Jennifer R. Kean and Dr. Deborah Heyl-Clegg Ph.D.
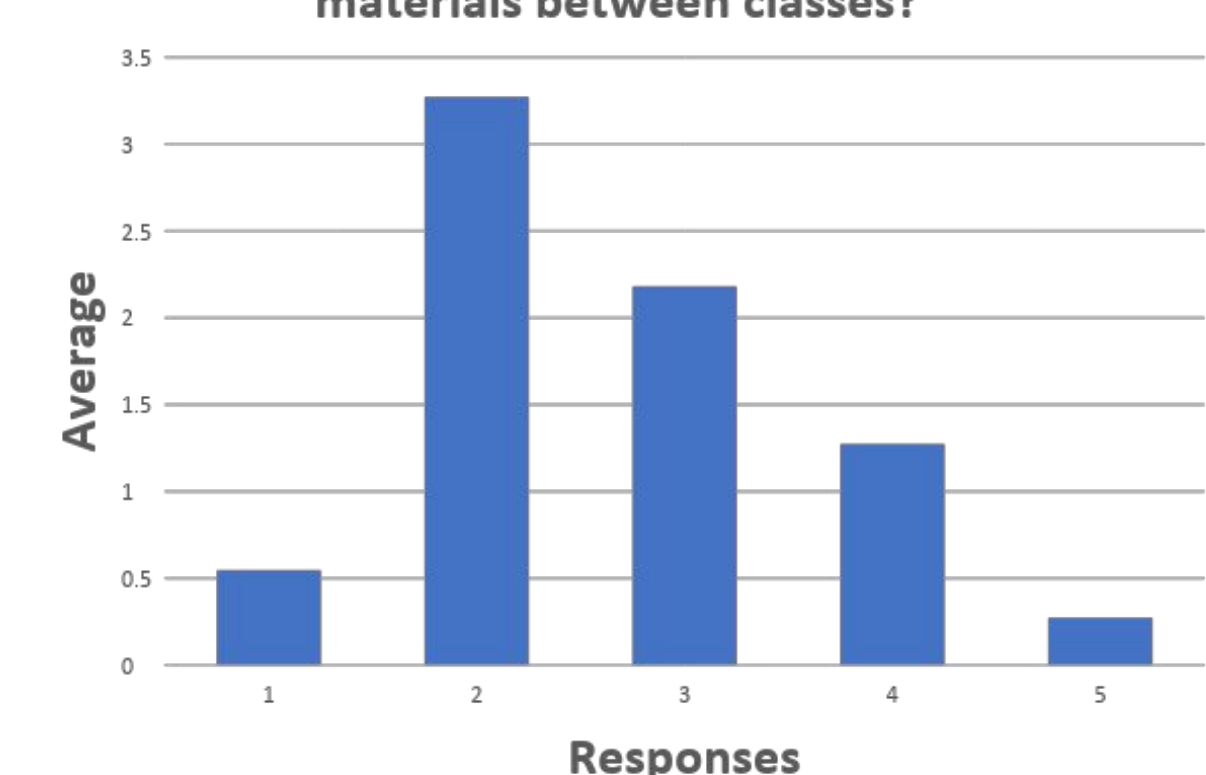## Department of Chemistry
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EASTERN MICHIGAN UNIVERSITY

Purpose

- Collaborative course (re)design (CCRD) is an approach to redesigning a college course that a professor has taught before with extensive input from a student to gain their perspective.

- The course of interest for our CCRD process is Medicinal Chemistry and Drug Design. This is an upper-level undergraduate/graduate cross-listed chemistry course.

- It was structured based on organic and biochemistry content as applied to the specialized field of medicinal chemistry, including principles of drug discovery (receptors, enzymes, metabolism, and drug design) and various classes of pharmaceutical agents.

- We participated in this learning community to broaden our own horizons and to implement SoTL techniques into an upper-level scientific curriculum. We want to increase student engagement and constantly reflect on how we present material to students who are at different levels of science/education (Undergraduate vs Graduate).

- We are working toward increasing the connections between the material and community/everyday life, which has historically been a strength of EMU.

Background

- CCRD, collaborative course redesign, is a scholarship of teaching and learning (SoTL) project at Eastern Michigan University where faculty-student partners come together as part of a learning community to change/alter their course with a current student.

- In CCRD, a professor and one of their former students work together collaboratively to redesign portions of a course that they want to update and improve.

- Faculty benefit from engaging in the CCRD process as it increases insights into student learning, and student collaborators benefit from engaging in the CCRD process as they develop insights into the teaching and learning process.

