

# **2019 AEI NATIONAL CONFERENCE**

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## ***COLLABORATION IN COMPREHENSIVE DESIGN: Towards an Increasingly Realistic Design Experience***

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**April 5, 2019**

# Overview

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Longtime capstone course at OSU taken by ARCH and AE students together in a studio  
Historically students worked independently

## **Course format revised to include:**

- Collaboration of ARCH and AE students in teams for the Schematic Design phase
  - Additional collaboration with *Construction Management, Fire Protection, and Geology*
  - Introduced the use of *Scrums* into the studio
- Assessment of course by students/professionals

# Comprehensive Design Studio

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4<sup>th</sup> year ARCH and 5<sup>th</sup> year AE students:

- 4 Faculty (2 ARCH, 1 Structures, and 1 MEP)
- 6 credit hour studio course
- 3 credit hour seminar course
- 3 credit hour management course

Project is designed and developed from initial concept phase through construction documents.

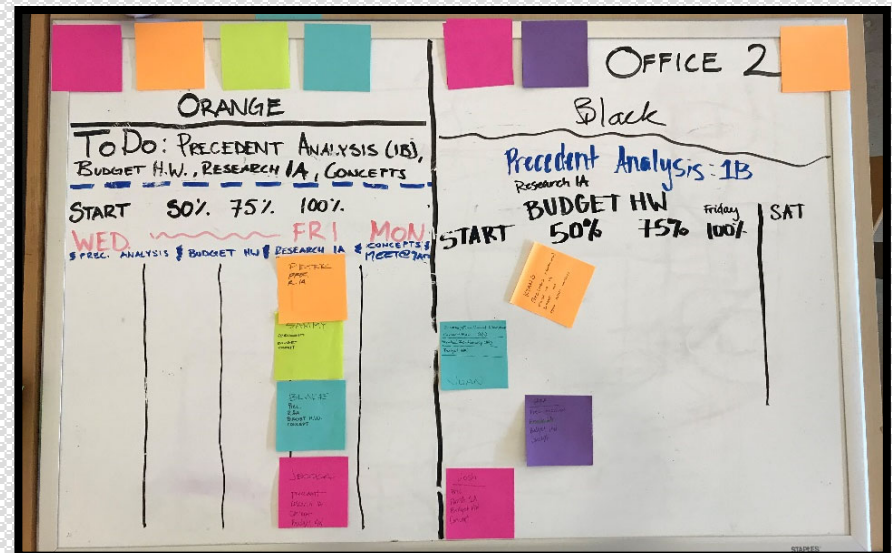




# Scrum Meetings

Beyond the team format, another addition to the course this year was including *Scrums*:

- *Scrums* are quick daily meetings to discuss status of various tasks being performed by team members
- Originally developed by software designers
- Marker board/ colored tabs used to track tasks



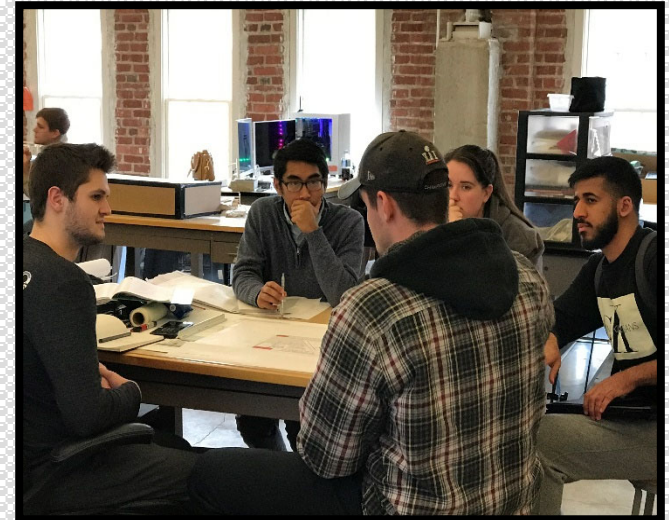


# Student Collaboration

Also included in the capstone was student collaboration with other departments, including:

- **Geology**
- **Construction Management**
- **Fire Protection**

Collaboration occurs at various points in the semester as ARCH and AE students work with students from other departments to develop their designs.



