"Bridging the Information Gap in the Comprehensive Design Studio"

John J Phillips, PE
Oklahoma State University

Abstract:

The culmination of a students design education at Oklahoma State University's School of Architecture is experienced in the nine credit hour comprehensive design studio. The approach used in teaching this studio is a team concept, with four different faculty members specializing in architectural design, mechanical systems design, and structural systems design. Additionally, separate courses in project management and environmental controls design (as elective courses) are closely linked in the same semester. The scope of the comprehensive design studio is representative of conditions the students will experience as interns upon graduation, covering many of the topics that affect the design process.

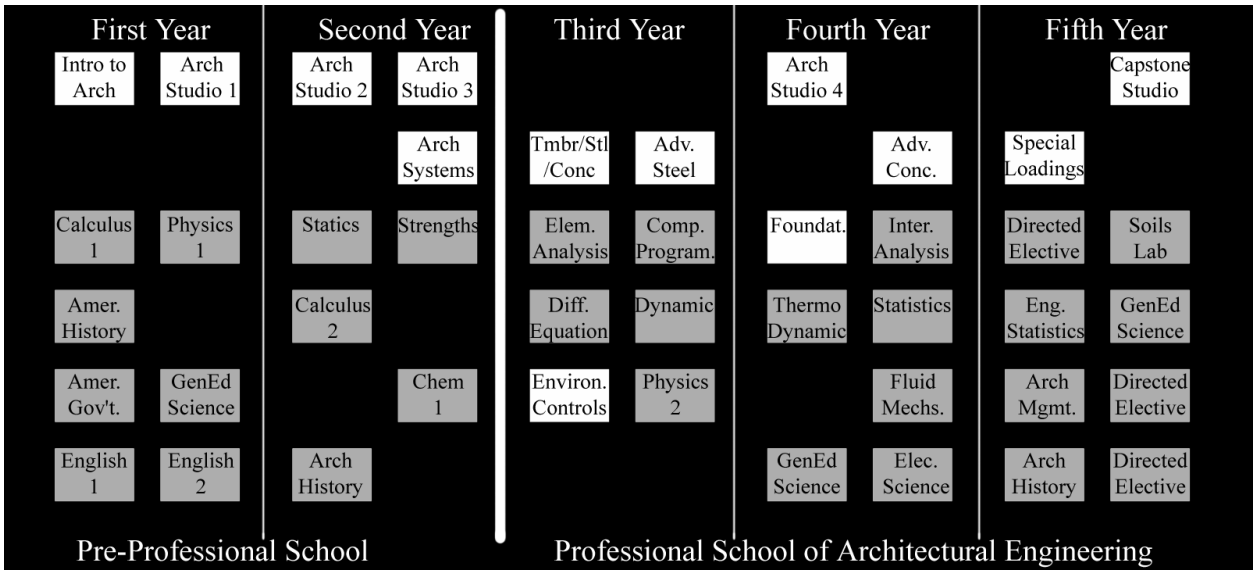
One problem encountered in this course deals with the vast amount of information that needs to be provided to the students during the semester. With the great number of topics that must be covered in this course to aide the students in the comprehensive design of their building, it is not time effective to depend solely on seminars to provide this information which have traditionally supplemented the design studio during the sixteen week course. It is the goal of the faculty members to utilize alternate methods to disseminate the required information efficiently, while simultaneously keeping a productive design atmosphere in the studio. This paper will look at the alternate methods used in introducing supplemental information to the students, and will review the relative success of these methods through qualitative analysis, with suggestions for comparing the methods through the use of quantitative data in the future.

Few would argue that motivated students are easier to teach or that interested students learn more than those uninterested in a subject. As an educator, finding the most effective method of getting the point across to a student is of the utmost importance. With the limited time of contact the faculty has with students, the information must be delivered quickly, concisely, and in a manner that will be retained by the student. Keeping the attention of the student is important in this process, as those uninterested in a subject will be less likely to absorb the information being provided.

For Architectural Engineering students at Oklahoma State University's School of Architecture, the result of their education is put to the test during the final semester of the curriculum, in the nine credit hour comprehensive design studio. This course approximates actual practice in an A & E firm, and looks at all phases of design, from conceptual and schematic design, through design and documentation of the structure for the students design.

