means of attachment</td>
</tr>
<tr>
<td>Abstract Cube Project</td>
<td>MDF rectangles and blocks precut sections</td>
<td>Stock dimensional MDF cut to precise sizes, glued</td>
<td>Cut-off saw</td>
<td>Full 900x900x20cm</td>
<td>Small, &quot;kit-of-parts&quot; construction focused on modularity</td>
</tr>
<tr>
<td>Composite Beam Design</td>
<td>Variety of lumber,学前教育, plywood, thin gauge metals, fasteners</td>
<td>Temple cutting, gluing, fastenings</td>
<td>Hand tools and small machine tools</td>
<td>Prototype model 1:10</td>
<td>Small prototypes to test structural principles</td>
</tr>
<tr>
<td>Design project model studies</td>
<td>MDF, Basswood</td>
<td>Stock dimensional MDF with some special elements from MDF limitations</td>
<td>Light shop tools, hand saws, scroll saws, Sanders, cross-cut, table saw</td>
<td>1:100</td>
<td>Highly detailed scale models of small objects with some variety of materials and means requiring limited use of machine tools and shop facilities</td>
</tr>
<tr>
<td>Small roof structure tested for performance</td>
<td>Small dimensional lumber, wood, thin plywood veneer, hardware connections</td>
<td>Stock lumber cut to length with simple fasteners</td>
<td>Hand tools, power drills, some shop tools</td>
<td>Full scale 2-1/2 meters tall</td>
<td>Scaled down building fragments</td>
</tr>
<tr>
<td>Furniture-size constructions</td>
<td>Hardwoods, MDF, metal, variety of materials and fasteners</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Full scale</td>
<td>Small structures and objects demanding high degree of craft, such as installations and furniture, with wide choices of materials, and full use of shop tools</td>
</tr>
<tr>
<td>Small Pavilion, structure</td>
<td>Lumber, masonry, metal, fasteners, variety of laminates</td>
<td>Building construction techniques including wood, masonry and metals</td>
<td>Job site tools, Unlimited</td>
<td>Full scale</td>
<td>Small site specific structures designed to test structural, material and, workmanship, and construction techniques</td>
</tr>
<tr>
<td>Small Buildings, Houses</td>
<td>Unlimited</td>
<td>Building construction techniques including wood, masonry and metals</td>
<td>Job site tools, Unlimited</td>
<td>Full scale</td>
<td>Complete buildings which utilize all the skills and understanding of tools and materials. These structures typically take a semester or more to design and complete, involving rough to finish construction</td>
</tr>
</tbody>
</table>

Fig. 2. A Graduated Approach to Design-Build

Foundation Year

Beginning in Foundation year, the principle of design-build is introduced. The concept is straightforward and implies that the process of making the object must be considered and will inform the design. An example of a project is the Presentation Stand (Fig. 3). This is an object that is designed by the student to act as a display structure during end of semester reviews for drawings and models. Here materials are restricted to small pieces of dimensional lumber and operations are limited to length cutting and simple bolt connections. Multiplication, transformation, and rhythm form the basis for design decisions. Yet, even at this basic level of construction, initial decisions about joining will have important consequences on the overall form, and vice versa.
Constructing the presentation stand coincides with an introduction to the workshop and to issues of safety as well. In the first year the use of machine tools is restricted. Cutting is accomplished with hand miter saws and a hand power drill. Instead of stifling creativity, this approach has the opposite effect, channeling creative energies towards design solutions enhanced by a deeper understanding of the limitations of the material, the method of joinery, and the variations in form possible by manipulating geometry and pattern.

**Second Year**

In Second Year a similar approach to design-build is followed. At the start of the term, each student fabricates a set of planar and linear elements in the workshop (Fig. 4). Precision is expected and instruction in proper cutting techniques is given. The idea of a set of pre-configured elements to be assembled into a single design is similar in nature to the Nine Square Problem that was developed by John Hejduk in the early sixties at the Cooper Union. The Cube Project is abstract and the elements do not correspond to real building components (frame, infill panel, etc.), as did many of the elements of the Nine Square Problem. Here, once the kit of design elements is made, the role of construction is super-ceded by pure investigations of form. Although second year design is focused mainly on architectural principles and spatial definition, with the introduction of the computer as an integral part of the design process, the first course in Materials and Construction introduces material characteristics through hands-on demonstrations and site visits.
Third Year

Third Year studio introduces building technology: structure, enclosure, and passive controls. Continuing the use of wood models for the investigation of space and form, the problem referred to as Wall-Frame-Plate uses MDF and wooden dowels to construct precision form models based on designs that explore three basic short-span structural systems. Similar to the kit of parts approach used in second year on the Cube Project, various components of the final project such as the floor and roof plates, front and side exterior walls, are created in advance. The student then transforms the universal floor plate into his or her own design. Openings are cut in the elevation for lighting and the floor plates are cut to correspond to double height spaces.

Although these models are strictly about the investigation of form, there are many aspects of fabrication that must be addressed by the student as the design proceeds. Precision cutting of openings in the MDF planes require learning workshop techniques associated with the intermediate range of shop power tools: the band saw, the drill press, the chop saw, and the planar. Non-rectilinear design forms present special challenges that must be solved on an individual basis. In the process the lesson is learned that complex form usually requires special fabrication techniques, in the model as well as in the actual building.

Complimentary to the study of structural systems in the Wall-Frame-Plate project, a parallel investigation is made of structural components. These constructions belong to a separate category of design-build structures called performance models. A performance model such as the Composite Beam Problem, tests assumptions about the way in which architectural form responds to the natural environment. Besides structural behavior, it is not uncommon for a performance model to test for lighting, ventilation, or, in some cases, an assembly sequence. The Composite Beam problem combines knowledge of material properties, understanding of structural principles, and some insight into connection design. The objective of the problem is to design and fabricate a one-meter long beam or other span element using a minimum of two structural materials. Performance testing is made to determine the load limit of the structure, with the lowest strength to weight ratio as the ultimate goal.

Another performance based design-build project is a variation on a pavilion. The project consists of a lightweight roof structure designed to be supported on a pre-configured support structure. “less Roof” (Fig. 5) was created to enable teams of eight students in a period of a week and a half, to design and construct a lightweight roof structure to fit a 2.5 meter span and carry the most weight. In this project economy of material was a premium and the successful projects incorporated sound structural principles in their design. This project also used a limited kit of parts in order to shorten the time frame of the project. The elements of the kit included specified lengths
of 1"x2" dimensional pieces of lumber, a length of steel cable, a half sheet of thin wood veneer, and various metal connectors.

![Fig. 5. "less Roof"](image)

In Third Year students are also directed in making detailed case study investigations of exemplary built works. The case study project includes a 1:100 form model of a single structural bay. Although not a design project, the creation of the case study project form models is not dissimilar from the other workshop projects. The presence of difficult joinery conditions and the mix of various materials challenge the student to find the best way to design a connection. Sometimes these are modeled at a larger scale to help understand their role and to better explain their tectonic character.

**Fourth and Fifth Year**

In the final two years of the program, the range of design-build projects includes small, highly crafted objects such as furniture, small site-specific structures, and even complete houses. The full scale, habitable design-build project has evolved from Buckminster Fuller's Geodesic constructions in the early 1950's to Steve Badanes, Samuel Mockbee, and others in the 1990's. The School of Architecture at Yale University has perhaps the oldest program in which a design-build project is a required part of the curriculum. In the mid 60's, the program at the Cooper Union established a regular workshop construction studio. And the College of Architecture at UNC-Charlotte has a relatively long tradition of building, with a house building semester begun by one of the authors in 1996 (Fig. 6). But these examples are rare; the building costs and logistics of a design-build house being simply too risky for many academic programs.8
A scaled down but habitable construction such as a pavilion is a good alternative. With a small budget and a temporary site on campus, a wood pavilion workshop project can be easily incorporated into a semester schedule. Basic issues of foundation design, structural stability, proper joinery, and functional performance can all incorporated. The Sun Shading Pavilion is an example of this scale of project. It also can be classified as a performance design-build project in that the one only required function is the provision of a shaded sitting place. The limited range of materials (approx. 2" x 2" lumber and 1/8th inch wood veneer) is more than adequate for the project. The fabrication of elements and the erection on site is accomplished with simple hand tools. This type of project can also be coordinated with an environmental systems course that teaches the basic principles of natural lighting and sun control.

Conclusion

In a graduated approach to design build, not only is the level of craft-building-construction-making graduated according to the level and needs of the student, but also the ambiguous intent: what is left speculatively open, and what is specifically directed. As the size and complexity of these projects grow, a greater emphasis is placed on the performance of the things being made. Where the first projects are almost entirely constrained to formal decisions and opportunities, the later objects are increasingly concerned with structure and the overall integrity of the thing. This is a natural progression that takes into account the increasing complexity of design problems as students move through the years. Each level builds on the previous, and as the students acquire more skill and a better understanding of materials, tools, and techniques, the parameters of the projects relax some. Then it is the responsibility of the student to define the boundaries of the problem.

This paper has attempted to argue that a graduated approach towards incorporating design-build into an undergraduate design curriculum at every level is achievable when the parameters of the projects are appropriately restrained and the use of pre-configured or limited component ‘kits’ are employed. The sequence of projects should also be matched by improvement in the skill levels of the students. Finally the problems offered should be more or less aligned with the overall aims of the studio curriculum and a consciousness of the development of a design language that is part of design-making.
NOTES AND REFERENCES

1 Dewey, John, How We Think, (D.C. Heath Publishers, Boston, 1910)

2 Dewey, John, Art as Experience, (New York, Capricorn Books 1934)


5 Ibid

6 The idea of a construction exercise or project for every studio level in a design program was a goal of Tunney Lee, former head of the Department of Architecture at the Chinese University of Hong Kong. On his insistence, each studio included either a detail or a complete project that could be constructed at full scale. To meet this course requirement, one of the projects illustrated in this paper was conceived by one of the authors in collaboration with Edward Allen, author and professor at MIT.

7 William Carpenter’s book Learning by Building provides a good overview of programs in the US that have design-build programs. In Chapter 1, Design-Build Education, he remarks that of the more than one hundred schools of architecture in the U. S., less than ten have design-build programs.

A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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Ideas as the Material of Architecture

JENNIFER LUCCHINO
Carnegie Mellon University

Introduction
Architecture as a discipline and a profession possesses the means to inspire and provoke. Its capacity in this regard is due to architecture’s firm position in both the realm of ideas as well as physical form. Straddling the conceptual and the concrete, ideas and information act as the substance or “material” of architecture and fuel the investigation for both the practitioner and the student. Thus, it is critical that the conceptual framework for a student’s initial exploration of architecture is established in the earliest years of his or her education. Such a framework, if carefully considered, can impart a desire for inquiry that can endure throughout a student’s education and beyond.

An overall goal of the First Year program is to create the foundation for an interdisciplinary education. In particular, a context for discussion is established from subject matter that spans knowledge domains from the arts and sciences. Material rich in poetic content inspires students to access deeper levels of meaning and the introduction of a broad range of facts and ideas develops their frame of reference. The material presented draws from familiar subjects and provides a rich context for discussion and exploration. This approach allows students to immediately confront and engage an object or physical environment and to access the underlying concepts. The program favors an oblique approach to address issues in architecture by structuring design assignments around subject matter at the edges of the discipline.

Methodology
The focus of this paper will center on the ideas and information that establish a context for discussion and form the basis of the First Year design curriculum at Carnegie Mellon University. The ideas and concepts discussed are organized around the overall goal to provide a conceptual understanding of architecture.

Material is presented and structured around a series of design assignments that emphasize the discovery of systems in the form of underlying structures present in the natural world and certain man-made realms, such as natural phenomena, landscape environments and cultural contexts. The purpose of the selection of subject matter is to uncover ordering systems in the form of patterns and transferable knowledge. These systems start with the most apparent and move towards the most universal, leading to archetypal ordering systems. “The archetypal is concerned with universal processes or dynamic patterns which can be considered independently of any structure or material form.”

Working within this conceptual context, many layers of knowledge and skill are introduced and engaged. Students develop specific skills that enable them to turn their ideas into physical form. They learn the process of discovery and the development of generative design strategies through the act of making. Assignments require that students learn to work fluidly between media, tools, methods and modes of learning. Over the course of the academic year, concepts and skills are introduced that build upon one another, shifts occur, complexity increases and connections are made between materials.
Natural Environment
In the fall semester, nature provides a broad context for design assignments. Through consideration of the natural environment, students engage the seemingly well-known subject matter and discover new qualities in the familiar.

“The discipline inherent in the proportions and patterns of natural phenomena, and manifest in the most ageless and harmonious works of man, are evidence of the relatedness of all things. It is through the limits of the discipline that we can glimpse and take part in the harmony of the cosmos – both in the physical world and in our way of life.”

As a result of a series of investigations, students begin to understand the depth and complexity of natural form and to employ new ways to think about the environment.

Shifting between the micro scale – natural objects smaller than the student – and the macro scale – a landscape environment that is much bigger - students explore the natural world. Students’ observational skills are honed through observation and drawing exercises. Methods of geometric analysis aid each student in his or her investigation and provide a means for students to gain a better understanding of nature. By breaking down composite form to discover and manipulate systems, students perform in-depth analyses and develop formal languages. In the broadest sense, students confront the complexity of the world and learn concepts that help them to process and to interpret it.

Form
Students commence their investigations of nature through the study of botanical specimens. Each student is assigned a specimen, such as liatrus, barley, iris, lily, etc., and conducts a thorough visual analysis of the object.

“If we look closely at a flower, and likewise at other natural and man-made creations, we find a unity and an order common to all of them. This order can be seen in certain proportions which appear again and again, and also in the similarly dynamic way all things grow or are made – by a union of complementary opposites.”

Immediately, the student begins to document the object through a series of assignments: to consider the nature of the specimen (its transitory character and transformation over time), as well as its defining characteristics (volume, surface and structure). These assignments employ a variety of media including drawing and digital media.

Once a basic understanding of the specimen is established, students further analyze and manipulate it. The design assignments quickly move from the particular to the abstract. Employing geometric methods of analysis, including concepts such as measure and proportion, students investigate how the parts of the specimen are related to one another. Focus shifts to the sets of relationships and systems at work, between and contained within objects and elements. The students discover a definable order by uncovering the underlying structures inherent in the specimen.
The design assignments employ various types of drawing and model making. Working in the two dimensional realm, students uncover underlying structures. They move progressively through relief models to fully three-dimensional manipulations. Closed system models describe the specimen as a whole with further emphasis on the study of relationships between elements and connections to develop the formal language of their systems. From this point, students are given more freedom to extend the rules of the system in an open system model in the search of a dynamic and fluid expression of the form and to explore three-dimensional growth.  

Consideration is given to the ideas of growth, time and gravity. Finally, students are forced to address the causal agency of a new context – the projection box.
Place

During the second half of the semester, the context of the problem shifts in scale and students confront a natural environment much larger than they are. Working in teams, students are assigned a site. Building upon their analytical skills from the first half of the semester, the students employ quantitative techniques to map elements on the site.

The sites are divided so that each student has a unique environment. In the process, material is presented that introduces new ideas and information, such as concepts in exploring place and landscape, that enables a deeper reading of the site. This leads to design assignments that delve further into the site and are intended to help the student understand and capture the experience and spirit of place.

“What, then, do we mean with the word “place”? Obviously we mean a totality made up of concrete things having material substance, shape, texture and colour. Together these things determine an ‘environmental character,’ which is the essence of place. In general a place is given as such a character or ‘atmosphere.’ A place is therefore a qualitative, ‘total’ phenomenon, which we cannot reduce to any of its properties, such as spatial relationships, without losing its concrete nature out of sight.”

Students then embark on a series of site analyses to provide a comprehensive understanding of its character. In particular, through drawings and models, students map static systems – topography, vegetation and horizon line – and dynamic systems – light, wind, and precipitation. Using their mappings as a formal design catalyst, the students program and adapt a response to these environments. Students consider perceptual faculties as they develop an experience for a person or a group of people along a path through their site. Attention is given to issues of choreography, measure and pace as the student designs built elements to heighten the experience of procession.

Fig. 3 Path Project, CMU, J. Ha, Fall 2003
Cultural Contexts/Social Systems
In the spring semester, systems and sequences previously explored in nature are developed in cultural contexts. Social systems are investigated through consideration of the interaction between people and objects, such as furniture, buildings and the urban environment.

“There is an inherent suggestion of action in images of architecture, the moment of active encounter or a promise of use and purpose. A bodily reaction is an inseparable aspect of the experience of architecture as a consequence of this implied action. A real architectural experience is not simply a series of retinal images; a building is encountered – it is approached, confronted, encountered, related to one’s body, moved about, utilized as a condition for other things, etc.”

Students investigate the idea of human scale and the relationship between people and objects. Through the study of precedents and mapping of human behavior, spatial, temporal experiences and narratives are created. Non-visual and physical subject matter from other disciplines is given visual form. Projects increase in complexity. Architectural proposals respond to and accommodate dynamic social and physical systems.

Human Scale
Students experience integrated design by moving from concept to product through the design of a piece of furniture. Generating design concepts address issues of human form and explore an activity involving more than one person and an object.

“Primitive man used his body as the dimensioning and proportioning system of his constructions. The builders of traditional societies shaped their buildings with their own bodies in the same way that a bird molds its nest by its body. The essence of a tradition is the wisdom of the body stored in the haptic memory.”

Students explore how a static form can relate to and articulate the spaces created by the interaction between two people. In recent years, the students designed a bench for two people. In the design process, students again build upon their knowledge and understanding of the development of formal systems as they apply these skills to the development of a new aesthetic experience. Additional concepts explored include the nature of the material, wood, and issues of structure, stability and durability. Through the course of design, students develop numerous study models, drawings and full-scale mock-ups before construction of the final product.

Fig. 4 Design/Build Furniture Project, CMU, K. Gardner, Spring 2005
Space

Students further explore concepts of space by studying architectural precedents, 20th Century houses, with the primary intent to determine three principles or systems of spatial organization inherent in these projects. In particular, the students investigate the types of activities that occur, the relationship between them and their location in the house. Further, they should also understand the generating forces behind architecture that lead to its form and arrangement of spaces. Dichotomies presented and discussed include public/private, dark/light, journey/episode and active/passive.

This analysis leads to the development of formal systems that explore the basic principles of volume, surface and structure present in the precedents. These precedents and initial studies form the basis for students to further develop and explore spaces for three activities - sleeping, sitting and standing. Students translate their understanding of the formal systems of spatial organization into their design proposals for a room. Through the development of models and drawings, students consider the size of each space, the intended activity for each and the relationship between the spaces.

Fig. 5 Room Project, CMU, W. Wu, Spring 2004

Non-Visual Realm

The scope, breadth and scale of the project shifts again, increasing in complexity. As with previous projects, the students commence their investigation with a mapping exercise, working in groups to map the urban context that will serve as their site for their final project. As they complete their site analysis, students are assigned a piece of music that they engage through an analysis of its fundamental principles and overall qualities.

Once again, they confront a familiar medium and elevate their awareness of it through analysis. They explore relationships between the fundamental principles of music – harmony, proportion, rhythm, beat, voices, instruments – to develop a visual, formal language, giving visual form to non visual subject matter. Each student performs an analysis in a variety of media – physical and digital. Students draw from music to explore sound as it occurs in time and space.
From these initial studies, students use their music analysis to form the poetic component as they initiate the investigations of their building for a performance space.

“An architect internalizes a building in his body; movement, balance, distance and scale are felt unconsciously through the body as tension in the muscular system and in the positions of the skeleton and inner organs… When we experience a structure, we unconsciously mimic its configuration with bones and muscles; the pleasurably animated flow of a piece of music is subconsciously transformed into bodily sensations, the composition of an abstract painting is experienced as tensions to the muscular system.”

Thus, as students confront the building program, they will again explore and develop the spatial sequence through the building in the context of the inhabitants’ experience through the building. Emphasis is placed on the sequence of spaces through the structure and the activities occurring in each space as well as their relationship to one another.

**New Territory/Possibilities**

Opportunities exist to expand and strengthen the conceptual framework of the first year curriculum. Taking cues from the conceptual shifts that occur between projects, contexts, scales and disciplines, it is possible to explore new subject matter that draws from related topics. For instance, a starting point would be to consider other material that draws from related subjects within the realm of natural and man-made environments that lend themselves to systems-based analysis. In addition, investigations of cultural contexts could be expanded to include related subjects.

The exploration of broad conceptual shifts in the ideas that form the basis of projects could further evolve and venture into new terrain. In a similar way, Robert Harbison discusses his thoughts on expanding the discourse in architecture:

“The large ideas…were parts of the material of architecture itself, some were allied disciplines, and some were human activities or faculties which architecture gave a home to or had to negotiate with…. The goal was to reflect comprehensively on the slippery hybrid, architecture, an entity so difficult to pin firmly in place that it needed to be approached from many directions.”
This opens up the possibility to further explore other realms - allied disciplines and human activities or faculties – to seek the content of assignments. In addition, connections amongst and between ideas presented over the course of the year, already carefully choreographed, can be open to even more diverse, broad interpretation.

**Allied Disciplines**

Numerous possibilities exist to further expand and explore connections with allied disciplines. Drawing from the realms of the arts and sciences, it is possible to broaden the context of discussion while further reinforcing the relevance of systems-based investigations. The following considerations are provided as merely suggestions of these disciplines' potential within the established framework of the first year curriculum.

Within the realm of the arts, both visual and non-visual art forms provide rich opportunity for interpretation and development. Visual art forms that could provide new objects for study and investigation, include pottery and sculpture. Disciplines, such as film, could investigate concepts of place and human interaction. In the non-visual arts, a dance or poem could be selected by each student to uncover and translate non-visual structures, such as movement and rhythms, inherent in each.

Within the realm of the sciences, it is possible to further broaden the message by considering subject matter that emerges by a shift to a microscopic or macroscopic scale – or a shift in the power of ten. Moving first to objects smaller than us, a primary point of consideration would be biological forms, cellular structures and even smaller, atomic structures. Conversely, moving to objects much larger than the human being, new worlds are opened for study. Potential new landscapes include the order of constellations, planetary movement and the cosmos each with complex systems at work. These investigations would lead to systems-based connections with biology or physics, for example. The goal would be to give physical form to the expression of the systems inherent in the processes at work, such as biological rhythms and wave phenomena.

**Human Activity or Faculties**

Opportunities could be explored to expand the architectural discourse into new cultural contexts. The understanding of how architecture fits into the complex social dynamic of the world is critical for students to begin to consider. While not all subject matter is appropriate for the beginning student, even complex subjects, such as politics, might be explored in a limited way. Further, even more seemingly oblique connections, such as the notion of the sacred or memory, could be linked conceptually with the curriculum.

Such connections might lead to the selection of architectural precedents that encompass a variety of human activities. For instance, the rituals of life, such as weddings and funerals, and social events, to name a few, involve provocative activities for a single individual or a small group. This would suggest the possibility of studying alternate building types such as chapels, mausoleums, theater spaces and museums. Contemporary examples could be found that reference ancient structures and draw on archetypal structures. The context explored could anticipate and lead to further development during the final project of the semester.

**Conclusion**

Within this context, the entire physical world has potential to be inspirational and provocative material for architecture. By introducing ideas relevant to architecture within the context of a broad conceptual framework, the goal is to instill in beginning design students a process of inquiry and investigation. Such a process enables students to continue to explore the
ideas presented, to confront new ideas and to add layers of information to their investigations
during subsequent years of study and beyond.

NOTES

1 A similar idea was expressed by Pierre von Meiss, Elements of Architecture: From Form to Place (New
York: Van Nostrand Reinhold, 1990), 11, that is “The vision adopted places architecture between the world
of physical realities and that of desire and the imaginary…The responsible architect checks the artistic and
cultural intuitions expressed in his design by rational means.”

2 Ibid, 11. von Meiss proceeds to discuss the fact that science and art occupy positions of equal importance
in architecture.

3 Christian Norberg-Schulz, Genius Loci: Towards a Phenomenology of Architecture (New York: Rizzoli
International Publications, Inc., 1980), 10, illustrates this idea when he states “Whereas science departs
from the ‘given,’ poetry brings us back to the concrete things, uncovering the meanings inherent in the life-

4 The discovery of systems in the form of underlying structures is referred to as “architectures” in the First
Year program, a distinction from “Architecture” which demonstrates the desire to approach the subject
matter of architecture from the direction of systems-based thinking.

5 Robert Lawlor, Sacred Geometry (London: Thames and Hudson, 1982), 6-7. Lawlor describes the notion
of levels, moving from the typal, to the ectypal and finally to the archetypal, to achieve philosophic
contemplation.


7 Lawlor, 10,14. The role of geometry to connect concrete with abstract realms of thought is discussed on
these pages. In subsequent sections of the book, Lawlor provides nine workbooks that discuss specific
techniques of geometric analysis. One workbook in particular addresses the Golden Section and Proportion,
critical topics to students’ work and understanding.

8 Doczi, 1.

9 Lawlor, 9. Discussion occurs about the importance of the angle as one critical method to uncover
relationships between objects.

10 von Meiss, 10. As discussed by von Meiss, form is “first of all, ‘empty of sense’ before taking on various
meaning which are changing through time…In order to teach and learn we must, nevertheless, proceed by
way of an analysis of the structures of the world of forms.”

Architecture+Urbanism July (1994): 37, “The sense of gravity is the essence of all architectonic structures
and greater architecture makes us conscious of gravity and earth.”

12 Readings from Norberg-Schulz and Christophe Girot, “Four Trace Concepts in Landscape Architecture,”
in Recovering Landscape (New York: Princeton Architectural Press, 1999); 59-68, provide a context and
means by which students begin to consider their landscape environment. In particular, Girot describes four
concepts to approach landscape architecture, landing, finding, grounding and founding.

13 Norberg-Schulz, 10-12.
Numerous references to phenomenology, or a "return to things" as it is described by Norberg-Schulz, 7-8, are discussed in greater detail. This includes discussion of and approaches to fully employ the perceptual faculties offered by others such as Lawlor, 5, and Juhani Pallasmaa, 30.

15 Pallasmaa, 35.

16 Lawlor, 5, Discussion of the stimuli received by the human body in five or more separate perceptual thresholds and how the human mind-body processes that's stimuli.

17 Pallasmaa, 34.

18 Pierre von Meiss, “Design in a World of Permissiveness and Speed,” in Educating Architects (Great Britain Academy Editions, 1995): 111. In von Meiss' example, "students are asked to explore ... (a) the coincidence of space and structure... (b) plan libre ... and (c) Raumplan...".

19 Lawlor, 14. In this passage, Lawlor discusses the differentiation of sight and hearing and how our intellectual capacity for each serves the other. For instance, "When we place the auditory capacity at the centre of our sensory experience we can become aware that it is possible to listen to a colour, or to a movement.”

20 Ibid, 13. Establishes the idea of geometry and the world of measure and proportion as the link between music and the formal structures uncovered in the natural world. Further, Lawlor describes, “we can generalize this response [auditory perception] to invoke the possibility of a merger of intuitional and material realms, the realms of art and science, time and space.”

21 Pallasmaa, 36.

22 Doczi, 53-77, in the Chapter 5, “The Anatomy of Sharing”, provides numerous examples from the realm of natural environments, such as shellfish, fish, frog and waves and rock formations that could be drawn from as well as in the Chapter 6, “Order and Freedom in Nature”, 79-92, where he discusses beetles and butterflies. Moving to man-made objects inspired by living form or specimen that require interface with a living being, consideration is given to forms of machines, inventions, tools and instruments, such as the airplane, bicycle, wheel barrow, ship, etc. The Notebooks of Leonardo da Vinci (Garden City, NY: Garden City Publishing Co., Inc., 1941-42) provide evidence of strong interest in man-made form and its relationship to the natural realm. Additional discussion and examples are provided by Doczi, 130-131, into such objects as the airplane. Machines in particular offer rich opportunity to examination. Robert Harbison, Thirteen Ways: Theoretical Investigations in Architecture (Cambridge, Massachusetts: MIT Press, 1997), ix,x. devoted an entire chapter to machines which he describes, “The underlying basis of this chapter is modernism’s love affair with machines – as an ideal of impersonal organization and a literal model for art – but its starting point is the Renaissance idea of a machine as an aesthetic device of unusual intricacy: table centerpieces in precious materials, urban pageants, stage scenery, fireworks displays...The theme is pursued through Michelangelo’s designs for Florentine fortifications, his architecture and Russian Constructivist liberation of sculpture into pseudo-useful machinery, stage scenery, and then buildings...” Further, complementary landscape environments that could accompany the specimen further place these objects in new and different contexts, such as the desert, airport landing strips, bodies of water, agricultural sites and the sea. These contexts open new realms of investigation, including, geology and the atmosphere.

23 Alternate approaches to the interaction of the people with the objects, varying the number of participants, the context of the activity and the type of object all open up new realms of possibility. Further, stronger connections could be made with the furniture piece that relates to objects from the fall semester or anticipates later assignments.

25 Doczi, 14-24, Drawing from the visual arts, Doczi, 14-24, in Chapter 2, “Dinergy in the Crafts” and Harbison, in Chapter 1, “Sculpture,” provides examples and connections to man-made art forms.

26 The work of the Office of Charles and Ray Eames, as documented by Philip Morrison, Powers of Ten (New York: Scientific American Library, 1982), 4, 11-12. “Forty-two powers of ten so far span our firm knowledge; we have only brave hints and conjectures beyond that. We do not yet know, though we can argue about it, whether infinity lies within the real world as it lies within the mind’s reach.” and “From apparent world to subatomic all forms are envelopes for geometric patterns, intervals and relationships.”

27 Both Lawlor, 4, and Doczi, 48-52, in the passage, “Rhythm and harmonious sharing” discuss the underlying rhythmic patterns or systems underlying the sciences.

28 Harbison devotes a chapter to each of these subjects, politics, the sacred and memory, broadly defining them in terms of a wide range of both architectural examples and related topics.

29 In Chapter 4, “Timeless Patterns of Sharing”, 38-47 and Chapter 7, “Hellas and Haiku”, 104-125., Doczi provides examples of built structures, including the pyramids and chapels that provide examples of archetypal structures.
The Culture of Architectural Design Studio: A Qualitative Pilot Study on the Interaction of the Instructor and the Student in their Culture and the Identification of the Instructor’s Teaching Styles

PATIENCE L. LUETH
Iowa State University

Introduction

The role of studio culture in the teaching of design has been the topic of conversation in the architectural arena for the past few years. The key aspects that have been debated are: (a) the tradition of working late nights; (b) competitiveness (Dutton, 1987); (c) steady production of work versus not producing work steadily, and right before deadlines producing the bulk of the work; (d) an environment where students will work together and learn from each other; (e) the star designer versus a cooperative design team, which is related to the focus on individual versus group work; (f) the content of process, which allows students to be integrative or synthetic, pulling together courses across the university curriculum; (g) the cost of low student-teacher ratios; and (h) the strength and depth of student-teacher relationships (AIAS Studio Culture Task Force, 2002).

Rumors of accidents, inside and out of the studio, has left the importance of or the role of studio education as a hotly debated topic. Such discussion of studio-based education seems stagnant as key aspects are assumed rather than identified, as are their value for education, and with little if any implementation of changes. While this debate is occurring in architectural education, professionals in the higher education arena are pursuing an agenda that seeks to eliminate or reduce teaching that occurs only to inform. They are attempting to support learning through the use of individual teaching and learning styles, fostering a learner-centered education, which enhances the experiences that students have in college (Huba & Freed, 2000). Although teaching and learning styles researched extensively in higher education, these styles usually are based on the lecture-type classrooms, laboratory settings and even distance learning settings as suggested by, Crow (1980), Elbe (1980), Glassman (1980), Mosston (1990), and Grasha (1996, 2002), however this research does not take into consideration those individuals in the design studio setting whose teaching format varies greatly because of the current nature of the design studio (Dillon, 1998).

Although there may be differences in teaching in a studio as opposed to a lecture, a seminar, or a laboratory, in all of these cases there is a differential in the power structure between student and teacher. In most instances the professor, regardless of the setting not only has more power, but also adopts the role of directing the teaching and learning (Knight, 2002). Some educational cultures have overcome this by incorporating different techniques of teaching, such as fostering discussion, student-to-student presentation, group work and hands on experimentation (not in a lab setting). This application of techniques is quite similar to the techniques used in the design studio; however using the techniques does not guarantee that the students are positively experiencing college, or learning much.

Challenging design educators to become self-conscious of their teaching styles related to student learning styles, and issues or aspects of studio education that are clearly articulated, will permit faculty members to be more proactive in reducing negative and increasing positive aspects as they define their value of studio education.
Relevant Literature: Culture of the Architectural Design Studio

Bates and Plog (1991) said that culture is “The system of shared beliefs, values, customs, behaviours, and artifacts that the members of society use to cope with their world and with one another, and that are transmitted from generation to generation through learning” (p. 7). Lang (1987) suggests this phenomenon in stating, “A culture evolves over time as a people develop approaches to dealing with the problems of survival and growth in a particular terrestrial setting” (p. 98). He adds that, “each culture is unique according to its own peculiar history” (p. 80). Gone, Miller, and Rappaport (1999) suggest that, “culture is not transferred from one generation to the next” (p. 373), but it is recaptured and changed through lived experiences. Cultures are therefore in constant flux due to peoples’ perceptions and understanding of themselves (Gone, Miller, & Rappaport, 1999; Mannheim & Tedlock, 1995). The history of architectural education, will therefore point out some of the influential factors on the culture and how the culture was influenced by history.

Influential History of the Architectural Design Studio

The architectural culture is dependent on its educational counterpart, which has historically been the primary focus for both teaching and learning in architecture (Corona-Martinez, 2003; Stevens, 1998). Fig. 1. shows the major time periods that affected architectural education.

Fig 1. A timeline of key events that affected the evolution of architectural education in America 1671 - present

Teaching Styles

The phrase teaching style was used to distinguish the identification of teaching behaviors in the mid-1960s (Mosston & Ashworth, 1990). The use of styles in some literature suggests a personal nature of teaching styles (Eble, 1980; Knight, 2002), while in other literature (Mosston & Ashworth, 1990) it implies that teaching styles are not based on ones’ personality. Other words such as methods, strategies and techniques are still used by some authors to describe the same phenomenon.
Style is the portrayal of one's personality in that they are exuding their presence to students (Elbe, 1983; Reinsmith, 1992; 1994). Teaching styles are not just the way a professor may go about lecturing, but it is the revelation of personality and character to the learners (Elbe, 1980). Some professors may consider this to be untrue because they feel that when they enter a classroom they switch from their own personality to their 'inherited' personality. They 'inherited' it from their former professors, or as part of their graduate teaching experience (Elbe, 1983). Nevertheless, according to the predominant literature, teaching styles are not teaching techniques. The term teaching techniques is used for the ways in which the information to be learned is presented (Knight, 2002). A teaching style is a frame of mind, which may include various techniques, based on one's beliefs and values (Grasha, 1996).

**Methodology**

Since my research questions were geared toward understanding the culture of the architecture design studio, this implied a qualitative methodology, relying on an inductive approach in which theory emerged through process (Marshall & Rossman, 1999).

The advantage of using several methodologies (grounded theory and narrative analysis, within a symbolic interactionist position and a social constructivist perspective) was that they allowed me to inquire about the respondents' experiences effectively, as well as providing a means to retell their stories through narrative analysis (Creswell, 2003). Grounded theory helped me to frame and organize the stories and led to richer comparisons. I conducted formal and informal interviews of 3 participants (2 professors and one student). I also used participant observations, and looked at documents relating to the participants and their setting. The use of multiple data collection strategies provided me with data that I could compare and provided me with inductive data.

**Results and Discussion: Interaction in the Design Studio**

Fig. 2 illustrates potential interaction in the design studio, particularly showing the

![Fig 2. The interactive relationship between the students and the professor in the design studio](image-url)
influence that the professor/instructor has on the student, which affects the project and artifacts produced by through the project. The importance of teaching styles within studio interaction, is also illustrated.

Teaching Styles in the Design Studio

**Instructor-as-Master**

I think fourth-year, is very like strict, chalk-board written into the programs. I remember fighting, like every day, fighting, for my like, project and that was a big revelation for me, I hated it and I did fight the whole time.

This was a recollection of Julie in her fourth year of study in the architecture program. She had explained to me that the studio that she was in was very strict because of the professor. She also said that she did not have room to do what she wanted to do. Julie and I talked at length about the experiences that she had throughout her years at Iowa State University, and this particular experience was one that really stood out.

Chad also describes some of the experiences that students have with professors. He said that because the instructor has the “power” to grade work, it “creates this issue, creates a power differential” and “the studio instructor, who was traditionally called the studio master,” had that “degree of power”. This statement goes back to the history of what the design studio used to be after the appointment of professors (Weatherhead, 1941). Chad, having been taught in a school that used the same theories, explains that it is not very common to find this type of professor here, but the master approach to teaching has not been totally erased.

**Instructor-as-Partner/Guide**

Some people may see the master style as sometimes being in the partner category, but the major difference between the two is the amount of control that the instructor has. The Partner who is described by Chad in the following narrative:

One of the models of design studio education, is that the student and the teacher are in a partnership. That they work together, that the teacher has a great deal of experience and so they are actively engaged in the design of that project along with the student, alright. They'll make sketches, they’ll say, do this, don’t do that, do this, you know, and they’ll actively be engaged in that project … It’s a very teaching-oriented kind of thing … You know, some people are really very good at this, alright, and students do sort of well in this, and yet it’s a, you know, it’s more oriented in the model of “I have this to teach.”

This description of the partner really spoke to the essence of what their tendencies are. The partner’s teaching type functions by allowing the student to come up with ideas for a piece of architecture and will give instructions on how to implement ideas, sometimes drawing on and correcting what they think is not right. They listen to the instructor and follow instructions, not questioning why the instructor asked them to follow the set of guidelines. Even though the word partner is defined in a collaborative manner, this teaching style can move toward the master in the instance where takes the stance of a boss and the student the stance of an employee.

**Instructor-as-Facilitator**

The facilitator is an instructor who does not base the studio on the knowledge that he has, but relies on the students to take initiative in the learning process. This instructor will not tell the students what to do, but instead will give advice on certain issues regarding their project. This instructor is like a mentor encouraging the students to produce actively and physically
produce the idea that they have generated, ask them what they think about it, and use the
students’ own insights to guide them. Chad described it in this manner,

*It is not based on the transmission of sort of fact from teacher to student in
lecture format, but it involves a continual discourse between a faculty and
students, and between students themselves and sort of an exploratory mode of
learning, ok.*

When Mike started describing the instructors who I describe as a facilitator, his eyes lit up and
there was excitement in his voice.

*Now that took a professor that came in with a framework, but allowed people to
exist slightly outside of that framework. A high degree of trust in him in order to
accomplish what their educational goals were, in addition to what his framework
was. Now that was earth-shattering for me!*  

It was clear that Mike aspires to be a good teacher by using the facilitator model. Mike called
himself a facilitator because his studio is a “very loosely designed space,” and concluded that,
“his framework is not the most important framework.”

**Conclusions**

According to the study, the instructor has a great responsibility in the culture of
architecture design studio. The instructor not only teaches, but also aids in the creation of reality
in the design studio through interactions. In comparison to a lecture type classroom, the
interactions may not be as complex. This is because of the one-to-one nature of the design
studio. In the design studio interactions are cyclical and there are multiple interpretations
occurring at the same time, by the same or different individuals in the several psychological and
physical contexts.

One way that the role of the instructor can be fulfilled is to discover one’s teaching or
instructor-type, which will foster an intentional reflection on the instructors’ part in consideration
for the student population. There most likely is a greater range of teaching-types than the ones
indicated in this study. Learning about other teaching types in other arenas, may help identify
those in architecture, as demonstrated when the literature was compared to the findings. An
instructor may possess one or more of these styles depending on the situation or the students’
need. After giving descriptions of the instructor-types to the respondents, they were asked to
identify each other’s types, resulting in a mixed format, therefore increasing the possibility of
possessing multiple styles, for example, Master-Partner or Partner-Facilitator.

The reason why one’s teaching-type needs to be identified specifically in architecture or
design studio is because of the prolonged, complex relationships that the student and the teacher
have. Instructors also should make a comparison with teaching styles in other disciplines,
therefore appreciating and learning about other academic environments of the university. It
seems to me that many designers know what their type is but it is hard to identify it because there
are no guiding materials that seem descriptive of what design studio instructors do.

Though Greenfield (1975) suggested that, in the tradition of architecture studio, the *facilitator*
may be the only way that design studio can be taught effectively, this study suggests
that there are several ways that studio can be taught, including the *master* and the *partner*
approaches. In spite of the different characteristics that the instructor-types show, the students
still learned something. This learning is fostered by the professors’ interests, personalities,
experiences as students and life experiences. Even Julie, who had the battle with her fourth-year
instructor said that, every instructor had different personalities and regardless of their personality,
she learned something.

Instructors need to make an intentional effort to apply and reflect on teaching styles. The
student interprets the role of the instructor, even though the instructors determine their own role,
which has the potential of dampening or fostering the learning process.
Recommendations for Further Research

A number of recommendations can be drawn from the findings.

1. Qualitative research methodologies were useful in identifying specific experiences from the narrators. In the research of architectural education, I suggest the use of qualitative research methods to understand the complex activities that occur in and outside of studio. The narrative is especially beneficial to work with because of the contact with the narrators and recommendations. Grounded theory is also recommended because it draws out themes that can lead to other studies. It also draws out the narrator’s way of framing and valuing various aspects. Social constructivism and symbolic interactionism are appropriate perspectives to help guide the study of interactions.

