

## **2006-1448: ASSESSING THE COMPREHENSIVE DESIGN STUDIO COURSE THROUGH ALTERNATE METHODS**

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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 consultant for Brown Engineering, P.C., in Stillwater, Oklahoma.

# “Assessing the Comprehensive Design Studio Course through Alternate Methods”

## Abstract

*Course assessment typically consists of the review of a course by the teaching faculty member based on student grades from the course. This process, without additional methods, can lead to a false sense of success in a course, and it becomes necessary to find alternate methods for further assessment.*

*For the comprehensive design studio course, alternate methods of assessment have been employed. This course is a semester long architectural and engineering design studio where all phases of an architectural design project are covered, from schematic design through design documentation. In addition, the course involves a jury process where practicing architects and engineers attend student presentations twice during the semester at which times the students individually present their projects to the jury. At those times, the jury offers critiques and feedback on the progress of each students design.*

*An additional source used for assessment in this course is based on information from the jury of practicing professionals that attend the student presentations. The juries assess the students' performance and compare this assessment to the jury members' expectations of how they thought the students should have performed. This assessment allows the course professors to evaluate if the end product of the course met the expectations of practicing professionals. For this process, historically the jury members have been given a questionnaire at the end of the semester in which they assess the abilities of the students in respect to the requirements of comprehensive design. This paper will look at the questionnaire presented to the jury members, at the results of the jury assessment for the course, and discuss ways of improving the success of the Comprehensive design studio course based upon this assessment material.*

## Introduction

As an instructor in a school of architecture, many of the courses taught are studios, where there are not absolute right or wrong answers to a given problem. There are as many solutions to a problem as there are methods that can be used to teach a studio course, and it is up to the professors to evaluate the effectiveness of these teaching methods to determine which lead to a successful result in the course. Assessing these courses is also a challenge in that it must be accomplished without egos interfering with the results of the assessment. We must be able to determine if the results of our teaching methods benefits the students, and to what extent. As quoted by Thomas J. Shuell, “*It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does*”<sup>3,4</sup>, and we as faculty must keep this in mind when we assess the courses we teach. A typical course utilizes student grades as a tool for assessment, but a studio course must be approached differently, utilizing alternate methods to arrive at the final course assessment. For the comprehensive design studio, there are many facets that the students must be taught, and it is up to the instructors to make sure the students are given the resources to be able to accomplish what is required in the studio.

Through assessment, we can evaluate how we are doing at providing the students these resources, allowing the faculty to make changes to the course to better the student's educational experience.

The comprehensive design studio is the culmination of a student's career at Oklahoma State University, and occurs during the last semester of the architectural engineering student's curriculum. At this point in the curriculum, the students have completed all of their structural design courses, but have not yet dealt with studio projects beyond the schematic design phase.

First Year		Second Year		Third Year		Fourth Year		Fifth Year	
Intro to Arch	Arch Studio 1	Arch Studio 2	Arch Studio 3			Arch Studio 4			Capstone Studio
			Arch Systems	Tmbr/Stl /Conc	Adv. Steel		Adv. Conc.	Special Loadings	
Calculus 1	Physics 1	Statics	Strengths	Elem. Analysis	Comp. Program.	Foundat.	Inter. Analysis	Directed Elective	Soils Lab
Amer. History		Calculus 2		Diff. Equation	Dynamic	Thermo Dynamic	Statistics	Eng. Statistics	GenEd Science
Amer. Gov't.	GenEd Science		Chem 1	Environ. Controls	Physics 2		Fluid Mechs.	Arch Mgmt.	Directed Elective
English 1	English 2	Arch History				GenEd Science	Elec. Science	Arch History	Directed Elective
Pre-Professional School				Professional School of Architectural Engineering					

Fig 1: Oklahoma State University - Architectural Engineering majors Curriculum Chart

This studio is team taught by four faculty members (two architects, one environmental controls and one structural) and has been structured to give the students an experience similar to what will be experienced in practice upon graduation. The course is structured so the schematic, design development, and construction documents phases are explored during the semester. During these three phases, each student acts as their own design firm where they deal with code issues, client meetings (with the faculty acting as the client), cost issues, and many other topics commonly experienced throughout an actual design project.