- Professors from various departments meet with their student partners to learn about SoTL and apply principles learned to change learning tactics or class format for each faculty member's course to enhance the learning experience for the class and make the content more accessible and less daunting.

- We met with the learning community every week during the Fall 2023 semester and now monthly during the Winter 2024 semester as the changes are implemented in the course.

Methods

- The class format was altered from a primarily lecture style with individual student presentations and papers to one that also includes more daily interactive groupwork with applied problems and case studies based on each lecture, partner presentations, and group discussions (in round robin format) addressing the primary literature.

- The student partner (myself) collaborated with the professor in many aspects of course format as well as choice of textbook and literature papers, discussion topics, assignments, the implementation of the round robin literature activity (everyone read the paper and then graduate students presented/explained figures to undergraduates), point distributions, and rubrics for assessment. This included a differentiation for graduate work.

- I also conducted daily surveys as well as a focus group at the midterm. All student responses were anonymous and only differentiated between graduate students (9 registered) and undergraduates (10 registered).

Our Findings

Graduate Students
Average Attendance: 7.5

Undergraduate Students
Average Attendance: 8.3

Q1: Do you think today's course material is applicable to your life?

Legend Key: 1- Strongly Disagree, 2-Somewhat Disagree, 3-Neutral, 4-Somewhat Agree, 5-Strongly Agree

Q2: Do you think that by completing the problems/case studies/readings for today, it will prepare you to be successful on the test?

Legend Key: 1- Strongly Disagree, 2-Somewhat Disagree, 3-Neutral, 4-Somewhat Agree, 5-Strongly Agree

Q3: In the past week, how many times have you looked over class notes or study materials between classes?

Legend Key: 1- Not at all, 2- One Time, 3- Two Times, 4-Three Times, 5-Four or More Times

Q4: Did you enjoy the small group discussion in class today?

Legend Key: 1- I hated it!, 2- Not Really, 3- Neutral, 4-Yes, 5-I loved it!

Q5: How difficult was today's content for you to understand?

Legend Key: 1- Very Easy, 2- Somewhat Easy, 3- Neutral, 4-Somewhat Difficult, 5-Very Difficult

Debbie and I created the daily survey so that we could actively modify/improve the course as the semester went on. It gives us a look at what the students are thinking and if the material needs to be presented in a different or better way. The graphs above display the average of daily responses for the first half of the course.
The daily survey questions were chosen based on SoTL and different categories of engagement.[1,4,5] These categories include: Applied Engagement, Goal-Oriented Engagement, Self-Disciplined Engagement and Interactive Engagement.[4,5]
Q1: Applied Engagement Q2: Goal-Oriented Engagement Q3: Self-Disciplined Engagement Q4: Interactive Engagement

Discussion

Undergraduate= UG and Graduate = G
Daily Survey Trends:
- UG/G students were generally engaged/found the material relevant.
- UG/G believe the modified group work we introduced prepares them for the exam. Most enjoy the group work/applied problems too.
- On average, almost every single graduate student comes to class.
- On average, at least 2 undergraduates miss class every day.
- Undergraduates study more than the graduate students and find the material more difficult.

Round Robin Literature Activity Feedback:
- UG/G students felt that this activity helped them better understand course material.
- UG/G students found the material and chosen paper relevant.
- UG/G students felt that their critical thinking skills improved.
- UG/G students felt that the activity could be better structured.
- The UG preferred this assignment over a powerpoint because it involved more discussion between UG/G and professor.

Focus Group Feedback:
- Grad students felt that their communication skills improved because they got to practice delivering scientific content to others, in addition to group discussion, reading assignments and literature discussions.
- Undergrads felt their communication skills did not improve by the group discussion, reading assignments and literature discussions.
- The graduate students felt that there were barriers to engagement in the course (such as work commitments) but the undergraduates felt that there were no barriers to engagement.

Conclusions

- One of the major findings was that graduate students did not feel their teamwork improved from the round robin literature activity, though communication skills did.
- The textbook was not helpful for test preparation, but in class group work problems that applied the material were helpful.
- The round robin activities and group discussions worked positively for graduate students, but the undergraduates did not feel the same way.
- Student feedback showed that the undergraduates could more easily adapt to changes and enjoyed more group work than the graduates.
- The content does not need any modification; everyone thought the topics were interesting/thought provoking.
- UG/G students would rather have a flipped classroom in the future.
- UG/G students would rather have more lecturing than group work.
- Overall trend is that we need to keep bridging the gap between UG/G so they both feel heard in the classroom. There are aspects where the course is working better for undergrads and vice versa.
- This course will continue to be taught with both UG/G students. When this course is completed, Debbie and I will try to modify certain activities and topics based on student feedback.

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