2. There is a need for documentation of the behavior that occurs in the design studio. In particular, there have been some new studies that address, learning styles and emotions in the design studio. It should not stop there, because there are several areas that can be researched, i.e., the project. In research studies based in other settings, there is plenty of information that can be used to understand behavior. These existing social theories and perspective can act as springboards for several other social theories, specifically in the design studio.

3. The research of design studio should include collaboration between students and instructors in the design studio and other academic areas that are well-versed in research methods, such as education. This will foster the importance of collaboration outside of the architecture field.

4. All the studies that are done should benefit architectural education and higher education as a whole. If possible, the data should be used for the improvement of quality education in that particular university setting, which hopefully will improve the quality of education as a whole.

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A Beginner’s Mind

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Stephen Temple, editor

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Negotiating Between Self and Architectural Design

GRETCHE MARICAK
Lawrence Technological University

Great architecture is always driven by a personal interest. However, beginning design students do not equate individual decisions regarding architectural design with personal preferences and passions that comprise their self definition. Instead, they engage in ongoing struggles which occasionally net unsatisfying results. How does a design instructor redirect the students’ focuses and nurture the application of self in students’ designs?

The foundational theories of both Kegan and Piaget explain a portion of the creative journey of both students and professionals. Kegan’s theories center on meaning-making based on the relationship of subject and object. One of Piaget’s theories concentrates on equilibrium and its influence on change as part of the developmental process.

Utilizing Kegan’s and Piaget’s theoretical frameworks, I examined the relationships between self and designs of several notable architects. From this investigation of theories and architects, I developed a design studio assignment for the students titled the Self Project. The students’ responses to the Self Project and its subsequent affect on their architectural designs are offered for discussion.

Foundational Theories in Development and their Relationship to Architecture Education

The foundational theories of both Kegan and Piaget in the areas of cognitive development assist in defining the creative process in architectural design offices and académé. According to Kegan, meaning-making is a component of self definition and how meaning occurs is the result of continuous renegotiations between the subject (self) and object (other). Piaget described renegotiation and its corresponding change as being driven by a need for equilibrium.

Understanding self is at the core of meaning making and a key component in both cognitive development and architectural design. Kegan perceived self understanding as more than just existing; it is defined by what people are and also describes their private worlds. Self is simultaneously a thing and an action. Self refers to the physical and intellectual person as well as his or her progressive movement toward new self forms through the incorporation of others. Other refers to anything outside of the self system. Therefore, meaning is created when judgments are made within the self system during the moments between an event and a reaction to it; it involves both self and other.

According to Piaget, an understanding of self promotes equilibrium. Equilibrium is a re-adaptive response to either the exterior world or internal thoughts. Achieving intellectual and emotional equilibrium involves a sophisticated balancing act. People must be willing to take detours and chances, and deviate from a self-expected path. They must be will to change their viewpoints, revisit old ideas and reverse their actions to achieve equilibrium. Piaget concluded that the highest form of equilibrium is intelligence.

In architecture schools, students make design decisions based on self whether they are aware of it or not. However, students need to be more deliberate in the understanding and application of self. To do this, students need to courageously incorporate new others and discard parts of the old self to instigate the development of an enriched palette of design choices. This ongoing swapping process is an inherent component of growth and movement toward equilibrium. It follows that the ability to firmly understand one’s self and also be able to deviate from and alter known perceptions is a critical activity that ultimately contributes to a successful architectural design process for both students and professionals.
What precipitates the need for positive change in architecture students? In the architectural design studio, a project deadline encourages the design process to begin but it is the need for high performance that pushes the student to search for a solution of value. Piaget referred to reactions such as these as a search for balance or equilibrium. Piaget observed that actions result when individuals perceive an uneasy imbalance between themselves and their environment. In the design studio, the students are uncomfortable because they have a problem with no obvious solution. Additionally, students’ instability is enhanced when they encounter internally defined limits that block the search for unique solutions. Design projects with numerous and open-ended variables create an intellectual imbalance that challenges students beyond their existing limits. However, students need ways of expanding their limits. Also, the problem remains that students find it is easier to look to the external concrete world around them for answers.

Self in the Profession of Architecture

There is a myriad of evidence regarding self as it permeates the designs of notable architects. Self-preferences and self-understanding evolve over a lifetime, thus the expression of this understanding in architecture also demonstrates mutations within individual design processes. The designs of Frank Gehry, Frank Lloyd Wright and Santiago Calatrava provide perspicuous representations.

Gehry translated his childhood memories of fish into motifs for numerous building designs and details. A fish shaped bath and dressing area appears to swim between the walls and columns in the conservatory of the design process model for the Lewis Residence. A fish lamp wiggles on an apple green wall in the Weisman Museum in Minneapolis. Yet the fish metaphor is suggestive of a deeper passion for Gehry, that of movement. Sketches are an indigenous part of Gehry’s design process, and their interpretation parallels the blur of speed and frozen motion exhibited by still drawings of cartoon characters for film. Gehry’s fascination for motion in architecture appears when one is cognizant of the increasing intensity of swirling motion displayed by several Gehry buildings. The University of Toledo Center for the Visual Arts, completed in 1992, demonstrates Gehry’s earlier fascination with motion in plan and elevation but the geometries are carefully positioned as to respect the effects of gravity. In the Frederick R. Weisman Museum, completed in 1993, the curved and angled planes are tossed about in defiance of gravity, and motion is more evident. The Guggenheim Museum Bilbao, completed in 1997, more closely mimics the movement of Gehry’s sketches as the warped planes defiantly suspend themselves above the ground. The architecture of Frank Gehry demonstrates specific preferences based on his personal experience and self-discovery.

Frank Lloyd Wright adapted his fascination with geometry into an architectural grammar. In his autobiography, Wright revealed his mother’s discovery of gifts: soft brilliantly colored papers, smooth shapely maple blocks and cardboard shapes with scarlet faces that became the subject of play and study. The wooden stacking blocks he played with were designed by German educator, Frederich Froebel, who pioneered the concept of the kindergarten in the late nineteenth century. Anna Lloyd Wright instructed her children in the Froebel method. The domineering rectilinear planes of Fallingwater, built in 1937, and the concentric curves of the Solomon R. Guggenheim Museum in New York, completed in 1959, attest to Wright’s lengthy experience with geometry and the Froebel blocks. Additional childhood experiences affected Wright’s designs. Wright’s description of what constituted livable residential spaces manifested itself in his 1954 book, The Natural House. He eschewed false useless spaces and redefined the meaning of the wall. Architectural elements became integrated and the recognition of human proportion, essential. Once again, Anna Wright’s influence is suspect. She created a plain and honest environment for her family. Desserts were minimal, nutrition essential and many times, fashion trends were shunned; she found beauty in the simplicity of nature. Anna’s simplicity affected
Wright’s designs. Wright’s mother was an early and strong influence in his self-development. Her training presaged Wright’s architectural designs and became part of his self-definition.

Santiago Calatrava’s animal sketches are liaised to architectonic form. His demonstrative black line drawings of animals transformed themselves into bridge elevations and section details. Calatrava envisions his designs as living structures. His interest in organic form and detail can be traced back to his experiences at an arts and crafts school in a neighboring Valencian village in Spain. There, young Calatrava studied with engravers, glass craftsmen and carvers who were themselves trained in 19th century traditions. Incorporating the skills of drawing and observation learned in his early years, he developed them into components of a viable architectural design process. As an architect, Calatrava continues to sketch in pencil, charcoal and watercolor, depicting favorite organic forms and transforming them into architecture. The section design for the bridge over the River Guadiana was inspired by the sketch of a bull’s head. Sketches of a ram’s head inspired the columns and connections in the entrance of Escuela Cantonal. Santiago Calatrava demonstrated that he has purposefully chosen favorite objects and mediums to incorporate self into his designs.

It is apparent that a building’s visual identity is many times the result of delicate negotiations between the subject (the architect) and the object (the architectural design). In each of the above examples, the architect had a clear awareness of self and acted upon those preferences to create designs. Sometimes distant memories made significant contributions to a building’s design; on other occasions, the design process itself became a catalyst. A third perspective involves a quest to give life, in the form a design, to a vision that is not yet part of self. Both the actions of architects as they engage in the design process and the research of theoreticians in the area of cognitive development suggest a pedagogical approach for design students in architecture schools that involve self. At the beginning of each semester, my sophomore design students are assigned the Self Project.

The Self Project and Students’ Responses

The purpose of the Self Project is to have each student recognize and define their own unique preferences and become aware of the differences existing among their peers. Ultimately this awareness was applied to architectural designs in class. The Self Project was initiated in my class through a handout that blends graphics, cognitive development theories and project instructions for the students’ consideration. To clarify the intent of the Self Project to students, I utilized quotes by theorists.

The graphics in the handout provided an easily understood introduction to the project. The ambiguous figure of an old/young woman, originally drawn by W. E. Hill and published in 1905, was observed by my students in the upper right-hand corner of the sheet. There was a soft murmur in the class as the students realized that there were differences in perception as some saw only the older woman while others saw the younger woman. The upper left-hand area of the handout displayed 32 different fonts; all spelled out the same word, Self. I explained to the students that I could not identify one font that was an accurate depiction of the meaning of self and decided that I needed many fonts to convey the diversity of selves that comprised our class. The remainder of the handout partitioned the more complex information regarding self-understanding into four categories: 1) where we want to go, 2) how we do it, 3) defining self and, 4) our objective. Each category contained a quote by a cognitive development theoretician so that students would more clearly understand each phrase. Lastly, students were instructed to collect artifacts that reflect their memories, preferences and experiences, and place them in a 9”x12” envelope called the Self Folder.

An open discussion of the four categories clarified the Self Project’s objective. The first category, ‘Where we want to go’, utilized the work of Sternberg and Spear-Swerling. Students’ needs in developing personal navigation through the identification of goals; direction, flexibility
and the ability to overcome obstacles are requisite characteristics for intellectual growth. The contents of the self folder may reveal an important personal goal or direction important to each student. The need for movement to achieve equilibrium is supported by Piaget’s theories. The second category, ‘How we do it’, depends upon Perry’s sage observation that human beings organize meaning. The students learn that they internally create meaningful relationships that are unique to themselves when considering people, objects and experiences. The ability to fold an understanding of relationships with self and transpose them into an architectural design has powerful consequences. Kegan’s concept of self and others reinforces the relationship component of development. In the ‘Defining Self’ category, Bruner and Kalmar rationalized that self-development occurs in an environment of a person’s own making and is continually being reshaped by his or her own perceptions of self. Students become aware that they have willfully made choices, yet these choices do change over time. Kegan’s theories about self support this meaning-making in development. The fourth category, ‘Our objective’, contemplates self-authorship as defined by Baxter Magolda and the outcome of the journey for self understanding as described by Kegan and Piaget. Baxter Magolda stated, “Self-authorship is a complicated phenomenon. It is simultaneously an ability to construct knowledge in a contextual world, an ability to construct an internal identity separate from external influences, and an ability to engage in relationships without losing one’s internal identity”. Developmentally, many students are not ready to accept this complex statement of personal growth but it is nevertheless offered for their consideration and to challenge their current boundaries. Self-authorship is the final stage of development in Baxter Magolda’s Epistemological Reflection Model, a cognitive development model for college students. Self-authorship does not typically appear until the graduate years of study or beyond. Nevertheless, my goal was to challenge each student beyond his or her self system so they may grow.

With the project under way, the students continued to share their insights in class discussions throughout the semester and were asked to review their envelopes’ contents when they were flustered and did not have ideas. During open discussions, some students were reluctant to share personal information. Others filled their envelopes but wanted to share only specific objects. Still others energetically spilled the contents of their envelopes onto the conference table and launched into monologues of sad, funny and sensitive stories. Later in the semester, the students were requested to give each other gifts in the form of contributions to their peers’ self folders. This project twist generated a renewed excitement in the self project and provided insights into self that were previously ignored.

From the sophomore design studio in the spring 2005 semester, Jen and Jon volunteered the contents of their folders and provided descriptions of their personal interests. Each student also indicated that they needed to further contemplate the application of what they had selected with relationship to architecture.

Jon was gregarious and an excellent communicator. While in architecture school, Jon held a service-oriented job that he clearly enjoyed. The identification badges from his folder were periodically updated by his company and Jon’s favorites included “Go Home Happy” and “I Love My Customers”. Jon had saved every movie ticket he ever acquired. His favorite book was “TV Sets: Fantasy Blueprints of Classic TV Homes” that included the homes of The Beaver, Mr. Ed, and The Jetson’s, to name a few. Jon’s reaction to the relationship between his self folder and architectural design is as follows:

I guess whether we know it or not, everything that happens in our lives forms the way we design. In my case, I had tickets and nametags to show that I keep everything. That explains parts of my personality, but I don’t know what it says about my design. I guess my folder shows that I have a love for older buildings. The Sears homes, the classic TV floor plans . . . all show that I am fond of classic nostalgic designs. The problem is that
you couldn't guess that from anything I have designed; everything I make looks contemporary. I guess maybe I should think more about that in future designs.

Jen’s self folder included a stack of family photographs, primarily of her posing two younger sisters. She held out a black and white illustration of a dragonfly and remarked, “I love bugs! I love the curved shapes”. A tiny white jewelry box from Mackinac Island sheltered several small objects including a sorority pin, a piece of green beach glass and a U.S. postal stamp depicting Edward Hopper’s 1942 painting, ‘Nighthawks’. This is Jen’s reaction to the self folder and architectural design:

The contents of my self folder apply to architectural design by showing life influences. My family influenced me. My parents’ creation of a triple bunk for three daughters in a small room shows that they are creative in solving space problems. The beach glass shows my preference for texture and color. I think that you need to know who you are and why you choose the things that you do to convey your ideas to others and to help understand why others may perceive things differently. Keep this in mind when designing for others.

The application of the Self Project began with a small design problem. The following design solutions and personal narratives from the Drive-Thru Donut Shop project revealed the students’ individual understandings and applications of self into meaningful architectural design solutions.

**Self and Studio Design Projects**

Jen and Jon participated in the Drive-Thru Donut Shop project. This was the first design project in which the students were able to incorporate information from their self folder. The project statement read, “You have been commissioned by the owner of a local strip shopping center to design a unique and distinctive building for a drive-thru donut shop to be located in the middle of a mall parking lot”.

Jon made the following statement regarding his final donut shop design solution:

The building’s concept is a reaction to present day strip mall culture. The mall buildings are plain and lacking any architectural interest. When designing, I tend to start with very simple geometry and then evolve it to create a complex composition while maintaining the geometric foundation. Using the same simple geometries and rectilinear forms as the surrounding buildings, I created an architecture rather than a box.

While Jon’s earlier analysis regarding his self folder and his design solution for his donut shop seem to be unrelated, the oral presentation that Jon made to the class regarding his self folder did reveal a relationship between the two. The object from his folder that Jon spoke of most often was the TV Sets book given to him by his parents when he was younger. He told the class of the endless hours he spent analyzing the floor plans. This activity translated itself into an understanding of the importance of usage, adjacency and relationships in architecture. Jon created a tightly and efficiently organized floor plan.

Jen reflected on her final donut shop design solution, “When I think of donut shops, I think of old diners. The sleek silver looks of a diner lends itself to the concept of motion and the speed of drive-thru. I appreciate contemporary views on older styles; the mixing of old and new”.

When Jen described the contents of her self folder, she pointed to an ink drawing of a dragonfly and eagerly commented that she loved curved shapes. During the presentation of her design project, she referred to the Streamline travel trailers of the early 1960’s as an inspiration for her design. The connection between how she defined herself and her design project were undeniable. While the trailer proportions were not utilized, certainly the aerodynamic nature of the design, as well as Jen’s fascination with curved geometries, was clearly present. Both Jen and Jon utilized elements of their self folder; some usages were more cryptic and others foretold of future self understandings.

Jen and Jon’s peers also thought about self as they designed their buildings. Saraya’s building had swirling geometries with bulging windows adjacent to the dining space and small triangular planes jutting out of the roof to form skylights. She reflected, “The main idea behind the execution came in the form of a delicious breakfast. I enjoy the essence of the donut, the jelly, and I did not throw out the napkin”. Joe selected softly curving geometries with low interior spaces and cozy niches for his design. While he cited the beauty of nature and the outdoors for inspiration, his last statement was more revealing and rationalized his comfortable spaces, “Donut shops should be places where we can take a small break from our stressful lives”. Additionally, Hannah observed that the roof planes swooping at ninety degrees to each other in her design indicated the contrast and conflict in her life. Melina also observed that there were twists and turns in her own life but interpreted them with rough edges and extreme angles in her design.

Conclusion

The Self Project did not present any startling revelations. Instead, the Self Project seemed to set in motion a curiosity for self awareness and an understanding of others. The curiosity was not equally demonstrated by every student, but that does not necessarily mean the students were not considering the information presented in the Self Project. All of the students engaged in different levels of meaning-making while the courageous students struggled to understand the implications of the Self Project and the challenge to incorporate self into their designs. Some students become especially appreciative of the concept of self when they realized that the contents of their self folder changed during one semester. Other students were not aware of how the self project impacted their design projects and did not see the relationship to personal growth. However, at the conclusion of the semester, two students admitted that they felt their architectural designs had progress significantly. One student thoughtfully offered, “I wouldn’t have thought about designing like this last semester”.

NOTES

7. Ibid., 7.
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The Doorway Project

IGOR MARJANOVIC
Iowa State University

Figs. 1: Doorway, Peter LeVake and Wilson Lewis

Figs. 2: Doorway, Peter LeVake and Wilson Lewis
Fig. 3: *Doorway*, Abbe Long, Carrie Machacek, and Alissa Pedersen

Fig. 4: *Doorway*, Abbe Long, Carrie Machacek, and Alissa Pedersen
Introduction
This paper focuses on the last project of the first year design studio—the Doorway Project. In this project, students fabricate a full scale Doorway on the University premises. The Doorway must be portable and must fit into a suitcase of student’s choice. The students bring their Doorways in a
suitcase to the final review and unpack them on site. They use the suitcase to carry their material supplies back and forth from the studio.

The project calls for a Doorway that is different, an artifact made of flexible and/or soft materials. The project emphasizes the experience of moving through, rather than a simple separation of space. The Doorway is also about connecting spaces and experiences. One can walk through it quickly or slowly, stop, pause, contemplate, rub against its surfaces, touch it, feel, smell or listen. Above all, the Doorway experience is about time. It is not a static experience, but an experience that is constructed through movement, time and bodily interaction with the artifacts of the doorway. The Doorway is not a single object; it is a space we inhabit.

This project brings together two familiar entities: a door and a suitcase. It recognizes the importance of suitcases and temporality in the age of global migration and diaspora. Suitcases—carried on or checked in—become our second home. In the context of this project, they are carriers for a doorway pattern that can easily be assembled. The project also connects binaries of distant theoretical narratives: home-road, domesticity-travel, and permanent-temporal.

This essay analyzes historical precedents of Doorways in the artistic practices of Marina Abramovic and Ulay, extending it into discussion about the theories of travel and flat pack patterns (IKEA). The paper unfolds as a documentary of student projects, complemented with the discussion about domesticity and travel theories. These discourses are rarely involved in “the beginner’s mind,” and this paper argues that they represent an equally important, if not critical avenue for the beginning design education.

**Dreaming an Ideal Doorway**

Doors are firm and sturdy. With their metal hardware and wooden parts, they appear very structural and solid. Doors separate spaces, rather than integrating them. In this project, we question these uncritically received notions of doors, and transform them into a Doorway, a place of movement, transition and transformation of space. Artists and designers often take familiar things and re-design them. In doing so, they make things strangely familiar and question their conventional appearance. In the Doorway Project we turn to artists as our precedents and seek inspiration from their speculative work.

In 1977, Marina Abramovic and Ulay (Uwe Laysiepen), produced *Imponderabilia*, an art performance in which they stand at the door naked facing each other. In *Marina Abramovic: Artist Body*, they write:

In a chosen space.

**Performance.**

We are standing naked in the main entrance of the Museum, facing each other. The public entering the Museum have to pass sideways through the small space between us. Each Person has to choose which one of us to face.

*Duration*: 90 minutes

June 1977

Galleria Comunale d’Arte Moderna, Bologna

Visitors: 350

The performance was interrupted and stopped by the police.¹

While this example may be an extreme case of a doorway—a space framed by two naked bodies ready to be rubbed against other bodies—it does embody some of the main dilemmas of each
doorway space. First, it poses the question of relationship between the body and the doorway frame, extending it into a question about the link between the body and the spaces separated or connected by the doorway itself. This extends into a question of relationship between the two artists, namely the relationship between their bodies. Through their sexually charged conceptual performance, they explore both physical and psychological limitations of themselves and of the visitors, who are forced to move between the tight space in-between the artists’ bodies. In doing so, Abramovic and Ulay establish new relationship between the male and the female body in a public space, transforming the conventional boundaries of a museum space. Second, *Imponderabilia* raises the question of materiality that engenders each Doorway space. Denying any right to artificial materiality, Abramovic and Ulay rely on a narrow space framed by their bodies, a space that is defined by the softness of their skin. Finally, *Imponderabilia* encourages risk taking, both on artists’ part and on the part of the audience. In deciding which way to face, the audience also makes conscious decisions about how the project is read, making “the reader no longer a consumer, but a producer of the text.”

Marcel Duchamp offers another and probably more architectonic exploration of the doorway phenomena. While living in Paris, Duchamp rented a small two room apartment, which he partitioned with the help of Man Ray. In that apartment, he designed a door, which served to close either the entrance to the bathroom or the entrance to the bedroom. With its position in the corner of the room, the door can close only one room at the time, but not both. Duchamp observed:

> I was living in a tiny apartment. In order to take full advantage of the meager space, I thought to make use of a single door which would close alternately on two door jambs placed at right angles. I showed the thing to some friends and told them that the proverb ‘A door must be either open or closed’ (**il faut qu’une porte soit ouverte ou fermée**) was thus found caught in the act of inexactitude. But one forgets the practical reason that dictated this measure and they only think of it as a Dada provocation.

This architectural intervention reflects Duchamp’s obsession with everyday objects, especially his obsession with the use-value and meaning of architectural artifacts. This obsession will culminate in his most enigmatic and unfinished work *Étant donnés: 1) La Chute d’eau, 2) Le gaz d’éclairage* (Given: 1. The Waterfall, 2. The Illuminating Gas). Duchamp secretly worked on this tableau for more than twenty years. He started it in 1943, after renting an apartment at 210 West 14th Street in New York City, and worked on it until 1966. The work remained a secret until 1969, when it was finally displayed at the Philadelphia Museum of Art several months after Duchamp’s death.

*Étant donnés* is a complex three-dimensional work of art. In a dimmed space, we encounter an antique wooden door framed by brick columns and a lintel. On the rustic door surface we find two circular openings. These peep-wholes voyeuristically invite us to look through, but not to move through. As we look through our field of vision is framed by an irregular opening in the brick wall. It is only then that we finally see the carefully cropped scene. We gaze at the nude female figure laying in the landscape. Her face is completely hidden behind the brick wall. Her sensuous lower extremities on the other hand, are very visible and seem close to the observer. With her legs spread wide open, the figure reveals all the details of the female genitalia. To make things completely enigmatic, she holds a glittering gas lamp in her left hand. Finally, the scene is completed with a sparkling waterfall in the background.

Duchamp died before revealing the exact meaning and message of *Étant donnés*. It is this mysterious quality—the enigma of a Surreal scene hidden behind the door—which adds ambiguity as another important characteristic to the doorway space. Transcending rational modernist ideologies of function and production, the doorway spaces in Duchamp’s oeuvre reveal
postmodern sensibilities and especially emotional and philosophical ambiguity. With its rejection of any form of Taylorization, *Étant donnés* is in many ways the culmination of Duchamp's work. His diverse art often integrated furniture, window frames, and apertures. In doing so, Duchamp courageously transgressed the boundaries between drawing, painting, and sculpture. Most importantly, Duchamp formalized and re-valorized the use of readily made and available objects. In displaying the stool or a urinal in an art gallery, he retroactively inserted meaning into these objects and transformed them into works of art.

**The Doorway and the Predicament of a Flat-Pack**

As we approach the Doorway Project in the contemporary design studio—and we are intentionally not using the word classroom—we position ourselves in relationship to the Bauhaus pedagogical legacy. Unlike the tightly prescribed character of the Bauhaus visual exercises, the Doorway project opens itself completely. The material selections are wide open, even the size and the scale of the Doorway is open. The only constraint is that the Doorway has to fit into a suitcase of student’s choice. Through this “rule of the game” we learn about the history and commercial significance of a flat-pack. We discuss the IKEA phenomenon and how their packaging and distributing of flat-packed items revolutionized the furniture industry. We talk about the many examples of modern designs based on “collapsibility”—an ability to stack and collapse in order to save space and money. From Alvar Aalto’s and Charles and Ray Eames’ beautifully modular and stackable chairs, to the nineteenth century umbrella mechanisms, we learn how to observe and to learn from the world of everyday objects. We look back at those familiar objects, examining their aesthetic and technological complexities. The repertoire of precedent studies includes the expandable cup, mini-blinds, air-and beds, just to name a few.

The students are encouraged to use a ready-made and portable suitcase. This constraint defines two main learning experiences—the problem-based studio project and its careful structural assembly. Through exploration of artistic precedents, students are exposed to various conceptual features of a Doorway. From Abramovic’s body art and absence of artifacts, to Duchamp’s use of readily-available objects, we discuss the theoretical and material limits of Doorways. At the same time, through suitcase we learn to deal with materials and their assemblies. Since the students are asked to fabricate a full scale doorway—there are no scaled models—they have to design a way of its folding and packaging into a suitcase. This poses a greater challenge than anticipated. Some of the issues that need to be resolved are folding lines, kit of parts, connections, and flexibility. The suitcase also brings a certain level of technological rigor—the Doorway has to fit into a certain volume and—unlike in the world of ideas—not everything is possible in a constrained volume.

The range of projects and solutions is as wide as the project boundaries themselves. One Doorway, designed by Peter LeVake and Wilson Lewis, unfolds from the suitcase as a system of black plywood panels connected by small hinges. It quickly assembles into a rectilinear volume, a cubic space for moving through. One cannot move directly through it, but only in a zigzag diagonal direction. As one faces this doorway, one cannot see through, resulting in an enigma of a space behind. Another Doorway, designed by Abbe Long, Carrie Machacek, and Alissa Pedersen, uses soft materials to define spaces. The vertical surfaces are formed by lines of tightly stretch thread. As we move through, we touch and feel the fabric, suggesting the cladding quality of this doorway. Like Gottfried Semper’s theory of clothing, this project identifies the origin of architectural artifacts in textiles and in the portable architecture and fiber arts of the nomads. Anthony Schley, Barry Peton, and Seungyeon Ha designed a doorway composed of two separate parts, two door jambs carefully wrapped in soft green fabric. Learning from Marina Abramovic’s relational body work with Ulay, this doorway explores the masculine and feminine principles and stereotypes. One door jamb is composed of exposed wooden dowels, individually wrapped in green fabric. Facing it is the other door jamb whose wooden dowels are carefully hidden behind
the fabric. It looks like a dress that is hiding body parts. With these opposing images, this Doorway addresses the universal question of solid vs. void, yin vs. yang, transparency vs. opacity.

**Conclusion**
The Doorway Project subverts the ambiguities of inside/outside and ephemeral/material. It appropriates the Surrealist strategies of “making strange,” aiming to distort the boundary between the fantasy and reality. An extreme example is a Doorway made of old clothing, transforming the suitcase into a simple container for the collection of colorful dresses, socks, shoes, and shirts. It is through these strategies of re-appropriation that students learn to observe, question, and ultimately criticize. In “Louis-Philippe, or the Interior,” Walter Benjamin explores the rise of a nineteenth century collector who transforms his home into “a box in the world theater.” The suitcase thus becomes a form of portable domesticity, transforming the Doorway from an artifact to the collection of desires objects. This transformation is what turns a door into a doorway, converting it from an everyday object into a work of art. This appropriation is similar to that of Marcel Duchamp’s *Boîte-en-valise* (or the *Box in a Valise*) in which the leather valise served as a container for the collection of miniature replicas of his art work. Thus *the Box in a Valise, series B*, from 1941, contains about twelve iconic pieces of his work of art, but all reduced to a miniature size. Among them are the famous *Fountain, Ready Made*, and some of his most recognizable early paintings. In *Privacy and Publicity: Modern Architecture and Mass Media*, Beatriz Colomina writes:

Duchamp’s work is an acute comment on the art market, on the condition of the artist as salesman, his work reduced to commercial samples. But that comment is somewhat undermined by another condition: the objects in the suitcase are reproductions that have been reinvested with “aura,” the very thing that the reproduction process eliminates.⁴

It is this notion of retroactive value investment into everyday objects that defines the Doorway Project. The Project appropriates this socio-economic critique as its main pedagogical theory, exposing architecture as a set of commercial samples that can easily be flat-packed, transported, or dropped in the mail. Ultimately, we acknowledge the tasks that economic development has taken away from architecture, tasks so painfully recognized by Manfredo Tafuri. It goes without saying that this problematic ruptures between architecture, economy, and use value remains the main focus of architectural discourse. As we prepare the next generation of architects, we must acknowledge the significance of these ruptures and courageously disperse false hopes in the power of design.

**NOTES**
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Building a Critical Mass of Design Options

PHILLIP G. MEAD
University of Idaho

Fig. 1, Stair Component by S. Nelson

“If I have seen further, it is by standing on the shoulders of giants.” Isaac Newton in a letter to Robert Hooke 1676

Background

In the book Sources of Architectural Form, Mark Gelernter identifies three main theories of form creation: Classicism, Romanticism and Positivism. Classicism for the most part asserts that certain design languages claim universal application based on underlying rational principles. Education consists of learning exemplary precedents and their accompanying principles. On the opposing pole is Romanticism which claims that form springs from the inner genius of the individual who helps us see the invisible. Education encourages self discovery and self expression in order to awaken the genius within. The third more scientific view, Positivism, Gelernter asserts is a hands-on approach inspired by the trial and error method of empiricism found in the scientific method, engineering and craft trades. Learning occurs by “doing” and empirically gathering, analyzing and testing facts. All three theories are implemented in today’s design education in varying ways. Historically, the trio most famously played themselves out within the short time of the Bauhaus curriculum. Each took turns dominating the beginning design curriculum until Gropius settled on the most unlikely candidate: Classicism.

In the initial years, the Bauhaus beginning design courses were taught by master craftsmen inherited from the former Weimar Academy of Fine Arts. Craftsmen primarily taught because Gropius thought he could replicate the medieval master/apprentice system of ‘learning on the job,’ which Gelernter asserts in Sources of Architectural Form as Positivism. Additionally, Gropius believed that the medieval cathedral builders could naturally express the ‘spirit of the age’ because they were free of preconceived ideas and drew their design/build inspiration directly from the materials and program at hand. What Gropius failed to grasp was that the medieval craftsmen worked from an established design language that incrementally changed from generation to generation. Despite his unfounded faith in the craft method, the resulting designs of
the first private Bauhaus exhibition deeply troubled Gropius because the projects did not express the ‘spirit of the age’ and looked like crude copies of past styles.

Seizing this opportunity, the newly hired charismatic Expressionist artist Johannes Itten quickly convinced Gropius to establish a six month preliminary Vorkurs course lead by Itten himself. True to the Romantic methodology, Itten assigned highly emotive design exercises which were influenced by Theodore Lipps’ theory of empathy. (Gelernter) After this initial indoctrination, Students advanced to studios taught by both pragmatic master craftsmen and Expressionist artists. However, after a few years of this approach Gropius was convinced once again, that the outcomes did not capture the ‘spirit of the age’ and did not easily translate to industrial production. From an economic standpoint, the projects were unmarketable which conflicted with the promise that the school would support itself through the sale of its work. (Whitford) Additionally, the Expressionistic projects were seen by both the local politicians and the European Avant Garde as unproductive ‘play.’ In short, the language or methodology of Expressionism was not tangible to machine production or to the reigning intellectual theories of the time. This criticism along with the declining relevance of German Expressionism weakened Itten’s grip on the preliminary Vorkurs course and encouraged the school to move in a more rational direction.

The final answer was found in Itten’s replacement, the Hungarian Moholy-Nagy whose design methodology incorporated the more rational and tangible languages of Constructivism and De Stijl. At this point Gelernter asserts that the Vorkurs course took an ironic twist for despite the notion that the Bauhaus discouraged preconceived forms, through accepting the languages of De Stijl and Constructivism, (both which claimed a universal and timeless application) Gropius unknowingly promoted the Classical design method.

Thesis

Through teaching rational and tangible languages of Constructivism and De Stijl, Bauhaus beginning students’ could more easily grow their designs in a fertile soil, or language of form. Conversely, earlier Bauhaus preliminary courses based on Romanticism and Positivism did not provide a tangible language of forms for ideas to grow because these methodologies did not provide a fertile substrate or soil for design ideas to grow. This resulted in designs that either reflected crude copies of past styles, or playful, but useless objects. Therefore, this paper asserts that like the Bauhaus, beginning design assignments should ground students in the various exemplary languages of form and their underlying principles which are tangible to the production of architecture. Exemplary is defined as any language with an established vocabulary, syntax and set of principles that has significantly engaged historians, critics or influential architects. Additionally, to further expand and deepen the understanding of tangible design principles, students should become familiar with the basic vocabularies and expressive potentials of common building components such as roofs, walls, stairs, promenades etc… By acquiring a critical mass of these exemplary precedents, students’ projects are able to articulate a broader range of formal expression and dramatize conceptual ideas. Most importantly, by initially exposing students to formalistic principles, later on when students reach upper level studios, they can more effectively challenge or refine these same principles. Mannerisms can successfully evolve from a tangible substrate of formal languages proven to engage both the body and mind. This stands in contrast to the mannerisms that evolve from the overwhelming mass of vague historical suburban images that bombard the senses on a daily basis. Hence, a critical mass of substantive examples is needed to overcome the sheer gravitational pull of our average everyday environment.
Studio Method

To ground students in tangible architectural principles and components, my students are first engaged in the natural and enjoyable act of “collecting.” This instinctive act, Biologist Nicolas Humphry claims, has both survival and aesthetic value. In his essay “Natural Aesthetics, Humphry argues that analysis naturally emerges as a collection grows because we instinctively begin to classify through comparison and contrast. Connections are made because we discover things that rhyme and contrast which he argues is pleasurable and aesthetic. This is similar to what a botanist experiences when collecting and classifying plant species. Furthermore, this act of collecting is analogous to what a architectural Classicist performs when comparing exemplary buildings. Both Aristotle and Alberti promoted this type of collecting to further one’s understanding of the nature of beauty. From displaying the most beautiful examples and interesting parts of each, a more idealized or ‘normative’ conception of the beautiful emerges. Through this process of selection, a ‘normative’ conception of beauty is born which is classified as ‘Normative Idealism.’ (Gelernter)

Taking a clue from Humphry, students are assigned to collect precedents that naturally appeal to them. Students are not, however, free to select from the overwhelming mass of average designs in the surrounding town or the internet. Instead they are asked to discover examples from a more established array of exemplary precedent found in the architecture library. To save time, student’s initial collections are photocopied and crudely assembled on poster board and displayed for the rest of the class to compare. After pin-up, students are given 7 to 10 minutes to individually observe other displays and then discuss their findings amongst themselves. This time is critical because it is here that students start to naturally teach each other. (fig. 2) After initial comparisons, students are then asked to justify their choices. This may appear unfair because the assignment did not require them to defend their choices, just to collect what appeals to them. As the philosopher David Hume has observed, “Reason is the slave of passions” and inevitably, students, if prodded, do find a rationale for why they are emotionally or intellectually attached to their choice. Prodding consists of asking such questions as: “what about this design engages your body, emotions or mind?”…how does this design affect your imagination?…does this design trigger an emotion or remind you of something? This sort of psychoanalysis encourages a justification beyond the superficial answer of: “it’s different” and
thus guides the students to reply with more expressive and thought-out rationales. From these answers, a more reflective class dialog emerges which can range in topics from literary narratives to craftsmanship. Additionally, since students are given an unrealistically short period to collect and digest the implications of their assemblage, I give a slideshow of a 20 year collection of exemplary principles and components. To demonstrate the inter-disciplinary relevance of aesthetic principles, examples are shown of nature, industrial design, vernacular images, art, landscape architecture, city design and finally architecture.

After exposure to this fertile mix of examples, the class plunges into design exercises ranging from figure-ground graphic abstractions to buildings and design components. Studio becomes a fast paced workshop where students are asked to apply basic principles within a short amount of time. Their results are frequently pinned-up, and as before, individually compared and discussed. The process is often repeated so that students can gain a sense of mastery. Additionally, the value in these frequent pinups is that students are exposed repeatedly to exemplary student designs which in many cases, are more interesting than the exemplars. These quick exercises also guarantee a successful number of accidents which in themselves spur the class towards more inventive designs.

Since Idaho’s three credit beginning design studios meet twice weekly, there is not enough time to significantly cover in detail the various building components of walls, roofs, stairs, promenades etc. This is where a class size of 18 to 25 is advantageous because the studio can be divided into three groups to work on different components. (Fig. 1) To ensure cross fertilization, all students come together in group pin-ups. Since each group consists of six to eight students, two to three exemplary projects typically emerge from each group.

After exposure to a variety of compositional and building component problems, students are now armed with a critical repertoire to tackle a capstone project. (Fig 3) It is at this point the class takes a more Positivistic stance that requires students to face a number of pragmatic issues. Since my research focuses on how design affects wellness, issues of light, air, comfort, views of nature and social options are addressed. For the site, students analyze sun movement, thermal comfort, views and circulation patterns. From the program, basic issues such as functional relationships, outside access, and standard furniture/component sizes are stressed. Additionally, students are asked to challenge the program and reflect on personal experiences from similar building types. From the site and program analysis, students then propose a set of moods that help dramatize and better express the project.

Fig. 3  Semester Capstone Project: Coffee Shop with a Garden Apartment by John Paul.

From these reflections and pragmatic studies, clunky looking plans and sections emerge. Plans show minimal furniture placement, and sections express different volumes. From here a minimum of two small-scale, quick block model studies are assigned that respond to both the program and site forces. These studies are similar to Frank Gehry’s initial process models which consists of different sized wood blocks (scaled to reflect each programmatic space) which
respond to both site and program. To the dismay of many students, solutions that express an overt formal strategy are quickly discouraged.

It is only after these function and concept studies are analyzed that students are allowed to incorporate formal design principles. At this stage they are now encouraged to see formal principles as function enhancers or force multipliers that provide coherence and drama to their initial designs. In short, they can now apply rhetorical punch to their argument. This is accomplished not by directly refining their crude plans and massing models, but by taking a lateral vacation from the functional studies. From their plans, figure-ground abstractions are drawn and functionless sculptures/models emerge. These quick studies can either be accepted or rejected according to how well they rhetorically support their initial concepts. From here students can directly refine their preliminary plans through their media of choice. Students are concurrently asked to reflect more critically about their project by writing two to three drafts of their design rationale. From here, the workshop pace slows down and desk crits become the predominate method of student interaction until the project is finished.

**Outcomes**

The results of the capstone problem surprise both the students and me. Often overlooked components, like walls, stairs and roofs are more fully expressed while site and building plans are aesthetically and functionally integrated. Project grading at this point appears to be nit-picking because the majority of projects demonstrate both functional coherence and thoughtful expression. In the longer view, what is most satisfying is that students who are required to transfer to other studios appear to further expand on their repertoire of design strategies and broaden their outlook under the guidance of instructors with different design methods. Furthermore, in the recent 2005 Spring Semester, both second year colleagues’ showcase displays were substantially represented by students from my previous 2004 Fall Semester studio.

**Discussion**

Theoretically, architecture lecture classes should provide information that applies to the studio. However, at Idaho, these classes (such as history, site design and structures) cluster around the third year design curriculum. The only class that runs concurrent to second year beginning design is Materials and Methods which appears disconnected and too detailed if not integrated in some way with the studio. Therefore, in many cases, the beginning design studio curriculum expects students to intuit solutions that are informed by the overwhelming mass of their average living environments and limited life experiences. This environment clearly favors the more talented and experienced students. Like the initial Bauhaus beginning design studios that produced crude copies of past styles, if today’s beginning designers are left on their own to discover design principles and building components, or are left to draw inspiration from what interests them from impoverished surroundings, the outcomes become predictably mundane.

In his book *Sources of Architectural Form*, Gelernter outlines the developmental psychologist Gene Piaget’s idea of “mental schemata.” This philosophically ‘structuralist’ idea proposes that a critical repertoire of conceptual tools and experiences are needed for beginners to go on to solve more complex problems. Evidence for the need to acquire a critical repertoire of “mental schemata” is demonstrated in research on the concept of ‘expertise.’ In studies on the characteristics of expert chess players, researchers Simon and Chase found that these masters are not deep critical thinkers, but instead possess a high vocabulary of moves. Similarly, studies by Glasner later found chess masters to be superior recognizers of chess board patterns. Both studies indicate that expertise is associated with the possession of a high number of options derived from an accumulation and application of numerous visual patterns and strategies.
Subsequently, in architectural design, reflective and thoughtful design appears to depend on a critical repertoire of design vocabulary and design strategies.