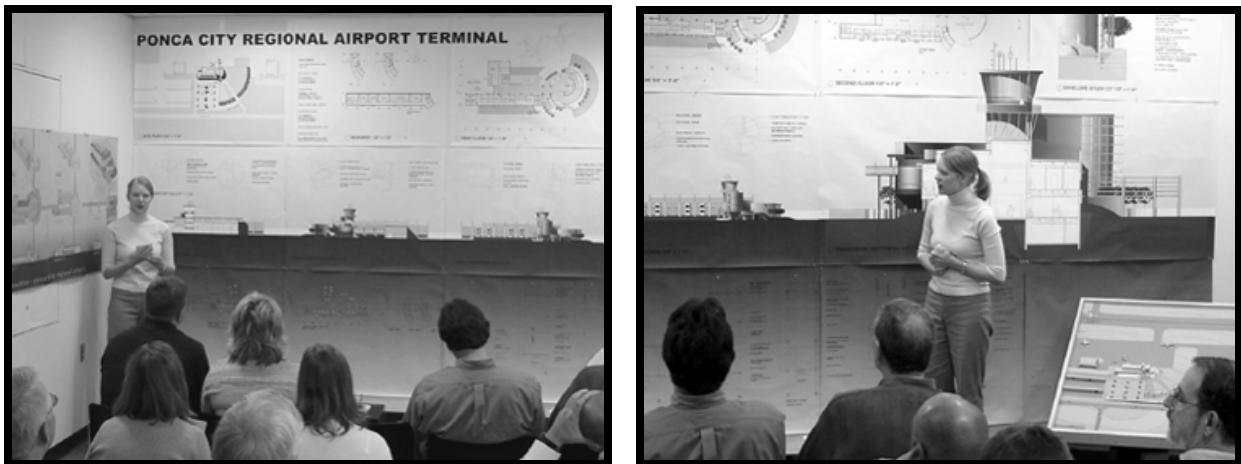


Fig 2: Student Presentation Jury to group of practicing professionals

In addition, the students are required to present their projects to a jury at the end of the schematic design phase and at the middle of the design development phase. This jury is comprised of practicing architects and engineers from across the state that come to the school of architecture to review the students work and give verbal and written critiques of each student’s project. In addition to the practicing professionals, jury members relating to the specific project assigned for that semester are present to give their unique view on the project. Students are required to present their projects to the jury using presentation boards and a verbal presentation to explain their project, much as a client presentation in the working world. The verbal and written feedback each student receives from the jury members allow them to evaluate their projects and make adjustments accordingly. This experience for the students is valuable in that it allows the students to obtain reviews of their projects outside of faculty. For the faculty, the practicing professionals help to validate the information we teach the students during the semester.

### Assessment

At the end of the semester after the jury members have had a chance to see how the students have progressed through the course, the faculty sends the jury members a survey questionnaire so that they may give us feedback on not only how they thought the students performed in the semester, but also which topics covered in the course the practicing professionals deem more important in the design process. The questionnaire covers all aspects of the design process covered in this course, and asks the jury member to evaluate the students as a whole on a scale of one to five. This information is used as one of the methods for assessing the course, and participation by the jury members in the process has been highly successful in past years. This information is utilized through the comparison of the survey results with previous years and using this information to help make adjustments to the course when necessary. Through this external assessment process, we have been able to keep connected to the practicing profession, and have established a course that respectively represents actual conditions. However, with any assessment tool, the faculty feels it would be beneficial to the course if we could receive feedback from the practicing professionals during the semester as the course progresses on how they feel the students are doing in the course. This would enable the faculty to adjust the educational aspects of the course to better represent actual conditions experienced on a design

Assessment Committee/ Oklahoma State University/ School of Architecture/ 101 Architecture Building/ Stillwater, OK 74078-5051											
<b>ARCHITECTURAL ENGINEERING PROGRAM</b>											
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?					How important do you feel each of the areas should be in the architectural engineering curriculum:						
	Very Well	Above Average	Average	Below Average	Not at All		Very Well	Above Average	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											

Fig 3: Sample of survey sent to practicing architects and engineers for student evaluations

project. The question became how to determine the kind of feedback that was needed from the jury members for use in assessment, and how this information would be obtained.