For the Architectural Engineering student, taking this capstone studio design course during the final semester of the curriculum allows the application of their knowledge from earlier design

courses to determine which structural material (timber, steel, or concrete) to utilize for the structure in their design. As could be expected, this nine credit hour course is intensive, with 20



Oklahoma State University - Architectural Engineering majors Curriculum Chart

hours of contact time per week between the students and the faculty involved with the course. There are four professors assigned to help teach this course; two architectural design professors, one environmental controls design professor, and one structural design professor. The four faculty members use a team approach in teaching the class of forty five students, with each of the faculty members focusing on their expertise as it pertains to the design process.

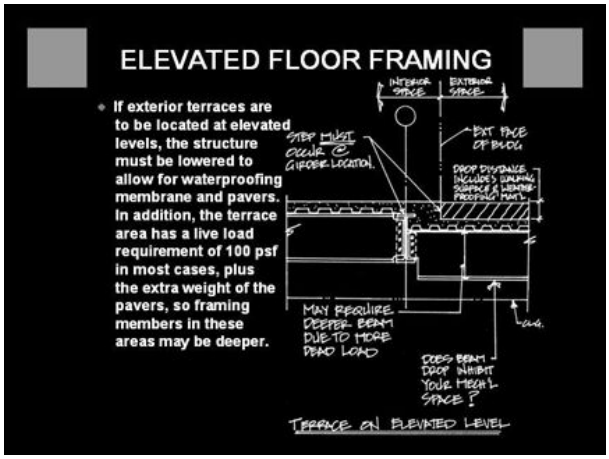
A major challenge to the faculty is keeping the students motivated and moving toward the final goal of completing the design process experience. The challenge lies in keeping the students interested in the course while at the same time trying to educate the students in the numerous methods and procedures that occur in the various phases of the design process. The course covers conceptual and schematic design, design development, and construction document phases of design. Prior to this course, the students have only touched on the design development phase in a design studio, and have not progressed beyond this point in the design process. In this course, the faculty is responsible for instructing the class on many topics to which they have not previously been exposed. For this progression through the design development and contract document phases of design to be successful, the students must be provided and instructed on many different topics during the sixteen week course. The studio environment is not the best place to accomplish much of the exchange of information that must take place during the course, thus alternate methods are employed to deliver the information. Over time, the faculty has questioned which of these methods are effective in the transfer of information to the student, and which are ineffective. If the course can take advantage of using those methods that are most effective, then perhaps the students have a better chance of realizing their potential in the comprehensive design studio.

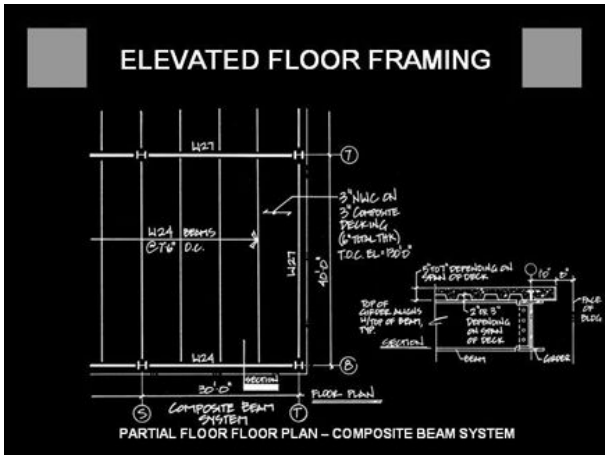
Beyond studio discussions, the alternate methods utilized in the course include individual reviews with a faculty member, plus seminars on design development, construction documents, environmental controls systems, and structural systems which are presented by the faculty

members. In addition to faculty seminars, practicing building code officials present seminars dealing with major building code requirements. Field trip visits to construction sites help to explain the construction process to students, and an information wall, internet web site, and handouts are used throughout the semester to constantly provide and update information on the studio project. On two occasions during the semester, students present their projects to a jury of practicing architects and engineers, who respond to the designs presented. During this sixteen week course, there is a constant stream of information that is provided, and if this is not inserted into the coursework in a timely manner, the students will not be able to proceed properly through the design process. Some of the methods listed above have become more successful than others in the distribution of information to students.

Individual critique sessions with faculty members are required in all design studios, and the comprehensive studio is no exception, where they become crucial in the development of the students project. Having four faculty members allows the students to respond to alternate viewpoints on their design, which helps the students prepare for the jury process that they will encounter during the semester. This method continues to be highly effective in the transfer of information to the students, though it seems to work best during the conceptual and schematic phases of design, when technical issues are less involved. The critique process allows the faculty to have input into each of the students learning experience during the semester by focusing on their expertise.