Conclusion

Although the Romantic method of self directed study and critical self reflection has proved useful for memory retention, curiosity development and life-long learning, it has limitations for the beginning design student who posses impoverished vocabularies and limited life experiences. With studio sizes ranging from 15 to 25, what teacher has the time to find and cultivate the unique individual genius within each student? Additionally, beginning design students do not have the critical amount of time to devote to a thorough positivistic scientific analysis of their projects. Both Romanticist and Positivistic approaches appear to require a substantial investment of time and a critical mass of design concepts...something upper division students posses, but beginning students desperately lack. As Gelernter suggests in Sources of Architectural Form, the classical approach provides a much needed shortcut to the learning of form. This statement also implies that the Classical approach is less complex and less sophisticated which is perhaps why the Bauhaus did not abandon both Positivistic and Romantic methods for teaching upper division design. Like the later phase of the Bauhaus, Romantic and Positivist methods appear more suited to upper division studios when students have absorbed and developed a critical mass of design vocabulary and design experience. Romantic and Positivistic methods appear to take firmer root in minds that have a more developed set of 'schemata.' In the end, Gelernter’s book praises the uneasy balance that Gropius tolerated between all three methodologies in the development of the Bauhaus curriculum and that by understanding the dynamics and tensions between the three design approaches, light is shed on a “complex but rewarding middle ground” in the creation of design form.

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When a student begins the first year of Architecture School, he/she arrives with many preconceptions about what an architect is and how an architect designs. It is these initial preconceptions that must be overcome during the first year, opening the student to other, unimagined possibilities. This is one of the most difficult tasks for an instructor of beginning design. One must find a process that allows the student to transition from the initial conception of an architectural idea to final three-dimensional form. The questions are many:

Where does one begin?
How does one begin?
How does one generate ideas?
How does one enable students to transform a two-dimensional idea into habitable space?

This article proposes a methodology for using drawing, collage, and other media as both complement and supplement to the design process. Developed through a collaboration between Smilja Milovanovic, teaching design, and Joyce Rosner, teaching visual communications, the methodology was tested in the spring, 2004 first year design studio at the University of Texas at Austin School of Architecture.

The structure of a studio’s pedagogy is critical for success, especially in the beginning year when students are first introduced to architectural education. In facing the difficult task of translating abstract thoughts into three-dimensional ideas, young students are confronted with assignments and a way of working quite different from any of their previous experiences.

We propose that students learn to look at information in a variety of ways. And the organization of those multiple readings of information can aid in the task of generation and translation of ideas.

At the University of Texas, visual communications and design studios are taught as complements, in tandem. We sought to structure the visual communications component of the first year design studio in such a way that the assigned exercises could both reinforce the design process and teach new methods of communications and drawing skills. The exercises we developed provided students with a two-dimensional method for making decisions about three-dimensional relationships.

Each drawing was approached as a means to explore ideas rather than as a final product. We believe that as the hand draws, it pushes the mind, which provides new ideas through interpretation of the process of drawing. In this way, coordination between hand, eye, and mind becomes the driving force in the design process.

Our methodology requires students to proceed through a guided framework, abstracting analytical and intuitive observations of changing views, points of observation and graphic technique. In this manner, they are freed from pre-conceived and conventional ideas and representations. Through these assignments, our students were able to successfully progress in their initial concepts of site, program, and representation.
Paradigms: The Assignments and the Process

The example project was a video gallery in an urban setting. For the first time, the students were dealing with a specific building type, with programmed spaces, on an actual site that could be visited, observed and measured. As a building type, the gallery provided spaces with simple relationships. Throughout the study, we placed importance on the relationship between the objects to be viewed (paintings) and the viewer. The urban site was long and narrow, backing up to a creek. This provided a site with distinct edges.

Exercise One: Observation Drawings—Information and Representation

For the early exercises, we drew from Barbara Solomon’s Green Architecture. Solomon describes a drawing as going beyond physical representation, something that “represents what is, and analyzes what might have been and could be.” She continues, “a drawing can try to show a building from the inside out, what is known about it and what cannot be seen.” ¹ She also discusses the notion of view — and the “problem of drawing the invisible on a piece of paper.” ² By instructing students to change the point of view by changing the drawing’s scale and location, new insight into the project emerges. The initial point of entry into design process varies widely among architects. William Alsop notes, “I often start with painting. The painting has life of its own, beyond your control. It is possible to see what you cannot think... I often describe this process as designing a conversation, not a building.” ³ Alsop notes that the process is uncertain and that uncertainty should be built into the design process. Steven Holl uses drawings in the form of a diagram, “I depend entirely on conceptual diagrams; I consider them my secret weapons... Finding the initial concept for each project that captures the essence of the architectural opportunities unique to that project, for me, is the only way into it, the door in which new ideas enter architecture.” ⁴

Consequently, we developed a series of drawings based on observation. Through these drawings, the students were able to describe, analyze, and comment on the site. Their choice of documentation ranged from photographic to collage to drawing. Through these studies, students were able not only to represent what is, but also what is “known about it and what cannot be seen,” ⁵ as described by Solomon.

In this manner, drawing becomes an instrument of vision. A student’s vision will become reality after many transformations.

Assignment for Exercise One

Now that you have spent time at the site, photographing, drawing, and simply observing, this assignment focuses on inventing a way to convey this information.

Using the reading and images from Barbara Solomon’s “Green Architecture” as a point of departure, create a drawing that communicates a variety of site issues. While this assignment depends greatly on your own observations, it also depends on your analyses and interpretations of those existing conditions.

Your completed assignment will be on one sheet of Strathmore or Stonehenge, but it should consist of multiple images. They may be drawn or created using collage, words, and anything else that you choose. Invent as you draw.
Exercise Two: Moment Collage: Inhabitation—Inside/Outside

Moving from site to program, we next asked the students to complete a series of “moment” collages. These explored the relationships between the view and the objects in the space, the view and the site (and conditions of light). The students’ initial collages exposed the relationship between place and event at specific moments within the proposed space. In this way, we introduced site and inhabitation and examined these concepts simultaneously.

The collage as a thinking tool became important in various ways. Collages are used to connect inside to outside—to investigate how interior space relates to landscape. By requiring the students to do at least six collages, we eliminated the fear of doing just one as the “right one.” Having the students create multiple collages also allowed them to deal with just one or two issues per collage, thereby eliminating the difficult task of putting all the information together at an early stage.

Typically, when students are asked to design a space they will use conventions like plan and section and not much else. But by asking them to create a collage at an early stage, we wanted them to seek out materials and other images that can depict the meaning of the space. Thus, they made the collages, not of design components, but rather of existing materials representing color, texture, light condition, and materiality, which they brought into the design from their own experience. They truly inhabited the designed space. The collages became investigations that led to new discoveries. In the end, they become idea generators for the next step, which is the creation of their own space or spaces. These exercises enabled the students to focus quickly on qualities of the space and its occupation.

Assignment for Exercise Two

This exercise deals with the relationship between the viewer, the site, and the space. Complete a series of six “moment” collages approximately 8” x 8”. These should be constructed as “sections that show the relationship between viewer, site and space. Make sure that the viewer is shown in the collages so there is a sense of scale.

Although you do not yet know what your project will “look like”, this assignment encourages you to visual relationships between inside/outside (threshold), horizontal/vertical planes (ground), and the inhabitants of the space.

Do not try to include too much information in each collage. Focus on addressing one or two issues in each one. Because you must do at least six, explore your ideas in a variety of ways. What is the view if you step up versus stepping down? What happens if a wall is transparent versus opaque? From where will the light be coming into the space? How can you control that light? These may seem like simple questions, but different solutions can totally change your perception of a space. These collages will provide you with a way of looking at the quality of a space and help you to further develop your design project.
**Exercise Three: Sequential Drawings: Imagined Spaces**

After the collage exercise, we further developed the project’s building and site sections by asking students to imagine moving through the space. This allowed views to emerge with both “surprise and ambiguity.” Through a series of drawings exploring accurately constructed shadows, using three-dimensional study models, and daylight, we examined the importance of natural light within the space.

**Assignment for Exercise Three**

Working from your initial collages and diagrams of your project, develop a series of 12 small perspectives.

Imagine that you are moving through the site/building and try to describe in perspective what you would see (or what you would like to see). You should be moving along the east/west axis, cutting transverse section perspectives as you proceed. Use these drawings to help you make decisions about your design and the relationships of spaces, edges, openings, etc.

Ask yourself many questions as you work. Think about physical movement as well as visual movement. The drawings should be approximately 4” square (exact dimensions may be determined individually) and may be line or tone, freehand or hard line. They should convey ideas of space, movement, and view. However, always keep in mind that these are process drawings and their main purpose is to help you develop your project, making decisions as you draw.

**Exercise Four: Conditions of Light**

The last assignment brings together the previous exercises into a coherent whole: a longitudinal section through the site and building.

**Assignment for Exercise Four**

Now that your project is nearing completion, cut a longitudinal section through the entire building in order to examine how light moves into the space.
After looking at Beaux-Arts sections in which various lighting conditions were carefully and thoughtfully rendered, draw a 1/2" scale section of your project and render the conditions of light. You may use pencil or charcoal on Strathmore or Stonehenge, or you may use watercolor on Arches. Allow the white of the paper to suggest light and illumination. Think about direct light, shadows, and reflected light. Look carefully at what light does in other spaces around you and in other drawings to help you understand how to communicate graphically your own ideas. These drawings will allow you to develop your drawing skills at the same time that you develop your design project, making decisions as you work. In this way the drawing becomes simply another tool in the design process.

**Fig. 4. Exercise Four.**

**Conclusion**

By examining the issues of site, program, view, path, threshold, and space through various media, students learned they could use the method of representation—whether a drawing, model, or collage—as a way of both describing and developing their ideas. Through this methodology, the drawings and models did not become the final documentation of the project, but necessary elements of the design process, incorporating intuitive and analytical elements. Drawing became an investigation, not merely a recording.

The sequence of our exercises moved from the intuitive to the rational and back to the intuitive. This progression allowed students to explore two very different ways of thinking. Using both left and right brain exercises, all students were able to find the best means to provoke their creativity in order to design.

Instead of going from general to specific while designing, we directed students to investigate specifics (as exemplified by the moment collages) without knowing the whole. This task carried only one condition or parameter at a time. And by abstracting the exercise assignments, students were not bound by conventional representation. Ideas flowed and emerged in the act of making, not just drawing, and the meaning of the whole emerged in the act of making the parts.

Unlike traditional final presentation work (plans, sections, and elevations) the students' sequence of drawings has an importance that delves beneath their surface. The strength in this process derives from the interlocking steps that illustrate how the original medium is transformed into architecture, as both experience and form.

**Fig. 5. Final Models.**
Notes:


2Ibid.


5Solomon, p. 53.
A Beginner’s Mind

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ISBN   0-615-13123-9
Beginning Design Studio: An Analog-Digital Language of Vision

BENNETT NEIMAN
Texas Tech University

...we have presented a studio course, or if you prefer, a laboratory or workshop course which opposes an administrative attitude of “theory and practice.” Naturally practice is not preceded but followed by theory. Such study promotes a more lasting teaching and learning through experience. Its aim is development of creativeness realized in discovery and invention — the criteria of creativity, or flexibility, being imagination and fantasy. Altogether it promotes “thinking in situations,”... it is time to advocate again a basic step-by-step learning which promotes recognition of insight coming from experience, and evaluation resulting from comparison. This, in sum, means recognition of development and improvement, that is, of growth, growth of ability. This growth is not only a most exciting experience; it is inspiring and thus the strongest incentive for intensified action, for continued investigation (search instead of re-search), for learning through conscious practice.

Josef Albers, Interaction of Color

This paper is framed as a proposal for a freshman design studio. The work shown is mostly from an undergraduate design seminar, which was taught fall semester 2004. All pre-professional architecture students are considered as novice designers who are at the beginning of their design education. Therefore it is believed that the methodology, which was developed over a 15-year period through a series of workshos, undergraduate, and graduate elective seminars, can apply to freshman design studio as well. These courses received the AIA Education Honors Award in 1994 and 1998. The pedagogy is offered not as the solution, but as a renewed model for beginning design studio, satisfying the demands of incoming students representing a paradigm shift, while acknowledging that architectural education is best served as a liberal art.

New Media Savvy Youth:

There is a current breed of new media savvy youth entering undergraduate pre-professional architecture programs. Students enrolling as college freshman in the fall 2005 were likely born after 1985. This means that during most of their lives they have been exposed to not just CD-ROMs, but realistic video games, Game Boy, dolls with embedded microchips, cell phones, the Internet, the graphical user interface, digital cameras, digital video, Tivo, DVD’s, flat screen HDTV, and the Fox News showing live satellite action directly from embedded war correspondents. High-school students are making and editing their own videos and digitally composing their own music while they download, sample, rip and mix mp3’s.

To the surprise of many in the older generations (pre-1985 architecture graduates), most of these “architecture” students will never set foot in an architect’s office. In fact, this phenomenon of architecture students not becoming licensed practicing architects has been going on for some time. Yet at the same time, architecture majors are in high demand by many sectors of the new media economy, such as: the software and website developers; the broadcast and film industries; the special effects, audio, and animation studios; gaming and toy companies; advertising and print agencies; manufacturing, product design; and construction to name a few. Non-architectural employers value these graduates for their ability to fuse ideas, images, movement and experience. Architecture students know structure, form, space, light, and information in ways that
bring a fresh outside approach to creative problem solving. Many architectural graduates with entrepreneurial ambitions immediately set out to start their own companies, overlapping architectural knowledge with many disciplines (www.tronicstudio.com).

Meanwhile professional architects and older generation educators, complain endlessly about architectural graduates' lack of preparation for the profession, driving the schools, through the NCARB, the NAAB, and a weakened ACSA to become ever more narrow, technical, and professionally focused.

What is going on is that these students demand and expect beginning design courses to deal with their reality. Yet there is a resistance by faculty and the profession they supposedly serve, to integrate new media with time honored traditions. One extreme rejects new media entirely, in favor of nostalgic methods. At best, there is a superficial introduction of digital media into beginning design, without an understanding of the principles of a language of vision.

**Analog-Digital Studio:**

This proposed freshman design studio addresses these problems through action followed by reflection, or as Albers suggests, a non-administrative approach to practice followed by theory. The studio teaches students how physical material (atoms) and digital media (bits) can be used interchangeably as instruments in a design environment. Digital media is introduced as a tool that enables the study of form, space, material, light, shadow, color, transparency, translucency, texture, and motion.

Current trends are referenced from the *Language of New Media* by Lev Manovich where he proposes a definition of New Media consisting of five interrelated points: (1) new media objects can be numerical represented; (2) digitized objects can be dynamically automated; (3) new media objects are modular parts that can be rearranged; (4) variability means that the parts may be used or displayed in a variety of ways; (5) and transcoding allows the objects to be transformed and manipulated creating entirely new kinds of products. All of these points are implied in the course. As the technologies of new media evolve, other trajectories are possible.

At the same time, the course relies on timeless ideas from the visual arts, such as the glass collage assemblages of Josef Albers; the diagrammatic analysis of still life drawings by Wassily Kandinsky; and Gyorgy Kepes’s *Language of Vision*. Utilizing a systematic approach that builds from the Bauhaus underlying principles of craftsmanship and visual perception, the course consists of experimental exercises stimulating intuition and analytical observation. The methodology explores the tactics and techniques of space making with a particular emphasis on experiential and sensorial perception. Potent ideas come from Lazlo Moholy-Nagy’s book, *Vision in Motion*, where he discusses the eight varieties of photographic vision, camera-less photograms, space modulators, and motion-light boxes.

The proposed studio is not a disconnected technical computer-training course, but a seamless exchange of information between various applications, design and media. Similar to Albers, it advocates pedagogy based on play and interpretation, creating an inviting environment for experimentation in the context of contemporary media. The act of playing or execution precedes results or conception (Neiman-Bermudez 1997).

**Current Seminar Structure:**

The seminar meets twice a week for one hour and twenty minutes per session, structured as a series of video critiques of student assignments, supplemented by theory lectures, and procedural demonstrations. The course is conducted in a classroom where the instructor can easily plug in a laptop to a data projector and the Internet. Both analog and digital assignments are completed outside of class time. Early assignments are team based as a preliminary setup to individual work. Assignment files are submitted to the class server a few hours prior to class meetings so that the instructor can review the work prior to the video critique.
The process unfolds as several incremental and additive exercises sub-divided into five major stages, each with its own set of interrelated experiments, media, and time frames. The course is an evolving dynamic process. As each new group of students engages the exercises, new ideas are applied to the pedagogy for future groups. Many of these exercises are explicitly discussed in two previously published articles (Neiman & Bermudez 1997; Neiman & Do 1999).

Stage One - Analog Light Box (3.5 weeks): Teams design and construct a physical light box, according to ideas described in Moholy-Nagy’s Vision in Motion. Students are encouraged to think of interesting material combinations and ways creating movement and interchangeability. The interpretive potential of space is examined by video taping and photographing moving and static events within the analog light box (figure 1). The video taped performance is studied, and several spatially provocative still frames are captured into digital media. Through the critical selection of images, students are introduced to the non-administrative relationships between practice and theory as suggested by the Josef Albers quote.

Stage Two - Vocabulary and Reconstructions (2.0 weeks): Each student generates a unique vocabulary by isolating, cropping, selecting, and cataloguing a variety of significant fragments, shapes, textures, and colors from the digital captures. Working rapidly with new media objects, a series of architectonic reconstructions, are fabricated emphasizing connections and jointure. The original conceptual framework of the light box is transcoded through digital collage (figure 2).

Stage Three - Analog Diagrams (1.5 weeks): This stage returns to the analog world based on Wassily Kandinsky’s analytical drawing methods (Poling 1986). The seeing and making of schematic diagrams facilitates the understanding and interpretation of the spatial construct embedded in the digital reconstruction. In this exercise, numerous diagrams study the hidden
geometries of the source image according to the following analytic categories: orthogonal grid, tension, schema (idea), and interpretive tracing (figure 2).

Stage Four - Tracings, Templates, and Reliefs (4 weeks): Students translate the analog diagrams into a vector format. Through additive and subtractive processes, the formal possibilities of layer combinations are expanded into digital templates. Digital reliefs are projected from the two-dimensional templates into a beginning three-dimensional study. Students work with solids and voids, projections and depressions, positive and negative space (figure 3).

![Fig. 3. Tracings, Templates, and Reliefs: J. Olgin.](image)

Stage Five - Digital Light Box (4 weeks): With the construction of the analog light box students begin this process in the “real physical material world” of three dimensions. They experiment with several two-dimensional processes that are translated and expanded digitally, back into three dimensions. In the final stage, students make a digital light box by freely re-arranging and experimenting with combinations of elements from the digital reliefs in three-dimensional space. They discover and record multiple isometrics of the construction, as well as immersive wire frame and rendered perspective views. They work with color derived from the digital reconstruction source, and experiment with potential transparency, opacity, and translucency seen in the original light box. The final assignment produces analytic animations in order to understand the relationship between form and space of this constructed spatial fantasy. Once again, a potent reference is drawn from Moholy-Nagy (figure 4, 5, 6).

The space modulator provides the opportunity to relate design to direct work with materials as against previous architectural methods in which structural inventions were hampered by the shortcomings of visualization on paper alone. On the other hand, structural projects could be solved just as well by working with the model alone; but again this would not give the experience in visualization and development on paper which is essential to the exploitation of a "space fantasy", one of the main requirements of contemporary architecture.
Fig. 4. Source Reconstruction and Digital Light Box: C.J. Macquarie.

Fig. 5. Source Reconstruction and Digital Light Box: M. Magee.

Fig. 6. Digital Light Box: G. Salazar.
Analog-Digital Conclusions:

An effective manifestation of beginning design studio is one that sets up a rigorous series of incremental and additive exercises, but at the same time introduces an attitude of open experimentation. The Analog-Digital Language of Vision exercises provide students with fundamental critical skills in formal manipulation, space, and organization. Today’s architecture student must fluidly demonstrate design ideas with both analog or digital drawings and models. Why not start these processes at the beginning of the beginning?

This method can start with drawing, photography, or physical modeling, with or without specific formats or procedures. The starting points are varied over the years so that it does not become a static or predictable formula. The seeming mystery of the approach is a part of the game of discovery.

We must return to the basics by requiring tactile studies in different media. After a physical media is introduced, then a digital translation is worthy of study, followed by a return to the tactile. Hyper networking can require students to participate in an online community, which they can improve and enhance at will, according to their own mutually agreed specifications. This community is an inherent documentation of their progress. Beyond the community, class projects can frequently involve networked computers for performance and interaction with projects. The ability to fluidly move ideas, control and interaction around the group is a key milestone.

While students must be brought through a range of media very quickly, the goal is unchanged: *teach them to appreciate the nature of each medium they approach, so they can apply that appreciation in future design*. Working with the hands must remain. But according to new media principles, they must be constantly digitizing, and re-factoring their process with the aid of tools that extend and complete their vision of their work. Moholy-Nagy’s precise definitions form a solid foundation that is not only easy to apply, but ideal for a database driven world. In short, these are the potential “parameters” for modulating and controlling the study and feedback between viewers and users of all aspects of design work. This is the reality that the new breed of media savvy youth seeks whether they enter the architecture profession or not.

References/Notes:


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Situating Design

GREGORY PALERMO
Iowa State University

Design Is:
“~ The process of creating and producing a physical artifact; ~ A layout or plan for the creation of any given thing; ~ You design something, whether it be tangible or not, to your liking or for the appreciation of others; ~ The combination of art/visual appeal with function; ~ A process of creating an object of organized patterns; to design > create > to make new from imagination.”

Culture Is:
“~ Beliefs, traditions, and products of a certain group of people; ~ The customs and characteristics of a group of people – what makes your particular group unique; ~ Everything included in a way of life of a certain group of people, including language, art, music, and many other things; ~ The values of a society that become apparent in designs, activities, stories/media and other happenings in a society.”

Student definitions; Tuesday, August 26, 2003

Background and Starting with Outcomes
This is a case study of the development of a new Core curriculum course at the Iowa State University (ISU) College of Design (CoD). It relates an overview of the creation of the course and sample learning exercises that activate a large lecture class.

Historically, the CoD separated first-year students into discipline specific studies, narrowing, we believe, their perspectives about design. A Task Force analyzed learning outcomes of the first year programs, and proposed a more interdisciplinary conception of design education. The CoD committed itself to creating a Core foundation year of design studies, which students in Architecture, Landscape Architecture (LA), Community and Regional Planning (CRP), and Art & Design (A&D) including graphics, interiors, and studio arts would share. We established learning new outcomes first, content and method second. The faculty envisioned enriched preparation for each discipline via a common core of drawing, studio projects, cultural studies and sciences that would serve as a platform for upper division studies. Faculty from all departments would be (and are) involved in Core teaching for the beginning design student cohort.

Design Studies 183x: An Introduction to Design Culture (Dsn S 183x) is one of the new core courses. Supported by university and collegiate grants, Susan Bradbury, CRP; Mike Martin, LA; John Cunnally and Gary Tartakov, A&D; and Gregory Palermo, Architecture, developed and offered the course experimentally. Fall of 2004, it became a required course for all CoD curricula.

First Exposures
The cited student definitions set Dsn S 183x into motion. Design is understood as verb and noun, active imagination and invention, a plan, fabrication, as thing (tangible or not), and involving aesthetics and purpose. Culture entails the values of a community of people, their traditions and rituals, and their production of language, art, music and implements.

How might ‘design’ and ‘culture’ be related? That there are keys to thinking design, as opposed to practicing how to design, is arguably a radical notion for incoming students. Design self-consciousness, thought and action inextricably bound, is new to them. Dsn S 183x is designed to initiate an awareness of the connections on these multiple fronts.
In Dsn S 183x we present humankind as social, inventive and constructive – constructing life through inventing and making stuff of all scales and sorts as we go about living life. Invention requires labor, resources, material transformation and fabrication to come to fruition, and waste thereafter. It entails economics, politics, social negotiation and ethical choices. We launch into the disciplines of the college through some unexpected yet shared territories.

Content and Learning Outcomes for ‘An Introduction to Design Culture’

Dsn S 183x is intended as a complement to studio action. It is a beginning, an introduction to design enterprise, its historical context, and how it fits into contemporary culture. Expected student outcomes:

~ to develop abilities at a beginning level of mastery to observe, experience, analyze, critically reflect upon, evaluate, form judgments, and write about design processes and the products of design.

Toward obtaining those encompassing abilities we expect that students will develop an enriched understanding of:

~ Design in the context of site, region, and society; ~ Design in the context of technology, ethics, and culture; ~ The historical, social, political, and ideological context of design; ~ The communal and ecological nature of all design processes; ~ The language of design discourse; ~ Reading and writing about art and design that addresses theory and criticism; ~ Interdisciplinary and multidisciplinary design processes and professional practice.

By ‘Design Culture’ we mean the full range of intentional activities we humans undertake and things we produce to shape our material lives, experiences and social patterns through the creation of planned environments, landscapes, buildings, furniture, appliances, artifacts of all sorts, including art works, and media expressions. Design processes and works are presented as socially, historically, economically, politically and culturally grounded events and artifacts.

In ‘Part I: Case Studies in Design’ we explore the pervasiveness of design in contemporary society and how to analyze a case study. ‘Reality Myth and Showtime: Transformation of the [Hispanic] Working West to [American] Ritual Rodeo,’ and ‘Lifestyle Design’ enterprises such as IKEA, Martha Stewart and IDEO are the first case studies. We construct an historical armature for each and a correlated culture and design analysis. We address several questions: What constitutes design action? What are design works? How is design ‘cultural’? How do technologies of production affect design? Is ‘design culture’ about markets and consumption, ‘high art’ – or more? In what way might design be political? Are ethics involved in design?

‘Part 2: Mediated Reality, Ideology and Propaganda’ looks at communication media, MTV & CNN, Nazi and Civil Rights poster art, and Washington, DC, as case studies in the use of design as forms of propaganda serving ideologies to shape culture, cultural meaning, and everyday life. To the questions from Part 1 we add another: What has ‘beauty’ got to do with design?

‘Part 3: Mediated Reality, Ideology and Propaganda’ looks at communication media, MTV & CNN, Nazi and Civil Rights poster art, and Washington, DC, as case studies in the use of design as forms of propaganda serving ideologies to shape culture, cultural meaning, and everyday life. To the questions from Part 1 we add another: What has ‘beauty’ got to do with design?

Part 3 lectures and take-home assignments use ISU as a model of comprehensive design. We explore the establishment, planning, landscape design, buildings, artwork and interiors of the campus as well as campus literature and website. Design processes and environmental character are analyzed in the context of encompassing historical national and international design movements. The designing and designs of the university are seen in historical context.

The Power of Place, by Dolores Hayden is the required text. It provides a wake-up call to the political and ethical dimensions of design. It involves diverse design (i.e., architecture, landscape architecture, graphic design and fine arts) and social science disciplines, illumines racial/gender/power connections to design, and outlines collaborative models for design practice.
Teaching Resources
The course syllabus, lecture abstracts, faculty contact information, and full lectures are available on-line through the ISU e-Library, a publicly accessible site. Information developed during class was recorded and added. Slides can be reviewed on the CoD’s Visual Resources Collection site “Plato’s Cave.” PowerPoints converted to PDFs are available on another resource: WebCT. Students can download slides and PowerPoints for personal use. Videos and music played in class are available through the ISU Media Resource center for individual student review.

Material is available 24/7 at the students’ choice of time from their choice of location! We found attendance to be extremely high – partly because, as does any text, the lectures require explication that helps students make sense of the material. Partly because 10% of the course credit was reserved for in-class writing exercises that were unannounced!

What Students Produced
We employed several active learning practices. The first was impromptu in-class writing exercises that were shared during class, recorded, and used to drive discussion directions. In another, small groups generated questions or responses to a challenge question. The same process of sharing, recording and explanatory commentary took place. Using the campus as a site, we assigned three field analysis projects. There were three exams, 30% of each being essay based. Our concern was not so much memorization as engaging new material and making sense of it. For example, the essays were ‘open book’ enabling students to use research materials.

Assessing enduring learning outcomes is dicey at best. As a trace, in architecture we most typically retain studio work. For Dsn S 183x we collected a portfolio of papers, assignments and exams. The opening citations to this paper are the first student production of the semester. Here we will be looking at in-class writing exercise results, field exercises and sample exam essays. They form a general set of practices of observation, direct experience, reflection and recounting.

In-Class Writing Exercises
One response theme in the early essays was a sense of surprise or revelation: “I had not thought of that before; this is the first time I thought of ....” The first unit covered the West and rodeo noted previously. Here are a few excerpts from responses to this question: “Identify one new thing about cowboys and rodeos related to design that you learned in these lectures, and discuss why it is important to you.”

The first example is typical of the full responses:

~ I learned the purposes for why the cowboys wore the clothes they did. I never really thought about the fact that bandanas would keep dust from the face and that the saddles had to be designed for low back support and comfort. This is important to me because it made me realize that design is not just a look and how attractive something appears. It must be practical and convenient which I think is a good realization. [Emphasis added.]
~ I never had really thought of a saddle as an element of design. ...
~ ... I have never made the correlation between the desolate plains when riding horses and space in artwork.
~ I never tied the cowboys of the West to the Knights of the Middle Ages before. ...
~ The evolution of the clothing and gear seem to be most interesting. I never really thought about how the outfits and tools would have to change as the environment/jobs of cowboys changed. ... I had my eyes opened through this unit.

We do not believe these particular students are more naïve, insular, uninterested or unaware than most others. Rather, design is not connected to everyday life in prior education, or daily endeavors. An essential expectation of the course is breaking the ice on this front.
The second major unit covered three design organizations. Here are a few responses to this question: “What is a common thread among: Martha Stewart Inc., IKEA and IDEO?”:

~ We see a common process – when inventing a new design or refining one. A very important aspect in this process is teamwork in collecting ideas from various sources to combine these ideas into the best one. In this process, another common thread is not only the design but the manufacturing and production process. All three design not only “cool” things but also efficiently. They stress the value and good quality at reasonable prices and also stress the importance that the products are user friendly. ...

~ The common thread was to design something that was affordable, useful, or innovative. ...

~ Studying them makes you realize how different they are, ... MS is selling information, IKEA products, and IDEO ideas. The common thread is each of these companies has devoted all of their time in trying to better our lives in practical ways. ... They don’t just look at how “cool” it looks; they also make sure it is easy to use, practical and reasonably affordable. ...

~ Each organization has developed a way of identifying their market, the needs of their consumers, and problems that may arise both during and after production. ...

~ ... They are all helping our lives to be better by design + innovation.

Teamwork, client needs, research, improving the quality of life, efficiency, material production, visual appeal, innovative thinking – the hallmarks of designing and design. Not too bad for 5 minutes of reflection! Responses to subsequent short question topics revealed increased analytic depth, improved grammar, more complete analysis and more complete assessments of the topic. We are hopeful that the lessons of these design cases, so well reflected upon and written about, will remain with the students as they pursue their individual disciplinary studies.

Field Exercises in Observation and Mapping

Part 3 of the course utilizes the history, culture, physical and electronic environment of ISU as a case study. ISU is explored as a sustained design event: from political imagination, to physical place, fashion & ritual, and virtual place. We began with the legislative founding of the university in 1858, and its chartering as a Land Grand University in 1867. How and why we are located where we are, the shape of the land, and early site development are presented as social, political, planning and design processes. We covered formal site planning and landscape design, the emergence of classicism as the dominant architectural image at the turn of the 20th-C, contemporary campus architecture, interiors and artwork. The rituals of the ISU community, sports and band uniforms, alumni association memorabilia, university publications and diverse university websites round out a picture of culture and design inextricably intertwined.

The student work is place-based site observation and recording. We introduce methods of direct experience and assessment of the designed landscape.

In ‘Campus Memorials’ students directly engage the campus landscape while assessing the bits of culture and history that designed memorials reveal. Working in pairs to locate 10 memorials students to become familiar with diverse parts of the campus, and also learned that memorials in the landscape act as ‘windows’ through which we can glimpse views of history and values – what is included and what is not. The resultant work was a map of the memorial locations, photographs, a summary of what was memorialized and why that was important.

The ‘Place Recording Exercise’ involved going about the campus, locating places that possessed a strong atmosphere, e.g., good places to relax, to study alone, to socialize, places that are unpleasant to walk or that have an attractive view. The intent of this exercise was to have students consider the experiential qualities of the campus landscape from a distinctively personal point of view, to be reflective about the reasons for the qualitative assessments they made, and to
articulate those reasons in a concise narrative form. The result of this was a table with written
descriptions of their perceptions and supporting design attributes of the selected places.

'A Lynchian analysis of the Iowa State Campus' followed. Students applied Kevin Lynch's
urban typology to a place with which they were becoming familiar, so that Lynch's valuable
conceptual ideas could transcend abstraction and become more real, memorable and useful.²
Like the previous exercise this was an interpretive effort on a personal level, but there was an
additional responsibility to see and understand the environment through Lynch's framework –
establishing a model for exploring other environments or testing other such frameworks. Students
prepared maps identifying districts, nodes, edges, landmarks and paths with explanatory
analysis.

Final Examination Essay

The final exam included an open book comprehensive essay question:

“Art (painting, sculpture, frescoes, film, photography, etc.) has been an integral aspect of
many sections of the course. Describe and analyze: a) several artworks, b) the use of art, and
c) its purpose and cultural importance for at least one aspect of each of the following topics
presented in the course. Support your general premises with detailed comments. The three
topics are:
1) The Cowboy, American West, and Rodeo group of lectures (Part I of the Course)
2) The Ideology and Propaganda group of lectures (Part II of the Course)
3) The ISU Campus and Artwork lectures (Part III of the Course)"

Given that the short in-class writings and the essays of the two prior exams focused on
design, using art in lieu of design induces coming to terms with the range of uses of art. There is
a shared perspective: art and design are not seen as autonomous, ideal, neutral property-based
disciplines (e.g., proportion, composition, visual beauty, color, etc.), but socially contextual.
Cultural, political and ideological positions are ever-present. Students were asked to cite sources
if other than their personal notes. Faculty notes are in "[--]". One example:

[This student prepared a detailed outline not included here.]

The rodeo and overall cultural history of the cowboy is intermingled with art constantly.
We see as early as 4000 BCE that in Mesopotamia there are early depictions of horse riders
(Rodeo timeline, pg. 1) In around 2000 BCE there is an early depiction of saddles brought to
our attention. The consistency upon which art is part of the cowboy is carried up into the
1870's when painters and writers begin to go to the West and record all of the Spanish
vaquero's cultural influence. [Art of the West was well underway in the 1870's; also, by the
1870's the Spanish influence was being erased.] This initiates the genre known commonly
as Western Art and produces the portrayal of the mythic cowboy. The next few decades of
cattle drives and Wild West Shows inspire the first art of film in 1903 (timeline, pg. 2) with
“The Great Train Robbery” that will always be a part of our art history.

The use of art here is not solely for our personal pleasure, it is the description of a
constantly evolving part of our lives, a description of the times that could not be captured with
a still picture on film. Painting and sculpture beginning with George Caitlin (lecture notes, pg.
2) in the 1830’s to Charles Russell today, artworks’ purpose is to provide us with images of
the West. Even in objects like boots, shirts & belt buckles art is involved. It is important to not
only recognize graphics as art but to dig deeper and find the true historical values of art
throughout cowboy culture.
Propaganda itself is an art. The art of persuasion and can be seen locally as ‘Vote for Goodman’ poster [student government campaign] to national levels like Washington, DC. One great example of art as propaganda is the Guerrilla Girls poster distributed in class. This poster educates people to the unfair treatment of women in art. This poster itself is art but more importantly it propagates the role of women in art. From art departments @ national universities [The poster lists faculty member ratios.] to the unanswerable critique that women allowed into the Metropolitan Museum have been inanimate ones with their clothes off. (pg. 8, Beauty lecture). The Guerrilla Girls ‘in your face’ attitude deals with propagation very well. We also see art in the form of propaganda in the movements such as Modernism or simply shown in war bonds, Nazism posters, & abortion rights posters. [For] The Modernism movement it is the design work itself and the ideas it embodies around which a system of propaganda is organized. Examples range from the ‘Salon de Refuses’ in the 19th-C, to the Bauhaus of the 1920’s and ‘30’s to the LA Case Study houses of the 1950’s.

More specifically let’s look at sculpture, classical details and building inscriptions. Each of the following were designed to reinforce the ideology of the American democracy. We see inscriptions like ‘Equal Justice for All’ on the Supreme Court Building, frescoes in the capitol recalling the signing of the Declaration of Independence, the Viet Nam Memorial, and even the design of our money includes major US buildings. Today we can literally carry around built symbols of democracy. (p. 2, lecture notes)

Lastly, on the topic of propaganda. Let’s look at our nation’s capital Washington, DC. From the selection of Greek and Roman architecture as the federal image to the constant use of painting, sculpture and graphics portraying America, Washington is a landscape of free self-governing people. In today’s age of digital media, Washington is a model of physical design from past to futures (p. 3, lecture notes).

Overall, we must look at the art of persuasion, more deeply into its historical values. Propaganda has painted us a vivid picture using art of our nation’s history. The cultural importance of propaganda cannot be expressed in words. To me it is something that must be experienced and interpreted for oneself.

Finally, let’s take a look at art and its uses throughout the ISU campus. Picturing the campus as a landscape sets the scene for art to be involved. [This student concludes the essay with four additional blue-book pages on art and the ISU campus; many examples and uses are provided.] … So now the landscape of ISU becomes media itself. … It is important to know the history of a place that you spend lots of time in. ISU uses various degrees of art to help us along. …

It appears that the overall theme of art throughout these topics is [art] is here to educate us. Art shows us the past … Art is everywhere not only to educate but to enjoy!

Above average, this essay is by no means ‘perfect’. There are a few technical factual errors; a number of grammatical ones; and it presumes the reader is familiar with the cited artworks, counting upon the professor to know the referent! Written under the pressure of an examination period, it is a solid consideration of the interplay between art, design and social context.

Onward

Design requires informed thought, ability to research, and capacity to communicate design ideas via diverse modes. Rational, poetic, reflective, and inventive action arguably come together best in the studio, but this requires nurturing by multiple means. Dsn S 183x’s structure, lecture content, required exercises and examinations are designed to awaken and engender informed thought, critical perspective, and recognition that design is not an abstract field of forms intuition and personal will, but a shared deeply cultural endeavor.
Notes:

1. A sample of the nine in-class questions posed during the first offering of the course: a) Define: design; define: culture. [8/26 Asked prior to any lectures.]; b) Identify one new thing about cowboys and rodeos that is related to design that you learned in these lectures, and discuss why it is important to you. [9/9 Asked at the completion of the topic lectures.]; c) What is a common thread among the three companies: Martha Stewart Inc., IKEA and IDEO? [9/18 Asked at the conclusion of the topic lectures.]; d) What new issue, process, or product from a design perspective did you learn about in these lectures on MTV and CNN? [9/30 Asked at the conclusion of the topic lectures.]; e) What do you think ideology and propaganda are? What does design have to do with propaganda? [10/7 Asked prior to topic lectures.].

2. Kevin Lynch, The Image of the City (MIT; 1968) and related works pertaining to place and its analysis.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
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Questioning Students’ Beliefs about the Design Disciplines

BRIAN POWELL
University of Louisiana at Lafayette

Introduction
What is in the beginning student’s mind? The beginning design student arrives at the first
year studio with beliefs about the design disciplines that they have arrived at somehow, perhaps
by some inner knowing or by external influences such as television, friends or teachers. Their
presence in the first year studio must also mean that they believe that what describes a designer
also describes them. What beliefs are held in the mind of the beginning student about design and
the characteristics of excellent design?

Questions about what constitutes an excellent designer are complicated by the fact that
students at my university may chose the study of three distinct design disciplines; architecture,
interior design and industrial design. The distinction of what describes the practice and study of
one design discipline from another, an interior designer from an architect might appear obvious;
the former primarily concerned with the inside and the latter outside. But, as professional
designers the distinction and the answers will surely vary dramatically. Ask a beginning design,
“What is the distinction between an interior designer and an architect?” and see what is revealed
in the beginning students’ mind.

To further complicate the attempt to understand the beginning students’ belief about what
describes a designer is the attempt to understand exactly what the faculty believes describes an
excellent designer. This is exactly what was recently attempted at my university, where the
disciplines of architecture, interior design and industrial design are administratively aligned.

Students were asked to respond to a survey that sought to distinguish characteristics of
design excellence as applied to the practice or study of interior design and separately the
characteristics as applied to the field of architecture. The responses were from a survey that was
compiled using descriptors obtained from faculty writings on the topic of ‘design excellence.’ The
responses by the students begin to reveal what the beginning student believes to be true for
those who practice not only their chosen discipline, but also what they believe to be true for a
related design discipline.

This paper attempts to reveal beliefs held in the mind of beginning design students by
comparing their beliefs to those held by their faculty, and by comparing the factors that influence
those beliefs, including gender, field of study, and year of study. Described here are the results of
a survey concerning beliefs among 1st through 3rd year interior design and architecture students
about the characteristics that describe the individuals who study and practice the design
disciplines of architecture and interior design. The results of the survey show that there was
agreement among interior design and architecture students about what defines the disciplines. It
also suggests that beliefs change from 1st to 3rd years, and that factors of gender, discipline of
study and year of study play roles in those beliefs.

Getting to Beliefs
How does one create a survey that seeks to describe the design disciplines? What are
the words that describe them and are the words different for each discipline? Also, how can
person biases be prevented from interfering with meaningful results? Initially, I looked at
resources outside of my school for inspiration, taking advice from the director of the internal
review board at my school and looked at already established surveys rather than create my own.
Feminist author and Professor Sandra Bem had created the BSRI (Bem Sex Role Inventory), which served as a starting point for my own survey. In the self-reporting survey, professor Bem used 20 feminine, 20 masculine and 20 gender neutral descriptors to provide a measurement of psychological androgyny. Although I was not interested specifically in androgyny, the use of 20 characteristics to define a group seemed a compelling method that would be later by used in my survey.