# Course Assessment

To assess the revisions to the course format, three categories were used for assessment:

- Faculty assessment (Grades)
- Practicing Professionals assessment of student presentation juries
- Student survey feedback

## SDCOMMENTS

ARCH 4216 & 5226  
Comprehensive Design Studio  
Individual Student Assessment

Students will not see these responses - for OSU assessment only.

Please circle one number per topic.

### Students ability to communicate design ideas

5	4	3	2	1
Required drawings seemed complete, and were easy to read, fully informative, and creatively presented. Verbal presentation followed a logic and explained both building and design process, and evidenced an understanding of the relevant audience.	Required drawings seemed complete, and were easy to read and fully informative. Renderings conveyed detail. Verbal presentation followed a logic and explained both building features and design process.	Required drawings seemed complete. Renderings conveyed only basic information about building. Verbal presentation evidenced a logic to the presentation, but did not explain the student's design process clearly.	Drawings seemed to be lacking in quantity, or necessary information on drawings was incomplete. Verbal presentation did not have a clear logic.	Required drawings seemed incomplete. Difficult to read. Coordinated poorly. Verbal presentation was disorganized. Student was unable to explain thought process.

### Students ability to integrate a variety of systems in solving architectural problems

5	4	3	2	1
Systemic components demonstrate investigation into the student's creative enquiry. Leading technologies are used. Integration of systems helps elevate the overall design quality.	All systemic components are described, and their integration with spatial and technological concepts has been considered.	All required systemic components are in evidence, but some are either inappropriate, inadequate or cannot be made to function properly as conceived.	Major systemic components are in evidence, but some are either inappropriate, inadequate or cannot be made to function properly as conceived.	Major systemic components are missing. Student seems not to understand how building components are integrated into a design.

### Students understanding of the architectural design process

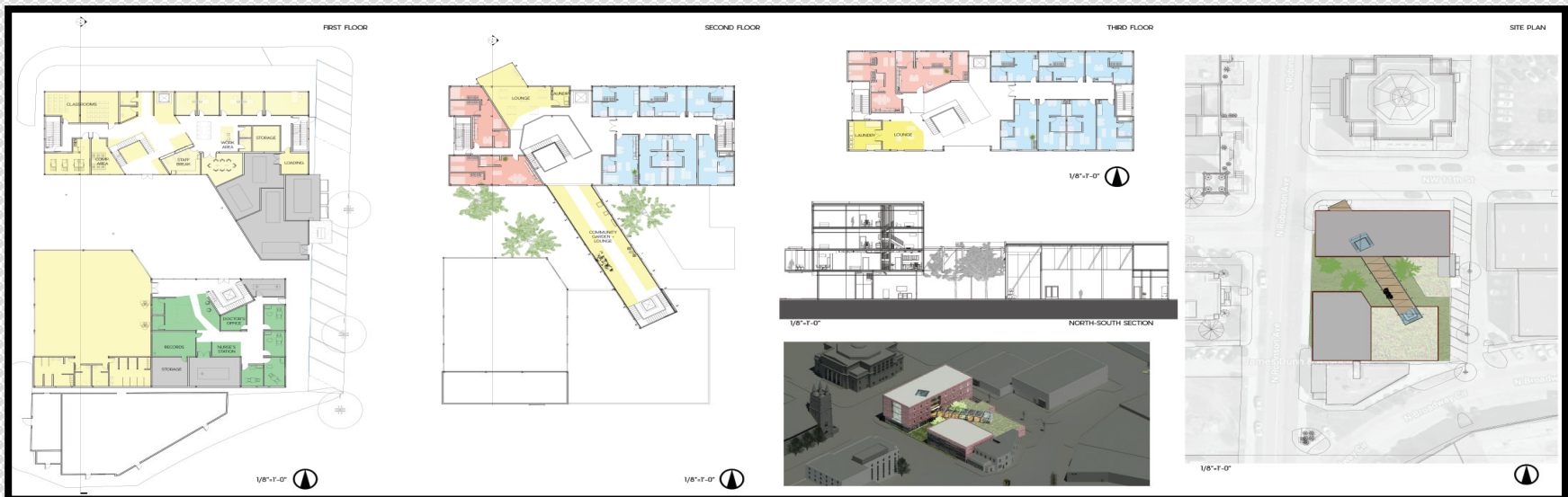
5	4	3	2	1
Student displays a strong grasp of the parameters for the employ of the chosen systems and materials so that they can be creatively incorporated. Concern for constructability and durability is in evidence.	Student displays a strong grasp of the parameters for the employ of the chosen systems and materials. Choices of systems and materials reinforce a unifying concept.	Student's project has encompassed all the major design is adequate but lacking a concept that can organize the major design decisions toward an artistically unified end.	Some design elements will not work as intended. The overall design could be built but is not clearly driven.	Student appears unaware or unconcerned with turning the design into a constructible solution. Large design elements will not work as envisioned, or else are inappropriate to the project. Conceptual basis is severely lacking.



