Use of Technology and Movable Furniture in Flexible Classrooms

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ENGINEERING EDUCATION RESEARCH
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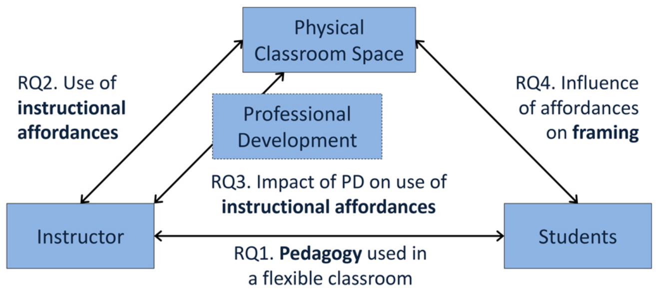
Background

- **Studio classrooms**: Students sit in small groups at fixed tables instead of in front-facing rows [1-6]
  - **Conflicting evidence:** Lecture in studio classrooms…
    - Encourages instructors to use more student-centered pedagogy [7-11]
    - Has negative effects on student learning outcomes [10]
- **Flexible classrooms:** Space can be easily reconfigured as front-facing rows (like lecture hall) or groups (like studio classroom)
  - **Insufficient evidence**: Effects on faculty teaching and student learning have not been rigorously examined [6,11-13]

Conceptual Model and Research Questions


Physical Classroom Space
Professional Development
Instructor
Students
RQ2. Use of instructional affordances
RQ4. Influence of affordances on framing
RQ3. Impact of PD on use of instructional affordances
RQ1. Pedagogy used in a flexible classroom

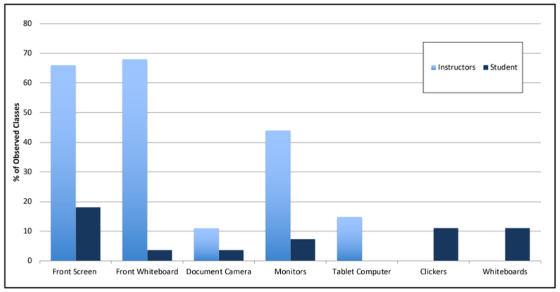
Instructional Affordances

- All have movable furniture

Classroom	Capacity	Moveable Whiteboards	Perimeter Whiteboards	Wall-mounted Monitors
1025 GGBL	24	No	Yes	Yes
1045 GGBL	24	No	Yes	No
1032 FXB	24	No	Yes	Yes
4440 EECS	36	Yes	Yes	Yes
224 GFL	48	Yes	Yes	Yes
2147 GGBL	56	Yes	Yes	Yes
2153 GGBL	56	Yes	Yes	Yes
1008 FXB	60	No	No	No
2150 Dow	62	Yes	Yes	No
133 Chrysler	84	Yes	Yes	Yes

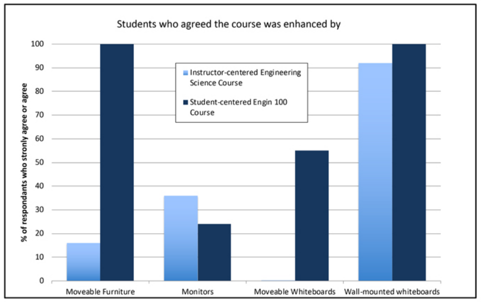
Preliminary Results

Percentage of 27 classes across 9 courses (two Engin 100 courses and seven engineering science courses) in which each instructional affordance was used.



Data from classroom observations

Student perception of the flexible classroom in two courses with excellent teachers but different pedagogies and rooms.


Students who agreed the course was enhanced by
% of respondents who strongly agree or agree
Instructor-centered Engineering Science Course
Student-centered Engin 100 Course
0
10
20
30
40
50
60
70
80
90
100
Moveable Furniture
Monitors
Moveable Whiteboards
Wall-mounted whiteboards

Data from student survey

Recommendations for Instructors

- Ask students to use wall-mounted monitors and whiteboards during collaborative group work
  - Allows you to "visually eavesdrop"
- Before the semester, think about different furniture layouts you can use
- Set the classroom norms at the beginning of the semester
  - Teach students how to rearrange the classroom
- Work with course schedulers to hold classes in flexible classrooms with a capacity > course enrollment

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