An initial attempt on my part to find the words to describe the disciplines did more to reveal my own biases and prejudices than provide an understanding about the design disciplines. Looking outside of myself, I found through conversations with colleagues that within the School of Architecture and Design, the faculty had produced a resource that I could tap into for descriptors that define architecture and interior design.

Each semester the faculty in the design programs of architecture, interior design and industrial design meet to review the student work, develop strategic plans, or work on other issues of importance to the programs. During one of these end-of-the-semester sessions, we asked ourselves, “What constitutes design excellence?” Each faculty member from the three disciplines submitted papers describing ‘design excellence,’ in order to make clear amongst ourselves those characteristics. The papers represented a significant range of writing styles and position statements, yet on many of the characteristics that define design excellence, the faculty was in agreement. These definitions of design excellence were not based on the area of design practiced to the gender of the practitioner, but reflected a general level of excellence independent of variables of gender or field of study. If we were in agreement on some of what design excellence in design, how would our student define design excellence? Would they be in agreement with us, would they define the disciplines differently, would the definitions vary by gender, and would they vary as student move into upper levels?

From the writings of the faculty about design excellence, twenty descriptors were selected for a survey to be given to students in 1st through 3rd years of interior design and architecture. The descriptors selected were those that repeatedly appeared in faculty writings about design excellence.

About the Survey

The SBIDAS survey (Student Beliefs about Interior Design and Architecture Survey) was designed to determine what attributes students of interior design and architecture believe describe the students and/or practitioners of those disciplines. The survey is composed of 20 descriptors; the same descriptors that the faculty said define ‘design excellence.’ The survey has 40 responses; 2 responses to each of the 20 descriptors, one response for how well students believe the word describes someone who studies or practices ‘architecture and another response for how well the word describes the study of practice of ‘interior design.’ Students rank how well the work described the discipline on a Liker-type scale from ‘strongly disagree’ to ‘strongly agree.’ The beginning portion of the survey collects demographic information including gender, major, and year of study of the respondent.

On a single day in the fall of 2004, the survey was administered to 137 students of architecture and interior design during their studio periods. Students were both male and female and were in 1st through 3rd years of design studio. Fourth and fifth year students were excluded from the survey. The results were collected and taken to the university statistician. Since the author of this paper had no experience analyzing a survey for statistical significance, this university resource was used for that propose.

Survey Results

The first information that was significant was that the survey demographics closely compared to those of the School of Architecture and Design in both the distribution of gender of
the respondents and the distribution of majors. The male to female enrollment of architecture and interior design students in the School of Architecture and Design is 51% male and 49% female. The distribution of respondents to the survey was 48.5% male and 51.5% female, which is very close to the enrollment distribution. The enrollment of architecture students to interior design students at the university is 69% architecture student to 31% interior design students. The distribution for respondents to this survey was 66% architecture students to 34% interior design students. Again, this distribution was a close match to the distribution by major of students enrolled in the school. The close comparison by gender and major of the sample group to the general population in the School of Architecture and Design suggest that the responses will provide an accurate description for the whole student body.

Analyzing the Data
Data from the surveys was analyzed in 2 ways: by ranking and by testing for statistical significance. Statistical significance was determined using the t-test method to compare responses between 2 groups and the PROC GLM method to compare responses between 3 groups. When ranking was used, the responses were ranked for highest and lowest responses for both architecture and interior design students in three areas; area of discipline, gender and year of study. The ranked responses are listed in TABLE 1 and reveal some interesting areas of agreement between the student respondents.

Rankings by First-Year Students
Since the focus of this conference is on the beginning mind, the responses at the first year are of primary interest. When first year students were surveyed, the highest response rate among all 1st year students was identical for the descriptors for ‘architects’ and interior designers.’ Creative, Passionate, and Skilled received the top response rate when describing the two disciplines. For the lowest response rate among all 1st year students in describing ‘architects’ and ‘interior design’ the students were also in agreement in two descriptors; Pragmatic and Playful. When looking at the responses of all respondents (1st through 3rd years, both disciplines) for highest ranking for ‘architects’ and ‘interior designers,’ Skilled and Creative are two of the top three responses. When looking at response rate among all respondents for the lowest ranking for describing ‘architects’ and ‘interior designers’ there is no agreement. The responses are different for describing the two groups. Do these results suggest that architects and interior designers are not pragmatic and playful or do students believe that these characteristics are not as important?

Some descriptors made noticeable shifts between first and third-year respondents. For words describing ‘architects,’ Poetic made the biggest shift between the first and third years. For all first respondents Poetic, when describing ‘architects,’ received the fourth lowest response rate, but by the third year Poetic received the third highest response rate. Among the words that describe ‘interior designers,’ Playful made the biggest shift between first and third years. For all first year respondents Playful, when describing ‘interior designers,’ received the third lowest rate, but by third year Playful received the third highest response rate. Does this shift in importance suggest that the university or studio environment plays some role? For example, at my university the third-year architecture studio professor uses the word and values the ‘poetic’ in design. The value placed on the poetic by this professor increases the value of the poetic in describing ‘architects’ by the time students are in their third year of study. Although I am not certain of any evidence that would suggest the rise in Playful as a descriptor for interior design, a similar condition may be occurring.
Rankings by Gender

None of the other data in the survey is analyzed specifically for first year, but is analyzed by other groups. Looking at response rated by gender, first through third year responses are grouped together. Rankings by gender reveal agreement on what describes ‘architects’ and ‘interior designers.’ Skilled, Creative, and Knowledgeable are the highest rated responses by both males and females when describing ‘architects.’ For describing ‘interior designers,’ Creative received the highest response rate among both males and females. Passionate was also ranked in the top three by both males and females for describing ‘interior designers.’ Examination of the responses in TABLE 1 reveals additional agreements and subtle changes in responses between students by gender, year of study and discipline. TABLE 1 follows and indicated response rankings for highest and lowest three responses by both architecture and interior design students by discipline of study, by gender and by year of study.

TABLE 1:
Responses to the Student Belief about Interior Design and Architecture Survey

By Discipline:
Ranked highest about architects
By architecture students: Creative Knowledgeable Skilled
By interior design students: Skilled Critical-thinker Passionate

Ranked Lowest about architects
By architecture students: Flexible Sensitive Patient
By interior design students: Sensitive Flexible Playful

Ranked highest about interior designers
By architecture students: Creative Passionate Sensitive
By interior design students: Creative Passionate Articulate

Ranked lowest about interior designers
By architecture students: Pragmatic Rigorous Flexible
By interior design students: Analytical Rigorous Pragmatic

By Gender:
Ranked highest about architects
By males: Skilled Creative Knowledgeable
By females: Skilled Creative Knowledgeable

Ranked lowest about architects
By males: Flexible Pragmatic Sensitive
By females: Flexible Sensitive Patient

Ranked highest about interior designers
By males: Creative Skilled Passionate
By females: Creative Passionate Knowledgeable

Ranked lowest about interior designers
By males: Pragmatic Rigorous Flexible
By females: Pragmatic Analytical Rigorous

By Year of Study:
Ranked highest about architects
By 1st year students: Creative Passionate Skilled
By 2nd year students: Skilled Knowledgeable Creative
By 3rd year students: Creative Knowledgeable Poetic
Ranked lowest about architects
By 1st year students: Pragmatic, Playful, Sensitive
By 2nd year students: Flexible, Sensitive, Patient
By 3rd year students: Flexible, Patient, Sensitive

Ranked highest about interior designers
By 1st year students: Creative, Passionate, Skilled
By 2nd year student: Creative, Passionate, Articulate
By 3rd year students: Creative, Responsive, Playful

Ranked lowest about interior designers
By 1st year students: Pragmatic, Playful, Ethical
By 2nd year students: Patient, Pragmatic, Flexible
By 3rd year students: Rigorous, Analytical, Risk-taker

By all Respondents
Ranked highest about architects: Skilled, Creative, Knowledgeable
Ranked lowest about architects: Flexible, Sensitive, Playful
Ranked highest about interior designers: Creative, Passionate, Skilled
Ranked lowest about interior designers: Pragmatic, Rigorous, Analytical

Areas of Statistical Significance
In addition to ranking, the data was examined for statistical significance when comparing response rates between students enrolled in architecture and interior design. Statistical significance was obtained by using t-test and PROC GLM procedures on the responses by the students.

Comparison by Discipline of Study
In t-tests, where responses were compared by discipline, statistical significance was found in 17 of the 40 responses. In 16 of the cases, the response rate for how well a descriptor defines ‘interior designers’ was significantly lower by architecture students when compared to the response rate of the same descriptor by interior design students. For example, using Disciplined to describe ‘architects,’ the response rates by both architecture and interior design students were relatively equal. Interior design students also used Disciplined to describe ‘interior designers’ and ‘architects’ at a relatively equal response rate. Statistical significance was found in the response rate by architecture students using Disciplined to describe ‘interior designers.’ In that case, architecture students’ response rates for Disciplined to describe ‘interior designers’ was significantly lower than the rate that architecture students used Discipline to define ‘architects.’ Architecture students rated ‘architects’ higher for 16 of the 20 descriptors than they rated ‘interior designers.’ The 16 descriptors rated higher for describing ‘architects’ by architecture students when compared to ‘interior designers’ are:
- Responsive
- Flexible
- Competent
- Risk-taker
- Enthusiastic
- Poetic
- Passionate
- Critical-thinker
- Disciplined
- Pragmatic
- Skilled
- Articulate
- Disciplined
- Pragmatic
- Ethical
- Knowledgeable

The only case where the response rate to the descriptors was lower for describing ‘architects’ when compared to interior designers’ by interior design students was for Playful.

What does this suggest about the respondents? Why would architecture students rate themselves at a significantly higher level than interior design students for 16 of the 29 descriptors? Is there a studio culture in the design building that elevates one discipline over the
other by the students? Is there a subtle elevation of status by faculty and administrators of architecture, that students sense which is reflected in the survey results?

Comparison by Gender

The next area where the t-test was performed was when comparing the response rates by gender. Statistical significance was found in 9 of the 40 responses by gender. In 6 of the 9 responses the male response rate for words describing ‘interior designers’ was lower than the female response rate. The 6 descriptors that males ranked at a lower rate for describing ‘interior designers’ than did females were:

- Rigorous
- Skilled
- Passionate
- Competent
- Creative
- Knowledgeable

For 2 of the descriptors that define ‘architects’ the response rate by males was lower than the rate of response by females. The 2 descriptors that females ranked at a higher rate that males when describing ‘architects’ are:

- Rigorous
- Playful

A Final Comparison

In the initial data analysis, a group of first year responses was omitted. This omission left the sample group of first year students at 37 respondents. In order to get a better picture of first year, a second data analysis was run for first year students that included the 24 first year responses originally omitted. From this group of 61 first year respondents, 31 were males, and 31 females, however 48 were architecture students and 13 were interior design students. In order for a statistical analysis to be valid, the groups tested have to be around 30 each. That meant that data comparing responses by gender would tend to be valid, which those that compared discipline of study would be invalid for this sample group. When t-tests were run for the gender comparison and for discipline comparison, no statistical significances were found. The comparison of data for gender using only first year respondents yielded no statistical significance, yet in the earlier t-test, which used data from first through third year respondents, significance was found for nine of the forty descriptors. I believe that this change for no significance at the first year, to significance for nine response areas using all respondents reveals something. Using data for the first year only, both genders describe the disciplines on relatively equal terms. But, when using data from first through third years, students define the disciplines on relatively unequal terms. I believe that this change in response rate by gender between first year responses compared to the first through third years responses, suggests that the school culture contributes to changes in beliefs among students by gender.

Conclusion

What conclusions or implications can be drawn from the data analysis from the survey responses? The data shows that first year students, whether they be architecture or interior design students are in agreement about what describes the design disciplines as well as what does not the describe the disciplines. I believe that this suggests that students come into design school with a view of the design disciplines that is relatively equal. The data also suggests that the descriptors that define the disciplines are rated a different levels based on gender and year of study. This is illustrated by data that shows that architecture students rate descriptors for ‘architects’ at a higher rate than they rate the same descriptors for ‘interior designers,’ yet interior design students rate ‘architects’ and ‘interior designers’ at relative equal rates. Do architecture students believe that they better represent the descriptors than do the interior design students? I believe that changes in beliefs between the design disciplines occur during their design education and that some aspect of their education contributes to this. Whether it is the language used by their professors, whether it is a subtle preference expressed for one discipline over the other, I
don't know. Perhaps the twenty words selected for the survey are skewed toward one discipline or the other. Whatever the reason, it is hoped that the results of this survey can open the door for a dialogue that can enhance the education of the beginning design student.

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Body and Architecture: Explorations from Composition to Theory Driven Space

CONRAD MARCUS RATHMANN
Savannah College of Art and Design

This article explores the use of a studio project that evolves in several distinct stages to blur the distinctions between compositional design and a theory driven architectural exploration. The project builds from explorations of proportion and composition, through form making and ends with the exploration of archetypal elements through theoretical concepts. In doing so, the project addresses the question of whether beginning design instruction should be geared towards projects of compositional or architectural scale. By building upon the experiences of the student from phase to phase, the project allows the student to develop an architectural design slowly and with a recognition of the important role that proportion and ergonomics play in design.

The project has been given as part of the Studio I course of the architecture program at the Savannah College of Art and Design. Studio I, … is the first in a sequence of architectural design courses designed to develop students’ abilities to create meaningful architectural design solutions. In this course, students develop the ability to solve simple architectural design problems. The course concentrates on the ways in which basic human factors affect and inform architectural design.¹

A secondary intent of the Studio course is to introduce the student to a wide range of post-modern architectural theories. Specifically, all students in Studio I, regardless of professor, are required to prepare a written document explaining a particular theory.

Students entering the Studio I course have a strong background in two- and three dimensional design, drafting, architectural graphics and fundamentals of architecture. In the Studio I course Students research and analyze human behavior data related to given design problems and develop simple functional programs. Problem-solving skills introduced in earlier courses are reinforced and the students increase their understanding of the basic ordering principles of design and develop an understanding of the interrelationship of form, space and human function.²

This project seeks to build a bridge from the more technically and compositionally oriented courses to an intensive, program driven architectural design. The project takes the form of a series of exercises. Approximately five weeks of working time are given to the project as a whole.

“Notation” is the title given to the first exercise in the overall project. The purpose of the exercise is to familiarize the student with the dimensions of the human body in general, and their own body specifically. The importance of this exercise rests in the importance of the recognition of human scale in architecture. The body is the reference we most often use to measure our world. Consciously or unconsciously we are constantly comparing objects and spaces in our world to our own body. Certain architectural forms have been informally codified with relation to the body. This makes up “…the nostalgia for living forms that haunts geometry.”³ Through our
experience of them, we understand elements such as stairs, handrails, furnishings and doorways as having a particular relation to the human body. All architects have heard the story that had Frank Lloyd Wright been six inches taller, his buildings would have had completely different proportions. Students are asked to investigate the “norms” provided by ergonomics and compare them to their own body and experience. As a notational exercise, students are asked to measure their body, noting important dimensions. The notes are to be made on a sheet of good quality vellum. Students are asked to make a well composed sheet containing the information about their relation to the norms provided by ergonomic sources. The drawing, however, is not be construed as a drawing “of the body”. Rather, the drawing is to be considered as a set of notational diagrams that might be used to prepare a later drawing. Students are asked to consider that the diagrams refer to a living mobile thing, and may do so at a variety of scales. As such, it becomes important to differentiate classes of information by lineweight and color.

The results of this exercise are varied, as students abstract the diagram of the body to a greater or lesser extent. As a general rule, students try too hard to impress with freehand drawing skills, and are, at this point, not focused intently enough on using the drawing to create an ordered system of measurements. Several examples, however, display an approach that begins to deal with movement of parts of the body and various body positions. The requirement of particular methods and materials frees the student from making decisions about aspects of the presentation and allows for more emphasis to be placed on the composition and the development of an ordering system across the sheet. The use of differing scales in some examples also helps to set up a layering of orders across the composition. The students are asked to address and expand upon these issues in the second exercise.

“Proportions” is the title given to the second exercise. “The intent of all theories of proportion is to create a sense of order among the elements in a visual construction.” In this exercise, students are asked to apply to their notational diagrams one or more proportioning systems. These systems have been developed and used to order architecture throughout history. For this exercise, students are asked to seek out the ordering systems latent in the first exercise. Working directly over the notational diagrams, students are to create fields of color using colored pencil to highlight proportional relationships. These proportional relationships are derived from historic models discussed in class. These historic models include: basic numerical proportions such as 1:1, 1:2 and 1:3; root number proportions such as 1/√2 and 1/√5; the golden section [1:1.618]; the Ken; Palladio’s proportioning systems; Fibonacci’s Series; and the Modulor. The Ken is a Japanese system that relates directly to the body. The ordering system is based on the use of Tatami mats to set out the floor of rooms. Each mat has a 1:2 proportion. Rooms are described according to how many mats they contain. Andrea Palladio favored seven proportions for the layout of rooms in plan: round, square, 1:√2, 3:4, 2:5, 3:5 and...
Fibonacci’s series closely approximates the golden section relationship of 1:1.618. This is achieved by relating numbers in a sequence where every third number is the sum of the previous two. As the numbers involved become larger, they approach the 1:1.618 relationship. The Swiss architect Le Corbusier built on this sequence to create the Modulor, a series of proportional relationships directly tied to an idealized human form, the Modulor Man.

As students investigate the ordering systems created in the first exercise, they begin to become aware of some of these proportional relationships in their own bodies. Students bring forth these relationships from the existing drawing using the idea of palimpsest to allow for a simultaneous reading of the notational work with the proportional relationships. In most cases, the foundation for a good composition has already been set in the first exercise; however, some drawings require a large amount of erasure and reworking in order to achieve the desired result. Again, materials and techniques are severely limited by the exercise, in order to allow students to focus on the concept and technique of palimpsest. Together, the work of the first two exercises forms the first phase of the project, and is recorded in the process of the layered drawing.

“Analysis” is the title given to the third exercise in the sequence of the project. This exercise represents a crucial break in the process, as students begin to create spatial relationships of their own. With “Analysis” students begin a phase of work that asks them to combine, in a critical way, aspects of personal geometry and universal proportion to form a space based on the human body. The exercise seeks to place an object into the world that has a direct relationship to their body. Students are asked to work through a number of iterations, on the understanding that “…no one can create beauty, be it in a work of art or on a golfing link, unless he has both disciplined control and the ability to let go to the sudden glimmer.”

On a sheet of vellum paper, students sketch out at least eighteen possible ways of dividing a square using proportioning systems. Each “square” is considered at full scale to the student’s body with arms spread, i.e. height and arm span are equal to height and width of the “square”. For most students this results in an actual square. For some the dimensions are off by an inch or so, but the student is free to regularize these dimensions to an actual square. From the eighteen studies students choose six preferred compositions. These six compositions become the sides of a cube of which the students draw the six “elevations” and two isometrics on the same sheet at a larger scale. Top and bottom, front and back are not seen as important concepts for the cube at this stage, and indeed should be regarded as interchangeable. Finally, students begin to draw connections across the cubic space from points on the sides, creating another layer of proportional relationships. Unlike the previous flat studies, these relationships are three-dimensional geometrical compositions of lines in space. The fourth exercise allows students to further develop these compositions in order to apply aspect of archetypal elements of architecture to the cubic space.

The introduction of the archetypes signals the beginning of the third phase of work on the overall project. This takes place through the fourth exercise, titled “Elements”. The close investigation of archetypes is based on the idea that “…the architect must be acquainted with the expressive characteristics of form before he starts designing.” The archetypes are taken from Archetypes in Architecture by Thomas This-Evensen and involve the phenomenological aspects of floor, wall and roof. According to This-Evensen, each of the three archetypes performs a specific phenomenological task with regard to the body. The floor directs us from place to place, delimits a space from its surroundings, supports our activities with varying degrees of firmness and defines an exterior that is around and beneath the floor. The wall delimits a space from its surroundings,

Fig. 3. Elements
supports the roof, and manifests the struggle between an attacking exterior and a secure interior. Finally, the roof delimits a space from its surroundings, relates to the sky by accepting, resisting or balancing the space of the sky and relates to the space below by articulating it as either open or closed with relation to the surroundings. Further, Thiss-Evensen investigates features unique to each archetype such as the mirrored or open or layered floor, the horizontal and vertical tripartition of the wall, openings within the wall, and the wall’s constructive systems, as well as roof forms and their various articulations. Following a careful reading and intense discussion of the archetypes and their “expressive characteristics”, students are asked to work from the elevational and axonometric compositions into the space within the cube, defining it through the application of the archetypes. Using the elements, students make connections through the space from one side to the other or to points defined by the spatial geometry previously set up. While materiality of the archetypes was not investigated, students focused on aspects such as proportions of openings, form of enclosure, layering of floor levels and thickness of walls to express the work of each of the archetypal elements in creating the overall form.

Again, the exercise to takes place on the previous drawing, with the axonometric being the primary tool to investigate the spatial qualities. The palimpsest continues to be evident, as students layer new drawings over old, working from both sides of the sheet, and in some cases introducing extra layers of vellum or “sticky-back”. Students continue to use color and lineweight to differentiate classes of information and to define the forms and space of the cube. By placing limitations on the technique of representation, students are freed to spend more time considering the actual design, rather than worrying over presentation. Students also become more adept at the axonometric drawing. The second and third phases of the overall project are recorded in the second layered drawing. This drawing describes an object that has a specific relationship to the body of the designer and is articulated through archetypal elements of architecture. This object becomes the foundation of the fourth and final phase of the project.

“Theories” is the title of the culminating exercise of the project and signals the fourth and final phase of the project. The purpose of the exercise is to introduce basic tenets of architectural theory, leading to the creation of a critical object. Specifically the exercise seeks to place the architectural object into the world by providing it with ground, support, framework and access. In this phase the space of the body, consisting now of a combination of archetypal elements, is considered in relation to a particular theoretical concept. The requirements of the Studio sequence include the acquisition of a body of knowledge regarding theory, and the demonstration of that knowledge through a written document. These concepts are wide ranging and each student is introduced to them through Kate Nesbitt’s Theorizing a New Agenda for Architecture. Further exploration is provided through Tschumi and Cheng’s The State of Architecture at the Beginning of the 21st Century. Proceeding from an overview provided by Nesbitt’s introductory chapter, each student studies a particular theory regarding the making of architecture. These divisions roughly parallel Nesbitt’s but are adjusted slightly to allow for a more current reading as Nesbitt’s compilation only covers texts up to 1995. The topics include Phenomenology, the Sublime, Linguistics, the Body, and Politics. Each particular branch of theory has a set of specific texts associated with it. The intense study of a particular theoretical viewpoint leads the student to create a critical object that has particular relation to ideas.
expressed in the text. Students were asked to place their previously created cube into a context through means of: Ground, Support, Framework and Access. Much the same way that theoretical texts provide a basis for the work of architecture, the ground must respond in a critical way to the text the student is assigned. The grounding of the object serves a basis for the positioning of your space. While it is required that each cube be at least one “body height” from the ground, the students must, in a critical way, construe the ground under and around the cube as it would best relate to their particular theoretical stance. Theoretical texts must be supported by the actual work of the architect, and, in a similar way, the cube must have some sort of support that connects the object and its ground. The best theoretical texts very carefully and deftly frame an argument for a particular position. Students are asked to consider, in a critical way, the framework that mediates between the support and the space. Students are asked to construe this framework integrally, internally or externally to the object in question. Thus links are made to Thisis-Evensen’s constructive systems, which include massive or skeletal systems. In much the same way that theoretical texts allow access to another’s thoughts the student must provide access to their object. Students are presented with the requirement that the access must, in practical terms, be handicap accessible, but in aesthetic terms should, again, take a critical position in relation to the text you have been assigned. For this exercise handicap accessibility is judged to be the use of a ramp at least four feet wide at no greater than 1:12 slope. For the purposes of the exercise vertical lifts are not allowed, as these would simplify the form of access to such a point as to be inconsequential. The object is only a starting point for this investigation. For each student, the theory that supports and surrounds this space can [and probably should] lead to an expansion of the architectural program. Depending on the particular theory involved, students react to the needs of ground, support, framework and access differently. Some objects are embedded into cliffs [the Sublime and the Body]; another is placed high above an urban area [the Sublime]. Another is placed at the culmination of a succession of hierarchical levels [Linguistics]. Some projects deal directly with the ground by embedding themselves into a slope, sometimes assisted by cables [the Sublime]; others are nearly crushed under the weight of retaining walls in the slope above them [the Body]. Still others provide a very simple and direct framework [Linguistics]. Some projects create elaborate frameworks that serve as much to support as to conceal the object [the Sublime]. Another provides an over-designed framework for the access path but suspends the cube itself from a single point [Politics]. Some examples show projects that do not allow for access to the space at all, either failing short [Politics] or confusing the observer through multiple paths, none of which actually lead to the space [the Sublime]. Others deal with relative levels of comfort and discomfort as one approaches the object and comes to be within it. Paths span great chasms [the Sublime and the Body] or delve into the earth and then release the observer into a discrete space [Phenomenology]. Students continue to work with the same format and materials as in the previous exercises. Plan, elevation and isometric drawings are required. While not expressly a work of palimpsest in that no previous drawing is required to be worked over, students are free to apply the concept of palimpsest to the design and presentation. In part, this palimpsest is evident through the use of text. In addition to the design of the project, students are asked to prepare a written document that relates their design to the assigned theory. This satisfies a requirement of the Studio I course as a whole to prepare a written document on
architectural theory. For this exercise, students are asked to address the topics of ground, support, framework and access in a minimum of a paragraph for each. Students are asked to explain the particular theory that their project references, as well as the ways in which this theory is made manifest in their design. This exercise draws the project to a close, but students are asked to continue to consider human scale and proportion, archetypes and theories of making as they further their studies.

This project is developed in such a way as to allow the student to attack small-scale problems in a sequence where each new problem builds on a body of knowledge developed in the previous phase. Through this, the student sees how simple geometries become more complex, and how simple ideas lead to complex concepts. The project has proven successful in its first run, but several areas may require further development. It is conceivable that the scale of the space should be enlarged. Some ways in which this might take place are through the use of a variety of gestures of the body or through the use of multiples of the body to form the dimensions. Also, while this project’s focus on the particular presentation technique of axonometric drawing on vellum allowed for a high level of development for the student and ease of comparison for both students and faculty, the third and fourth exercises, which transform compositional exercises into spaces, might better be handled as modeling exercises. Finally, while the setting of the project within the studio sequence required a survey approach to contemporary theory, a more focused exploration of the phenomenological aspects of space would be preferred in the final phase of work.

Notes
1 Savannah College of Art and Design, ARCH 300 Syllabus
2 Ibid
3 Jean Baudrillard, America (London: Verso, 1989)
5 Michael Murphy, Golf in the Kingdom (New York: Arkana, 1992)
6 Thomas This-Evensen, Archetypes in Architecture (Oslo: Norwegian University Press, 1987)
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
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Surrounding Architecture

BRIAN T. REX
Texas Tech University

I. Shifting Surroundings

“Site Planning”, “Site Design”, “Environmental Analysis”, “Environmental Forces”, and “Landscape” are all a particular sort of course typical to many professional architecture degree curricula. Professional curricula typically locate this sort of course concurrent with the third year of studio instruction. This paper doesn’t question the presence of such a course in the professional curriculum. It does develop a pedagogical critique of the traditional course content of “Site” classes by studying the traditional sources of this particular sort of course content found across North America and it projects an alternative model for content and delivery developed during the relocation of a site course “down” into the foundation years of a degree plan.

A review of curricula from the turn of the century Ecole des Beaux Arts or the 1920’s Bauhaus or the 1950’s Architectural Association shows no “Site Planning” or any equivalent pedagogical units needed for matriculation. Certainly, instruction on how to design and manage the spaces surrounding a building were a part of these curricula. Courses that focus on the mediation between a building and its surroundings in architectural education came into being through a whole range of socio-political situations and events. However and wherever they’re taught these issues of “Site” are indelibly linked to architecture throughout history. Such issues have been a part of education in the academy throughout the history of the academy. They weren’t necessarily taught as a bounded body of knowledge and professional talent in the way they have been over the last 30 to 50 years but they’ve been there.

The arrival of “site design” as a body of unique and sequestered knowledge in the Architectural Registration Exam (ARE) seems to be a turning point in the way we teach this sort of topical matter. Since the 1970’s the notion of “Site Planning” has been a stand-alone subject within the exam. Typically in the exam it’s been a set of “pass / fail” stand-alone test components (sections I and II) requiring both written and graphical acumen in understanding the responsibilities an architect has when working in the surroundings of a building. Starting in the mid-1980’s and to this day a common primary text or studio companion for such course content is the exam preparation text by Woods entitled Site Design. There’s a strong and direct hold on this curricular content from accreditation boards and other licensing bodies.

As stated earlier, this content found its traditional place linked or just nestled next to the third year of a five or six year professional degree. At TTU we found reason to relocate the course to concurrence with the first semester of studio instruction. The gradual move of the course “down” to the foundation of the curriculum begged a reconsideration of what is relevant and comprehensible when the student’s first day in studio is their first day in site design. Two things change in regards to the audience for the “site” course when the class is moved from third to first year instruction:

a) The awareness and ability of the student is reduced by two years of disciplinary experience, spatial acuity, and making acumen.

b) The course is relocated in the pre-professional portion of the curriculum. Less than half of the students enrolled in the first semester of the pre-professional curriculum will pursue the professional M.Arch. degree let alone sit for the exam that has such a strong influence on the course and content.

The audience for the “site” course has changed. Certainly, the general validity of the course...
within the curriculum could be a reasonable question to take up but this paper assumes the courses’ place in the greater scheme and limits the inquiry to a re-consideration of the course description and its execution.

Teaching the course content as shaped by the ARE to beginning design students makes as much sense as teaching surgery to incoming biology students. The vast majority of the new audience will not operate ON “site” as much as it will operate WITHIN architectural “surroundings” - not working as active designers but influencing design in passive and political ways. This pedagogy shifts to the more general and physical concept of “surroundings” as the subject of the course while still addressing the “site” technologies of shaping and managing the earth’s surface that an architect should understand.

One criticism that comes from a study of the pedagogy and content of a normal “Site” course in a professional curriculum is the sheer instrumentality of the intent and philosophical stance of the material as presented. So many versions of the course direct the student to see the “standing reserve”. Heidegger warns us about the pitfalls of this thinking in “The Question Concerning Technology” but still we teach the course as a sort of “way to make the land pay”. Alternatively, in some cases the material is taught as environmentalism, which on it’s own can’t seem to come to terms with the materialist invasions of placing a building in its surroundings. Environmental science is a key component of teaching a student how to relate to their physical surroundings but it is not an architectural idea. Another paper would be required to fully outline the relationship between environmentalism and the the typical site-planning course as seen as a part of the greater shift towards a Bachelor of Environmental Design that came out of the 1960’s and 70’s. This criticism, when addressed in the process of shaping the change in pedagogy and content at TTU, can be used as a vehicle to answer: “What do we teach when the people who are taking the site course no longer have a developed spatial acuity or graphic handiness and are no longer likely to site for the ARE?”

II. Specifying Surroundings

Thinking about “site” suggests one has a privileged overview (professional detachment) from beyond the subject. “Site” as recognized in the ARE is typically bound by invisible flat conditions of abstract delineations such as property lines, contours, easements, and FARs. “Surroundings” suggests a more specific and situational sensibility to study when compared to the fairly generic and unvisual manifestations of professional “site” study. “Surroundings” suggest a direct understanding based from within the subject rather than from over it, as “site” does. To wit: A universal meaning of “site” comes much more readily than does one that defines a general sense of “surroundings”. “Surroundings” are more direct, physical, formal, and experiential than “site”.

To teach to this shift we intensify the relationship between the course and the everyday urbanism of the community that surrounds our campus. The city is the focus and laboratory of both the courses’ exercises and lectures. Much of the course lecture material is taught out on locations around the city that beautifully illustrate technologies, techniques, and conditions by presenting either obvious and novel solutions or clearly deficient or incomplete relationships between architecture and its surroundings. Course material on topographies of parking, drainage, real estate economics, and ecology are taught there, surrounded by the city. We’re looking at Lubbock, TX, a town that J. B. Jackson identifies in his writing as the prototype for ubiquitous mid-western agri-urbanism. An urbanist visiting town recently for a charette told the local daily newspaper that the city is, “one of the most suburbanized and automized cities” he’d ever seen. It’s a simple place and is simple to see and to explain underlying systems of infrastructure in the city and surrounding architecture. To illustrate a particular opportunity for field teaching; Lubbock leaves all of its storm run-off water on the surface of the city with it.
running curbside until it drains into artificial “Playa Lakes”- evaporative lagoons rife with non-point source pollution issues and ringed with relatively denuded “park grounds” that few in the city ever visit. Explaining drainage to students who live in a city with “no need” for a planned subterranean storm water management system is a blessing in disguise because it both illustrates the role of civic drainage projects in most cities and limits the breadth and complexity of systems to identify and understand. As things unfold in this pedagogy the use of Lubbock as an academic laboratory just makes for a particularly common and simple set of determining factors in locating architecture in the environment. Lubbock has certain advantages, as would any locale if properly framed in the course content. As we will see next, the not too distinctive but interesting decision to use the local urban landscape as a study lab sets up a series of opportunities for further specialization and elaboration in the course’s pedagogy.

III. Surrounding Community

Looking at Lubbock, going out into the local and familiar community, and using the city as a laboratory enables us to channel the course experience through exercises in problem-based learning (PBL) - something we in architectural education have been doing successfully for years as studio and of which the university has only recently found a deep appreciation. In a problem based learning environment the problem drives the learning. To start the learning process students are given a problem. The problem is posed so that new knowledge will be required to satisfy the problem. The simplest exercises, design to teach both recognition of surroundings and graphical conventions for drawing a building in it’s surroundings, are accomplished via the direct observation, analysis, and graphical recording of situations from around Lubbock. These studies vary in size across three scales: Community in the City, Grounds in the Community, and Building in the Grounds. The semester’s studies are broken up chronologically across these three scales from grandest to most intimate.

Contemplating the preferences of what gets looked at in the city and what is made of all this local looking and study brings us to another shift in the course. Certainly, the primary concern of going into the city is the education of the students but it has come to be recognized that the observational and recording efforts of the students could be tapped and expanded on at times as a resource for community design. What fills the diminished charge for professional content in the new pedagogy of the course? Civics as channeled through community design replaces the lost professional content with operational content broadened to accommodate both the new-found location of the course in the curriculum and the majority student’s eventual career trajectory. The professional study of the technologies of shaping and managing the earth’s surface is augmented (and a little diminished) by the added study of community design as an equally operative technology in deciding where and how architecture exists in its surroundings. Community based work in the course becomes an opportunity to deliver a primer in community design very early in the educational experience. In this understanding of community design we have a useful tool for both the future professional and the pre-professional undergraduate student to explore. The exercises described above are amalgamated problem-based community design projects by teaching the curriculum as an observation and graphical recording of carefully framed found conditions full of problems and solutions in the landscape of Lubbock.

The presence of a client as an added variable in the teaching equation can be a very risky and difficult undertaking. The student’s academic focus can easily be lost as the primacy of learning a particular knowledgebase is displaced by the seductive opportunity to service a particular and endearing client. Lacking previously developed skills a beginning design student can easily confuse capricious design decisions and living vicariously through the client with the implementation of appropriate diagnostic and operative techniques for building a relationship between a building and it’s surroundings. Any inclusion of a client-based variable in the curriculum at this level has to be carefully controlled and manipulated to assure the maximum
academic content. Students at this level can only handle so many variable design factors in a design exercise. The PBL model is first and foremost about learning, not about practicing practice or playing office. Successful work will be both situationally responsive and pedagogically guided.

In two instances to-date the scope of the community-based exercises has expanded and aligned so that the problem actually is “commissioned” by an interested local organization that presents a request for assistance in problem solving.

In one instance a set of exercises were run across the length of the semester to complete a quantity survey of the grounds of the Panhandle South Plains Fairgrounds here in Lubbock. The 67 acre grounds- set between an interstate and a canyon- was figuratively sliced into 200 foot wide swaths and each swath was assigned for a quantitative and graphical survey by a pair of students enrolled in the course.

These exercises in observing, measuring, and representing the assigned swath add up to a fairly comprehensive survey and presentation of the place. First comes a planimetric drawing that explores the swath’s proximity within the overall grounds. Second there are planimetric drawings of the requisite bona fide and flat boundaries found within, surrounding, or in crossing the swath. Third, an illustrated taxonomic catalog that counts and categorizes everything that could be found is produced. Fourth, a set of local in-depth surveys are completed of 6 foot by 6 foot by 6 foot cubes within the swath. And as a set of final exercises, a study of drainage and flow across the swath is paired with the study of vehicular flows and parking issues within the swath. As a closing frame for their work each student is asked to write a brief essay on what they think could be done to improve the fairgrounds. When compiled together the results of these swath studies have enabled the students of the course to provide the board of directors for the fairgrounds a comprehensive quantitative survey and a first impression of how the grounds are seen by a key (and most often missing) 18-22 year old demographic for the annual regional fair.

The second running of an expanded, client-based community design problem has been handled in a significantly different manner. The project is greatly compressed and inserted into the beginning of the semester so as to match both pedagogical and client based needs. The assignment is the reconsideration of the approximately 7 acre grounds of Stewart Elementary School here in Lubbock. The issue of “client” this time around is checked and controlled by cloudy and conflicting interests and diagnoses from various “clients”. The project charge by the school’s principal is to adjust the grounds so that precipitation doesn’t pool on the ground below a deteriorating pre-cast concrete pavilion on the grounds surrounding the school building. The school district’s facilities director says that anything the students propose cannot cost money to construct, cost money to maintain, or increase legal liability in anyway. The school children, it is
observed, have no reference on the school grounds other than the mud puddle that forms up under the pavilion because the grounds have been denuded of any play appurtenances for liability reasons. Students from the student council, in an arranged meeting between the college and elementary school students, complain about nothing to do in time spent on the grounds surrounding the school building. The school PTA offers to raise an indeterminant amount of money and offers to donate time to see a project accomplished. Converting volunteer labor into quantifiable work or materiel is beyond the student’s level of sophistication. All of these demands upon the grounds and their design is taken into consideration as client charge. The requests for development and the limitations set on the scope of work cancel each other out like the weak signals that make up static on the radio. It becomes evident quickly that the accumulated student observations, analysis, and recordings will have to stand as an independent effort to decide what is best via interpretation, translation, and competition of community interests. What is made certain is that whatever is done to complete this PBL exercise will show a very clear relationship between the building and its surroundings.

The possible scope of work at Stewart Elementary is considered at three graphical scales, similar to those already mentioned above: Grounds, Surroundings, and Pavilion. Teams of three students each study the whole of the campus, prepare graphical analyses, and develop conceptual sketches of alterations, additions, subtractions, and refinements. In class reviews precede a final presentation to the combined community of Stewart Elementary of a varied set of project proposals bound together through a comprehensive and common presentation structure. The presentation of the compiled body of student work becomes a catalog of possible ideas for discussion and consideration. The compilation of the Stewart Elementary design work is framed as an instigative or polemical document for the community to consider rather than as an opportunity to select a scheme for action and direction. The schemes proposed are understood as a provocation to a problem as much as they are seen as a solution to one. Their primary goal is to teach the student about how to observe, analyze, and record their surroundings. That the work can, on occasion, become a valuable community design is a welcome and valuable effect of the shift of the content from professional site planning study to pre-professional problem based study focused on the what surrounds architecture in the surrounding community.

IV. Conclusion
With the two site sections of the ARE no longer a relevant summation of course content, the attending student body’s shift to non-professional career-tracks, and the curricular shift of the
course into the beginning design years there is less need or relevance in a course focus on an instrumental notion that architecture is a machine that "makes the land-pay" via a series of maximizing operations. In response to this an underlying goal of the pedagogical shift illustrated in this paper is to move the delivery of course content from the typical instrumental, in-class, and detached focus on "site" to a more critical and elementary exploration of civic-minded tools for identifying and quantifying what surrounds and situates the everyday architecture of sprawling, non-hierarchical and automated Lubbock. The operational goal is not to be able to do sophisticated technical manipulations of the materiel of "site". What is hoped is that the successfully matriculating student will be able to diagnose and read the situations that can and have been constructed between a building and its grounds and will be able to record and identify these observations. What this pedagogy does is presents a broad overview of ecological, cultural, infrastructural, economic, legal, and civic relationships between architecture and what surrounds it, provides an experience of the socio-politico-economic mechanisms and policies that shape the landscape of the community around us, and a delivers a rudimentary and referential understanding of the technical ability to physically and legally manipulate architecture's surroundings.

Notes
2 Jackson, J.B. "The Accessible Landscape" in A Sense of Place, A Sense of Time (New Haven: Yale University Press, 1986.)
A Beginner’s Mind

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Site as Motion Assemblage

CLARE ROBINSON
Iowa State University

“Learning from the existing landscape is a way of being revolutionary for an architect.”

This paper presents the design of a Motion Assemblage as one of five related projects in a second-year architecture studio. This studio addressed relationships between the body, environment, and culture and focused on the design of public transit-related architectural interventions in Ames, IA. At the end of the semester, these interventions, including a pedestrian ‘conduit,’ transportation ‘hub,’ and art installation, are part of a coherent circulation diagram connecting Ames and Des Moines. The Motion Assemblage preceded the design of the specific interventions, followed initial site observation, documentation and analysis, and served as a mechanism for students to visualize and construct a dynamic diagram of the site.