# Faculty Assessment - Grades

Faculty assessment of team format includes:

- With the team format to the course, while there were no extremely low grades in the SD phase, neither did student teams “*hit one out of the park*”.
- Further study needs to occur to see if team format skews the distribution of grades in the course.





# Student Survey Results / Assessment

Table shows the percentage of students that answered yes to survey questions

Results are broken into responses from ARCH, AE, and students combined

Student survey of Architecture and Architectural Engineering students on Team Approach			
Question	AE	ARCH	Combined
Before the semester began, were you excited about the team requirement?	53.6	75.0	70.3
After the team interaction, were you still excited about the team requirement?	71.4	73.3	72.9
Did your team utilize the scrum meetings to determine what was achieved the day before, that day's task, and to identify impediments?	78.6	62.0	65.6
Did the scrum process help manage team conflicts?	60.7	67.0	65.6
Did the scrum process help with the division of work?	71.4	73.0	72.7
Was the whiteboard provided to your team utilized?	71.4	57.5	60.5

# Student Survey Results / Assessment

Assessment of the team/scrum format included:

- Students were less excited at the start of semester compared to after with team setting, but only slightly
  - AEs were initially more tentative about the team aspect than ARCHs but their excitement improved by the end
  - ARCHs excitement declined slightly from start to end
- Scrum meetings did enhance the team process



# Written Feedback on Team Approach

Students gave favorable feedback on several issues:

- Communication
- Motivation of team
- Member strengths
- Developing ideas together as a team

## **Student Survey of Architecture and Architectural Engineering Students on Team Approach**

**During the process, what worked well on your team?**

- Communication & division of work
- How well individuals took on their tasks
- Having another motivated and driven teammate next to me helped
- Our communication was our best attribute
- People using their individual strengths to better the project as a whole
- Developing ideas together

Challenges were listed as well by the students:

- Contrasting ideas
- Work division fairness
- Computer issues
- Differing goals/values

**What issue was the most challenging working on the team?**

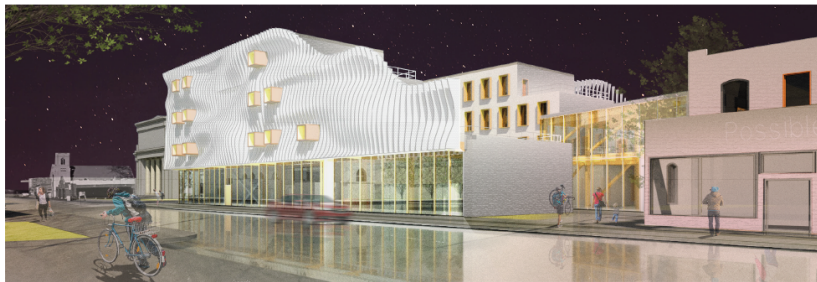
- Contrasting ideas and opinions to work through
- Teammates making decisions without consulting others
- Moving towards a design with which everyone could be happy
- Fair division of work
- Knowledge of computer programs was lacking for some team members
- Differing goals / main values between team members



# Presentation Juries

Juries occur twice during the semester:

- At end of SD phase as a team presentation
  - At end of the semester as an individual
- Juries were asked to assess the students



Nighttime West Perspective





# Assessment of Presentation Juries

Professionals are invited for student presentations.