Seminars presented by faculty members occur frequently during the semester. Each of the four faculty members present seminars pertaining to areas of their expertise. These must be concise and to the point, as we have experienced that the attention span of the class of students is between 35 and 45 minutes in any one sitting. Faculty try to keep within this time frame when possible, but it is quite often difficult to present all of the information required on a topic in this short amount of time. The faculty discuss major points in their seminars, and inform the students



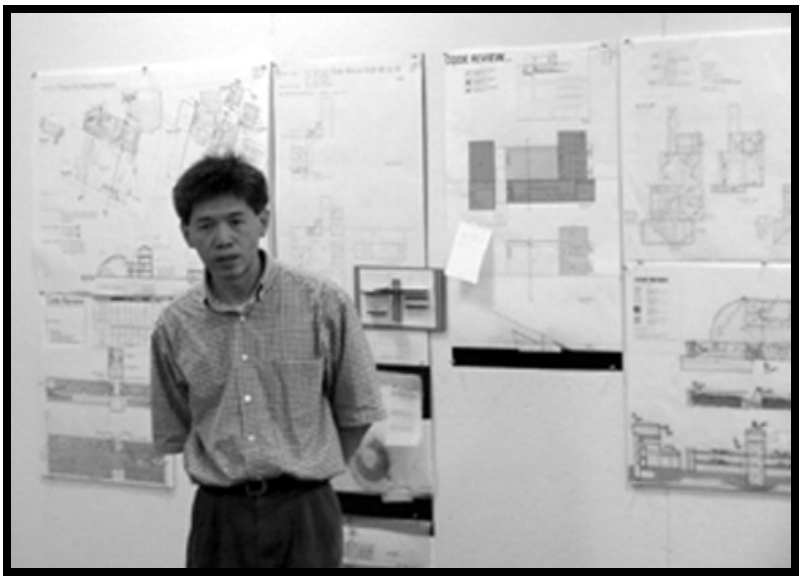


Powerpoint slide examples used in the structural seminars presented during the semester

that they are available for individual crits as needed to discuss details of the individual topics further. The success of this method depends on the faculty member and how the seminar is presented. Those that incorporate visual images into their presentations have been deemed more successful, in that the images tend to keep the attention of the class better. Additionally, those seminars that required student participation have been very successful in encouraging the

students to show their knowledge, or lack of, on a subject. One idea is to use some form of guided lecture notes to encourage the students to pay attention and take notes on handouts provided to them prior to the seminar.

Building code seminars are presented by practicing building code officials from Tulsa, Oklahoma. This course is the student's first exposure to many of the complicated building code issues that must be considered in the design process, and the seminars presented by the code officials have become invaluable in educating the students on specific requirements. An initial seminar is presented to the students on the major requirements of the building code,



Practicing building code officials review student projects and discuss building code issues

such as egress and fire resistivity issues. A second seminar takes place later in the semester that includes the code officials reviewing each of the student's projects and discussing with the class the common misconceptions and errors that the students have incorporated into their designs. This face to face contact with practicing professional code officials has been very successful in the design studio, giving the students a face to the building code requirements that they are required to meet with their designs. The building code seminars are concise and interactive, involving both the students and faculty members, and have become an extremely efficient method in teaching the course.

Site visits to buildings under construction are particularly informative in the comprehensive design studio where construction documents are a requirement for the course. The site visits are scheduled so the students can view the construction of a building during both the systems construction phase, when structure and environmental control systems are viewable, and during the finish construction phase, when the finish materials are being installed. By seeing actual construction projects, the students can experience how the materials used in design interface with each other, as well as experience the potential problems encountered during construction. This process has been helpful in educating the students about the most common methods and materials of construction. However, with the exploration of sustainable design that most students include in their designs, it has been difficult to visit construction sites that include those materials most commonly included in sustainable design.


Site visit to project under construction allows students to view details of building systems

A *wall of information* is established each semester for structural and environmental control design information that can be utilized by the students. This is placed near the entrance to the studio, and is often a place of discussion between the students and the faculty members. This information expands on topics from seminars and is set up to answer the most common questions, and to show examples of systems, methods, and drawings. By removing the student from their desk, even for a few minutes to discuss a specific topic, the effect of the information provided becomes a focus and has been successful with the student focusing on the topic at hand without being distracted by the studio atmosphere. This information has been utilized by the students and is very helpful for students in answering many of their questions, but future enhancement of the type and amount of information placed on the wall may increase the effectiveness of this method of delivering information to the students.