Compared to the preceding second-year studio, this studio placed a greater emphasis on phenomenology, phenomenological method, and spatial practices. Such emphasis demanded that students engage the physical and ephemeral contexts of place and space while also working iteratively, revising each transit-related intervention such that each part actively participates in the larger context. In this way, each student was as an integral part of articulating site phenomenon, describing the everyday landscape in which we live, and translating space-producing patterns of inhabitation.

Site and Assemblage

Before the design and construction of a Motion Assemblage, students observed, documented, researched, and analyzed the existing landscape of downtown Ames and engaged various strategies of experiential research and visual representation. This process combined issues surrounding observation and experience with those of visual communication. While individual strategies of observation and representation could differ, strategies were characteristically analytical and coordinated, designed in such a way that the information was accessible to all members of the studio.

The physical and ephemeral site elements, including edges, spatial boundaries, neighborhoods, and districts, the type and location of building materials, roadways, sidewalks, and plantings, building orientation and infrastructure, signage, and history, served as clues to spatial sequences and patterns of inhabitation. And elements, such as bus stops, parking meters, trash receptacles, newspaper stands, benches, power lines, and fire hydrants, were relevant “things” with ‘characteristics, ‘properties’ and positions that inferred the situation of each object. Space was conceptualized as not merely the setting in which objects exist but the medium through which object positions are possible.
All of the observed and documented site elements (Fig. 1, left) resulted in a map of a place, a totalizing view of downtown Ames. This totality, the sum of all parts, impedes analysis and phenomenological comprehension. An element in isolation however, (Fig. 1, center) illustrates aspects of place, specifically the location and direction of signage, and aspects of space, the inferred difference in scale and speed of inhabitation above and below the railroad tracks. Similarly, a group of site elements, including a pedestrian lighting and ‘green’ spaces (Fig. 1, right), reveal potential patterns of inhabitation and an apparent disjunction between the location of lighting and potential recreation spaces.

Such findings demonstrate relationships and/or disjunctions between the formal order of place and the inhabitation of space and informed the design and content of the Assemblages. Assemblages were therefore, synthetic interpretations of site, diagrams relating the complexity of various physical and ephemeral aspects of the existing landscape.

Site interpretations grew from careful consideration of patterns of inhabitation, systems of transportation, and motion, including space and speed of movement and the time, duration, frequency, and character of inhabitation. In this way, Assemblages negotiate ‘tours’ of space and ‘maps’ of place, narratives and spatial totalities and, as a consequence, did and do not necessarily resemble the physical characteristics of site but perform in a manner analogous to elements and phenomena observed on and around downtown Ames.

One such Assemblage illuminates the phenomena of interruption (Fig. 2). Specifically, the student observed that the railroad line, which participated in the establishment and development of Ames, is the same railroad line that carries trains that periodically stops automobiles and pedestrians throughout the day and night. Here, the ‘train tracks’ are constructed of wood and enclosed on all four sides while the ‘roads’ are built as open three-pronged tracks and ‘sidewalks’ as two tracks with side guards. Several large silver ball bearings represent the train, dozens of medium-sized ball bearings are the automobiles, while several dozen small ball bearings are pedestrians. The system utilizes gravity to generate motion and a lever to halt vehicular and pedestrian motion before a train passes on the ‘train tracks.”
While the Assemblage is comprised of roads, walkways, and a rail line, it ultimately demonstrates how the train interrupts pedestrian and vehicular traffic. It also operates as a visual palimpsest, revealing spatial productions as visible interdictions between pedestrians, vehicles, and trains and the production of space.

Another Assemblage also situates the train as a significant entity downtown Ames (Fig. 3). Here, the interruption of pedestrian and vehicular traffic caused by passing trains, is conceptualized as a pause. Small, hanging pendulums, fabricated of plastic, medal rod, and magnets, represent the vehicular and pedestrian traffic downtown Ames while a larger, single magnet concealed in plastic represents the train. The ‘train’ is designed to slide back and forth along the bottom of the Assemblage in a track. The sliding ‘train’ causes displacement of the ‘pedestrians’ and ‘automobiles’ above.

The second Motion Assemblage translates the concept of a temporal pause, the initial experiential phenomenon, into displacement. This displacement of pendulums situates pedestrians and automobiles as secondary and yielding to a larger and periodic force. The train, pedestrians, and automobiles, therefore, share a rhythm but not space and are hierarchical in relationship to one another. Like the first Assemblage, the second illuminates potential patterns of inhabitation. The second, however, ultimately reveals a motion that is dependent, rhythmic, and changing, showing stable relationships and instable spatial states.
Another Motion Assemblage dealt directly with mechanization and the impact mechanization has on the land (Fig. 4). Rather than mobilizing pedestrians, vehicles, and trains, the student represented a process and eventual outcome of development specific to the place and culture of Ames, IA. In this instance, mechanization served as a metaphor for the values of engineering and agriculture, values that shape the physical and social landscape.

In appearance, the powered mechanism is analogous to farm equipment, circling around a track in a slow and methodical manner, while the substrate below is analogous to the land, fragile and mutable. Performatively, the slow and persistent motion of the machine contrasts with the operations of mechanical equipment – its impact on the rubber substrate is seemingly unpredictable and, more importantly, the outcome amounts to destruction rather than construction or growth.

![Fig. 4. Motion Assemblage demonstrating destruction (Joseph Bednar, 2004).](image)

In the third Assemblage, the relationship between the mechanism and substrate represents the manipulation of land and environment. The affect of the Assemblage is dependent on time and is cumulative – it allows us to observe motion and also view a physical, rather than ephemeral, representation of produced space.

**Outcome**

The pedagogical outcome of the Motion Assemblages is twofold. First, Assemblages convey that students are able to be observers of phenomenon and are able to translate physical and ephemeral 'properties' and 'characteristics' of the site into a performative motion assembly. Significant aspects of this translation involved careful observation, analysis, and representation of downtown Ames. This process, negotiating the difference between forms used in a spatial system – the buildings, fire hydrants, and signs, for example – and ways of using a spatial system – patterns and orders of inhabitation that may or may not align with place, interrogates potential and changing relationships, situations and/or differentiated positions.

Second, concepts guiding later transit-related interventions emerged from the spatial and physical manifestations of the Assemblages. The first Assemblage, for example, facilitated the conceptualization the 'conduit' as a path that can enable the movement of objects. Within this system, 'conduiting' occurs as a combination of continuous movement and pausing. When objects grouped together, they are collecting or 'hubbing,' which happens during pausing. The concepts of a conduit and hub are therefore interrelated and inseparable such that the spatial production of 'conduiting' and 'hubbing' occurs in relationship to one another, oscillating continuously between 'conduiting' and 'hubbing,' 'conduiting' and 'hubbing,' and 'conduiting' again. A routine.
The second Assemblage demonstrates that pedestrians, automobiles, and trains have an interdependent rhythm and while the entities share a rhythm and space, cannot occupy the same place at the same time. This Assemblage, therefore, facilitates the conceptualization of a ‘conduit’ and ‘hub,’ as locations of orchestrated displacement and accommodation. In contrast, the third Assemblage conceptualizes ‘conduit’ and ‘hub’ as relevant to the process of mending. This approach reflected the student’s observation of the apparent physical and social separation between the town and campus. Later projects sought to sew places and people back together again, conceptualizing the transit-related interventions as aids to existing social and physical disjunctions.

In the end, the Motion Assemblages framed the conceptual potential and performance of ‘hub’ and ‘conduit’ and, based on spatial production where inhabitation actualizes spatial order, caused space to exist and emerge. In addition, the project and processes helped students anticipate the design and function of transit-related architectural interventions, and most importantly, demanded each student be an integral part of articulating phenomenon, learning from the landscape, and translating site into spatial production.

Notes

2. Phenomenology and phenomenological method refer to the work of M. Merleau-Ponty (Phenomenology of Perception. Colin Smith, trans. London: Routledge. 1998.) and his predecessors, Edmund Husserl and Martin Heidegger, in which a dialectic between perception and object are central to discerning space and spatial relationships.
3. The terms ‘place’ and ‘space’ are used in reference to Michel de Certeau who carefully distinguishes one from the other in his essay “Spatial Stories” (The Practice of Everyday Life. Berkeley: University of California Press. 1988. Page 115-130.). Here, ‘place’ is defined as “an instantaneous configuration of positions” while ‘space’ exists when one considers “vectors of direction, velocities, and time variables” (de Certeau, p117).
5. The “things” with ‘characteristics’ and ‘properties’ refers to Merleau-Ponty’s description of objects. While certain aspects of objects are stable, it is important to consider that such stability does not define things entirely – perception of size and shape will vary as our relationship to things change (Merleau-Ponty, p299), hence the importance of distinguishing between the position and situation of objects (Merleau-Ponty, p244).
6. Here, the position is distinguished from the potential situation of an object, implying situations are social, vector based, or dialectical (Merleau-Ponty, p243-44).
7. Michel de Certeau describes a ‘tour’ as a circuit, an itinerary, or series of paths with implied or actual spatial vectors. While a ‘tour’ pertains to acting or going, a ‘map’ pertains to seeing and/or comprehending a totality of fixed place relationships (de Certeau, p119).
8. This Assemblage exemplifies Michel de Certeau assertion that space “is composed of intersections of mobile elements,” including pedestrians on foot and in automobiles, buses, and trains (de Certeau, p117).
9. This Assemblage illustrates how spatial production is a dialectic between bodies (Lefebvre, p183).
10. Michel de Certeau makes the distinction between forms and uses in “Walking in the City” (The Practice of Everyday Life. Berkeley: University of California Press. 1988. Page 91-110.) in the context of spatial actualization. The core of this distinction is that the space of place implies relationships between different positions (de Certeau, p98).
11. Michel de Certeau situates the concepts of spatial existence and emergence as the result of a walker appropriating a ‘topographical system’ (de Certeau, p97-8).
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ISBN 0-615-13123-9
Illuminating a Well-Worn Bauhaus Path:  
A Second Course in Design Fundamentals

JOE SELF  
Texas Christian University

Introduction

Lighting at the Bauhaus was mostly confined to light fixture design for mass production, photographic graphics and as a hygienic component of planning and architecture. The focus was not on the space of lighting. The *Light and Space Modulator* from 1930 by Lazlo Moholy-Nagy suggested the value of a lighting environment but the synthesis of light with form, color and material was not integrated pedagogically at the Bauhaus. Principles drawn from the theatrical and painterly work of Oskar Schlemmer, applied to architecture and interiors, may illuminate the path within the Bauhaus tradition for beginning design students.

The tight focus on light fixture production, photography and daylight does not suggest a condemnation of the Bauhaus pedagogy. The advances and influence of the school are unquestionable. The fact that the Bauhaus addressed the issue of lighting in any manner at the time is remarkable since the political and pedagogical discord inside and outside the Bauhaus created a difficult environment for Bauhaus leadership. Design contributions by students and staff have been mostly overlooked. The work of Marianne Brandt, at the Bauhaus from 1925 to 1929, is just now being properly documented.

Significant research in lighting environments has lagged behind the technological advances in lamping technology. The recognition that lighting can vastly alter the perception of space and form is hardly addressed in most design programs even today. A way to investigate the interaction of light with space and form is needed. When this goal is combined with the desire to formulate the perception of color within space the pedagogical plot thickens.

The highly trafficked Bauhaus methods often lead to a kind of pedagogical fatigue. Haven’t we seen enough of the Bauhaus? Since the extension of previous methods is unavoidable this influence must be acknowledged. Other ways of looking at the Bauhaus curriculum can deepen the human dynamic within space. Since the focus of most design schools...
is less on manufacturing processes and more on sense perceptions of space then a certain reevaluation is needed of familiar teaching methods addressing space, form, color and light.

With that hope, an interpretation of the Bauhaus method of instruction has been coupled with a focus on lighting to create a second level design fundamentals course. This course aims to recognize the importance of lighting and color in design. The subject course was developed in concert with Laura Prestwood at TCU but the descriptions and theoretical underpinnings are my own.

Prior to the second-year course, a first-year course includes manual drafting, obliques, perspectives and a final project involving a three-dimensional model. The final first-year project focus is on line, plane, frame and volume within an 11” x 11” cube. A wholly separate first-year course introduces the students to lighting principles. In the lighting course lectures are coupled with hands-on studies including a commercial lighting kit for use with design models. These two first-year courses provide the groundwork from which a second-year course integrating light and color will have meaning for beginning design students.

Exercises

The second-year course extends the principles established in the first-year course. The student’s 11”x11” cube projects are taken from storage and reassigned to the students. This suggests a certain continuity for the students from first-year to second-year. The students are asked to apply color, in drawing form only, to the white cube they created the previous year. The color wheel is revisited and the students are encouraged to employ basic color combinations such as triads, complimentary, etc. There is always the caveat that a student can deviate in an experimental mode from the standard color combinations. This is encouraged because the combinations of colors are, though somewhat predictable, never completely foreseeable.

A plein-air foray with watercolor postcards is followed by low relief studies of the 11”x11” cube from first-year. The purpose of the low-relief exercise is to explore the contrasting effect, subtle or drastic, of juxtaposed textures. The low reliefs are documented in a textured but white state. This set of documents serve as a control group for comparison with the low reliefs after color is added. Color strategies are revisited and certain schemes may be carried over from earlier exercises. The colored low-relief exercise is then extended to include an assemblage of found materials. The task here is to compose materials off-the-shelf and on the market. The student must engage actual materials and fastening methods. This marks the extent of typical interpretations of Bauhaus instruction.

The students are then asked to construct an 8 ½”H x 11”W x 17”D box, all white, with an aperture to allow directed light within. The passage of light within the confines of the box is documented, by drawings or photography, through a separate aperture. If artificial light is used the angles of incidence are noted on the documents. If daylight is used orientation and times of day are recorded. The students are often surprised, only after they have produced drawings or photo-documentation for objective study, at the dramatic play of light within the simple box.

The long white box is then used for a deep-relief assignment. The deep-relief must fit one short end of the box. The deep-relief must include forms that allow light only through the deep-relief itself. The deep-relief can be backlit or lighted from any of its four edges. Front lighting is not allowed. The deep relief is subjected to various lighting orientations and is photo documented. This set of documents is considered as the control group serving as a comparison for the next step when color is applied to the deep-relief.

The introduction of color within the deep-relief is an extension of an earlier exercise – the introduction of color to a low-relief. The important difference isn’t so much the deepening of the relief but the addition of color to light, space and form. Up to and including this stage the exercises have had no scale or function. This is intended to help the students focus on general design principles. Figures 1 and 2 above demonstrate the significant change in the deep-relief
with the addition of color. The next and final exercise addresses scale, function and a change in representational methods.

The students are directed to assign a scale to the deep-relief to create a backdrop within an imagined room. Any scale and function may be chosen with fixtures, figures and furniture added. The final format is a rendered perspective that must include the representation of a human figure.

Photo-documentation is important throughout this process because the transformation of form and color can be better studied through lighting comparisons. The full force of color, often eschewed for purely formal studies, is itself trumped by the radical change in perception through lighting variations. The insertion of the human figure in the final exercise forces the recognition of perception from within the space instead of towards the space.

**Analysis**

Informal student feedback from the course as taught in the Fall of 2003 and 2004 seems to indicate an increased comfort with manipulating the principle elements—space, form, color and light. The timidity in establishing instances of shadow remains indicating a weakness in appreciating the absence of light. The other weak point seems to be a deep uncertainty concerning the human figure in space. The figures seem passive instead of active participants in the drawn space of the final exercise. A reevaluation of the course by this author necessitated a re-examination of the roots of the method and an exploration of other courses of instruction within the Bauhaus. How might lighting contrasts, like form, material and color contrasts, add to the expression of space? How might the human figure be more of an active player within space?

**Reflection**

The main force of instruction in the first and second-year courses described above falls well within Bauhaus traditions. The Basic Course of Johannes Itten’s cubic exercises and the color explorations of Kandinsky and Klee are clear precedents. Perhaps the atypical component for the current interpretation of the Bauhaus tradition is the combination of the formal, material and textural elements within lighting of environments. This focus on lighting and color to animate space and form, though not alien to the Bauhaus spirit, is missing from much of the building and architecture programs at the Bauhaus. The strictly hierarchical organization at the Bauhaus seems to have kept light, shade and color environment explorations from directly affecting the building and architecture programs. A division between disciplines, not often associated with the
Bauhaus, was the Achilles heel of the school. A review of the primary courses taught at the Bauhaus with a focus on lighting revealed that principles drawn from the work of Oskar Schlemmer may help deepen design instruction concerned with space, form, color and light.

At the Bauhaus from 1921 through most of 1929, Schlemmer had various teaching duties. He is generally noted for his contributions to stage design, theatrical productions and wall painting. His costume design, sculpture and other design projects were centered on the dynamic human form, or its representation, in space. These other projects were often influenced by his theatrical theories.

Walter Gropius, founder and the first Director of the Bauhaus, cited Schlemmer’s understanding of the possibilities of architectural space in the theater. The stage design and theater workshops addressed the dynamics of light and color out of necessity given the need to control lighting for dramatic effect. The solar hygiene associated with Bauhaus building design and the attention to light fixtures as object were not an issue in the theater or painting projects of Schlemmer. Space, color and light, surrounding the representation of the human figure were the key elements for Schlemmer. He insisted on the human figure as an instigator of physical drama within architectural space. This is in direct contrast with the role of the human figure in official Bauhaus photography of architecture and interiors – which is to say there rarely are people in the picture. When figures do appear in official Bauhaus photography of architecture or interiors they are sedate and washed, typically, in even light.

The photographs from the stage and theatre program indicate the use of chiascurro – dark and light contrasts. This was often coupled with brightly colored costumes and sets. The fascination with contrast was essential to the theatre program but do not seem to have been important for architectural environments at the Bauhaus. The undifferentiated lighting for architecture was likely a result of the overarching interpretation of the modern to stand against variations of many sorts. It seems that light and shadow were too dependent on the passage of time and the passage of time was something that only pre-modern architecture had to recognize.

Fig. 5 – The Bauhaus Staircase - Oskar Schlemmer, 1932.

Fig. 6 - Photograph of Oskar Schlemmer – Lucia Moholy-Nagy, 1927.
The study of the body in relation to form, space, color and light is also evident in the paintings of Schlemmer. It may be possible to adopt a set of design principles from Schlemmer's paintings. A clear assertion of the human figure in space is coupled with a reticence to reveal the exact boundaries of the occupied space. The lighting too is seen to glow from non-specific sources. The reasons for Schlemmer seeing figures in space in this manner is probably tied to his conception of what it meant to be a human being in the 20th century. Most records indicate a struggle in his mind between a mechanistic and a mystical interpretation. This basic difference, also the basis for the primary schism within the Bauhaus, cannot be overlooked but is beyond the scope of this essay. The application of the painting and theater principles of Oskar Schlemmer, mechanical or metaphysical, remain valuable for design education.

It is interesting to set, side by side, the image of Albrecht Durer’s 1525 etching of a draughtsman separated from his voluptuous reclining model next to Eadweard Muybridge’s time-lapse photographs of a Woman Pirouetting (1887) and the reclining Schlemmer in Figure 6 above. Even if Muybridge tried to get closer to the model than Durer allowed by placing her in front of the grid, then his camera merely substituted another filter. The photograph of Schlemmer suggests him addressing the rational grid and letting the deep shadows of the grid define his form. At the same time, his form distorts the vision of the mechanical grid. We are on the same side of the grid as Schlemmer, partaking in a lateral approach to form, space and light. The naturalness of Schlemmer’s pose may owe as much to Lucia Moholy-Nagy but the incessant positioning of the body in light and space is Schlemmer’s legacy. The lessons from Schlemmer would seem to include the acknowledgement of people as a dynamic figures in space, a willingness to develop deep chiaroscuro lighting, bold color application, an openness to uncertain spatial definitions and a willingness to admit indeterminate light sources.

Closing

The introduction of lighting into the making of form, space and color for a second course of design fundamentals was an attempt to synthesize the design issues set out by the Bauhaus tradition. The theatrical and painterly experiments of Oskar Schlemmer provide a route for the further exploration of environmental lighting apart from light fixture design, the graphic qualities of abstract photography or the hygienic program of ensuring undifferentiated light within architectural space typical in the Bauhaus tradition. One could also refer to the almost classical use of profile by Schlemmer in his paintings to enrich the use of profile in architecture and interior design. His expressive use of line as a three dimensional design element sets a precedent as well.

A study of work by Oskar Schlemmer is just one entry point for enriching the Bauhaus legacy. Other avenues for exploration include any of the other Bauhaus workshops seen as precursors or peripheral to the architecture and building program. The well-worn path of the Bauhaus remains fertile ground for teaching and learning design.

Notes

5. Ibid, p. 83.
6. Later courses in the current curriculum at TCU explore the design and production issues of lamps and light fixtures.
11. Ibid, p. 481.
13. Ibid.
14. Ibid, Figure 27, p. 81. (Three Profiles, 1922)
15. Dearstyn, op. cit., p. 165 (wire sculpture for Dr. Raabe residence in Zwenkau, 1931.)
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The Village XL: A Report

MAHESH SENAGALA
University of Texas at San Antonio

Introduction
With over 900 students, the school of architecture (now College of Architecture) at the University of Texas at San Antonio has been experiencing phenomenal growth. This growth has presented a number of problems, least of which is studio pedagogy. This paper reports some of the pedagogical, organizational and managerial methods developed and implemented to address the problems raised by the mega studios with multiple sections, specifically at sophomore level. A systems approach has been adapted successfully to turn the various problems into opportunities in novel ways of studio-building.

The Problem
Across the United States, growing studio size has been a problem, particularly at public universities. Studios of 150 students are becoming common. Multiple sections with multiple instructors are a given in such a situation. Studios, as we all know, are places where students virtually live the entire semester. The element of habitation, communal relationships, sense of belonging, sense of meaningfulness and privacy are some of the basic issues in defining and solving the problem of large numbers. Moreover, administering such large, coordinated studios is a pedagogical challenge.
A number of symptoms have been observed. Vandalism, minor thefts, high noise levels, low quality and intensity of work and other expressions of the underlying problems have plagued these studios.

Systems Approach
The author was entrusted with the responsibility of organizing and coordinating eight sections of a sophomore studio in the four year Bachelor of Science in Architecture/Interior Design programs. One hundred and forty-four students were enrolled at the beginning of the semester.
Systems approach takes a holistic approach to problem-solving. Interrelationships, organizational structure, grassroots level infusion of knowledge, spreading decision making responsibility across the system, trusting the systemic power to produce something larger than otherwise imaginable, are all tenets of system theory that are applicable in finding a solution to the complex problem posed by extra large studios.

The Village
An integration of studio-building into the pedagogical and curricular structure of the studio was essential to the organization of the studio. The common misconception about architecture is that it is about designing buildings. To go beyond this misconception, the author and the team of seven other instructors had decided to define three items as being central to the studio:

1. Architecture is about comprehensive institution and community building
2. A hands-on understanding of the qualities, characteristics and tectonics of building materials is essential to an effective design process
3. Studio is an institution in and of itself. Studio space is the primary site for implementing the design learning and process
The first step toward defining the studio as an institution and community-building is to define its social and political structure so as to make the studio a partially self-governing organization. Inspired by Michael Sorkin’s book The City Code, a bill of rights was proposed by the instructors, who are now called the Village Elders:

1.1 The right to a village not in appearance alone but in function
1.2 The right to vote
1.3 The right to a village with a harmonious and visible relationship to its surroundings
1.4 The right of assembly, expressed in clear centers at all scales through the village
1.5 The right to noiseless tranquility and calm
1.6 The right to safety and civility
1.7 The right to privacy and security
1.8 The right to free movement through the village streets
1.9 The right to dwell in a chosen social arrangement, offering adequate scope for self-individuation
1.10 The right to a habitation that provides pleasure and comfort. At a minimum this will include space, light, fresh air, sound construction and access to available electrical outlets
1.11 The right to a mini café collective
1.12 The right to live in a delineable neighborhood and amenities within easy compass of dwelling place
1.13 The right to hygiene and trash-free public space. No one is obliged to the waste of the others
1.14 The right to well-detailed architecture

The Political Process
A village council was formed through a democratic election process. Each section had elected two council members. The council members had to discuss and form an expanded village code about public spaces, waste management, material palette, dispute resolution and other common issues. The studio premises were to be built as a collection of interconnected neighborhoods. The studios were housed in what was a large light-industrial space with exposed structure and services. Three materials were agreed upon as the material palette from which to build the whole village: cardboard, polycarbonate sheets and wood. It was agreed that the neighborhood boundaries were not places of division but places of connection and dialog. Three weeks of time was allocated for the village-building exercise.

The first observation was that the students were quite thrilled by this empowerment, political process and an emerging sense of ownership. However, it has also been noted that the students, who were unfamiliar with such political processes, needed much guidance in organizing and communicating among themselves.
The village was built through a process of dialog within and beyond the individual neighborhoods or “clans.” A budget limit of $250 was set for each clan. Time and resource management was an essential part of this mini design-build program.
The investigation of selective materials had served as a thread to focus the design attention and enable deeper understanding of those materials. Reinforced concrete and tensile fabrics were the two other material types chosen for investigation in the subsequent projects. Urban sites with strong constraints were used to bring further focus and manageability to the studio proceedings. Some of the project statements have been included in the appendices.

**The Results**

Not surprisingly, there were some thefts in the initial stages of the village formation. A village-wide meeting in the village square was conducted by the council members to address the problem. Amazingly, some of the stolen materials were miraculously returned to their rightful places within the next two days. Vandalism was completely eliminated. Noise levels were reduced by means of better organization as well as by architectural means. A pedagogy rooted in the actual making of full-scale building had instilled in the students a sense of engagement and accomplishment. A focus on material, making, constraints, and on institution building had fostered the much needed discipline in the design process, learning process and living together in the studio as a communal institution.

**Further Research**

Studio teaching needs more attention regarding its socio-political structure. Attention should be paid to grooming the leadership, collaborative and competitive potential of the individuals as a part of a larger collective. Further research should be conducted to understand similar initiatives and efforts elsewhere. Quantitative research into the working and results of such experimental studios would be very helpful in shaping the studio in all of its aspects.

**References**

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Problem-Based Learning in Architecture and Medicine: Comparing Pedagogical Models in Beginning Professional Education

KORYDON H SMITH
University of Arkansas

Introduction

"If future-oriented curricula are to prepare students for effective living, they must emphasize critical-thinking skills, continuous learning, and creativity or fluency of ideas."1

Throughout the past thirty-five years, Problem-Based Learning (PBL) has gained international popularity in primary-, secondary-, and higher-education, and has gained esteem in diverse disciplines, including medicine, the social sciences, engineering and chemistry, and the design disciplines. Formalized PBL began in 1969 at McMaster University in the education of health sciences students. Subsequently, in numerous universities throughout the world, traditional health sciences curricula were converted to the PBL model. The rapid growth in problem-based pedagogy in the medical profession resulted from two conjoined issues. First, in a tradition that found its roots in educational scholars such as Dewey and Kilpatrick,2 an increased focus and value had been placed on "active learning"; the lecture-based approach to teaching and learning had fallen out of favor. Educators in secondary- and higher-education were exploring new teaching methods that placed students rather than instructors at the center of classroom activities. Case-studies, group projects, and project-based activities became more prevalent. Second, the medical profession, its knowledge base, and the technologies of medical practice were changing rapidly. Students and practitioners were expected to engage in continued education and sustain a working knowledge of the newest advancements. The pre-1960 model of health education did not readily prepare students or practitioners for continued learning. The pre-1960 model focused primarily on rote memorization not on processes of learning, information gathering, or problem solving. Problem-based learning approaches offered solutions for both addressing the critiques of the previous educational model and preparing professionals for the changing knowledge-base and practice of medicine.

In contrast, architectural education, at least that of the design studio, had remained (has remained) largely unchanged. Three and a half to six years of college-level study followed by three (or more) years of internship: architectural education is currently a two part linkage born from the Beaux Arts tradition and the model of apprenticeship that preceded it. The preparation of medical students is an analogous two-part study. Although the delineation of problem-based learning methods was formed much later than the traditions of the architectural design studio, and although established in a divergent discipline, the basic components of problem-based learning are synonymous with the pedagogical traditions of the design studio. "Problem-based learning (PBL) is an approach to professional education that stresses the use of real-life problems as a stimulus for learning."3 Critical thinking, self-reflection, interdisciplinary and self-directed learning, and ill-structured problems are central to both PBL and design education. In addition, PBL has been formally adopted by architecture schools in Australia, Asia, the UK, and northern Europe. Hundreds of other architecture schools employ this instructional model, but do so in an implicit rather than explicit, and an anecdotal rather empirical manner. There is great danger in this.

Problem-based learning has significant implications for the beginning years of professional education—the years in which students are socialized to a) various teaching/learning
approaches, b) discipline-specific methodologies and terminology, and c) the demands of a professional education. In addition, formations of learning habits and significant cognitive developments occur in the beginning years. Though variations of problem- (or project-) based learning methods are used in hundreds of design schools around the world, there is little research or literature on problem-based learning in architectural education, especially beginning design education in the United States. PBL in beginning design education requires further study.

On the contrary, educational literature on the use of PBL in the health professions is abundant. For this paper, the author is suggesting that this literature may provide an analogue to PBL in professional architectural education, as numerous similarities between the educational and professional mechanisms of architecture and medicine exist. This paper, therefore, examines the implications of problem-based learning in beginning design education through a comparison to PBL in medical education. The paper includes a discussion of three basic issues: 1) a comparison of “pure” problem-based learning to the traditional architectural studio education, 2) a comparison of the professional educations of architecture and medicine regarding PBL, and 3) an articulation of the need for and areas of further research on PBL in beginning design education. The primary goal is to provoke further research on PBL in architectural education.

Comparing PBL and the Traditional Design Studio Education

There have been increasing debates throughout the past ten years over curricular integration and roles of the (so-called) ‘sub’disciplines of architectural education—history, technology, theory, and practice, as well as a general, liberal arts education—in relation to the design studio. “Making the connections, both within the architecture curriculum and between architecture and other disciplines on campus, is...the single most important challenge confronting architecture programs.” The use of PBL in some European and Australian schools results from this drive toward curricular reintegration, a desire to recombine the autonomous design studio with the allied subjects of architectural education. Faculty members at the University of Newcastle in Australia, for example, have published several pieces on this subject. The faculty asserts that the “integration of subjects is somewhat handicapped in a ‘design’-dominated curriculum like architecture.” They propose PBL as a solution, as integrative learning is central to PBL.

The five basic objectives of problem-based learning are to facilitate a student’s development of: 1) extensive, growing, and flexible knowledge, 2) effective problem solving skills, 3) self-directed, life-long learning skills, 4) effective collaboration skills, and 5) an intrinsic motivation to learn. The two overriding goals of PBL are to foster self-directed learning and self-regulated learning. These ambitions are pursued through the use of ill-structured, open-ended problems, which often elicit multiple viable solutions and often require integrative, interdisciplinary learning. Critical thinking, self- and group-criticism, a combination of analysis and synthesis, and a preference of the application of knowledge over rote memorization are central to problem-based methodologies. These characteristics are also fundamental to the studio environment. In both situations—the architectural design studio and the PBL environment—the instructor is a facilitator or “coach” rather than a lecturer, and his/her daily activities tend to be reactive rather than preemptive. In a lecture-based setting the instructor is the “channel” for learning and students maintain a passive role, while, on the contrary, the studio environment employs the design problem as the conduit for learning and requires active student involvement. Advantages and disadvantages of each method—including learning outcomes, instructor preparation time, student motivation, etc—have been well established and discussed. One dilemma that remains unstudied in both PBL and the design studio is the role and application of “the problem.”

The nexus of the students’ activities is the ill-structured problem; it is the mechanism for learning. Students move through various stages of problem-solving—clarifying unknown terms, brainstorming, testing hypotheses, etc—throughout the learning process and partake in various roles—information gatherer, critic, etc. The tenuous issue is that the problem exceeds the
student’s current knowledge foundation. “In a PBL classroom, students confront a problem before they receive all of the relevant information necessary to solve it.” In other words, learning occurs through the struggle of solving the problem(s); the problem is not a means to evaluate or apply prior knowledge. This is a common oversight in the daily interaction of studio instructors and students. Students often become frustrated in their inability to solve the given design problem and their lack of knowledge, experience, and expertise at doing so, and fear how their unfamiliarity with the issues of the problem will affect their grade in the course, while studio faculty often profess that students are under-prepared (by previous studios, by secondary-education, etc) for the content of the current course.

“Pure” problem-based learning is intended to be adopted throughout the curriculum, from year one through graduation, in both studio courses and non-studio courses. The architecture faculties at Newcastle in Australia and Delft in the Netherlands, as two examples, made the transition to a formalized PBL curriculum in the 1990s. The mid-90s was also a time when many U.S. medical schools shifted to a PBL program. Most institutions, including professional schools of medicine and architecture, however, are not structured to make the full transition to “pure” problem-based learning, nor is there consensus among most faculties to do so. This may result from a number of causes: escalating number of adjunct and visiting faculty members, discontinuity in administrative structures and teaching assignments, lack of teaching experience or knowledge, and/or lack of broad (school-wide) curricular discussion or awareness, among other reasons. As well, the traditions of professional education (whether architectural or health sciences education) have maintained a strong foothold, and even pedagogical siblings such as PBL are skeptically viewed. Some architecture curricula are built around the view that first-year courses are broad, shallow introductions to the various topics of the discipline. In this curricular structure upper-level courses move deeper into the subjects revealed in beginning courses and require increased sophistication. An alternate curricular structure views each course, regardless of year-level, as a primary source of a specific content area; each course is specialized. And, of course, other models exist; though it is currently unclear which model is most successful for student learning and which is the best match for the PBL system. Further research needs to be conducted on the value and success of the aforementioned and other curricular structures regarding a) student learning, b) cognitive development, c) student motivation and satisfaction, and d) preparation of students for licensure and practice.

Another aspect of “pure” PBL that has been dismissed in the project-based structure of the design studio is group learning. Problem-based learning is intended to be collaborative. Because the problem precedes the student’s learning/knowledge, shared knowledge is crucial. When part of a formally structured group, students are able to learn from the knowledge and experiences of others, gauge others’ views against their own, share their own unique experiences, and “pool” their knowledge in the problem-solving process. In addition, the PBL environment provides students the experience of working in groups and helps to prepare them for an increasingly collaborative working environment. This is a significant reason why PBL is valued in medical education. The medical profession is becoming increasingly specialized, requiring specialists and general practitioners to work in conjunction to solve patient problems. In parallel, the architectural profession is immensely collaborative both within the architecture firm and in association with the various specialists that provide consultation to the architect. So, why are so few curricula (why are so few studio projects) structured as group or collaborative problems? Why are so many projects built on an antiquated model that views the architect as a self-sufficient authoritarian? Admittedly, the assessment of group work may be more cumbersome, less precise, and less easily controlled; organizing group activities can be time-consuming; sustaining desirable group interactions can be unpredictable; and institutions with highly competitive entrance or touchstone requirements may not be conducive to group structures. However, there is abundant literature on the group learning activities of PBL that may be useful: group structure and
interaction, structure of effective problems, formative and summative assessment strategies, student and faculty perceptions of working in a PBL environment, and curriculum structure. Group activities and assessments can be as easily managed in the PBL and studio environments as the parallel activities seen in typical lecture settings, given that the instructor is properly trained and practiced and utilizes the appropriate educational literature.

Comparing PBL in Medicine and Architecture

“Problem solving is an important aspect of professional practice. Professionals must be able to ‘make new sense of uncertain, unique or conflicted situations’ that they regularly face in their work... Increasingly, professional education programs are recognizing the need for professionals to be able to solve ill-structured problems and are incorporating instructional experiences into their curriculum to help students develop problem-solving skill. One such instructional method is problem-based learning (PBL).”

Formalized PBL began in the late 1960s at McMaster University (Canada) and rapidly flourished as an educational technique in the health sciences. With a widespread increase in the perceived value of ‘active learning’ methods, PBL has gained interest among educators across multiple disciplines. As a result, literature on the use and effectiveness of PBL has promulgated in various higher education publications during the last two decades in virtually all disciplines—health sciences among the most common. Though variations of project- or problem-based learning methods are used in hundreds of design schools around the world, little educational literature has been written on the use of PBL in professional design education, especially beginning design education. Professional medical education, presumably, is a viable analogue to professional architectural education because the pedagogical and professional mechanisms that underlie each discipline possess a reasonable degree of similitude. Each is a two-part education composed of academic instruction and practical (e.g. clinical) training; each requires licensure through national examinations; each requires an internship under the supervision of a licensed practitioner; both professions are governed by local and national bodies; and each discipline—architecture and medicine—requires lifelong learning.

Like medicine, the knowledge-base, technologies, and everyday practices within the architectural profession are continually changing. Medical practitioners and design practitioners achieve licensure later in life (than many other professions), but can often anticipate long careers. Philip Johnson, for example, practiced architecture for 60 years. Over such lengthy careers, professionals must expect and be prepared to cope with changes: technological, political, social, or otherwise. Moreover, in both medicine and architecture each project (“case”) is unique, with its own physical, social, and fiscal contexts; though there are transferable characteristics between cases (i.e. the use of case-studies). Adaptability, on the part of the practitioner, is crucial. The practitioner must be able to incorporate previous knowledge and be skilled in the search for new wisdom when solving each problem. Therefore, the education of the practicing architect or health professional does not merely reside in obtaining factual knowledge. The preparation of each aspiring professional comprises a) obtaining technical knowledge, b) honing critical thinking skills, c) refining research and investigative skills, and d) cultivating skills for solving open-ended problems. As students and licensed professionals must understand the fundamental knowledge of their discipline, they must also know the appropriate (and multiple) resources for obtaining knowledge that they do not already possess, enabling the resolution of unique problems. The two-part goal “is to build disciplinary knowledge bases as well as to develop metacognitive skills...to become lifelong learners.” Again, the interest in problem-based methods has grown due to PBL’s ability to do just that. In addition, “a critical aspect of problem solving in ill-structured situations is that people hold multiple, and sometimes conflicting, perspectives of the nature of the problem, procedures for solving it, and appropriate solutions.”
In both medicine and architecture, professional preparation is two-part: academic instruction (the setting of the academy) and practical training (the setting of the internship). It is expected that specific knowledge and skills are obtained in each setting. In architectural education, however, the instructional roles of the academy and the profession are unclear. According to Oppenheimer, “Confusion and ambiguity surround architectural education, what it is and what it should be.” Oppenheimer goes on to state that there is a clearly outlined track of study for medical and dental students, but architecture students have a less defined path, partly because the academy-internship schism is poorly defined. Furthermore, there is debate surrounding the roles of beginning design education vs. upper-level courses of study. Similar debates have emerged regarding the use of PBL in medical education. Is PBL appropriate in 1st year study? And oppositely, is it beneficial in the “clinical years?”

As stated by Knowlton, some educators believe that “foundational knowledge” must be established prior to problem-based learning. Knowlton refutes this claim and argues that problem-solving is relevant throughout the curriculum and that rote memorization is not a prerequisite to problem solving. “When faculty members point to a need for students to have foundational knowledge, they really are advocating that students memorize information as a precursor to…problem solving. Rarely, though, does memorizing a database of knowledge assist students in solving problems.” Other research suggests that students exposed to problem-based methods early in their medical education expressed higher levels of satisfaction and greater perceived learning than did traditional curriculum students. In addition, McClean reported that students who had previously failed year two of a traditional medical curriculum, largely overcame this setback once enrolled in a PBL curriculum. It still remains unclear, however, how and when PBL is best introduced, while the disjunction between secondary-education methods and PBL methods in entry-level higher-education remains a predicament, especially in architectural education.

**Conclusion: An Outline for Further Research**

The advantages of PBL are numerous. First, the problem-based method gives students the experience of working in groups and prepares them for an increasingly collaborative working environment. PBL allows students to share their own unique knowledge, while, in complement, students become aware of what they do not understand and learn from the know-how of others. Second, PBL requires that students recognize and evaluate disparate (often conflicting) ideas and construct relationships between previous and new knowledge. This parallels constructive views of adult education (andragogy) and the work of educational theorists such as Mezirow’s *transformative learning theory*. Third, problem-based learning builds confidence and knowledge of where to go to “find answers”; i.e. students become familiar with multiple resources for learning and become adept at gauging which resource is most appropriate for their specific problem-driven needs. Forth, PBL helps to bridge the gap between academia and practice. The disjunctions between practice and academe can be vast and troublesome to aspiring professionals. Complex problem-solving develops students that are familiar with and prepared for ‘real-world’ problems, in part because the learning issues in the academic environment are viewed by the students as relevant to their professional training. Finally, most of the literature and research suggests that students in a PBL curriculum declare higher levels of empowerment, responsibility, and perceptions of learning, are more motivated, and are more likely to continue (life-long) learning than traditional curriculum students. Problem-based methods, however, are not free from scrutiny; and there are numerous areas in which further empirical study is required.

Foremost, a clarification of the role of PBL in architectural education is needed. Future research might include: 1) the typological differences between problems, 2) the effectiveness of these various “problem types,” 3) curricular organization (i.e. the role, structure, and function of problems at different levels in the curriculum), 4) formative and summative assessment techniques, 5) PBL-student vs. traditional-student long term success (in the profession), 6)
outcomes of group learning vs. individual learning scenarios, 7) PBL and cognitive development (especially traditional vs. non-traditional students), 8) instructor/student interactions in the PBL environment, 9) perceived and actual learning outcomes, and 10) student transitions from non-PBL settings to problem-based environments.