At the start of this year, we devised a method to assess the course during the semester to help us determine how the students are progressing throughout the semester. Twice during the semester the students present their individual projects to a jury of practicing architects and engineers. The students receive feedback from these jury members in written and verbal form. The students utilize this information to help correct inadequacies in their designs and to move forward in the design process. For the faculty, this year we have attached to each students comment sheets a list of five questions that the jury members will answer for each student. Figure 4 shows a sample of the questions that will be asked of the jury members. These questions are presented to the jurors at the bottom of comment sheets that are filled out for each student in the course. This will allow the faculty members to ascertain how the students are doing in the studio course relative to how well practicing professionals feel they should be performing. Students do not see the assessment by the jury members, as this part of each page is removed prior to giving the comments to the students.

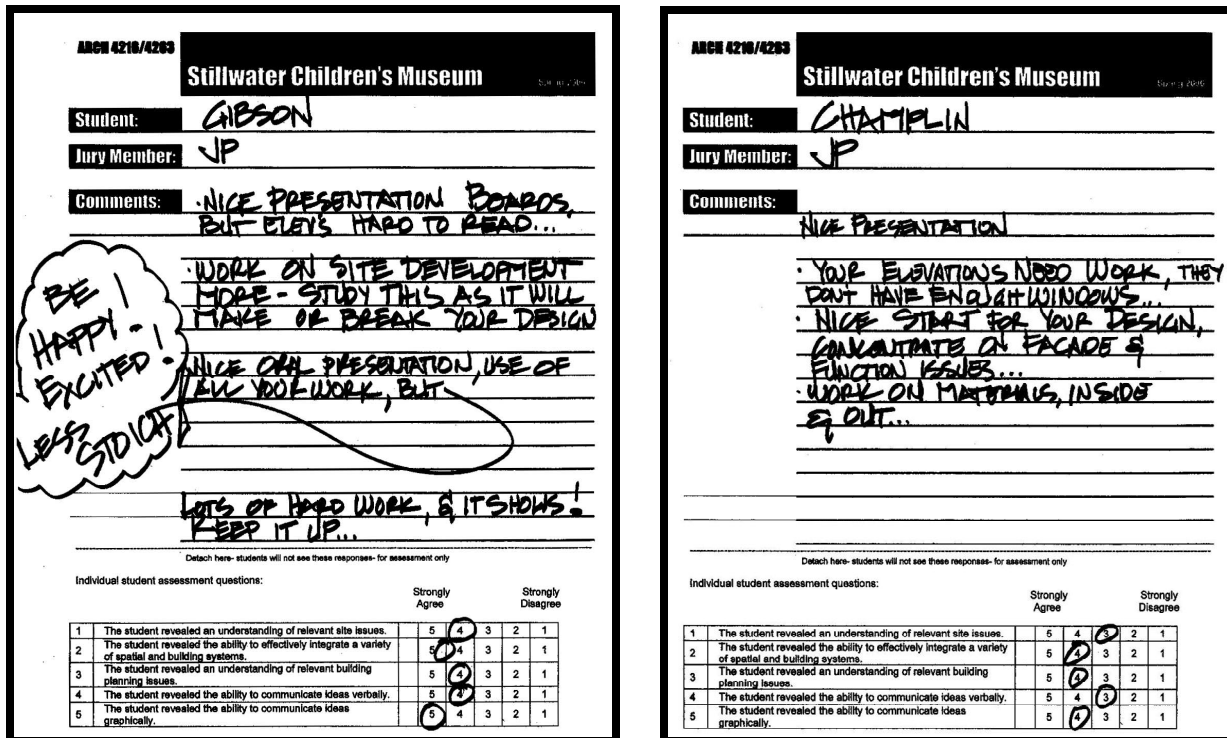


Figure 4: Examples of juror comment sheet with questionnaire at the bottom of the page

Over the past five years, this course has consistently received high marks from the external assessment provided by the practicing professionals. Based on the jury surveys, where values range from 1 to 5, the results for the structural engineering portion of the course over the past four years has been highly successful based on a measure of 3.5 and above being the measure of success, as shown in Figure 5. The numbers in parenthesis following the year are the number of architectural engineering majors that took the course each year. For each of the values that fall below the threshold of 3.5, the faculty revisits the topic and decides the importance it plays in the

course. The survey sent to the practicing professionals asks for the assessment of multiple skills the students must master, and it becomes apparent that each of these skills cannot be given the same amount of time devoted to them throughout the semester. For example, the assessment of topics such as *Construction Cost Control* and *Constructability Issues* as shown in Figure 5 has ranked below the successful range over the past four years, but we must keep in mind that this course cannot cover all issues equally, and unfortunately some topics have been deemed less important due to time constraints in the course. At the end of the semester, we will compile and assess the course based on the responses, compare this assessment with other methods for the course (both external and internal) and this information will be used for potential revisions to the course that will enhance the learning experience for the student.