Verbal and written feedback is provided for use by students in design development phase of the project.

Assessment of the student work for 2017-18 is shown.

Schematic and Design Development Jury Survey of Practicing Professionals		2017	2018
Team Schematic Design Phase	Student team's ability to communicate design ideas	4.13	4.33
	Student team's ability to integrate a variety of systems in solving architectural problems	4.07	4.40
	Student team's understanding of the architectural design process	4.15	4.38
Architecture Students Design Development Phase	Student's ability to communicate design ideas	4.10	4.17
	Student's ability to integrate a variety of systems in solving architectural problems	4.01	3.93
	Student's understanding of the architectural design process	4.06	4.07
AE Students Design Development Phase	Student's ability to develop a structural system	4.06	4.07
	Student's understanding of relevant structural system issues	4.25	4.00
	Student's ability to integrate a variety of systems in solving architectural problems	3.97	3.96

# Assessment of Presentation Juries

Evaluation of jury assessment included:

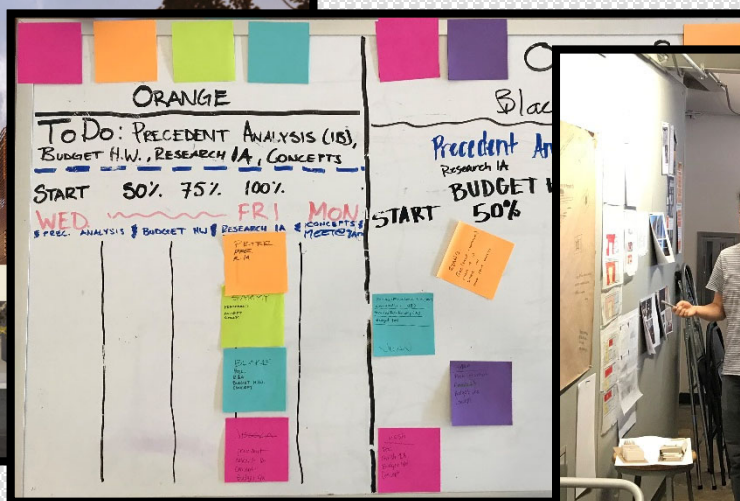
- Teams were assessed as better at *communication*, *systems integration* & *ability to understand architectural design* in the SD phase.
- However, once the students moved to the DD phase of project, the improvement was not as consistent.
- Add'l assessment in coming years may help to explain the cause.



# What's Next for the Capstone Course?

Continue to offer the team format for the course:

- Teams allow for interdisciplinary collaboration
- Students reacted positively to atmosphere of teams
- Use of Scrums will continue as their results are positive
- More in-depth crits from Professors can happen
- Chance to increase interdisciplinary aspect of course

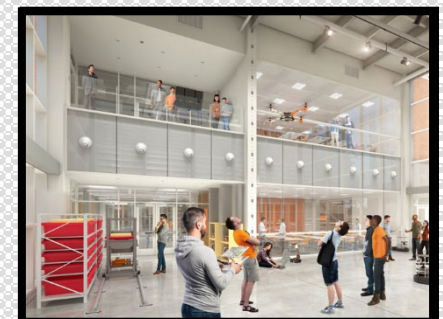




# ENDEAVOR: Undergrad Research Facility

**The Endeavor Lab** is a new undergraduate research facility at OSU:

- Opened in September 2018.
- 72,000 sf / \$35 million
- 3 floors of labs/makerspaces for innovation, collaboration, assembly and fabrication.
- Industry-aligned labs, sponsored by corporations.
- Home to interdisciplinary capstone design projects in collaboration with industry.





# Oklahoma State University

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## Goals of the collaboration process:

- Enhance the learning environment for students
- Allow students to better understand other majors
- Provide a near real-world experience for students