It may be argued that too much of the architectural design curriculum is implicit, hidden; pedagogic strategies are often kept from the students rather than described to them. From this author’s experiences, not enough time is spent in the studio discussing the facts of architectural education (specifically) and the characteristics of learning (more generally): teaching methods, learning styles, cognitive development, etc. It is often expected that students will either “get this knowledge elsewhere” (e.g. PSYCH 101) or will come to understand architectural learning intuitively through experience. But it is not sufficient for students to operate in the project-based method with merely an implicit understanding of the learning objectives, processes, and assessment techniques employed. PBL (or any other instructional strategy, for that matter) should not be utilized by the instructor without a thorough tutorial session for the students on the differences between PBL and other methods, what students can expect in the PBL setting, and why the PBL method is being used. Research suggests that learning outcomes, positive student attitudes, and student motivation increase in the problem-based environment when courses/curricula begin with a comprehensive tutorial session which contextualizes the PBL environment. It is in the opinion of the author that studio instructors must develop more numerous and more formalized group learning activities. It is important to teach students not only about architectural history, technology, etc, but also about the educational methods that are at work.

Traditional first-year students, for example, enter the architecture studio with few prior educational experiences that are structured like the design studio. The educational and social environment of the design studio differs greatly from that of secondary-education. It is important to research how beginning students, especially traditional students (i.e. entering 1st year college students) react to, cope with, and adapt to an unfamiliar pedagogical model. For instance, what are students’ perceptions of the high level of one-to-one interaction with their instructors? Early studies suggest that student reactions to various types of instructors are not easily predicted. Webster states that “there has been surprisingly little research focussed on the tutor-student relationship...in one-to-one design tutorials.” More broadly stated, very little research has been conducted on the role of problem-based learning in architectural education, especially beginning design education in the United States. Part of the dilemma resides in the fact that there are few discipline-specific venues in the U.S. for the publication of empirical studies in architectural education. In conjunction, most scholarly activity in architectural education is anecdotal. There are, however, extensive similarities between problem-based learning in medicine and the structure of the architectural design studio. These parallels should not be readily dismissed. The project-based environment—whether termed “PBL” or “design studio”—is being sought after for its core values: fostering critical thinking, cultivating collaborative skills, and inciting life-long learning. Despite recent critiques of the long-standing traditions of the architectural design studio, it is difficult to imagine an alternative system of learning. The project-based environment is all too synonymous with the profession and practice of architecture. The design projects faced in architectural studios—whether in firms or in schools—are complex “problems” that require creativity, speculation, and self-criticism. Problem-based learning is the design process; “we cannot design without inherently thinking and working in a problem-solving mode.”

Notes


A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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College of Architecture
The University of Texas at San Antonio
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ABSTRACTION & DIAGRAMMING
Critical Processes in Psychological Theory as Applied to Design Learning

MANU P. SOBTI
College of Architecture, Georgia Institute of Technology

Introduction

ABSTRACT - Etymology: Medieval Latin abstractus, from Latin, past participle of abstrahere to drag away, from abs-, ab- + trahere to pull, draw.

- Adjective /" bstr kt/ 1 of or existing in theory rather than practice; not concrete. 2 (of art etc.) not representational. Verb / b"str kt/ 1 (often + from) remove. 2 summarize. noun /" bstr kt/ 1 summary. 2 abstract idea, work of art, etc. - Adjective 1 academic, hypothetical, indefinite, intangible, intellectual, metaphysical, notional, philosophical, theoretical, and unreal. 2 non-pictorial, non-representational, symbolic. noun 1 outline, précis, résumé, summary, synopsis

ABSTRACTION - / b"strk/ noun 1 abstracting. 2 abstract idea. 3 abstract qualities in art.

DIAGRAM - / dia-+ graphein to mark out by lines, from diagraphein to mark out by lines, from dia- + graphein to write - 1 a graphic design that explains rather than represents; especially: a drawing that shows arrangement and relations (as of parts); 2 a line drawing made for mathematical or scientific purposes.

The first exposure to design for beginning students in the fields of architecture, graphic design and communication and the arts is filled with two frequently-employed terms - abstraction and diagramming. Not only is their usage popular amongst instructors, so too is the pre-dominance of the jargon in casual and more serious conversations of the students. On closer examination, however, it is revealed that in a majority of cases the real meanings of these terms are often shrouded in mystery - they are, in fact, often times ‘explained’ as ‘accumulations’ of understanding gained from previous semesters - rather than clear views of critical methodology in the design process. Consequently (and often mistakenly), the term abstract is seen to contrast to the concrete (as in abstract versus concrete ideas), while the term diagram is equated to the process of drawing (often a drawing comprising of many small parts), extrapolated into diagramming as the act of ‘making’ such diagrams.

In Arnheim’s elaboration, these two terms - abstraction and diagramming - serve to frame creative activity critical to the design field. The word abstraction is interpreted as negative in some sense. It speaks of the process of removal, since the verb abstrahere means actively to draw something away from somewhere and passively to be drawn away from something. This sense of removal and detachment places an inauspicious burden on the name of the mental operation associated with the term abstraction. In psychological theory, the term abstraction has frequently been taken to refer to a process that is based on sensory data but leaves them behind and abandons them totally. Any phenomenon experienced by the mind can therefore acquire abstract-ness if it is seen as a distillate of something more complex. Such a phenomenon can be
a highly rarified pattern of forces or it can be an event or object in which the relevant properties of a kind of event or object are strikingly embodied. A phenomenon is an abstraction when it serves as a picture. It may fulfill this function for one person but not for another; and it may suddenly acquire this property of pointing beyond itself for a person who has not looked on it that way before. In effect, buildings and objects (and ideas about these), may be abstracted to evolve into very diverse entities, with little physical similarity to the original object. The diagram, on the other hand, is the visual rendition of the 'abstract' idea, rather than the description of the object itself, as often interpreted by students. In this sense, it serves as a powerful tool to explain rather than represent the object (or its image) in the designer's mind.

This paper examines abstraction and diagramming in detail, and how the ‘correct’ usage of the two terms may serve to develop the mental faculties of the beginning design student, in preparation for a career in architecture, graphic design and communication and the arts. Consequently, it begins to question the validity of conventional categories employed in design pedagogy, such as ‘Abstract and Concrete Learning’ through extensively employing case studies from foundation studios taught to freshmen and graduate students in architecture.

Abstraction and Diagramming as tools in the Design Process

While in a semantic sense, the meanings of the two terms ‘abstraction’ and ‘diagramming’ are understood by a large number of beginning students in design schools (freshmen), the employment of these as conceptual tools to further the design process is a relatively complicated process. Two case studies, documented through freshmen work done at the College of Architecture, Georgia Tech, Atlanta and at the School of Architecture, Southern Polytechnic State University, Marietta bring out the various approaches addressed.

Case 1: Common Freshmen Curriculum, College of Architecture, Georgia Institute of Technology

Entering freshmen were asked to modify a simple cube of dimensions 4" x 4" x 4" based on a set of rules or premises that they developed. The first several interventions, illustrated through sketches and chipboard models, were ‘ends’ in themselves, with little sense of being part of a larger design process. Interventions (and the physical/formal actions initiated as a result of these
interventions) were seen as ‘spectacular’ events, often the result of accidental actions. Only the drawing and illustration of these ‘events’ as schematics on paper facilitated the transformation of these events to experiment and ‘typical’ phenomena, or the deeper understanding of cause and effect. In a second and subsequently third iteration of the exercise (initiated through a series of quick charrettes), several students were actually able to ‘derive’ a set of rules based on their observations of these causes and effects, creating for themselves the first set of abstractions in this design exercise.

Fig. 2: Freshmen Project at COA, Georgia Tech, Fall 2002 (David Bucciero) - In sharp contrast to the kind of object expected through the progression of diagrams in Fig. 1, this illustration shows a further refinement of the same project, the media shifting to the physical model, rather than the sketch drawing. For this particular project (illustrated in Figs. 1 & 2), the student actually came back to finish the diagram series (see especially, right side of Fig. 2) post-project, demonstrating strongly that certain ‘kinds’ of ideas were re-affirmed and expanded on the physical model itself.

Case 2: Design Foundations, School of Architecture, Southern Polytechnic State University

Employing a series of design charrettes, this exercise asked students to examine ‘found’ conditions through a successive series of transformations, each transformation becoming the starting point for the next investigation. Students investigated what does an object want to be? What does it want to do? The exercise was aimed to make explicit the use of framework structures (or scaffolds), thereby allowing backtracking in the design process, especially important in a complex problem. The very act of rendition of these frameworks (i.e. drawing, modeling or making them explicit through some other means), and the kinds of choices made as a result of these, encouraged designers to employ a visually-descriptive, ‘shorthand’ of sorts - a language they could speak to themselves in and to others. As a case in point, some students began by drawing magnified views of textures in man-made and natural objects. A selected texture ‘swatch’ was then drawn to a larger size, with an emphasis on looking into the cavities, crevices and peaks of the composition. As a third charrette students produced figure-grounds of the enlarged swatches, deciding what and how to see. A fourth charrette, translated the figure-ground into a physical model (called a tile). All through the exercise, the implicit instruction was the removal of all connection (familiarity) with the original object that had served as the basis for
the swatch, and to employ the ‘image of the object’ or its ‘modified artifact’ as the basis for the next intervention. Other students began by studying 3D objects around them, seeing to examine how the ‘manipulation’ of formative rules in each case could yield very different objects. In both cases, students understood the symbiotic relationship between abstraction and diagramming. Abstraction was described in the following ways –
1. A way of “recording” and “remembering” designed object.
2. The “unnecessary” qualities of the object stripped away to leave an “essential” core that describes the object.
3. Objects “remembered” through spatial and formal associations, often particular to each person.
4. Thoughts are organized in the brain using abstractions.
5. Abstractions as represented through diagrams.
6. Abstractions may be recombined to “create” new objects.

Fig. 3: Illustration of ‘discoveries’ made through the process of model-making for the Cube Project – Clockwise from top left; Freshmen Project at COA, Georgia Tech, Fall 2002 & 2004 (David Bucciero & Calvin James).
Fig. 4: Examples of ‘found’ conditions manipulated through a successive series of transformations, each transformation becoming the starting point for the next investigation. School of Architecture, Southern Polytechnic State University, Marietta (Anna Khaol & J.W. Blanchard)

Conclusions
A diagram is made of symbols and is about concepts. It is abstract and propositional: its several elements and spatial relations can be expressed as a set of statements. It explores, explains, demonstrates, or clarifies relationships among parts of a whole or illustrates how something works (a sequence of events, movement, or a process). Its particular “short-hand” or symbols may represent real objects (e.g., a space, spatial elements such as wall, columns or furniture), programmatic concepts (e.g., service area, a buffer zone, accessibility or noise), activities, and phenomenological qualities (light, shadow, surface, texture and mass). A diagram omits detailed scale or realistic pictorial representations; it indicates spatial relationships only approximately using indefinite shapes. It is a rarified, abstracted, simplified scheme to “think with”. Finally, it can be a drawing, a series of quick models, charcoals, collages, even drafts.

Notes


Bibliography


Fig. 4: Three versions of the Tile exercise at the School of Architecture, SPSU (Eric James)
A Beginner’s Mind

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Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Transfer students – The “other” beginners

TRACI SOOTER
Drury University

For a variety of reasons, some economic, others philosophical, the number of non-traditional transfer students entering undergraduate schools of architecture is growing every year. Each school of architecture is faced with the challenge of either placing transfer students somewhere in the curricular track based on an individual evaluation or providing a program for this group of students that addresses their lack of formal training without discounting their informal experiences.

Transfer students can be a diverse group in many ways but more particularly in age, and experience. The demographic of these students can range from traditional sophomores changing their major to parents in their forties changing their lives. Adults entering the program may have backgrounds as diverse as nursing, general contractors or full time parents. This group of non-traditional students has the potential of enriching the studio culture with not only the advantage of age (and hopefully maturity) but with a diversity of experiences.

At Drury University we offer a summer program to transfer students that allows undergraduate students to complete the first year of Architecture courses during the summer and then places them in the second year curriculum in the fall semester. This program acknowledges that the transfer student may have completed certain courses that fulfill course requirements but it does not acknowledge the maturity or life experiences the student may possess.

Throughout American schools of architecture you will find that both individual placements into a curriculum and summer catch-up programs are used. It is most common, however, that if a school of architecture offers a summer program to transfer students it is not advertised. Most school web pages simply state that transfer students should be interviewed and evaluated on an individual basis. Disclosure of these programs is then made during the interview. Such is the case at Drury University. This is an economic strategy. The belief is that if we advertise and promote a transfer program we will be promoting an increased number of students intentionally transferring in to our 5 year BArch in the second year. Our transfer program is not intended to promote a planned or strategic transfer but to make available a reasonable option to the person who has discovered his or her calling a little later than most, a limited, accelerated alternative to a 5-year lock-step program.

The transfer “program” at Drury University is relatively young. It began in the summer of 2002 with seven students. The pedagogical approach to the curriculum was as it is today, nearly identical to the curriculum and projects presented in the fall and spring semesters to the traditional students. As the approach and projects change in the fall and spring semesters so do the projects in the summer transfer “program”. The only difference between the two programs is the speed at which they are delivered. My students fondly call the summer program “Speed Architecture”. They do benefit from the luxury of focusing solely on architecture during the summer because they do not have the typical distractions of the school year: other courses, jobs, parties and school activities.

This group of students tends to be more mature, focused and very eager to excel. They are typically thoughtful and reflective. The work of this group tends to be at the upper end of expectations. They handle the projects and work load often better than their fall counter parts. As they are transitioned into the mainstream of the studio sequence they do perform well and
seem to adjust to their younger peers. But are we challenging this group to work up to their full potential?

In our beginning approach to preparing this group as architects, do we ignore the potential maturity, experience and diversity by sending them through the same first year curriculum we apply to traditional students or should we rethink the curricular pedagogy for this potentially enriching group of future architects?

If we acknowledge the diversity and potential of this group then how do we create a beginning curriculum that is appropriate to varying educational and experiential levels?

Where do we begin? To answer the question of where to begin with the education of transfer students we must first characterize who they are and what are their experiences. Characterization of the non-traditional student is not a simple matter. As stated earlier, the demographic of these students can range from traditional sophomores changing their major to adults with backgrounds as diverse as nursing, general contractors or full time parents.

The statistics of Drury transfer students to date look like this:

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*Student had 2 careers

Of the students who have matriculated each year from this program, 70% of them are within the top 10% of their class. This suggests that not only does their diversity of experiences have the potential to enrich the studio culture but they are also enriching the studio with their abilities.
This group can produce leaders. Each of the 3 transfer groups, while relatively small, has had at least one person who has held an office in AIAS or a campus student organization. The majority of the group however becomes unofficial peer leaders or role models. Maturity, experience and self-confidence are most likely the reason for these leadership roles.

Sixty percent of this group is still in the program. Most of the students who are no longer in the program left for personal reasons, marriage, babies, etc. The summer 2002 group will graduate in May of 2006. I have interviewed each of the students that have gone through the summer program. Each of them are either happy with their educational experience or are afraid to tell me otherwise.

To shed a more honest light on the educational experience of a non-traditional student I look to myself. I was a non-traditional student at Drury University. At the age of 32, after a Bachelors degree in Marketing and a career in General Contracting, I began the 5-year BArch program at Drury University. At that time there was no program or placement for non-traditional students. I started my architectural education in Arch 100 sitting next to the 18 year olds. In retrospect even the exposure to youth was a good learning experience but I probably would have benefited from a curriculum that acknowledged my experience.

I cannot discount my experience in the non-bending educational track, it lead me to where I am today. I began to discover my role within the studio and my future career during late nights filled with constant questions about size and application of materials. From this experience I realized that I had something to offer students and made the decision to teach. However, I wonder if I might not have come to the same conclusion if I had a different educational experience.

Eventually I transferred to Washington University in St. Louis to their 3-year MArch program for students with non-related Bachelors degrees. This program celebrates and promotes the diverse backgrounds of their graduate students. It is a rich program that I believe we can look to as a model to begin to rethink our approach to educating non-traditional undergraduate students. In the new model we should celebrate the diversity of undergraduate non-traditional students in Bachelors programs and promote the possible enrichment they have to offer the traditional studio.

To look at a graduate program as a model for the undergraduate program we are discussing we should remember that there is a distinct difference in the students. The non-traditional undergraduate student does not have a bachelor’s degree and they must fulfill the requirements of the first degree just as a traditional student would. Not only are they typically dealing with adult loads from life, family, house, debt, but there are also very few non-traditional students that can avoid general education requirements and the load they place on the student.

Although this group has additional loads upon them, they also have valuable experience they carry with them. These adults whether they realize it or not have had great exposure and experience with space. Most 18-year-olds arrive at a school of architecture with the spatial experience of a 10x12 bedroom as their entire universe. They have never been responsible for any space outside of their bedrooms. They have not had to plan a living room for conversation or entertainment; they have not had to function in a kitchen; they have not had to work effectively in an office.

The non-traditional student on the other hand typically has at very least had an apartment if not a house as opposed to a dorm room. Again the dorm room is just another reinforcement to the universe is a 10x12 space. Laundry for the dorm room student suggests that the task of doing laundry happens “somewhere else” and you can just forget about them even considering that there is anything mechanical happening in their universe.

These spatial considerations are not the focus of a beginning design course but I believe that having those spatial experiences make the non-traditional student more spatially advanced than the traditional undergraduate student. It is not by chance that during my interviews with the
transfer students they all mentioned the 3-dimensional project from the beginning course. It would be natural to talk about the project in which you were most comfortable or successful. It is also very rare that as I move them into the design of a building that I get gigantic personal spaces and neglected public or functional space.

I have no clear solution as to how to redefine this program. I know that there is value in beginning with basic principles of design but I have not resolved the question of how to craft a curriculum that challenges this group in a more effective way educationally while recognizing that these students will arrive with very different levels of experience.

In the summer of 2005 I will incorporate a seminar which will focus on spatial experiences. I intend to evaluate this group of students in their approach and attitudes about space as they are influenced by their life and educational experiences.

From the perspective of a non-traditional student, I understand the frustration of being slotted into a non-bending educational track that discounts life experience. I believe we should define the potential and create a curriculum that taps, supports and promotes the maturity and experience of this group.

It is my hope that through discussion and inquiry that we can develop a “program” that provides a more suited education to non-traditional undergraduates that not only enhances their educational experience but promotes their diversity and enriches the studio culture.
A Beginner’s Mind

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21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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Projective Mapping: Exercising the Metavisual

JOSHUA G. STEIN
SARA DALEIDEN
Woodbury University

Early in the architectural student’s career, it is crucial to redefine the role of the architect as one of creating dynamic relationships in space rather than static object-making. This understanding can be imparted to new students by developing beginning design projects that foster this sensibility in both philosophy and technique. The process of projective mapping examines phenomena in the outside world, identifies patterns to develop a formal abstraction and subsequently translates the abstraction into scaled space that can then be interpreted for the production of architecture.

The beginning design student is often asked to develop complex conceptual ideas, but lacks a developed formal vocabulary with which to manifest these concepts. The student will often default to arranging iconographic elements of architecture (wall, window, floor, etc.) Inherently, as with all aspects of the natural world, the patterns of human inhabitation tend to incorporate many subtleties and complexities that can easily be overlooked. The technique of mapping asks students to document these complexities without being reductive, allowing for later interpretation of underlying flows and logic.

As most students enter into a design program, they are often loaded with preconceived notions of design that can be limiting to envisioning creative possibilities. At the same time they have a back catalogue of experience and perceptions with the potential to contribute substance and richness to their observations. It could be argued that a significant portion of beginning design education is focused on overcoming this residual way of perceiving space and design while capitalizing on personal experience. This process of projective mapping is presented as a compliment to other traditional design education rather than a replacement.

Through exercises that force the eye to move beyond the ‘first impression’ or quick summary, students can learn to use the techniques of visual representation to reveal a more complex understanding of underlying systems. The following line of research develops the act of visual documentation to the extreme point of discovery — what we will call metavision.

Gesture vs. Blind Contour Drawing

Beginning art education can be looked to for strategies designed to break down an untrained understanding and develop a new critical eye and hand. One of the most essential exercises for any beginning designer is learning to meticulously observe the world as it is, not as it is assumed to be. Figure drawing is one of the foundational modes of beginning art education. It is useful to compare two exercises employed in this pedagogy: gesture drawing and blind contour drawing.

Both of these exercises work in tandem to develop an artist’s eye and hand. Gesture drawings tend to privilege the image or gestalt, while blind contour drawings emphasize a rigor in technique. The rules for each appear similar: the pencil must keep moving as the eye moves between paper and subject (gesture) vs. the pencil line must remain continuous while the eye remains fixed on the subject matter (blind contour). Each, however, develops different modes of seeing and production.
The gesture drawing seems analogous to traditional methods of problem solving instilled in beginning designers. Gesture drawing privileges an immediate, overview understanding summed up in a quick sketch. It often includes an identification of key components composing a perceived whole. This understanding is then developed through articulation and revision, built-up through a successive layering of information. Back and forth review is made to update the drawing so that it ‘resembles’ reality and captures its visual essence.

Figs. 1 & 2. Gesture drawing vs. blind contour drawing (artists unknown).

Blind contour tends to favor a complementary understanding of the world. While there is an intensely meticulous examination of reality, no assessment or summary is made before or during the descriptive process. The method of documentation is more important than the subject matter. The strict rules (never take your pencil off the paper, never look at the paper) supercede any representational depiction of the subject matter. Rather than trying to offer a summary, blind contour picks one aspect and follows that system to its logical extreme. The mapping of the surface of hand preferences continuity of one system (in this case topography) over an identifiable image of a hand. Although one does not set out to draw a hand, the understanding of hand starts to grow out of descriptive tracing of wrinkles. In this way these drawings start to resemble more abstract forms of representation. Parameters are created that restrict or focus ways of seeing in order to expand results. These results are rich with accuracy and integrity and without necessarily being figural, they may foster a deeper understanding of physicality. This could be called an act of metavision - an understanding is gained through the techniques of the visual, but this understanding moves beyond simplistic visual representation.
Marey and Muybridge

The chronophotography methods developed by Etienne-Jules Marey and Eadweard Muybridge provide an analogous study into methods and outcome of mapping and motion studies. Marey (1830-1904) began his research in physiology and biomechanics while his contemporary, Muybridge (1830-1904) was a photographer and artist. The anecdote of Stanford's Wager ties the advances of these two innovators together.

Wealthy horse breeder Leland Stanford held a wager claiming that a horse, while galloping, momentarily lifted all four hooves off the ground. In 1872 after reading about Marey’s motion studies, Stanford employs Muybridge to develop similar techniques document and prove this hypothesis. Together, Stanford and Muybridge develop a technique of chronophotography using multiple cameras and in 1876 prove Stanford’s theory. This innovation in documentation then leads to a new understanding of physicality and motion. As this intensely visual research blossoms into broader implications of the material world, it also demonstrates the qualities of the metavisual.

Marey and Muybridge meet and share information in 1881, but what is most telling is the direction in which their research diverges after that point. Muybridge continues with his multiple camera technique which tends to keep the subject centered in each image. His interest in sequential images seems to lie in describing a narrative and is hence attributed as being one of the fathers of cinema. Marey, however, continues to be motivated by technique of documentation and comparison. He develops a fixed camera technique that records multiple exposures in rapid succession. His research methods, created to compare and analyze motion, focus on relationships between objects, more than on the objects themselves. It is this sensibility and methodology developed by Marey that will inform the process of projective mapping. The goal of the techniques developed by Marey and those of blind contour exercises is to move beyond the representational nature of the gesture or narrative towards the metavisual of the blind contour. This set of techniques offers a methodology that can be particularly effective in beginning design education.

Motion Mapping

The following set of exercises is a four week long process and is used to generate both form and concept within a larger design project. Each studio attempts to research phenomena in the natural world and to allow these findings to directly translate into the development of a formal and spatial vocabulary. Research focuses on mapping the dynamic yet systematic patterns that arise in transformation over time: from human motion to daily light and shadow patterns to social interactions. After selecting and documenting a particular phenomenon, successive steps attempt to harness the complexity of these natural patterns and translate them into the realm of space, form and activity.

Raw Data Gathering

Students are first assigned a natural phenomenon to document after researching the techniques of chronophotography developed by Marey and Muybridge. Of obvious importance is consistency of documentation technique: a tripod is necessary, as are equal intervals of time between photographs, etc. This phase yields the raw data which, as of yet, is not necessarily expressive of any particular phenomenon or natural tendency. As the information has not yet been filtered, it appears as a mere representation of reality and nothing new can be observed.
Compilation

This method of photo-collage is the first phase of editing. At this point, students must become more analytical to create a photo-assemblage that documents a phenomenon rather than objects or scenes. Here they must become intensely meticulous in following only one aspect to document. As the blind contour follows only one aspect of the hand, these photos should document only movement or transformation. Photos are assembled into a two-dimensional system that begins to reveal or emphasize certain tendencies within nature. Attention to technique can reveal radically different interpretations of similar source material. While a simple matrix (such as those employed by Muybridge) may demonstrate a certain rhythm and narrative, more creative methods of assembly (such as those created by Marey) will better express a sense of continuity of underlying forces and tendencies.

Graphic Diagramming

A black and white two-dimensional diagram charts a particular set of qualities as they modulate over time. In essence, this is a graphic explanation of the most striking qualities in the photo-documentation. It is again an exercise of expressive editing. To bring clarity to the chosen qualities, each student must de-emphasize information from the images which is not supportive. Exaggeration, as demonstrated by the systematic techniques of cartographers, also becomes a useful and expressive tool. Students are cautioned against using icons or symbols as these often
replace the richness of the natural world with a reductive representation. Instead, the expressive quality of line and texture are employed to create a map of qualities and their transformation over time. At this point, one is now free to edit out the image of the human in order to focus more directly on human motion. Marey’s techniques again become particularly instructive as his mapping of motion tends to eliminate any subject in order to focus on relational movements.

3D Diagramming

The stage of transforming two-dimensional information into three dimensions is one of the most challenging, yet crucial, for the beginning designer. Whereas the previous steps focused primarily on editing techniques, here the operative task becomes one of translation. Students are asked to use the two-dimensional information as an instruction set for creating a three-dimensional form. At the end, the drawings should not be a representation of how the three-dimensional form looks, but rather a representation of its internal logic or system. This is not an architectural design and therefore should not be limited by constraints such as gravity or even a ground plane.

This phase is most clearly about translating and identifying the potential of each medium. The linguistic example describing the problems of literal translation from one language into another is often helpful to demonstrate that the translation cannot be word for word as structures shift between languages. Similarly, just as the properties of water differ as it moves through the phases of solid, liquid, and gas, the essence of the students’ graphic system should remain intact as it naturally manifests itself in radically different ways across these different phases. This is also a lesson of critical importance to the beginning designer. In a discipline where the design project often resides in a different medium from its presentation and documentation, it is essential to become conscious of the impacts of this change in medium.

Space/Scale

Again, another act of translation is required to move from form to scaled space. At this point the scale of the human body will hold influence over the interpretation of the forms. The exploration now moves from the forms themselves to the spatial possibilities and tension created in the negative space between them. The logic or system of the formal diagram is translated so that proportion and scale begin to create meaningful human experience.
Activity
Form must now integrate the implications of scale, activity, and movement. In this exercise students try to imagine the experiences and activities implied by the spaces they have generated. Students must learn to trust their own formal/spatial system as meaningful and productive even if it is not immediately evident how. This means that program or activity may need to be invented in order to occupy some of the spaces generated in the forms. The complexity of the forms should not be reduced, but rather modulated to create plausible situations for unexpected activities.

The Benefits of Projective Mapping

This focus in teaching asks that research be conducted in a way that starts to imply a design direction. The research is therefore projective. It differs from a more traditional method that performs research believing it is separate from form-making. A complex understanding of form’s ability to influence activity becomes the link between a formal exercise and programmatic research. By concentrating on systems of movement and connectivity rather than the placement of discrete objects, this flexible process remains precise and rigorous while pushing beyond typical compositional investigations of form. Research and analysis are then used not to develop constraints, but rather as opportunities for design. The early phases of a design project become generative rather than limiting. The method of technique actually becomes expressive. In this way the earliest phases of a design project, information gathering and research, become immediately a part of the design project rather than the steps leading up to it.

By observing the patterns and systems that exist in nature, the core of the design project is one of editing and translation. The system remains constant, but it manifests itself in different forms as it moves from one medium to the next. In this way, students are allowed to build a formal language which best expresses the phenomena observed in the outside world. How can this tendency or effect be best described in any particular medium? Graphic form may express these patterns differently from three-dimensional form or from scaled space. Criticism is not based on aesthetics or metaphor, but on the clarity with which the forms express the underlying system. Students are taught to embrace complexity from the outset and to learn to manage, rather than fear, the unpredictable.

This process allows for the flexibility to accommodate accident, change and refinement while remaining precise and rigorous. The role of the designer becomes one of inflection and interweaving of various systems of experience into a cohesive, complex whole. Through every step, information should be modulated but never lost. The models are understood to be elastic in that relationships can stretch and distort but should never be broken. This instills a topological understanding of form at a foundational level.
Students are able to develop a rich formal vocabulary without the pressure of having to develop or follow a particular style. It is understood that there is an integrity in the complexity generated by the natural world and that it can be translated into a richly complex experience by the designer. During the first phases the project teaches how to edit without being reductive. Through the techniques of both editing and translation a method of generation is developed.

Most importantly, students are engaged and empowered as beginning designers. They are asked to transform the everyday into the fantastic and are given the tools to achieve such a task. They are asked to surprise themselves through and intense examination of patterns they gloss over every day. This method of projective mapping clearly privileges a design that starts with ‘what is’ before stating ‘what should be’, and therefore can be called concrete. Simultaneously, its success depends on extracting patterns through the process of abstraction. This reliance upon the complexities of the concrete coupled with the opportunities offered by abstract thinking, empowers students to see these two realms as productively interdependent.

Notes

2Michel Frizot, E. J. Marey, 1830/1904: la photographie du mouvement : exposition / rédaction du catalogue (Paris: Centre national d'art et de culture Georges Pompidou, Musée national d'art moderne, 1977)

3See also Heinrich Hertel, Structure, Form, Movement (New York, Reinhold 1966, c1963). His diagrams of biomechanics and fluid dynamics often clarify the nature of motion by editing out that which moves.
A Beginner’s Mind

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Inside Out

NATALIJA SUBOTINCIC
University of Manitoba

Abstract – “separated from matter, practice, or particular examples, not concrete; ideal, not practical; abstruse; the ideal or theoretical way of regarding things”

Concrete – “denoting a thing as opposed to a quality, state or action, not abstract; existing in material form, real; in the sphere of reality” ¹

Moving from abstract ideas to concrete physical realities is a core difficulty in developing any foundation design studio pedagogy. Indeed, how we negotiate our ideas and thoughts “separated from matter”, through a multitude of possibilities to final physical manifestations “existing in material form”, is central to the development of any design process. Many architectural educators have approached this task in a linear fashion, beginning with concept and ending with materials and detail design. This linearity however, enforces an ideological separation of the abstract and concrete. The sequence of projects discussed below follow an alternate methodology, where ‘fabrication’, for example, is not seen as a concern to be applied to a pre-formed set of concepts, but rather something that ‘participates’ in the inception and fundamental being of a work of architecture.

In his book “The Texas Rangers – Notes from an Architectural Underground” Alexander Caragonne outlines a revamping of the architectural education at the University of Texas at Austin that began in 1951. As part of the search for new design pedagogies, Bernhard Hoesli and Jean Harris were assigned the task of restructuring the design studios.² In 1954 Colin Rowe, John Hedjuk, and Robert Slutsky amongst others joined as teaching faculty. Rowe and Hoesli were of similar mind with respect to the state of architecture and architectural education.

"As they surveyed the scene, that state would seem woefully inadequate: either caught up in a messianic vision of architecture cum technology and enthralled by extra educational moralisms such as originality and self-expression, or bound under the hand of authority and tradition, having degenerated into a form of architectural self-gratification mostly preoccupied with matters of artistic presentation or, more commonly little more than the preparation for a trade. Hoesli and Rowe were convinced that there was an alternative."³

One of the projects that emerged from the studio restructuring was “The Nine Square Grid Project”. John Hejduk conceived this project in 1954 while working with a group of interior design students. He states, “The nine square problem is used as a pedagogical tool in the introduction of architecture to new students. Working within the problem the student begins to discover and understand the elements of architecture. Grid, frame, post, beam, panel, center, periphery, field, edge, line, plane, volume, extension, compression, tension, shear, etc...an understanding of the elements is revealed, an idea of fabrication emerges.”⁴ In Hejduk’s first moments of teaching he describes that he “became painfully aware of what seemed a fundamental deficiency...that I was not really competent enough in understanding architectural detail.” Therefore he set about, “to reinform myself about construction at a conceptual level, at a real level; detail, the methodologic development of construction conditions: column, piers, walls, beams, edges, and so forth.”⁵ In fact, this realization was completely in line with the coordinator
of the studio Bernard Hoesli, who had expressed his desires to develop a studio that introduced a series of elementary exercises that stemmed from the idea of "an integrated "useful" form of abstract design". Therefore, the nine-square-grid project arose out of a desire to join a technical set of explorations with their conceptual counterparts and vice versa.

Since 1954 many beginning design educators have adopted and adapted this pedagogic tool. What I find enticing about the nine-square-grid project is that it provides a "field" for design activity and inquiry where options can be created and changed quickly, allowing for fruitful discussions on the ramifications of each iteration. However, one difficulty I have always had with this tool is its overriding 'interior focus'. In adopting the nine-square-grid project, I have introduced a slow progression where exercises move from abstract highly "rationalized" and homogenous environments of a primarily interior nature, to those that begin to engage concrete free flowing environments of an exterior nature. In so doing, the project's inherent abstract nature begins to dissipate, and questions of 'identity' both metaphysical and physical emerge. These seemingly opposing fields of engagement: interior/exterior and abstract/concrete are brought together during the term, and are thoroughly explored in a 'live interaction' that takes place in a sandbox in the final project.

What follows is a brief description of the five sequential projects that make up the introductory thirteen-week term at the University of Manitoba. I work with a group of 10 to 12 graduate students who come to architecture with previous degrees from non-design backgrounds such as Commerce, Science, Philosophy, etc. My strategy has been to develop an entire term of work where each project builds upon the previous one, allowing students to comprehend connections and increasing levels of complexity, comparing and discussing as we progress.

Project One: Orientation (Two one-week exercises)

"Orientation" explores a basic set of organizing principles within the context of a highly rationalized interior environment as set up by the nine-square-grid. Students begin this project by constructing the 1:50 (17" x17") base condition. Each of the two one-week exercises is completed with a plan and section drawing.

Fig.1 Orientation week 1: Model, J. Zeng; Sketchbook, A. Lewthwaite; Model, R. Loewen

In the first week students are asked to work along the orientation of the grid lines utilizing a limited set of design elements: full and half, opaque and translucent wall panels. Spatial investigations are guided by the exploration of light and shadow within the framework of one of the following selected paired "situations": Centre / Periphery; Rhythmic / Arrhythmic; Compression / Expansion.

At this point I must pause to describe what I mean by the term "situation". I began using this term after discovering it to be the first and most important of Antonio Gaudi's "Five Points of Architecture." Intrigued by the word "situation" and wondering what Gaudi fully meant by it, I began to see how it might link a multitude of thoughts in a way that a "concept" did not. Architectural "concepts" seem to impose and fix a singular thought that more often than not, is applied to a project from the outset. How often have you heard someone ask, "What is your
concept?" or attended a final review where the critics evaluated a project on how well it matched the initial concept. Often implicit to this form of criticism is the assumption that a good concept is one that does not change throughout the design of the project – a steady guiding beacon of sorts.

This common occurrence offered such a sad and reduced state of affairs, that I had to find an alternative way of working. So, I began to explore ‘situations’ rather than ‘concepts’. This shift in vocabulary offered a much broader way of thinking about a point of departure for an architectural project. Situation is derived from ‘situ’ and is implicitly ‘located’ in the world in a relational manner amongst a multitude of human and nonhuman conditions. ‘Situation’ implies taking notice of a whole complex of circumstances, and, unlike ‘concept’ it implicitly places a sensitive subject at the center of the action. Situation is not singular in nature but open-ended, and subject to change depending on the surrounding context at any given moment in time. It has a verb-like restlessness to it. The beauty of ‘situation’, is that it changes and alters with the developing project – partnering with the designer. Students working this way are not guiding their work with a clear concept from the outset but rather developing conceptual clarity as their questions, explorations, responses and discoveries unfold through the process of their work.

Having clarified this term, I shall now return to the discussion of project one - “orientation”. A more complete understanding of “compression and expansion”, for example, can arise from spatially examining these two “situations” simultaneously. When contrary thoughts are juxtaposed they are inevitably placed in relation to each other. This provides us with a more considered base to define each and to explore the zone between them. Questions of boundary, degrees of separation, unity, dialectic, overlap etc. emerge and offer ways of exploring these spatial situations within the design field. Critiques emphasize manipulating architectural space rather than modeling architectural form. Students are often reminded when moving a wall, to notice the space they just moved as well.

The exercise is repeated the second week, however, this time students work diagonally in relation to the grid of columns. A few new elements are added to the initial walls: Beams must be utilized introducing the presence of a ‘canopy’ of sorts – an element defining space from above; also one column is replaced with a tree (approx. 4 – 6m high). Replacing a column with a tree immediately charges the base with a contextual dichotomy; what began in exercise one as a primarily interior field of inquiry, now assumes a simultaneous exteriority. Each student’s ‘individual’ tree set into this abstract rational environment begins to resonate a distinctly unique character. The tree’s particular ‘identity’, whether robust and commanding or weak and fragile, exerts special consideration in the subsequent design activity. Upon completion of these two orientation exercises we temporarily put aside the nine-square-grid base, and turn our attention to an exercise that introduces the context of a free flowing environment.

Fig. 2. Orientation week 2: Model, T. Alston; Model, M. McFetrick; Model, J. Zeng
Project Two: Observation: (Two weeks)

The first week of “Observation” begins with the students making a 6” x 6” x 1” wood frame. They then go out into the world to search for and record a physical ‘event’ that marks an interesting co-existence of the built and natural worlds. These ‘events’ are to be found on the ground plane, a surface we look at quite a bit but do not see very well. The frames are then filled with plaster and these ‘recordings’ are brought back to studio for further examination.

Fig. 3 Observation: Cast, J. Reynolds; Drawing, B. Andrews; Graphite, M. McFetrick

Each student begins with a 3” x3” window that is cut out of bond paper and placed over the plaster cast “recording”. The small window is moved around in order to ‘mine’ the cast for an interesting fragment. Once found, the window is secured and the long slow process of observing and drawing their selection begins. Each student completes two 100% enlargements of their selected fragment: a graphite rendering and a watercolor/pencil crayon rendering. This exercise insists on attentive and careful observations, as the students are asked to draw absolutely everything they see. This stage of work is primarily geared to ‘slowing down’ their perceptions in order to have them ‘take notice’ of the world existing around them in all its intimate details. Within the week they produce two 6” x 6” renderings of the same fragment. This amount of drawing time also allows them to acclimatize to the drawing mediums. This exercise leaves them not only surprised by what they can produce, but establishes a benchmark for future work.

Project Three: Translation: (Two weeks)

This exercise begins with a fragment of one of the drawings produced in the previous exercise. Employing the framing device described earlier, students once again ‘mine’ their drawing to locate an interesting fragment. This fragment is then used to guide a three-dimensional modeled translation utilizing sand mixed with water and white glue. Using this medium, the drawing fragment is converted into undulating surfaces directly on the nine-square-grid model base. The only restriction to the translation is that the sand may not extend beyond

Fig. 4. Translation: Model, R. Loewen; Model, T. Alston; Plan, A. Lewthwaite
the top of the columns. The next task is to develop a two-dimensional drawing translation—a topographic plan. This is entirely accomplished through mechanical means, where students must invent tools and methods for surveying, measuring and drawing the landscape. The broader intention of this exercise is to further merge the “rational” homogenous environment with the “natural” free flowing environment introduced in the first two projects.

**Project Four: Re-Orientation: (one week)**

"Re-Orientation" now confronts the condition of the nine-square-grid’s integration within an undulating landscape, providing students with alternate sectional design opportunities. Students are asked to explore a design proposition that embodies both a ‘Canopy’ and a ‘Ground’. The existing palette of walls, beams etc. from project one are initially utilized with the further addition of elements introduced by each student. In this stage of work constructions may utilize the existing column grid as support elements.

![Fig. 5 Re-Orientation: Model, J. Zeng; Model, A. Lewthwaite; Plan, A. Lewthwaite](image)

Rather than being given a “situation” students are asked to develop one on their own. To facilitate this they are asked to consider the following: What clues does the site offer about where you might locate an “inhabitation” in/on or above it? How can your inhabitation engage this new context and highlight these clues? In what way might you respond to and negotiate between the distinct aspects that now make up your site - the grid and landscape? Situations are intended to motivate and orient design moves. For example, a student may feel particularly drawn to a distinct valley located between two crests in their landscape. They may desire to make a connection between these two crests without actually inhabiting the valley. This then, begins a set of explorations that build towards further situations. As soon as constructions start to appear on the site new situations emerge, shifting and orienting subsequent design moves.

