EDUCATING DESIGN INTUITION
A SURVEY OF PROBLEM SOLVING METHODS USED IN ARCHITECTURE AND INTERIOR DESIGN STUDIOS

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*T*HE scope of this research aims not only to define and explore the strengths and limitations of humans' "sixth sense" intuition, but also to discover how it can be improved in design thinking and better understood during the maturation of a design student. Intuition is aligned with, among other things, automatic, tacit and unconscious processing, implicit memory, and procedural knowledge. Broadbent (1973) argued in Design in Architecture that there were seven avenues to approach any particular problem, to include deduction, induction, algorithm, ratio, analogy, metaphor, and chance. But perchance, there might be another that is often overlooked; that is intuition. In Educating Intuition (Hogarth, 2001) tackles a fascinating topic that has until now garnered little scientific attention; that is intuition. This study conducts a survey of the design pedagogy, in particular the problem solving methods taught to undergraduate architecture and interior design students. It is hypothesized that the problem solving method of intuition is not addressed. Observations as to why intuition is not addressed as a design problem solving method are provided in order to assist faculty in developing opportunities for such to occur.

Key Words: Design Intuition, Intuition, Design in Architecture.

Introduction
During the last twenty years, the delivery and development of these problem-solving skills have been best honed in a problem based learning (PBL) situation. In the discipline of architecture, the atelier (the architecture design studio) has served as the setting for the integration of all the skills and knowledge to be applied in a (PBL) setting. This started with the guild house and manifested within the Ecole Des Beaux Arts the world renowned architecture school in Paris which started in 1717, Drexler (1977). Boyer and Mitgang (1996) made an interesting observation that PBL learning has been used in architectural education since its inception.

"The good news is that architecture, by nature and tradition, holds vast potential as a model for the integration and application of learning, largely because of its most distinctive feature - the design studio. Beyond question, the design studio is a model that many other disciplines on campus, as well as elementary and secondary schools could well profit from" (p.85).

The practice of and education of an architect has, throughout history, taken a Gnostic form in what architects know as the studio. The ACSA (The Association of Collegiate Schools of Architecture) has throughout the years published the Guide to Architecture Schools (2003). The seventh edition provides a good understanding of the structure and goal of the design studio:

In a Bachelor of Architecture program, and to a lesser extent in the four-year non-professional degrees,

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the primary concentration is design, in both credit hours and time. In some schools, "design" may be a required course every semester. It is almost always a studio course, and certain aspects of an actual or hypothetical architectural problem are emphasized. The student, either individually or as a member of a team, working with a faculty "critic" finishes a project with a preliminary design solution for the problem, which is graphically (and often verbally) presented. For centuries, "juries" of faculty and professionals have been used to discuss and evaluate the student solutions-undoubtedly the best-remembered experiences of nearly all students. Ideally, knowledge from other courses is applied in the design studio (p.6).

This is that portion of the curriculum where the culmination of knowledge, technical skills and problem defining and solving occurs, dealing with unique ill-defined problems. Schon (1985) comments about the architect design studio that these, "systems of intuitive knowing are dynamically conservative, actively defended, highly resistant to change" (p.27) This is the quintessential observation of intuition.

The purpose of this research was to determine what particular problem solving methods are being taught in the architecture and interior design programs at the School of Architecture, Southern Illinois University Carbondale. At the core of this terse survey is the hypothesis that of the eight methods of design, intuition was not being addressed. Possible assumptions as to why this method is not being addressed in the curriculum will be commented upon later in this paper. It is the author's observation that there are initially two reasons for not addressing intuition: ignorance and dogma.

Design Methods

At the very heart of Career and Technical education is the pedagogy in the development of critical thinkers, armed with an arsenal of problem solving tools and skills. Broadbent (1973) argued in *Design in Architecture* that there are seven avenues to approach any particular problem, to include deduction, induction, algorithm, ratio, analogy, metaphor, and chance. He contends that this spectrum of design has two polarities at one end, operations research and at the opposite, Dewey's "creative leap" (p.325).

Deduction and Induction

The full spectrum starts with deduction, best understood as a top down, general to the particular approach in problem solving. This ideal is founded in Plato's Republic, as he describes the ideal as a shadow on the wall of the "cave", wherein we see the archetype. Induction approaches the problem from the inverse where it is a bottom up, particular to general. Raphael (1509-1510), in his great fresco found in the one of the salons in the labyrinths of the Vatican Museum, carefully depicts these two classic modes of problem solving, wherein we see two men conversing with each other in a great architectural space, surrounded by an entourage of philosophers, thinkers and writers. The two men, Plato and Aristotle, are in a grand argument with Plato (see Figure 1.) pointing a single finger upward, purporting that starting with the general to the particular is in fact the best mode of inquiry, whereas Aristotle (see Figure 2.) has one hand pointed down with all his fingers thrust downward, indicating that starting from the particular to the general might be the better path to understanding.

Algorithm

In the great treatise by Vitruvius, (1914) The Ten Books on Architecture, a rubric is given to Cesar, providing him with a means by which to judge architecture. This rubric is composed of three words-utilitatis, firmitatis, and venustatis. In today's architectural idiom, it is properly taught that buildings should be functional, constructed appropriately with strength, and provide a delight to the eyes. Within the problem-solving domain, is algorithm, that method of solving problems via mathematical formula such as presented in the following formula (Gordon, 1978):

$$f_{cr} \equiv \frac{\pi^2 E}{\left(\frac{L}{E}\right)^2}$$