	2004 (8)	Preception	2003 (13)	2002 (1)	2001(10)
The Structural Design Process	4.33	4.80	4.00	5.00	3.84
Structural Building Loads	4.33	4.80	4.17	4.29	3.57
Selection of a Structural System (type)	4.17	4.40	3.69	4.29	3.57
Design of Concrete structures	4.17	4.40	3.50	4.29	3.81
Design of Steel structures	4.17	4.40	4.00	4.29	3.93
Design of Timber structures	3.83	4.20	3.22	3.57	3.33
Design of Masonry Structures	3.83	4.40	3.20	3.57	3.27
Foundation Design	3.67	4.40	3.92	4.29	3.37
Lateral Force Resisting System	4.17	4.60	3.67	4.29	3.84
Detailing of Structural System	3.33	4.00	3.54	3.57	3.25
The Construction Process	3.50	3.60	3.08	3.57	3.57
Construction Cost Control	2.83	3.80	2.78	2.86	2.96
Constructability Issues	3.17	3.80	2.92	2.86	3.25
The Mechanical Design Process	3.17	4.00	3.05	3.57	3.17
Thermal Comfort Concepts	3.17	3.80	2.90	2.86	3.33
Heating & Cooling Loads	3.00	3.60	3.10	2.86	3.17
Concepts of Passive Design	3.00	3.60	3.22	2.86	3.41
Selection of a Mechanical System (type)	3.50	4.00	2.78	3.57	3.33
Design of the Mechanical System	3.00	3.60	2.89		3.04
The Architectural Design Process	4.20	4.00	4.15	3.57	4.07
Principles of Design	4.00	4.40	4.00	4.29	4.07
Responding to Architectural Context	4.20	4.20	3.69	2.86	3.88
Sustainable Design Issues	3.60	4.00	3.50	2.86	3.41
Site Planning	3.60	3.80	3.31	3.57	3.29
Ethics and Legal Issues	3.60	3.80	3.60		3.39
Social and Human Considerations	3.80	3.80	3.91	3.57	3.43

Figure 5: Partial results from the course assessment over the past four years

We have often thought of our comprehensive design studio as very thorough and an excellent representation of how an actual design project would be handled in an architecture and engineering firm. The way in which we have established this course and the effort put forth by the jury members, students and faculty was recently recognized. In 2004, the project for the comprehensive design studio (then known as ARCH 5116) was entered into the national NCARB Prize for the Creative Integration of Practice and Education in the Academy. The prize recognized this course as the most creative program in architectural education integrating practice with architectural education. I was one of four professors teaching in the course, and our entry won Grand Prize with a cash award for the school of \$25,000. More than the prize money, the recognition of winning the NCARB Prize helped to validate the program we have established at the School of Architecture.

## Conclusion

The process of assessing a course is one that must be approached carefully so that the results are not skewed, leading to a false sense of success in the course. By using alternate methods of assessment, such as surveying practicing architects and engineers, the faculty is able to evaluate if the course is successful based on the views of professionals in the field. This enables the course instructors to re-evaluate the course structure based on the assessment, which can lead to more successful results in the future. The faculty at the school of architecture feel that the extra effort put forth to obtain this information allows for the course to be structured in such a way that the results of the course closely represents actual conditions the students will experience upon graduation, and feel this course is one of the reasons our graduates are highly successful in their respective fields.

One question that arises is what to do with the additional information that is gathered during the semester. This criterion-referenced assessment can be reviewed as it is obtained throughout the semester, but it is not realistic to expect revisions to occur during the semester. Any changes to the course would occur in subsequent years and could be introduced to achieve a better outcome for the course. The information will be a useful source of assessment for revisions to specific topics in the comprehensive design course, resulting in a course that better represents actual working conditions, and hopefully students that better understand and are able to achieve the comprehensive design process. In addition, the intermediate assessment will be utilized at the university level to evaluate student learning outcomes for the course. By including the use of intermediate and end of semester surveys to a group of practicing professional architects and engineers, we can ensure that we are not only educating our students for practice upon graduation, but also that we are teaching the students those topics that the profession deems important.

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