In developing their schemes they are also asked to consider a sequence of approach and departure as well as places of reflection and repose that include questions of light and shadow. The scale remains 1:50, but this time any materials introduced are to model “dimensioned” or “real sized” standard building products. In other words, they are asked to carefully consider the construction assemblies of their responses. Glue guns are banned from the studio as they offer an excuse not to think about the detail of how things are brought together. As part of the overall integrated curriculum, I also teach an introductory Building Construction workshop that runs alongside the studio replacing a previous standup lecture course. Proof of knowledge from the workshop is displayed directly within the studio work.

**Project Five: Situation - Building Site (1 week construct sandbox, 5 weeks build/design)**

This project focuses on a small-scale design intervention that explores interior and exterior relationships through the inhabitation of a landscape. It addresses the design and synthesis of the following mediating elements: light, wind, passage and boundary. The intent is to
examine ways of approaching relations between human experience, site, enclosure, materiality and construction process. The project is undertaken in groups of four, where each group is collectively responsible for assembling a large box approximately 4’ x 4’ x 5”, to be filled with play sand. Each student is given their own quarter of the box as a site, however, each site is connected with three others, requiring individuals to consider and work with others. This allows us to experience and explore how individual desires and collective decisions are negotiated.

![Fig. 6. Building Site: Sandbox/piles; First Phase - S. Field, M. Stoesz, C. Moon, A. Talwar; Second Phase - View from A. Talwar to C. Moon and M. Stoesz](image)

Reference to the grid continues, however, this time it is placed within this “live” amorphous moving ground. At a 1:50 scale the 5 m grid is designated by a set of plexiglas support columns placed below ground like piles. Students are able to cut or extend the piles, based on where they determine grade level to be at any point in their building site. They are responsible for thinking about how the forces within the developing structures will be resolved to these piles. No structures or constructions are allowed to bear down on the shifting ground.

The design criteria are as follows: Create a series of intricately connected spatial experiences where the inhabitant is both protected from and exposed to light and wind. For each sandbox, sunlight is designated from the south, and the wind from the northwest. Protection is considered private and individual, and exposure is considered public and negotiated. There are two distinct phases of design activity: The first two weeks are intended to engage the conditions of being IN and ON the ground. The second two weeks shift to the conditions of being ON and ABOVE the ground. Each phase of work engages the following: On an individual level, response is confined to each site, primarily driven by individual desires and situations; On a collective level students are expected to extend beyond the borders of their individual sites and respond to the larger situations developing within the box as a whole, requiring design negotiations and connections with others. These conditions inform ways of engaging the landscape that would never have been addressed if the project were designed on a drafting board.

To begin, students are encouraged to “play” and construct directly inside the sandbox, whereas, if they work outside the box on their tabletops, they’re working in an abstract space void of forces, stresses, materials and relationships. Constructions that happen outside the box end up being concept driven and feel as if they are “helicopter-ed” into the site. If they are working in the box they are working with all the elements of the project simultaneously. As they dig, shift and move the sand around, their first “situations” emerge and are then explored, edited, and built upon, in order to eventually arrive at a clarified sense of purpose by the end of the project.
Photography is used to record significant events that develop throughout the process of their work. By the end of the project these images allow each student to reflect on, present and discuss their paths of exploration and how certain decisions affected later developments in the design. Drawings are used in two ways: Students are encouraged to keep a sketchbook of “working” drawings where they can simultaneously work out difficult details or constructions in the sandbox. They also produce detailed mechanical drawings of each phase of intervention including everything they have constructed, from foundations to connections, making each constructive idea a part of their consciousness through drawing. They are encouraged to not simply record what is in the sandbox, but to keep designing, allowing the expansion, altering and clarification of designs. This makes the drawings the most up to date declaration of the stage their work has reached.

This project does not attempt to replicate full-scale construction. Instead, the mini-laboratory of the sandbox serves as an analog for the physical dimensions of design. It acknowledges the importance of physical and conceptual ideas emerging simultaneously, in bringing relationships and form into being. Rather than using models in their more traditional role as a medium of representation, modeling is explored as a testing devise, inciting observations, thoughts, and ideas from the realm of otherwise ‘technical’ concerns.

Summary
The sequential projects outlined above engage in a process that allows reflection on developing work. This is something students are rarely able to do within the context of the traditional design studio, where projects are reviewed at the end and lessons learned are not easily taken to the next project. This reflection occurs on two levels: With respect to the term as a whole, doing the same project over and over again with slight changes to criteria each time; and with respect to an individual’s work on any single project, design decisions are tracked and
changes are understood in their “situational” context. In a sense these projects offer a way of finding designs within the complexities of life rather than imposing singular authorial control.

Notes and References:

3 ibid.
6 ibid.
7 A disciple’s transcription of Gaudi’s words… “In architecture, form takes fourth place in order of importance: First is Situation; Second is Size; Third is Material (Color); and Fourth is Form. The sense of touch provides the form, but it does not locate it; the sense of sight locates the form and provides us with its color and its size. After these four comes Stability, followed by all the rest.” from M.A. Crippa, Living Gaudi - The Architects Complete Vision (N.Y.: Rizzoli International Press, 2002).
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Architecture as an Ill-Structured Knowledge Domain

JIM SULLIVAN
Louisiana State University

Introduction

It could be said that architectural educators are as interested in the architecture of thinking as they are in the thinking of architecture. That is to say, they are as much interested in how students think as they are in what student think; the former being habits of thought while the latter the object of thought. Efforts to codify and institutionalize this object are widespread and largely successful, as evidenced in the relatively consistent curricula of architectural schools. The courses that populate those curricula - history, structures, mechanical systems, and design among other - are the discreet units that constitute, in large part, the overall object of architectural knowledge. However, efforts to codify or institutionalize the habits of thought are few. Still, if asked, educators would likely say that they are primarily interested in teaching students “to think.” Yet the characteristics and qualities of that “thinking” as well as the means by which it is taught and acquired have been left largely unarticulated.

This paper attempts to articulate things such as these. It describes the flexible habits of thought conducive to working within ill-structured knowledge domains such as architecture. The paper’s argument is founded on Rand Spiro’s Cognitive Flexibility Theory, which calls for the “ability to spontaneously restructure one’s knowledge…. in adaptive response to radically changing situational demands.” and, to achieve this, focuses on the “way knowledge is represented” and the effect that representation has on the conceptualization and utilization of knowledge. (Spiro, 1990, p.165) More specifically, this paper identifies the weak subject/object relationship as the defining condition of ill-structured domains as they relate to well-structured ones. Lastly, this paper proposes, via the postmodern literary technique of complex narrative structuring, that that relationship opens the possibility for an alternate representation of knowledge that amends the role and status of knowledge as a facet of truth to an uncertain object of interpretation, of the educator as the seat of authority to a potentially unreliable narrator and finally of the learner as a passive receiver to active evaluator.

Subject/Object Relationships in Well and Ill-Structured Knowledge Domains

While all knowledge domains -- mathematics, literature, and architecture for example -- exhibit some well and ill-structured qualities, all domains are considered either dominantly well or ill-structured. The difference between the two is their assumed relationships between the learner-subject and the knowledge-object: specifically, the role of the learner-subject, the representation of knowledge-object, and the character of their interaction.

Well-structured domains, such as mathematics and science, assume a strong subject/object relationship between learner and knowledge; meaning a powerful boundary separating subject from object. This boundary is rarely, if ever, transgressed. The knowledge-object is a clear coherent categorical edifice comprised of information that is thought to belong together naturally. Its representation is authoritative and autonomous, hierarchical and consecutive, fixed and static. In this type of domain the learner-subject sits apart from the knowledge-object. That subject’s role is largely passive; receiving or partaking but reframing from altering or disturbing the knowledge object. Accordingly, well-structured knowledge domains lend themselves to memorization, repetition and a predominantly procedural application of knowledge.
On the other hand, ill-structured domains, such as literature and architecture, assume a weak subject/object relationship between learner and knowledge; meaning the boundary separating subject from object is blurred and unclear. Indeed, it may not even exist. In this type of domain, the knowledge-object is rendered as a provisional form contingent on the use of the learner-subject rather than as a autonomous categorical edifice. That provisional form is made from the “simultaneous interactive involvement of multiple, wide-application conceptual structures, each of which is individually complex.” (Spiro, et al., 1991a, p. 25) These conceptual structures interact in countless ways depending on the variables of a given situation. The role of the learner-subject is to construct and reconstruct the knowledge-object: organize and reorganize its conceptual structures to meet the demands of a particular situation. The representation of the knowledge, then, is hardly authoritative and certainly not autonomous, but rather, conditional and dynamic, useful and flexible.

Architecture is an ill-structured knowledge domain that has well-structured areas, such as structures, mechanical and material systems, codes and regulation to name a few. However, these areas are only well-structured as stand-alone sub-disciples, sort to speak. When brought to bear on a particular design project, these areas become ill-structured as there is no single procedure that dictates their universal use in any and every project. Instead, their application is negotiated and coordinated with other areas of architecture’s domain. Each area of architecture’s domain, from site to structure or concept to detail, is intricately interwoven to meet the demands of a particular project and then rewoven to meet the demands of another.

Cognitive Flexibility Theory
This weak subject/object relationship causes difficulty in knowledge acquisition and application because the contingent nature of the knowledge-object resists broad unqualified statements. There is typically no “always” or “at all times” in ill-structured knowledge domains. Instead, there unusually are caveats that limit the jurisdiction and authority of any statement. Also, the eccentric, situation specific variables and irregularities of any context in which the knowledge will be uses resist the application of procedural techniques. A typical response to this difficulty is to suppress eccentricity and render the knowledge domain as well-structured (Coulson, 1986). Spiro argues that such oversimplification instills an inappropriate cognitive model that is difficult to latter supplant. Instead, an alternate representation of knowledge is needed to foster a more pliable habit of thought that facilitates knowledge transfer between different or unique situations.

Spiro’s Cognitive Flexibility Theory (CFT) addresses two needs that arise in ill-structured domains: more pliable habits of thought and a concomitant representation of knowledge. CFT strives to develop in students the intellectual skills and dispositions to “represent knowledge from different conceptual and case perspectives and then, when the knowledge must later be used, the ability to construct from those different conceptual and case representations a knowledge ensemble tailored to the needs of the understanding or problem-solving situation at hand” (Spiro, et al., 1992, p. 58). According to CFT, these skills and dispositions are as much, if not more, a product of the form as the content of the knowledge. In other words, the formal characteristics of the knowledge-object and its associated relationship to the learner-subject has a significant influence on the character of the cognitive structures created and determines to a great extent how flexibly that knowledge will be applied. CFT, then, is fundamentally form based rather than content based. CFT asks for changes in knowledge representation – in the formal qualities of the knowledge-object - not the knowledge content. By redressing the form of knowledge, CFT acknowledges and takes advantage of the weak subject/object relationship in ill-structured domain. For example, with CFT, Rand proposes the use of hypertext to make evident the content’s interconnectedness of content. (Spiro, 1990, p.172) Hypertext technology resists the hierarchical and consecutive ordering of the well-structured knowledge-object; favoring instead multiple pathways more indicative of the complex knowledge use. The resultant knowledge-
object is distinctly different from that found in well-structured domains: it is one in which the
learner-subject is an active architect of the knowledge-object and the content is pliable material
available for the making.

CFT is especially useful in the context of novice or introductory learning where there is a
tendency to oversimplify and reduce the complexity of ill-structured domains. These contexts are
particularly interesting because there is some justification for simplification. As William Perry’s
seminal scheme shows, typical students enter college with some form of "duelist" view of
knowledge. (Perry, 1990, p.31) Such a view suits the strong subject-object relationship of well-
structured knowledge domains: knowledge resides outside the learner as an authoritative
autonomous object that clearly defines right from wrong and true from false. Learners such as
these are uncomfortable with the inconsistency of ill-structured domains and are easily
overwhelmed and discouraged by its complexity, especially when revealed too quickly.
Therefore, reducing complexity or simplifying the knowledge-object is reasonable, perhaps even
necessary. It is worth noting that non-structured knowledge is not an option here. Knowledge
acquisition and application must be structured in some way; otherwise it is just raw, unorganized
data. The question, then, concerns the qualities and characteristics of that structure or, put more
specifically and in regards to introductory college learning, how does one craft a knowledge-
object that at once instills a cognitive model appropriate to ill-structured domains and initiates a
more advanced view of knowledge while not intimidating and discouraging to the introductory
learner?

Complex Narrative Structuring as Model

This paper proposes to use the postmodern literary technique of complex narrative
structuring of the type found in novels such as John Barth’s *Giles Goat Boy* and Mark Z.
Danielewski *House of Leaves* as a model for such a knowledge-object; specifically, the form of
the introductory textbook as a representation of knowledge appropriate to an ill-structured
knowledge domain. These novels share a narrative architecture that blurs the traditionally strong
boundary between subject and object (reader and narrative). In doing so, they diminish the
authority of authorship, undermine the autonomy of the narrative-object and reposition the reader
relative to the object. They do so by surreptitiously extending the boundary of the narrative into
those parts of a novel that traditionally are not, such as the publisher’s disclaimer and author’s
letter (as in *Giles Goat-Boy*) or the footnotes and the general form of an academic text (as in
*House of Leaves*).

The publisher’s disclaimer and author’s letter in *Giles Goat-Boy* allege that the book is, in
fact, not authored by John Barths but was delivered to him by a man named John Giles or
perhaps Giles John (Barths is supposable unsure), who, in turn, claims that the story was written
by a computer as a work of non-fiction. The publisher’s disclaimer also includes letters from
several editors of the publishing house. Some of these editors advocate for the book while others
against it. All, however, are affected by it. One editor, for instance, revises his life’s work, as
does Barths, based on the Giles tale. The House of Leaves follows suit. It takes the form of an
academic essay describing and commenting on a documentary film. The essay is allegedly
authored by a blind man but was found and brought to the publisher by an unfortunate (as it turns
out) character named Traut. The footnotes and preface of *House of Leaves* includes Traut’s
ramblings as well as editor’s notes claiming to be unable to authenticate many of the sources
cited in the academic essay. Like the editors of Giles Goat-boy, Traut is affected by the
documentary film, as was the blind man. Both haunted by a creature from the documentary.

This occupation of traditionally non-narrative elements frames the narrative-object in such
a way that its relationship to reality is uncertain. As Peter Eisenman said when referring to the
novel, confusion is created “as to who the author is… [or]… what is the object? …there is some
doubt in our minds about this structure that has been created. We question reality.” The reality
in question is not whether fiction is being read – a book about a goat-boy could hardly be taken as true – rather questioned is the location and nature of the boundary separating fiction and non-fiction, subject and object, truth and non-truth. This boundary, as found in the traditional narrative-object, is clear and predictable. This clarity and predictability places the reader is a passive and detached relationship to the traditional narrative-object. This not to say that the reader is not engaged when reading the narrative-object, but that the reader does not have to work to understand the form of the narrative-object. By blurring the boundary between subject and object, *Giles Goat-Boy* and *House of Leaves* requires the reader must reconsider that form and with it the reader’s role and the status of both the object and its authorship.

**Sources:**


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Parallel Processing: Teaching Assistants in the Beginning Design Studio

BETH TAUKE (WITH KORYDON SMITH, SCOTT NUNEMAKER, KERRON MILLER, JESSICA JAMROZ, AND TED LUTZ)
Department of Architecture – School of Architecture and Planning
University at Buffalo, State University of New York

Introduction

Schools of architecture are relying more on graduate student instruction these days, especially in beginning design studios. Statistics suggest that this trend will continue to grow as universities rely less on tenure and tenure-track professors to deliver undergraduate curricula. If this is a given, it is important for faculty and administrators to focus on effective coordination and development of teaching assistants to ensure the highest quality design education for both graduate students themselves and the beginning students for whom they are responsible.

The teaching assistant as a studio instructor is somewhat unique in that few of these graduate students receive formal training in the skills of teaching prior to taking on that role in the studio. It is often assumed that graduate students will be capable of design instruction simply because they have achieved a certain level of expertise in their own work. However, the possession of knowledge and competence in the discipline of architecture does not guarantee the ability to transmit these ideas and skills to others. Beginning studio graduate assistants can become discouraged with teaching because of their inability to communicate information, critical thinking strategies, design skills, and enthusiasm for the discipline itself to their students. One of the tasks of the new teaching assistant, then, is to learn to translate the language of design to beginning students in ways that make it both accessible and meaningful.

This paper describes one curricular model involving teaching assistants, and examines ways to help them find their own teaching approach while simultaneously delivering a quality design education to beginning students. This model (consisting of a faculty coordinator, an instructor, ten teaching assistants, and approximately 160 students divided into groups of 16) places varying degrees of responsibility for teaching/learning on each individual and group within the structure. The curricular core of this model begins with rigid prescription and, through a series of assimilated and connected projects, gradually opens into a flexible set of explorations. All participants in the model begin with more grounded conditions, and move toward conditions that are less defined, requiring them to make multiply linked decisions with imprecise and partial information. With this increase in processing—translation/transformation—time, comes the increase in critical thinking and making, a primary aspect of beginning design. All participants in the various levels of the model work in parallel to one another, and, at times, they formally change roles.

The teaching assistants in the first year studio at the University at Buffalo participated in the writing of this paper by providing written descriptions of the curriculum and its structure, their concerns about assuming the role of instructors, opinions about what worked and what didn’t in their own studio section and the larger studio, ways that they evaluated their effectiveness, recommendations for curricular changes, and reflections on their own approaches to teaching and learning.
The first of these statements is written by Korydon Smith, who taught during the 1999-2000 and 2000-2001 terms, and currently is an Assistant Professor in the Department of Architecture at the University of Arkansas. These remarks set the stage for the comments of the other teaching assistants and frame the primary issues addressed in the first semester studio.

Parallel Perforations

Korydon Smith: “The evolution of the graduate teaching assistant, through the fall semester of first year studio, occurs in conjunction with the evolutionary ‘perforation’ of the sequence of first year projects, an increased flexibility and independence within a clearly delineated domain. This development begins with a markedly prescriptive project that initiates the semester. A list of clearly outlined objectives initiate this project, alleviating some of the stress and confusion that comes with entering a new position, allowing teaching assistants to focus on: 1) establishing a positive rapport with students, 2) discovering his/her role as an instructor, and 3) gaining confidence as a mentor and section leader. Here, the faculty coordinator’s role is to establish an articulate, recognizable pedagogy for the teaching assistants and a rigorous, inspired, and firmly grounded educational setting for the students.

“As well as communication with the coordinator, the assistants’ comprehension of the curriculum occurs in two other distinct ways. First, the graduate assistants are in an academic extension of the curriculum, and many of these TAs went through the undergraduate curriculum themselves. This familiarity with the program permits...[an answer to the question: What is covered (or not covered) in the first semester design studio at SUNY at Buffalo?] Second, TAs who are teaching in this studio for the second time facilitate the pedagogic dialogue between the coordinator and the first-time TAs. As the ‘veteran’ assistants previously had questions and struggles experienced by first-time assistants, a peer-dialogue of these issues can occur.

“The projects in the final two-thirds of the semester contain an increasing flexibility. However, this is not a complete open-endedness, but rather a single calculated perforation within project statements and objectives. First this flexibility came in the form of material processes; each teaching assistant engages a different material process—casting, machining, cutting/folding, assembly, etc. In the final project, the differentiation between each studio section comes in the form of site, artifact selection, and analytical processes. Teaching assistants choose the various sites and subject matter in this project. These selections often correspond to the research interests of the graduate student/teaching assistant, which allows for an analogous learning process between the graduate assistant and the first year student. The built-in flexibility of the projects allows the graduate assistants to explore thematic secondary and tertiary issues of the project, while exposing first year students—during daily inter-section discussions and formal whole-class critiques—to the multiplicities of architectural philosophy, design, method, and construction.

“This evolutionary environment prepares teaching assistants to further pursue careers in education, developing the assistant’s confidence and familiarity as an instructor and exposing him/her to the multiple roles of teaching—i.e. discussing and generating pedagogy, establishing the rhythm for daily/weekly assignments, facilitating group discussion, and experiencing the environments of one-on-one ‘desk’ critiques, small group critiques, and formal multi-group reviews. It is the faculty coordinator’s responsibility to ensure a well-grounded common experience among a large group of first semester design students, while exposing each student and TA (actively and passively) to a multitude of architectural topics and methods.”
Assuming the Role of Instructor

Despite the fact that only the best graduate students are selected to teach in the first year studio, the anxiety level among them about teaching is typically quite high. Most are concerned about their qualifications and the responsibility of introducing the fundamentals of the discipline to new students. Prior to teaching, many graduate assistants question their own knowledge of fundamentals, often admitting that they aren’t confident in their abilities to communicate various basic principles and ideas.

Scott Nunemaker: “When I was first approached about the possibility of teaching as a graduate student, I had feelings of both excitement and anxiety. I had never taught before. I certainly did not feel like I had the authority or the ability that I saw in my own instructors.

“The weekly meetings with all the other teaching assistants and the faculty coordinator on the development of assignments really helped me to understand the importance of getting into the mind of the student. I soon realized that [to a certain extent] I would have to think like they did. I believe that being a beginning design student four years before teaching a studio was an asset to the process. The years I lacked in experience, I made up for in my ability to relate to students as they made the transition from high school to the intensity of the undergraduate architecture program. I, too, made that transition and remembered it like yesterday. As a beginning design student, I struggled to understand how to create meaningful architecture. Encouragement and sensitivity from my studio instructor turned my discouraged attitude into confidence. Consequently, as a teaching assistant, I learned to pay attention to those who seemed somewhat frustrated or discouraged as well; often, I encouraged the quieter and more sensitive students who might otherwise have gone without notice.

“I assumed from the start that most students would have reservations about a fellow student acting as their instructor. I feared a lack of respect would make the process weak, but I was wrong. I think that most students respected me and felt like they were actually accomplishing something.”

Unexpected Difficulties

Teaching assistants encounter many unexpected difficulties during their teaching experience. Some do not realize how new this studio mode of learning is to incoming students. Others are surprised by the types of personal problems their students experience—roommate difficulties, financial difficulties, illness, disabilities, etc.—and the ways that these problems affect students’ performance in studio. Still others are simply caught off guard when parents enter the picture, at times, even attending studio with their child. Often teaching assistants find that beginner’s notions of architecture are quite rigid, and their expectations about what will happen in studio are equally rigid.
Scott Nunemaker: “The biggest obstacle to overcome in my mind was the preconceived notion of architecture that the students brought with them to the studio. Most had a specific idea of what architecture should look like. They were not concerned with how to manipulate space in a way that was not only meaningful, but also unique and personal. Having a first project that somewhat catered to these notions was helpful. This project allowed the students to use their t-squares, triangles, and all the other items on their shopping list that they were expecting from the start. Drawing objects within the confines of geometry was not too far from what they were anticipating. It also allowed them to accomplish something in a fairly straightforward way with a very presentable product in the end.”

Kerron Miller: “The difficulty that arose in my studio was ensuring that each student understood the goals of the project even if they didn’t understand every part of it. I addressed this by breaking down the components of the project and focusing on specific relationships that could be developed as the project evolved.”

Jessica Jamroz: “In most cases, the students were fresh to university experience and came to the studio with a wide range of skills, talents, and backgrounds. Initially it was difficult to instill the appreciation of working long after-formal-studio-time-hours together towards the creation of a studio ‘vibe’.

“Eventually, this difficulty was overcome by checking in on students outside of allocated class time.”

**Evaluating Effectiveness**

It is difficult for teaching assistants to evaluate themselves and their success or failure in the studio. Many expect immediate results (forgetting that much learning takes place “after-the-fact”—sometimes years after), and are frustrated when their students don’t “get it” or are not as motivated/inspired as they assume them to be. Often, during the first weeks of teaching, the assistants are troubled when students do not follow their lead. They are equally upset when the coordinator discourages them from telling the students exactly “what to do” and instead, asks them to put the responsibility of thinking through the project onto the student. To compound matters, there is a natural competitiveness among the various teaching assistants. Consciously or unconsciously, they are rewarded for high quality work in their studio. However, high quality work does not always verify high quality teaching. Sometimes, teaching assistants will opt for approaches that generate “great looking” work in lieu of approaches which concentrate on and challenge the student's ideas, abilities, and critical development, but which do not necessarily produce exhibition pieces. Eventually, most come to value within themselves the art of helping students to refine their own logic, and to take intelligent design risks.

Kerron Miller: “I evaluated my effectiveness in the freshman studio by judging how much the overall group of students in my section developed their design and critical thinking skills from the beginning of the semester to the end.”

Jessica Jamroz: “At first I felt that each failure or success reflected on my abilities as a teacher. I took it very personally. I wanted to give as much knowledge as I could to the students so that they could take it and translate it through their own personalities. At first I became frustrated with myself when they either did exactly what I suggested or when they completely missed the point. Once the channels of communication with my students were strengthened, I determined my effectiveness to be verified by the considerable improvements in the students’ abilities to translate their ideas into their own design work.”
Reflections on Approaches to Teaching Studio

By the end of the first semester, each teaching assistant has had the opportunity to experiment with their own ways of delivering the studio content, and inspiring their group. Some tend to emphasize how history and theory affect design processes and products. Others are very materially oriented, and focus intently on the work as everything. Many emphasize concept and imagination as the basis of risk taking. All are attempting to encourage their students’ particular potentials to research, imagine, represent and critique various design processes and explorations.

Ted Lutz: “I saw my role as being an interpreter, educator, and motivator. When a project was first given to the students they often were overwhelmed. As interpreters, we offered them a specific set of tasks to accomplish. We broke the project down into pieces and explained not only why they were doing this work, but how to get it done. I would spend time discussing their time line and I would often require certain work by the end of studio. As educators, we taught beginning students the skills necessary to complete the tasks they had been given. I often tried to teach one lesson per day. At the beginning of a semester these lessons were rather simple; perhaps a drawing technique or a simple structural principle. As the semester progressed, these lessons built upon one another and involved more complex conceptual issues.

“Finally, we were charged with motivating the students to create great work. This was the most difficult aspect of teaching. Students need to be treated as individuals. While each responds to different types of motivation, all students need to be applauded when they try hard and, therefore, produce a quality project.”

Role of the Faculty Coordinator

While many educators are suspect of the increasing participation of the teaching assistant in design studio, others view it as an opportunity to couple the freshness and new ideas of beginning instructors with the experience and knowledge of more practiced educators. Within this reciprocal framework, faculty coordinators play a key role in the effort to ensure provocative, and meaningful studio experiences for beginning students and valuable teaching experiences for graduate students. These coordinators are required to be highly energetic, organized, informed, and flexible instructors who are aware of the value of their mission; who can frame design curricula to respond to changing conditions; and who can communicate the curriculum and its value to others. Faculty coordinators can facilitate the success of apprentice teachers and their students by defining responsibilities, providing clear (but multiple) strategies within a flexible framework, setting up studio content/process, questioning the intentions and operations of the curriculum, working as a cooperative team, and pursuing responsible engagement of the studio. Likewise, teaching assistants can facilitate the success of the faculty coordinator and the beginning studio as a whole by deliberately assuming the position of simultaneous teacher-student, assisting in the development of curriculum, mediating between students and faculty, questioning the preconceptions of both groups, and pursuing responsible engagement of the studio. And students themselves can contribute to the success of the studio endeavor by actively participating in critical thinking and making, suspending their disbelief, taking risks, questioning the teaching assistants and faculty, and pursuing responsible engagement of the studio. This parallel pursuit of responsible engagement of the studio requires three interconnected entities,
each of which executes a portion of the tasks, each contributing to a shared memory, and each dependent upon the development of reciprocal teaching/learning sensibilities that optimize the education of the designer.
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Teaching Meaning: Design Studio as Cathartic Experience

JON THOMPSON
University of Texas at San Antonio

Introduction
This paper is an account of a project that was intended to help students design buildings that are meaningful. Inspired by Carl Jung, the project used memories, dreams, and reflections as part of a form-finding process.

For the architect, meaning is defined here as the idea or experience one intends to convey or transmit through an action or design. For the user, meaning is experienced as the emotional, psychological, intellectual, and physical reaction to a design, in whole or part. In architecture, the deepest meanings are intrinsic, those that derive from the primary spatial experience. Extrinsic meanings, those that one learns to associate with certain configurations or signs, are most effective when supported by an analogous intrinsic spatial experience.

Of primary importance for architects is the meaning conveyed by spatial experience; i.e. the experience of moving through a space over time, as well as the layered memories of moving through that space multiple times — of living that place. The Humanism of the Renaissance was an extrinsic idea supported by the intrinsic spatial experience of the new centralized church plan. The Baroque of the Counter Reformation responded with the intrinsic experience of the linear path, which was more supportive of the extrinsic meaning of processional rituals important to traditional religious ceremony. At its most profound, meaning expresses or makes clear the relationship between the individual and the cosmos. This includes the passage of time and the bittersweet perspective gained from an acceptance of each individual's death when contrasted with the continuity of life — i.e. the continuity of architecture.

Premise
Architecture is a joint effort arising from our existence as social animals. As social animals we have a consensus, in general, of what is meaningful. A meaningful design that deals directly with the foundation truths — we are social animals, we are going to die, we are visual thinkers, we are manipulative, etc. — becomes profound. Profound designs, such as the trickle of water running through Kahn's empty court at the Salk Institute, are often simple. If we accept this premise, then it follows that those designs that are meaningful for the student are the most likely to be meaningful for others. Conversely, designs that lack meaning for the designer are, by definition, meaningless.

Meaning is usually dealt with in the studio through the concept of concept. Concept is often presented as both the central idea that unifies parts into a whole, and as the generating idea that helps direct problem seeking and form giving. It is the mental construct used to direct our shaping of matter. As such, concept is the first intellectual component to which the beginning student is introduced.

However, another possible source of meaning can be derived from individual introspection into the psyche. Individual introspection can yield publicly accessible ideas because of our shared social nature. Rarely is the psyche idiosyncratic. When dealing in an academic setting with the inner workings of the individual psyche, it is incumbent upon the teacher to provide a theory base that provides a coherent, tested basis for that shared inner inquiry. Carl Jung and his theory of the collective unconscious is one such theory.

A Jungian approach in the search for meaning lends itself to the studio environment because Jung worked primarily with images that commonly occur in dreams, myths, and fairy
tales. Although the specifics of each myth might be unique to each culture, the underlying foundation seems to be universal. The general tendency in the individual is intrinsic; the unique cultural expression is extrinsic. Jung called these deeply shared motifs archetypes. Several of the Jungian archetypes are related to architectural experiences, such as the basement and the attic.

Over several years, I have borrowed some of Jung’s more accessible ideas to teach students specific methods of identifying either archetypes or personal experiences as sources that help generate meaningful designs -- meaningful to the individual and meaningful to the culture.

Project

One such project asked each student to design a House Like Me (with thanks to Malaparte) based on dreams or deeply felt personal experiences, some of which turned out to be traumatic. The intent was that the students, by examining their personal psyches, would discover archetypal designs that were more meaningful to others than would be an intellectual construct that primarily reflected the external world.

Process

To ease students into this unfamiliar approach, each was asked to design a small bas-relief plaque that expressed his or her fundamental self. Several of the results played on the commonly understood meaning of cultural icons, such as the moon, a Porsche, or Superman. Others presented a personal narrative snapshot in which objects, colors, textures, etc., were used to illustrate personality traits. This introductory project served three uses. First, it helped students understand how to explore their psyches and personal histories. Second, it got each student comfortable with discussing the results with others in a public forum. Finally, it was a first effort in translating psychological experience and meaning into material form.

The main design effort then began with a period of exploration and discover, an uncensored flow of hunches communicated from the psyche to the conscious mind through sketches, a dream diary, and stream of consciousness exercises. CAD was of no use in such an endeavor. Conté crayon and other expressive media were encouraged as a way to enhance the fluid flow of ideas, which, in the beginning, were often vague and stilted. Words and sketches sometimes poured out together. Little editing, censorship, or interpretation was used at first so as not to stifle the flow.

Each student then “resolved” pages of sketches and notes into a design. Each student found a site appropriate to his or her experience. Unlike the usual student tendency, early ideas most often began as thumbnail sketches or perspective notations rather than floor plans. Perspectives were encouraged so that the design would evolve as a spatial experience rather than a graphic plan. Three student examples follow:

Student A

For the initial bas-relief, Student A created a diagrammatic narrative (fig. 1). It is a map that expresses the impact felt when, as a child, his parents had moved the family from Mexico to Texas. A grid, logical and controlled, represents Texas. Below a break representing the Rio Grande and the border, Mexico is shown with a topo map of the natural terrain. San Antonio is a cross roads marked by a Mayan glyph. Surrounding the glyph are four bowing figures, each facing one of the four cardinal points. This figure was based on a brass figurine that represented the student in meditation. On the right, overlapping the edge of the plaque, is a hand of cards — the hand of fate.

An early sketch (fig. 2) shows a figure trapped in a box that is actually a safe with a combination on the right side. The figure’s right hand is a mason’s trowel. On top of this cell is a
house form topped by a cross. The meaning of this house above the cell was not clear until the final review.

The final sketch from Student A (fig. 3) shows a section taken below grade at a time when the house design was well underway. A living area looks out into a recessed pool and garden, which are open to the light above. Notes in the sketch refer to healing, spiritual awakening, and memories of loved ones. Such subterranean spaces are often associated with chthonic forces and mother earth. In myth, the cave leads to the underworld and death but death, as part of Jungian reintegration of suppressed parts back into a unified whole, must be understood as a prerequisite to resurrection.

In the final design, the house included a small space at the top, a version of the house form on top of the original sketch of the figure in the cell. The use of this space had never been made clear during the design process. When asked what it meant, the student turned to the professor, puzzled either that the professor had forgotten, or that the student had failed to mention its meaning. As it turned out, this small space was central to the entire project. It represented the student’s twin, who had died as a child. The house was a place where, in a way, they could be reunited.

**Student B**

The initial design from Student B was literal and yet enigmatic. On a black background are shown images of the dome of a gothic cathedral and the photo of a bright red Porsche sports car (fig. 4). Wrapping around from the back is a piece of crumpled paper. It is bright red, the same color as the Porsche. Over this is a photo of a brick wall upon which is printed the word, “Personal.” In later discussions, Student B hinted that he had experienced a trauma in his
childhood that he would not discuss. The Gothic dome represented timeless beauty. The Porsche was mechanical, logical, comprehensible, and perfect. The color red, an energy that welled up from his attempt to resolve the inner crisis, animated and yet threatened to consume the external world.

Student B’s design development sketches often showed arrows and spears shattering the ground (fig. 5). Most of his sketches were powerful renderings in black and red Conté. The final design (fig. 6) was a direct expression of these sketches. It featured a bold claustrophobic path that broke through planar forms, leading to rooms lit through crevices rather than windows. Unfortunately the final presentation of this project was done in CAD, which lost much of the expressive power of the sketches.

**Student C**

The initial bas-relief project for Student C was composed of a cubic frame with a checkerboard floor. Small figures crawled over the frame. The early design development sketches for the house design showed a crude courtyard plan with another house in the middle of the court. The student explained that, from the time he was a child, his role in life had been to protect his drug addicted mother from harm. She would live in the house in the middle, where he could keep her safe. An early perspective showed two wings of a house, which he explained were studios, one for his wife and one for himself (fig. 7). The student explained that the rather menacing face on one wing was his wife. The portrait was used to identify her studio. This was not promising but I could only trust the direction suggested by his psyche.

Two weeks into the project I entered the studio and found the class clustered around the desk of Student C. I asked what was going on. One of the students turned and said, excitedly, that Student C had had a dream. On his board was a new design, completely drafted and rendered. It had nothing to do with his previous sketches. I asked about his dream. This was his account:

The night before, the spirit guide of Student C appeared in a dream. It was Jim Morrison, the deceased lead singer of the Doors (fig. 8). Morrison took Student C up into the sky. They flew over the land and finally stopped above a beautiful cubic house made of glass. Morrison descended with the student and alighted in front of the glass house. They entered. Morrison showed the student all of the rooms and explained all the details. It was spacious, open, full of light. Concrete columns supported the load, while a tiled floor curved up to unify the interior walls and the ground. They reviewed each of the three floors. The stairs finally took them up to the roof deck, which was meant for gazing at the stars. When they had finished, Morrison and the student floated back up into the air, where they paused to look down at the marvelous glass house. Morrison held out his arm and gestured toward the house then turned to the student and said, “This is your home. You live alone.”
The student woke from the dream at about 4:00 a.m. He grabbed his sketchbook and spent the next two hours jotting down everything that Morrison had shown him. In retrospect, the new design that evolved from this vision contained many of the features of the first bas-relief model. The student drove to school at 7:00 a.m. and spent the morning drafting up his design. It became his final solution. It did not include a home for his mother or a studio for his wife.

Conclusion

This attempt to center a design process on the search for meaning is based on the opinion that too little of contemporary architecture is meaningful. A process centered on the deeply meaningful leads inevitably to the depths of the designer and to the psyche. A response to this approach might be that we are architects, not psychiatrists or psychologists, and that we are therefore unprepared to deal with the emotional turbulence such an inner search might stir up. My response is that we are already involved in myth and archetype, and that trauma is already operative in our students — and in us. It is no more inappropriate for us to work with one another in an attempt to bring an inner richness, complexity, and meaning to our outer professional expressions, than it is for psychiatrists to design and build their own homes.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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The touch of hands and the awakening of senses

RAFAEL URBINA
School of Architecture and Urbanism.
Universidad Central de Venezuela.

...if we would recuperate the lost soul, which is after all the main aim of all depth psychologies, we must recover our lost aesthetic reactions, our sense of beauty... 

Hillman James “The thought of the heart”

The pure meaning of initiation isn't merely to initiate something, start, depart from a new point... Initiation, as seen from the beings' interior viewpoint (true initiation), means transformation; a symbolical death... To bring about a process of initiation, it is necessary to leave behind a part of us, “leave it to rest”1, in order to make room for a new and renewed being.

The true rites of initiation may have very little significance to the collective actions of our modern societies. A true transformation belongs more to the psychological inner movements, which are triggered by unexpected “happenings”, profound encounters that mark us: those rare cases where a genuine experience takes place, where an echo is left, a resonance, an energy that urges us to continue...

Each stage in our life is marked by thresholds of initiation - we leave something behind, a part of us dies: when we enter this world, when we're separated from the breast of our mothers, when for the first time we're left in school, ascending through college, arriving at university... some leaving marks more profound than others, some being displaced by events of greater importance that mark us even more profoundly.

In our modern societies, the journey through adolescence into the adult world, coincides with the entrance into higher education, and collectively muffles the emergence of the inner calling; the vocation is represented by the action, connected to the overruling question of social-collective usefulness, the action as social service. Now... What will I become? Will I be useful? Those are the questions that overwhelm the majority of our youngsters with anguish upon leaving secondary education.

Most of the students arriving at our universities come from a one-sided education, mostly oriented towards the scientific and rationalist angle, forbidding those sensorial and perceptive aspects of their personalities. On the other hand, they have no specific preparation to do something useful or work. In this sense, students aspiring to be architects arrive at university with a sensation of emptiness, with an incomplete vision for approaching the world.

The architect Louis Sullivan’s words sound quite assertive:

How strange it seems that education, in practice, so often means suppressions: that instead of leading the mind outward to the light of the day, it crowds things upon it that darken and weary it... 2

As a fact, students aren't aware of all that they carry within: strength of expression, vitality, questions, interests, innate talents... also mixed up with confusion, doubts, bore... all factors hiding their real vocation.

They are unaware that what is to be revealed and developed, has to spring forth from what already exists within, “nothing happened in my imagination”, “professor, you should see my work”, are the usual comments for expressing their anxiety and juvenile desperation, for...
something they feel they don’t possess in that moment, something that was suppressed. Something he feels that is no longer his, contrary as to when he was a child: feeling and response.

As Rilke said to the young poet:

You wonder. Are my verses any good? You ask me, and before, you've asked the same questions to others... Now that you have authorized me to give you advice...I will ask you to abandon all this. You are looking outwards, and this is fundamentally what you shouldn’t be doing now. Nobody should give you advice or help you. Nobody, there is just one way. Go across your inner self. Examine the reason that drives you to write; observe if it extends its roots into the deepest place of your heart. Confess if you would die if someone forbids you to write anymore. This is the most important point...3

You look outwards and this is what you fundamentally shouldn’t be doing, Rilke says, pointing out a possible and a necessary way in re-education: recuperate that which has been suppressed.

Rilke, the mentor, disappears in the moment when the young man requires his presence, and points towards the necessity to search in the fountains of his being; the vocation which aids in overcoming all that which counteract realization.

The mentor takes his absence, but his poems are now in the hands of the young disciple: the bridge is sketched; it’s now up to the young one initiating himself to cross it with his own words, with his own poems, ceding space for a new being.

It’s now up to the student to reconstruct a body that is capable of surprise and wonder at encountering matters in their material qualities. A physical body that touches and sees; that starts to feel and perceive again; that starts to awaken from the long sleep to which it was confined through rationalization.

It’s up to the student to search in the ancestral fountains of his body. To initiate, in one way or another, also translates into returning; returning to the body of sensation and perception, restore to the body that which was “removed”: the aesthetical response, that which makes us unique.

But, how do we bring back those treasures that concern the individual and the particular potentials? Those treasures that make us different from the others... that are hidden beneath our skin. How do we recuperate that vital sensibility connected directly to the heart? 4

Which is the ritual that we have to perform in order to recuperate it?