The *internet* web page is provided to give the student's links to product web sites dealing with structural issues, and to provide examples of structural calculations and construction drawings as examples for the students during this phase of the course. The students are expected to become interactive with this site in providing the faculty with new, informative web sites they have found during their searches. The use of the product web sites is crucial and time efficient in that much of the information provided on the product web sites include images of the product and details of the product's implementation. The web site has not been utilized by the students as much as anticipated, with each of the students still asking the same questions (Where can I find …?) even though much of the time this information has been provided on the web page. This method of informing the student requires little time on the part of the faculty, but needs to be enhanced and promoted to the students as a quick reference for their questions.

Handouts are numerous during the semester, but are imperative in the success of the studio. The students are required to compile a studio notebook documenting the design process during the semester. This notebook includes all handouts, notes, and other information received by the students during the semester. With the notebook being part of the final course grade, the students are required to keep up with the handouts. However, most of the students just go through the motions of keeping the notebook because it is part of their final course grade. This method has been deemed ineffective, and revisions to this approach need to be studied.

Presentation juries occur twice during the semester, in which each student presents their project to a group of practicing architects and engineers who review and provide comments on the design. These comments come in written form by each of the jurors, and through viewing the

Student Presentation Jury to group of practicing professionals

video recording of the jury presentation, where oral comments by the jury can be reviewed by the students and faculty. This is an important opportunity for the student to have direct contact with professionals, and is very successful in the students becoming interactive with the profession. Hopefully, the faculty has done their job during the semester and these practitioners will reinforce what has been taught to the students.

As can be seen, there are many methods utilized to present information to the students during the comprehensive design studio. The question becomes how to quantitatively evaluate and rank the effectiveness of these methods so that those with less effectiveness can be revised or eliminated from the process. Evaluating the effectiveness of the methods utilized will not be an easy task, as

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ARCHITECTURAL ENGINEERING PROGRAM

How well do you feel that OSU Architectural Engineering 5th year students understand each of the following areas of knowledge based on your participation in the ARCH 4216 Jury?	Very Well	Above Avreage	Average	Below Average	Not at All	How important do you feel each of the areas should be in the architectural engineering curriculum:	Very Well	Above Avreage	Average	Below Average	Not at All
The Structural Design Process											
Structural Building Loads											
Selection of a Structural System (type)											
Design of Concrete structures											
Design of Steel structures											
Design of Timber structures											
Design of Masonry Structures											
Foundation Design											
Lateral Force Resisting System											
Detailing of Structural System											
The Construction Process											

Partial example of survey sent to practicing architects and engineers for evaluation of students

many factors could skew the results of the evaluation. One method of evaluation that might be used is a series of surveys. These would consist of one survey taken by the students at the end of the course and would deal with their evaluation on the effectiveness of the different methods utilized to distribute information during the semester. The second survey would be given to

members of the design juries and would evaluate the juror's impression on the student's knowledge of the various issues pertaining to the comprehensive design process. Through the results of the survey, the faculty could review and revise the process of teaching the students to achieve better results from subsequent surveys.

The art of teaching is based in communication with the student. If the student cannot be mentally drawn into the subject being taught, then the chance of success in teaching a course is greatly diminished. In a comprehensive design course such as this one, the amount of information that must be provided to the students can make the success of the course even more difficult if the information cannot be presented in an interesting and efficient manner. By utilizing alternate methods of presenting information to the student, this process can be made more efficient and exciting to the student, greatly increasing the chance of success in teaching the comprehensive design studio, or in teaching any course.

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3. Felder, Richard M.; *Reaching the Second Tier: Learning and Teaching Styles in College Science Education*, J. College Science Teaching, 1993.

JOHN J. PHILLIPS, PE
John Phillips, an assistant professor of architectural engineering, is one of four faculty members teaching in the comprehensive design studio, where his expertise is structural design. He also teaches Analysis I, Foundations, Structures: Timber Steel & Concrete, Steel II, and Steel III courses. Professor Phillips is a registered engineer in the state of Texas, and a structural engineering consultant for Brown Engineering in Stillwater, Oklahoma.