In his book, “Icon and idea” 5 Herbert Read recalls that:

The Greek Word for ritual ...is dromenon, thing made, and the word is highly illustrative. The Greeks had noticed that in order to do a ritual you have to do something, which means not just to feel it but to express it through an action... Not just to receive an impulse but to react in front of it...6

To feel and to express; to touch and to do, and to touch, according to the dictionary, is:
  - to get something without grasping it
  - to stumble something slightly against something else
  - to approach something to something else, to communicate a certain virtue
  - to try a piece of gold or silver on top of a touch stone, in order to know the proportion of metal that it contains
  - to find the greyhound after the hunt...7
This touching without holding, this slight stumbling, and this practicing until getting the trace, implies a game, an erotic-sensorial dialog between the senses of our body as a matter that feels, and the matter of the world that we touch. Now… when the cult is celebrated on top of the stone, it is not oriented to the stone but to the god, who has it as his residence…

The ritual that is performed on the matter as stone, doesn’t point to the matter as such, it points towards the images that the matter activates in us.

The beginner’s realm as a space to grow, appears as a place where the young student could recuperate his sensitive and sensible body, through the practice of touching the matter and doing things with his hands, as a bridge towards his interior world. This could be seen as a process where sensibility and those ancestral senses of the body get activated - a process where the mind gets enlightened through the steps of designing, conceiving and making things.

Not as separate steps of a linear process, but as an active and multi-directional process where design melts with its Latin roots, which means to draw in the ample sense of the word, as a tool to develop, to undress things. A drawing that activates and nourishes the imagination. A drawing that also build and conceive the world from the imagination...

Through all these years, the main objective has been the awakening of the young student through a process where he approaches the essential elements of art and architecture through the contact with those qualities, which, by their presence, attract and speak to us.

In spite of the diversity and multiplicity of the character of the work, all our approaches are supported by two fundamental columns consisting in the teaching of art crafts and the method called "learning by doing" through the design and construction of objects full size scale 1:1.

In the first stage, the student gets in contact with his own sensorial and expressive potential through the innate qualities of different medias, starting with the noble and softer materials such as pastel, charcoal, and graphite…after that, high relief with clay, carving blocks, to in the end working with cardboard, wood and other materials that implies more sophisticated techniques.

In this stage, the young student is encouraged to explore all techniques except digitals, which are on purpose denied.

In the second step, the beginner discovers his own possibilities with different material in the constructive structural sense; how to assemble them, while also having to build the proposals, the student gets into the economical aspects. This way the beginner is captured in short time by the essential elements of architecture.

We have developed two different types of exercises. Those called introductory or complimentary, and the regular exercises developed during a semester (sixteen weeks).

**Introductory exercises**

**First week (welcome)**

As an activity of the first week, the beginner is asked to bring something personal, done by him…establishing thereby the departure point to support his initiation and in order for him to recognize himself and his potential in front of the group - showcasing our small things done with individual effort and desire. They bring something to share, to introduce themselves, and welcome themselves into the group. The approach to architecture starts from small things.
First day
The first day requires the organization of the furniture in the classroom, the students thereby facing themselves into working with the body, afterwards asking them to find the best distribution for the class tables. The explanations will come; the way we will work in the studio, how big the group is, how many tables we have, how the windows are located in relation to the columns, the tables, and the door - a verbal play to make them talk, to make the opinions spring forth, to establish an order in the classroom and general rules during the study time.

About the presentation and the critique
Each day requires that the exercises done at home and in the studio get displayed on the wall at the end of the session. The students have to give their opinion and express how they feel about what is hanging on the wall, thereby minimizing the professor assistance. This way, the students will build confidence in their own opinions, the critiques will arrive as impulses according to what they feel; their eyes will start to see in a new manner. The organization of these works on the walls may need an effort in composing them, and will give them the first knowledge about composition: to get the horizontal line, the separations in between them, the way to place the tape, the way to get rid of it. The color composition, or contrast if it necessary.

Complimentary exercises

During the following two weeks, beginners are asked to do some parallel exercises. These are regular exercises during a semester, generally done as introductory in the inner world and in the media expression. These exercises are advised to be done during the hours in which they are most calm, taking the necessary time to reflect upon them, trying to get as relaxed as possible. In this way, the student will get time to make some reflections about himself through his drawings, and at the same time, a plastic activity where the results will begin to surprise him. This is a process that goes from the intimate to the collective critique. It is necessary to point out that these exercises have to do with the psychic aspects, but the discussion is always framed within the plastic discussion. The composition and the expression are the main topic of the work. The psychological and intellectual will be nourished and enlightened by the work.

Self-portraits
The student is asked to do three drawings per day. It is basically an exercise in training his eye and his sight. The drawings start out trying to be realistic, the student gazing at himself in the mirror. Slowly it gets more complicated, from being drawings of just lines, then volume, details, until the final work is a free composition based on ten details or more, taken from previous drawings and done in letter size papers.

A flower diary
This exercise is for establishing a short-term relationship to something alive for a very short time. The student should select a flower that attracts him. The process is similar to the self portraits. During a period of two weeks the student will do a set of plastic and expressive drawings. At the end of the two weeks, the drawings are shown to the others to be discussed and critiqued.
The signature exercise
This exercise has the same goal as the ones mentioned before, but departing from the students own signature. Starting from writing it on a letter size paper, students have it as first composition, and then they have to enlarge it in several windows zoom. It becomes an extraordinary exercise in observing and fine-tuning the eye aptitude of appreciating width, proportion, scale, character, etc.

Regular exercises
All exercises, apart from the Topic they are dealing with, are done applying the same or similar methodology. It starts with the analysis of one concrete object, starting with drawing in all the variants, through a special research that ends in an architecture exercise or in a design of a utilitarian object in real scale.

The product of each exercise step has a value in its own, that hinges with the next one until they get together to the final work. The design exercise then becomes a product of a research process where the beginner builds, during the process, a world of references of his own inspiration.

Exercise type 1

Fig. 3

From the object to the architecture
Point of departure They start choosing a utilitarian object. In this case it is necessary that the students select it because of its color, shape, texture, design, originality, etc., which builds up a kind of perceptive and sensorial connection.

Exercise type 2

Fig. 4

The wooden cube exercise
Point of departure As the first step, the students have to build up a cube made of wood (20 cm. side). It should be done with pieces of wood taken from the carpentry trash can, and with any preliminary idea of composition (at first), maintaining the orthogonal and geometric laws of the cube.

Commentaries on exercises type 1 and type 2
Also when the design process and the training could be similar or identical for both cases, the result is different. In one occasion, from the wooden cube, derives in a final object absolutely
organized in a “Cartesian” way, in contrast to those who depart from a utilitarian object, since the final result tends to be more “organic” and looser in its final expression.

The starting point conditions or predetermines the final result. The method that we use to introduce the beginner into the architectural problems, differs from the traditional order established in the traditional education. Not trying to say that ours is innovative or unique, it is simply the result of looking for a way of recreating the learning process in the field of architecture as a need.

Explicitly we obviate architectonic references, styles and studies of the great masterpieces as the main point of departure; instead the starting point is the geometric laws of the compositions obtained form the objects we study, not the historical references.

**Exercise type 3**

![Fig. 5](image)

**Design and construction of utilitarian objects. real scale, 1:1.**

**Point of departure** In this case the departing point is diverse, depending on the element to be designed: a domestic chair as an analytical approach to the design of a chair; the main page of a news paper, or a tabloid sheet of paper in the case of designing a screen; tools taken from the kitchen in order to look for referential figures and shapes to design after a chess game.

![Fig. 6](image)

**Final Commentaries**

In this type of exercises, the acquired or adopted intellectual knowledge does not participate. The blinding light of intellect is left out, and the student starts to “wander” in the shadows of sensations and bodily perceptions, as such displacing the center of thinking from the brain to the heart, from the cognitive understanding to the aesthetical sensibility... establishing an immediate connection between the heart and the imagination... 10 The cognitive task at this point, does not consist in understanding the meaning, but in being sensitive to the details...11

And as such, at this stage, rather than proposing tasks to be solved through a constructive-intellectual process, we propose themes that can be solved through free experimentation in composition, and imagination - leaving out all elements inducing the anecdotic, instead attempting to capture a sense of composition rather than an idea of composition, in order to understand, at a later point, what happened to the composition in rational terms.

In conclusion, we feel that these exercises produce a high level of results as a specific solution to an immediate design problem. We have experienced significant influences in the way these beginner students confront the following architectural problems, apart from the scale or the
depth of the exercises. As a teacher, the most gratifying experience has been to witness how the
students are flourishing from the things they do with their hands... How these same things evolve
into an echo that nourishes them to confront the next design problem in superior levels,
transferring into them a spiritual energy that most of them recall as memorable even after school.

And so, the Touch we're referring to, in the words of Sullivan, acquires a new dimension
which illuminates us:

This something that he is doing, and the physical and psychic state that it
implies, we call Touch: meaning not the touch of the painter, not the touch of the
sculptor, not the mechanical and technical touch of the fingers only, nor quite
their negligent contact with things, but the exquisite touch of the sensibilities, the
warm physical touch of the body, the touch of the sound head and a responsive
heart, the touch of the native one, the poet, out of doors, in spontaneous
communion with Nature. 12

Notes
1 Jean Chevalier / Alain Gheerbrant, Dictionary of symbols. (Barcelona. Herder, 1991)
3 Rainer Maria, Rilke, Letters to a young poet (Editorial y library Goncourt. 1977)
4 Cf. James Hillman, El pensamiento del corazón. (Madrid: Siruela, 1999)
5-6 Herbert Read, Imagen e idea. (México: Fondo de Cultura Económica, 1993, Pages 35, 36)
7 Diccionario de la Real Academia Española, (Madrid, 1992)
8 Jean Chevalier / Alain Gheerbrant, Dictionary of symbols. (Barcelona. Herder, 1991)
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INTRODUCTION

This oxymoron, while perhaps a little cute, nonetheless describes the primary criteria that many beginning students use to judge their work. Their evaluation operates along a continuum; with these terms acting as the poles, and its clear to them which pole is better. What's important about these criteria is that they are reflections of a static set of preconceptions about what constitutes good and bad things; linked suggestively to familiarity and notions of taste and style. There are other subsets of this dichotomy that include the discrimination between ideas that work versus those that don't work, things that are wanted versus those that are not wanted and, most basically, things that are right versus things that are wrong. On the surface it appears there's not much more to it. These judgments are expressed, primarily verbally, in an un-shaded way. They seem to be made with a certainty, a clarity, about the work that is often emphatically stated when asked to discuss it. These narratives create a fiction of control that the student attempts to project when discussing their work.

“It is as certain as it is strange that truth and error come from one and the same source; for that reason one must often not do something to the detriment of error since one would do also something detrimental to truth.”(1)

These traits are really not all that surprising. Most of us arrive at design school having been well conditioned by education that places a high value on problem solving skills, linear reasoning, reductive analytical techniques and, perhaps most importantly, predictable outcomes. The fewer mistakes you make the smarter you appear. The consequence is that many come to the subject of design strongly averse to error and motivated to work very carefully to avoid it, either in fact or in appearance. Error is failure and failure is feared. We hate being wrong. This of course is not just an affliction affecting the novice, but it is particularly resistant in the beginner, and in architecture we can be beginners for quite some time.

The friction between these skills and their consequences and the skills needed in design studio is considerable. It’s between two ways of working and thinking. One method is structured to avoid error and reduce the risk of failure versus another that ideally, according to the premise of this paper, invites risk and deals creatively with the ambiguity and uncertainty of designing anything. One is focused on structured problem solving with the other grounded in repeated practice and the certain expectation of error. It’s this friction that stimulates the cautiousness and fear that influences so much of the work and thinking of beginning designers. The dilemma for the student and the teacher is that this fear is attenuated by nurturing a number of strong visual and cognitive habits. (2)
CERTAINTY

One of the reasons this is a dilemma for the instructor is that we ourselves are susceptible to fears of failure and error and respond in surprisingly similar ways to the students. It is known what is wanted, and how that information is to be communicated. It seems evident from experience and observation that a great deal of the work done in beginning design studios is structured to help the students avoid making ugly things. When they appear, as they inevitably will, they are often vigorously and quickly suppressed. This suppression takes many forms from active and direct correction to humiliation to starvation by inattention. Other methods of avoiding confrontations with the potential disasters lurking in beginner’s work involves projects built around highly prescriptive and constrained instructions that clearly outline and define the steps of the process and the end product. It is easier and less risky, for both the instructor and the student, to be directed to the conclusion than left to discover and decide on a conclusion. These types of instructions are rarely accompanied by an equally clear or comprehensive explanation of the intentions of the assignment. That would introduce another, less controllable variable. It’s interesting to consider how methods of instruction can reinforce and exploit, either consciously or unconsciously, the students’ fears and their defensive assumptions about what is right or wrong, good or bad, pretty or ugly. This is done not by revealing them, confronting them, or dismantling them, but like a virus, replacing, reshaping and refining their contents and rules, and redesigning their outcomes.

In 1984, James Fitzggibbon wrote a critical essay on how certain styles of instruction work to directly, or indirectly, imposes a normative set of standards on design studios. They work both to the benefit of the instructor and the student. The standards, introduced through the methods described above, worked to create conformity in the process, the product and the vocabulary of the design studio.

“Looking at representative samplings of student design work it is not difficult to decide that a large majority of architectural students (to say all students would of course be going a bit too far) but in numbers high on an asymptotic curve, approaching totality, that these students all appear to design buildings in exactly the same way. There is a pervasive, almost cloned, similarity apparent in the design work and in the design procedures that students employ in just about
every American architectural school. The buildings look the same, the graphic techniques look the same, the explanations offered are the same and the specialized language that surfaces during critical discussions is as though tape-recorded from a central architectural concordance. In all respects a remarkable sameness prevails...“(3)

While Fitzgibbon was referencing the work being produced across the studio curriculum, he also addresses specifically the issue of basic design teaching.

“The problem, of course, is as we have seen, that architectural studios under ‘Method’ operation, work to perfection even with students quite unprepared in any real design or architectural sense. Success seems to require only the wit and the energy necessary for following the ‘Method’ steps.”(4)

Twenty years later, the situation seems virtually unchanged. The type of work that Fitzgibbon described is still present because the underlying motives remain unchanged. Much of current studio work is still generated and sustained by methods teaching and styles of learning that actively suppress the awkward, the uncertain, the ambiguous or the ugly. Attention is focused on looking for examples that match the rules with little time devoted to the study of the work that fails to meet the standards. This model of evaluation makes the comparison of work, and the arguments supporting it, internally consistent: Does it follow the instructions? Yes = correct, No = incorrect. Does it appear consistent with instructor’s expectations? Yes = good (pretty), No = bad (ugly). Does it meet the student’s expectations for their work? Unknown-N/A. The resulting range of work is extraordinarily tight, falling very close to the mean. Students whose efforts fall away from the mean quickly learn to adjust their work and conform to the rules, techniques and habits of the studio; to move toward the pretty and away from the ugly.

RISK

These types of methods run contrary to what we understand about the nature of any creative act. It’s not plausible that 40 students, at any level, over a short period of time, would start drawing the same conclusions about what constitutes good or bad work unless guided by some authoritative instruction which shapes and enforces a consensus. Consensus supports rules and rules control risk. Experience should make it clear, however, that designing anything involves risk. Removing the risk from design work leaves little to learn but technique. The possibility of failure must remain close to the work. The presence of risk and the possibility of failure, if allowed, is part of what draws and sustains our attention, once we understand the importance and value of both.

David Pye, in his book “The Nature of Art and Workmanship”, puts forward an idea about the role of risk in the creative process that supports these notions. He divides creative work into two general categories or types: the workmanship of risk and the workmanship of certainty.

“...in principle the distinction between the two different kinds of workmanship is clear and turns on the question: ‘Is the result predetermined and unalterable once production begins?’” (5)

This distinction, as described by Pye, goes on to articulate the consequences for work that is structured to increase certainty compared to work that engages risk. In general, his position is that regardless of ones level of skill, creative work that does not involve, in a genuine way, the risk of failure is rarely work of consequence or persistence. The simple fact is that failure is instructive. It is elemental to learning. When, in Pye’s model, work ceases to engage risk and the
possibility of failure, it becomes more an act of manufacturing that an act of art. The certainty of its outcome increases while the possibility of error and failure decrease. As instructive work, it is spent.

It's important to note that this idea of work and risk says nothing about the quality or beauty of things made by the workmanship of risk versus the workmanship of certainty. On the contrary, things made with certainty can be of extraordinary quality while things made by the workmanship of risk often fail. Taking risks with ones work is not a guaranty of beauty or high quality. Its value is in increasing the range of possibilities in ones work and the probability that these things will emerge in the process and its products.

"The workmanship of the standard bolt or nut, or a glass or polyethylene bottle, a tobacco tin or an electric light bulb, is as good as it could possibly be. The workmanship of risk has no exclusive prerogative of quality. What it has exclusively is an immensely various range of qualities, without which at its command the art of design becomes arid and impoverished." (6)

What makes this idea of risk and failure pertinent to beginning design education is that it presents a direct challenge to the defensive reflexes and habits that students and instructors engage in. It argues for a way of working that supports fearlessness and recognizes not just the inevitability of failure, but also its value as a generative and instructive moment. It discredits the naïve criteria based on superficial qualities of appearance and the correlation of work to set of arbitrary instructions or rules. By relieving the beginning student from the tyranny of making 'pretty' things, it provides an opportunity to develop in the novice an appreciation for a more exploratory and probative approach to design. Its from a foundation in which the student takes responsibility for the decisions they make, and where those decisions lead their work that will come the positions and principles that will shape their future work.
Anyone who has taught drawing or studio to beginning students knows how tough it can be to walk into a room full of naive, incomplete, misunderstood, awkward, ugly, horrible things. The panic that this creates in beginning faculty teaching beginning students is almost an olfactory event. You can smell the fear on both sides. The instructor wonders if anyone else has seen this. Should it be hidden? Will it effect my evaluation? Was I this bad? What follows is often a fateful decision to make certain this doesn’t happen again. The students also don’t want it to happen again, and so the ‘instruction’ begins. Imagine the violin teacher yanking the instrument out of the student’s hands to play the lesson as it should be played.

The fallacy, of course is the belief that there is some way to short circuit or expedite this uncomfortable stage of development. The fact is that this is the inherent nature of beginning anything. There is no way to avoid this part of the process. It begs the question why would you want to? It is at this moment that students have the opportunity to examine the static state of their understanding of design. It is the time to reveal to themselves and others the nature of the preconception they bring with them. It is a time to explore the limits of their skills of observation, drawing, making, and thinking. It is an emersion into what we all understand to be an ambiguous and uncertain endeavor, and their first trials in learning how to navigate this territory. It needs to be the time when they are encouraged to make their most disastrous mistakes as opposed to
learning how to achieve small, timid, technical successes. It should be a time of exuberance and fearlessness. Like the violin lessons, it is also a time for patience and practice on both sides.

References
1. Johann Wolfgang Von Goethe, Art and Antiquity, III, 1 (1821)
4. ibid.
6. ibid

Fig 1. Second year architectural design
Fig. 2 Second year interior design
Fig 3 Second year architectural design
Fig 4 Second year architectural design
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Offered through the Research Office for Novice Design Education, LSU, College of Art and Design, School of Architecture.

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Mutant Methodology

SHAI YESHAYAHU-SHARABI, MARIA VERA
Southern Illinois University

“I admire the dazzling manual skill acquired by the students through their instruction at the Ecole des Beaux-Arts…I recognize the elegance, which guides the solutions of plan, façade, and section. But, I should like to see intelligence dominating elegance…...”

*When the Cathedrals Were White, Le Corbusier*

Perception is an essential cognitive process that constantly reorganizes our sensory abilities to selectively modify our impressions. Thus, as the world of design evolves from a discipline which served a selected few to an industry that encompasses all aspects of human existence, we challenge pedagogies that institutionalized perception to specific design solutions. This paper, like Le Corbusier’s statement, contest teaching methodologies that relies on prescriptive techniques in order to educate future designers. Because design educators are increasingly seeking an educational technique that can be as proliferate in its methodology as the current market indicates the world of design is.

Here, Manuel De Landa’s novel approach to envision *A Thousand Years of Nonlinear History* inspired us to pull away from handed down tutelage related to Tabula-Rasa ideologies that encouraged future designers to discard previous knowledge and start anew [3]. This is because we start from the premise that an education that follows a linear model is devoid of a lifelong learning commitment and is immune to the likelihood that practice may be shaped by multiple careers and trans-disciplinary collaboration. Accordingly, this decision leads us to implement collaboratively exercises where the teaching approach would foster an individual’s personal intelligence. The goal of this approach is not to strip a person of his or her previous knowledge nor inherent abilities, but to augment them by sharpening his or her immediate awareness. It relies on the premise that every acquired knowledge or skill is an essential tool and ought to yield much more than aesthetic language, program, or form.

Thus, regardless of the fact that we teach beginner design concepts to architecture and interior design students, this paper highlights lessons that are applicable to all design disciplines. It introduces mutant methodology as a teaching technique, which focuses on developing students’ ability to research, fabricate discoveries, and document findings as their quest for detail increases.

Initially, while implementing this teaching technique, some of the challenges that we struggle with relate to the dependency students have on digital gadgetry that cultivates a desire for immediate gratification and encapsulating working habits [Fig.1]. This digital obsession disconnects students from their immediate environment and negates the needs of or benefits from an open-ended education that allows for exchange of critical thought and combinatory processes. It replaces creative thinking with an automatic pilot process that inhibits comparative analysis.
In this regard we seek to address and test these setbacks against the goals we are striving to accomplish. For instance, the first time we meet, students are asked to observe their own bodies and begin to document it. A way to teach or to learn this is by immersing the student in a process where scale, movement and perception are recorded through pencil-paper drawings. Immediately the students are confronted with their lack of knowledge about their own bodily dimensions, motor skills, and perceptual abilities. As a result, they encounter difficulties grasping the process of how to complete the assignment, and soon, need or demand help from their peers. Many students rebel against the time consuming process that requires personal engagement with others; but as they struggle to overcome this hurdle, they become more perceptive and start projecting imaginative subtleties that are reflective of their individual creative voice [Fig.2].

In the hope that they become fluent in their body-knowledge and capable of using the newfound knowledge for design purposes, they will be assigned to tell a story about their newly acquired knowledge. Telling a story becomes cumbersome and places all creative responsibility on the student’s ability to recognize facts and observe detail. It is a task that cannot be answered by the instructor; rather, it needs to be created by the individual who has to re-compose their newfound knowledge, evoking relationships between movement, scale, vision and space.

As soon as they become conversant in design linguistics and documenting techniques, they also become interested in how others have handled these challenges; they become curious to see how theories and changes happen and begin to use their drawings and digital knowledge in presentational form [Fig. 3]. Along the way personal techniques of representation become the stimulus for further discourse and students begin to learn from each others’ material, igniting new stories.
Through different exercises and stories, students, like journalists, researchers, economists, politicians, scientists, etc., collect information, and they make connections between their observations and design processes. From their intellectual connections and design fabrications they build files, catalogue findings and create indices which throughout the year become personal archives that are instrumental for instructors to assess the diverse skills students have or are quickly acquiring as they learn to review their peers' work and analytically critique their own accomplishments.

Hence, cultivating attention to detail and paying attention to personal, physical, and sensory stimulus allows for the development of their fundamental knowledge to flourish. In time, students’ own creativity would seem incidental; innate, almost anticipated by the world of design and our evolving idea about teaching students to think in a nonlinear manner also seems inherent in the mixture of other interacting perceptual reorganizations [Fig. 4 & 5]. Thus, De Landa’s historical trajectory [geological, biological and linguistic], informs the beginning of our methodological development, which introduces a combinatory process of thought in the design curriculum.

Fig. 3 Embodied techniques; perception and movement.

Fig. 4 & 5 Material tactility serve as a stimulus in the creative exploration process.
“We live in a world populated by structures—a complex mixture of geological, biological, social, and linguistic constructions that are nothing but accumulations of materials shaped and hardened by history. Immersed as we are in this mixture, we cannot help but interact in a variety of ways with the other historical constructions that surround us, and in these interactions we generate novel combinations, some of which possess emergent properties. In turn, these synergistic combinations, whether of human origin or not, become the raw material for further mixtures. This is how the population of structures inhabiting our planet has acquired its rich variety, as the entry of novel materials into the mix triggers wild proliferations of new forms.”

Manuel De Landa

Emerging from a philosophical understanding that evolution is a complex mixture of historical processes, this paradigm shift postulates that educational values can no longer be exclusively informed linearly but rather conceived as a heterogeneous model of thought, in spite of the fact that history is perceived or taught as a linear progression.

Our current response acknowledges history as a stratum, a mesh of events, viewed as layered information where linkages tend to divert from lateral trajectories into occurrences, leaps, and/or connections that revoke linearity [4].

Departing from this premise we ask our students to reconstruct ten historically known villas that range from classical to contemporary times with scale as the common denominator. Here, accurate documentation on the part of each student becomes critical in order to provide the class with an opportunity to develop highly personalized logs that will later be used to process, decipher, interpret and ultimately create new ideas. Although a timeline system places these buildings in their historical context, almost instantly, through analytical interpretations, the displacement of linear relationships occurs. Students start to introduce cross-references as a collective transfer of knowledge, igniting complex undertakings and a fresh accumulation of information which generates new ideas and allows the students’ own log formation to flourish.

This technique, which permits students to combine [consciously or subconsciously] events that are not sequential, but are more like cinematographic samplings, triggers a proliferation of discourse without linear bearing. It reconsiders how the selection of forms, composition, proportion, harmony, etc., can suggest waste of resources or how it celebrates or trivializes the environment we live in.

At times, interpretations of previous theories are transformed into combinatorial methodologies of design, thereby broadening both creative palette and future outputs. Ultimately, this process allows compiled data to be perpetually renewed [Fig. 6].

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Fig.6 Sequence breakdown of exploration and representation
In sum, at the core of our mutant methodology lies a fundamental shift that removes instructors from the role of conductor to one of moderator, empowering students to undertake creative responsibility for the work they produce. It does not prescribe educators with formulas that will yield crafted results, however, it provokes an open-ended code of interconnected processes whereby design becomes a collective undertaking to influence pluralistic changes.

Notes

References
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

Conference held at the
College of Architecture
The University of Texas at San Antonio
24-26 February 2005
Corners College [Snapshot Library]

MIKE ZEBROWSKI AND BETH TAUKE
State University of New York at Buffalo

What is invisibly at play behind a wall or floor, once exposed, becomes an active participant in a spatial drawing of the building’s inner life...Aspects of stratification probably interest me more than the unexpected views which are generated by the removals—not the surface, but the thin edge, the severed surface that reveals the autobiographical process of its making. There is a kind of complexity which comes from taking an otherwise completely normal, conventional, albeit anonymous situation and redefining it, retranslating it into overlapping and multiple readings of conditions past and present. Each building generates its own unique situation.

-Gordon Matta-Clark¹

Introduction

Grounding beginning students in material/spatial knowledge, logic, representation, innovation, and memory are the primary purposes of the first year architecture studio at The University at Buffalo – State University of New York. Each year the pedagogy of the first term is designed with new projects that take on these primary tasks. The project sequence addresses issues of processes and their attendant results. The processes in the studio are grounded in the notion that design is found in the making, and that if work is closely read, it will reveal the next set of questions to pursue. To that end, we try to: a) understand materials and spaces relative to their constructed logic or one applied to them, b) explore ways in which space is articulated by the materials, instruments and methodologies we adopt for looking and experiencing, c) examine the many factors that influence our experience of space and material, and d) analyze how we affect space through what we build.

The final project of the sequence, entitled “Corners [Snapshot Library],” investigates the materials and construction of common building types, and ways in which these types might be reassembled and reconfigured. To begin the exploration, eight 5’ x 5’ x 5’ corners from eight building types (civic, residential, commercial, industrial, educational, public, temporary, and architecturally ‘significant’) are measured, photographed, drawn and modeled. Students study the materials, construction, and assembly of these specific corners; consider their location and orientation in relation to one another; and develop connections between them. They use both the joinery conditions and the unique material characteristics of the various corners to design a space for the act of storing and viewing the snapshots (already photographed and yet to be photographed) of their lives.

¹Gordon Matta-Clark (1943–1978) was an American artist and key member of the New York-based art movement known as “The Grand Canyon of the East.” He was also a member of the interdisciplinary team that created the “Surrounded Scatter (Adjustable Wall) / Construction” (1974) at the Museum of Modern Art in New York. This work is the cosmic principle, the first piece of a series of projects that explore the idea of “non-architects.”
The combined corners, in this case, embody everyday architectural experiences and memories. Through their location, orientation, and connection, they suggest specific ideas about architecture—first, that architecture is multiple, a condition that depends upon the many ways in which we engage it. Second, this multiplicity brings, as Henri Lefebvre has termed it, a sort of ‘instant infinity’ in regard to the coding and decoding of meanings and contents. Third, juxtapositions of different material conditions establish new systems, methods, contingencies, and sites for architectural invention. And finally, in the words of Peter Lynch, “Architecture design is a process of accommodation, adjustment, and inflection, which attempts to raise apparently meaningless circumstances…to the level of intention, significance, and insight.”

Process

The students in the studio are quite diverse in terms of race, ethnicity, gender, class, economic status, and education; consequently, their backgrounds and experiences differ greatly as well. Some grew up in Buffalo or Western New York, others spent the bulk of their lives in New York City, still others are international (from Russia, Turkey, China, Japan, Thailand, Columbia, Peru, etc.). Using common building types that are somewhat familiar to all of the students, regardless of their histories, establishes both a common ground and sense of comfort within them. The memory of these types is already there—it is part of their make up. Particularly for the international students, this base architectural palate allows them to make connections that bypass verbal language, that summon feelings similar to Rainer Maria Rilke’s description of a wall encountered while traveling, “I recognize all of it here, and that’s why it goes right into me: it’s at home in me.”

At the same time, a closer reading of these specific corners puts all of the students into unfamiliar territory, and undermines preconceptions about the materials, assembly, and construction of that which they encounter in their everyday lives. Some students, for example, have general knowledge about wood frame construction, but when they photograph, measure and carefully examine the corners of their bedrooms, they find particularities not present in the typical construction diagrams—the way settling has shifted the floor plane; the missing screws in the curtain rod plate; the addition of insulation; the presence of a reading lamp, headboard, or smoke detector, etc. The articulation of these specifics (sometimes referred to as ‘third elements’) is what gives the bedroom what Heidegger would call its “being-in-the-world”—it is what makes the corners ‘come to life’ in the world of the studio.

One of the difficulties with the documentation of the corners is that often students cannot ‘get into’ the walls, floors, or ceilings to see what’s really there. Consequently, they need to search for clues beyond the 5’ x 5’ x 5’ corners that inform them about their make up. Often this involves going into basements or attics, finding exposed areas, and using stud finders or other technologies that help them to detect hidden information. In the process, they tend to uncover the specific construction logic as well as the anomalies of the buildings on which they are working. Of course, not all information can be found. And, in those cases, students must resort to ‘imagining
into the walls, floors, or ceilings based on the other logics that they have discovered. At all times, however, they use the actuality to establish the imagined.

The information established in the initial documentation processes is used to develop drawings and models of the corners in an effort to gain another understanding of the corners through their representation. (In the case of this project, and all others in the studio, the drawings are used to document that which cannot be modeled and vice versa.) Moving into these representational modes puts distance between the original corners and the analyses at hand. However, it must be acknowledged that the very act of recording itself is a distancing mechanism, bringing some aspects of the corners closer and others further away. The drawings and models might be considered the ‘once removed’ layer of recording devices in the process; nonetheless, the drawing and modeling process might provide other kinds of knowledge and understanding of the corners that the initial recordings could not offer.

At this point in the process, students experiment with ways of locating and reorienting the eight corners to make a cube. Six of the eight corners must break from their original orientation. For example, they consider the industrial corner and how its construction, weight, and materials determine where it could be placed in relation to the other corners. What happens when it is turned on its side? What joinery opportunities does it offer to the other corners? Can it remain structurally viable? How does the meaning of this corner change when it is reoriented? Changing reference conditions poses many complex problems, and obliges students to consider the logic of construction and materials. Through location and reorientation, they confront the realities posed by Aris Konstantinidis’ statement that “construction embodies material and its use according to its properties, that is to say, stone imposes a different method of construction from iron or concrete.”

At the same time, these reconfigurations of common corners alter students’ perceptions and engagement of them. The palate is familiar, but the process of combining them is not.
Connecting the corners requires students to consider two scales, the scale of the model \((1 \frac{1}{2}\text{"}:1')\) and the full-scale conditions of each corner. Through the study of joinery, the properties of materials are revealed and their structural capabilities are exposed. At first, the material and construction restraints pose a seemingly impossible set of conditions, but upon closer examination, they actually become resources to kindle innovations. Students take on the task put forward by Charles Eames, “When you get into connections, you begin to get into architecture.”\(^7\) They ponder ways to connect masonry to wood, steel I-beams to glass, concrete to stone. They develop connections either by adding, subtracting, or displacing various linear, planar, and volumetric elements. Invention is at the forefront as students play with the materials out of which their surroundings are constructed in an effort to find new possibilities within that which they thought they knew.

The project then expands to include the forces of site and program. In this case, the site is abstracted; it is one \(\frac{3}{4}\) sheet of birch plywood cut \(2'\times6'\times2'\times6\). The site orientation is either 90 degrees (vertical) or 0 degrees (horizontal). It must be penetrated by the corners cube, and should have a direct relationship with the entry and exit of the cube. The corners cubes embody the clues that determine the occupation of the site and stipulate how it ought to be developed. The result is a hierarchical organization of space, which typically is a set of moves outwards from the corners.

Simultaneously, a simple program is introduced. Students are asked to design a snapshot library—a space for the act of storing and viewing the snapshots of their lives—using the eight corner cube. This library requires a separate entrance and exit, a storage system that holds up to 10,000 \(4\) x \(6\) snapshots, and a place to view and reflect upon the stored snapshots. Natural light is the only light source for the interior. The corner joinery and the ‘third element’ or particularities of the corners serve as the departure point for the development of the library.

Introducing site and program late in the process requires yet another set of shifts. The ‘object’ yields to a set of outside forces that can dramatically alter its makeup. Students grapple with the idea that architecture is more than the building itself; it arises from a studied relationship of buildings, sites, and programs. They consider Bernard Tschumi’s statement that “any architectural sequence includes or implies at least three relations. First, an internal relation which deals with the method of work; then two external relations, one dealing with the juxtaposition of actual spaces, the other with the program (occurrences or events). The first relation, or transformational sequence, can also be described as a device, a procedure. The second, spatial sequence is constant throughout history; its typological precedents abound and its morphological variations are endless. Social and utilitarian considerations characterize the third relation: we shall call it for now the programmatic sequence.”\(^8\) All three relations are present in any architectural work, whether implicitly or explicitly. Ultimately, it is the unique combination of these fundamental conditions that constitutes the architecture in this project.
Considerations
At times we think we know ourselves in time, when all we know is a sequence of fixations in the spaces of the being’s stability—a being who does not want to melt away, and who, even in the past, when he sets out in search of things past, wants time to ‘suspend’ its flight. In its countless alveoli space contains compressed time. That is what space is for.
-Gaston Bachelard

Memory is used as a point of departure, as a way of questioning/critiquing how the world is experienced, and as the subject of the project. One of the primary intentions of the project is to allow students to discover the roles that architecture plays in their memories and experience. Each student enters the first studio, not as a tabula rasa, but as a person with a rich history of space, buildings, materials, and the events related to them. Student Kelly Zona describes her interpretation of the project:

The original idea for the cube was based on dreams that I used to have when I was little. For example, I would be in my grandmother’s house and open the door and I would suddenly be in school. The house is often a symbol of the self in dreams, and I extended the metaphor to mean the spaces of our lives. The eight corners come together like different pieces of an individual’s life come together to create a whole.

According to Buddhist philosophy, however, the self does not actually exist—it is only an illusion. The eight corners are held together as a seeming whole but are never completely joined. The site, a frozen matrix of spacetime, both defines the cube and holds it together. “Frozen time,” like a photograph becomes a false representation of reality. Although you can say that the cube does not exist, it represents our perception of reality.

The snapshot library, in a sense, becomes a kind of architectural scrapbook that houses the photographic recording of the student’s life and sense of being—it is a compilation on two different scales. As the students’ awareness of the relationship between the recording of their lives and the specific circumstances of material practice comes to the fore, their attention moves towards the issue of making and interpreting architecture. They begin with material detail, with a conception of the specific ways that lines, planes, and volumes make up our material world; but, hopefully, through this process, they come to ponder how architecture can reflect and activate human complexity—the idiosyncrasies of their everyday lives.

NOTES


10 Kelly Zona, From her final presentation of the project in December 2004.
A Beginner’s Mind

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WORKSHOP:
Beginner's Praxis Workshop
A Social Constructivist Approach to Learning Through Scaffolding

DWAYNE BOHUSLAV
San Antonio College

Praxis is from the Greek prattein = act and designates the actual execution of an activity (contrary to theory). Put another way, it is putting theoretical knowledge into practice.

Scaffolding as educational theory refers to Russian Developmental Psychologist LEV Vygotsky's (1896-1934) Zone of Proximal Development (ZPD) = The intellectual development of A Beginner's Mind is a function of human communities, rather than individuals.

The study unit for understanding the human condition cannot be the individual person or organism alone or its behavior or experience, but should be a complex including the individual and the social, the biological and the cultural, and this complex needs to be seen in its historical nature. The Beginner's Praxis Workshop will guide freshmen students through scaffolding figuratively and literally, navigating both educational theory framing the student within the social, extended community outside of the classroom, and putting that theoretical knowledge into praxis by construction of a temporary, lightweight installation within and about the physical scaffolding ringing the Downtown University of Texas at San Antonio Campus where the Conference is to be held.

This Beginner’s Praxis Workshop will focus on extending the freshmen students' abstract instruction to “first-hand experiences with actual materials”, sites and “full-scale design-build”. As iterative extensions of theory into direct practice, the project will demonstrate the innovative workshop format that focuses the beginning student on the elusive phenomena of the contemporary metropolis and their implications for possible architectures. The purpose is to have the beginning student critically discuss/investigate/document a specific physical scaffolding location towards the discovery of new ways of seeing/thinking/acting on it through the collaborative construction of a temporary installation.

There are three (3) objectives to the Beginner’s Praxis Workshop:

Day 1) to expose the beginning students and Conference attendees to the writings of Vygotsky which lead to his “scaffolding of instruction” and an awareness of praxis;

Day 2) to guide students to investigate and critically document one specific scaffolding condition on the Campus;

Day 3) to develop and construct a temporary, collaborative architectural installation on the chosen scaffolding site. Using the existing scaffolding, the students will use as their biological model the epiphyte, an organism that grows on a host without damaging it but rather benefits it. The intervention, being temporary, lightweight, and easily demountable, would be non-invasive to the environment - a “soft” interaction with the site for the last day of the Conference.

If it is true, as LEV Vigotsky theorized, that “learning is a constructivist activity”, then his Zone of Proximal Development includes all the functions and activities that a beginning student can perform only with the assistance of this scaffolding process. Knowledge within the discipline of architecture is important, but solving problems that encourage the beginning student to go beyond their current individual skill and knowledge level into their social communities further development of higher functions beyond the discipline. By implication, new knowledge can be built.
A Beginner’s Mind

PROCEEDINGS
21st National Conference
on the Beginning Design Student

Stephen Temple, editor

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WORKSHOP:
Making Something: The Power of Limits” & the Pitfall of Assumptions

JEFFREY S. HARTNETT AND JIM SIEMENS
Portland State University

A deceptively simple yet telling first-day experiment was performed by the two instructors for second-year design studio at ___ University to begin the Fall 2004 term. The students were asked, in the absence of any other directions or requirements, to “make something”. They were asked, after completing this task, to open an envelope that contained the second half of the initial task; the enclosed assignment asked them to “make something” but this time something that possessed relationships with both a particular descriptive-and-poetic narrative and with the “something made” in the first half of the assignment. They were then asked, as a carefully considered follow-up, to consciously reflect upon what they had both thought and did to make those two things come into existence; i.e. to “reflect on the process of your making”. Their reflections took the form of both a written statement and a prepared spoken explanation. Our analysis of our students’ work has led us to desire to perform a reactive experiment over the course of the conference.

The experiment would involve taking a group of 1st-year architecture students from the University of Texas-San Antonio (on Thursday afternoon), split into three groups of approximately 10 students each. Each would be asked to complete the two “making something” assignments; they would be given a day to complete them. The first sub-group would operate under exactly the same set of directions as the group here at ___ University. The second group will read and discuss Doug Kelbaugh’s article entitled “The Power of Limits” prior to beginning the two assignments. The third group will be given a List of Assumptions not to make, followed by a discussion period, prior to beginning the two assignments. We will then (on Friday afternoon), ask the students to self-consciously “reflect on the process of your making”. We will analyze all the students’ work (on Friday night/Saturday morning), followed by making some working observations and conclusions of the three sets of work relative to each other and to the previous work by our students.

Our theory is that the latter two groups will benefit greatly by our placing the assignments in an effective context; therefore, a better learning experience will result. Our theory is broadly based on prior studio instruction experiences but, more particularly, on the understanding and application of the work of the co-authors of a book entitled Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom. This useful business-oriented book suggests that a sink-or-swim strategy is inefficient and, more important, ineffective. It claims that it is far better to deliberately create receptors for learning by providing frameworks and/or tools and/or other types of mental structures to which experience can be tied. The Kelbaugh article and the List of Assumptions will serve as, hopefully, two possible effective forms of those frameworks/tools/structures, and perhaps others can be suggested from the resulting dialogue.

Our final presentation will involve both showing the work and our own analysis and tentative conclusions, as well as public interaction with chosen student participants in terms of the particular nature of their individual learning experiences and of the differences in learning experiences amongst the three groups.

“The foolish reject what they see, not what they think; the wise reject what they think, not what they see”. [Huang Po]