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Increasing Student Attentiveness and Engagement in Growing MSYM Courses
Instructional Improvement Plan (IIP)
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Background

Growing enrollment in undergraduate MSYM courses has carried increased class sizes and then made it more difficult for students to remain attentive and engaged during lecture. In fall 2014, I maintained a dynamic lecturing style in MSYM 354, Soil Conservation and Watershed Management. Readiness tests, an active learning tool, continued to be helpful, but the mode of delivery was still largely a traditional lecture. Team based learning was utilized which divided the class into diverse learning teams for both the lab and the lecture. Students completed readiness tests both individually and in their teams.

The objective of this activity was to solicit more student attentiveness and engagement in the fall of 2015 by improving the mode of delivery.

Improvements

I implemented three improvements to my lecture style in fall of 2015 in MSYM 452, Irrigation Systems Management. With Dr. Eisenhauer's retirement, I had agreed to teach MSYM 452 instead of MSYM 354. First, a more effective use of readiness tests to stimulate discussion and introduce lecture topics was utilized. Instead of going over readiness test answers quickly, I took 5-20 minutes to discuss the answers while the students were curious about the correct answers. Also, I used one or two of the readiness test questions as a transition to introduce the new lecture topic. Sometimes there was a shuffle in the classroom when students realized I had went over all five questions and they began to relax for the regular lecture material, indicating increased engagement during this time immediately after a readiness test.

Second, I used more in-class example problems. These required students to work in their teams to quantitatively apply the concepts they learned in lecture. Example problems were scheduled for the middle of the lecture period when student attentiveness can start to wane.

Finally, I increased the use of the white board and decreased the use of PowerPoint. This forced me to slow down (which is hard when I am excited about the material) and be more interactive with the students. I can better read students' faces and body language, and then adjust my lecture accordingly. A good textbook in MSYM 452 helped make this transition possible, since I did not need to rely on PowerPoint to disseminate detailed lecture material.

Assessment

This activity was assessed through observing lectures and a survey. Dr. Eisenhauer, who served as a peer reviewer, observed two lectures (one with a readiness test and one without) in MYSM 354 in 2014 and in MSYM 452 in 2015. His written summaries are included in Appendix A.

A survey was administered in 2014 (n=63) to collect baseline data and in 2015 (n=41) in order to assess the effect of changes in lecture style. Questions were organized around eight topics, with a positive and

negative question for each topic, and the order of questions was randomized for the survey form (Appendix B). Dr. Eisenhauer provided input on the survey questions and they were also reviewed by Evan Curtis to check for bias in the way questions were worded. While performing the survey on two different courses introduces uncertainty into the analysis, both courses are upper level MSYM courses with similar student demographics (majority MSYM and agronomy students). The CIEQ method was used to assign numerical scores to survey results so that a higher score is always better:

	Agree Strongly	Agree Moderately	Disagree Moderately	Disagree Strongly
Positive questions:	4	3	2	1
Negative questions:	1	2	3	4

A change in mean score of 0.20 or greater was considered to be significant. This correlates approximately to the CIEQ adjusted percentile changing by 20. CASNR states that variation in percentile greater than 10 may not be significant.

Results

Survey results (Appendix C) showed that students had an overall favorable view of the course in both years (composite mean score of 2.95 and 2.93) and especially appreciated the laboratory exercises (questions 17-19) and team based learning (questions 5 and 8). More specifically, results demonstrated an increase in student learning during the lecture in 2015. For question 4, a higher mean score (2.7 instead of 2.2) indicated that fewer students had trouble paying attention during the lecture. Also, in 2015 students put a higher value on the lecture relative to other activities in the course (question 13). This trend was also confirmed in the CIEQ results for question 5, “It was easy to remain attentive,” with the mean score increasing from 2.53 (2014) to 2.78 (2015).

Several questions had a nonsignificant (<0.20) difference from 2014 to 2015 (Appendix C). Results did show that the course content was more difficult to understand (question 11) and that students had increased difficulty keeping up with the pace of the lecture (question 12) in 2015. This may be due to the fact that 2015 was the first time I taught MSYM 452, in contrast to 2014 which was the third time I had taught MSYM 354. Scores for questions relating to the readiness tests decreased in 2015 (questions 7 and 15), although they still showed an appreciation for the readiness tests as a learning tool (mean scores were 2.7 or higher).

In the answers to the open ended survey questions, several students in 2014 requested that the lecture be more engaging, and requested more hands-on activities in both lab and lecture. In 2015, several students said that the lecture was well done, although some requested more PowerPoint presentations or videos. Students also request fewer equations and more applied management topics.

Conclusion

This instructional improvement plan strengthened me as an instructor by helping me to focus more on student learning instead of delivery. Both the survey data and the peer evaluation documented improvement in student attentiveness and engagement. I plan to continue to improve MSYM 452 by continuing to update it with industry trends and recent research in irrigation management.

Appendix A: Peer Evaluation

Instructional Improvement – Peer Evaluation

Dr. Derek Heeren, MSYM 354

by

Dean E. Eisenhauer

On November 25 and December 2, 2014 I sat in on Dr. Heeren's MSYM 354 lectures in Room 116 Chase Hall. This was a relatively large class of about 70 students. I attended the class to observe Derek's teaching style on a day when a Readiness Test (quiz over reading material) was being administered (11/25) and on a day without a Readiness Test. On both days a portion of the class time was used for lecture.

Derek's lectures are well organized and relatively fast-paced. He displays a lot of enthusiasm of the subject which undoubtedly encourages students to become engaged in the learning process. The Power Point slides were very clear and concise and I might add a significant improvement over the visuals that I passed on to Derek when he took over this course. I liked how Derek used the overhead camera to work through example problems and students became engaged through this process. Following this activity with a team problem solving activity could be beneficial.

On the day of the Readiness Test I observed active team learning. I believe that there were over 15 learning teams in the class and most teams seemed to be relatively functional. Like most team-based learning classes there are a few team members that more or less "go through the motions" but I didn't consider or observe this to be a big problem in Derek's class. There were a few students that left immediately after the test, just before the lecture but I believe that part of that was due to the fact that this was the day before Thanksgiving vacation.

If there is one area of improvement that I might suggest is for Derek to slow down a bit and allow students to process material and interact with him more during the lecture. Perhaps that given the large class size, the use of clickers might help increase student engagement. This is also true following the Readiness Tests. For my classes I found the Readiness Tests to be a good venue to encourage class participation and critical thinking. Use of some class time immediately following the Readiness Test for discussion worked well for me. It is a time that the students and the instructor can key in on the concepts that the students really didn't understand well after studying the material. Being patient with the students as they formulate questions might be helpful.

Dean Eisenhauer

July 23, 2015

Instructional Improvement – Peer Evaluation

Dr. Derek Heeren, MSYM 452

Fall 2015

By

Dean E. Eisenhauer

On December 2 and 9, 2015 I sat in on Dr. Heeren's MSYM 452 lectures in Room 112 Chase Hall. This was a relatively large class of over 40 students. This is my second time to serve as a peer reviewer in one of Dr. Heeren's courses; in the Fall of 2014 I reviewed his lectures in MSYM 354.

As was the case with Derek's lectures in MSYM 354, his lectures in 452 were well organized and filled with meaningful content. He displays a lot of enthusiasm of the subject which undoubtedly encourages students to become engaged in the learning process.

Compared to his teaching style in 354 I noticed that Derek followed a slower pace in 452 and didn't speed through a Power Point to simply cover the material. He spent more time encouraging discussion and making key points on the marker board as well. This seemed to make it easier for the students to follow the material and to become more engaged in the lecture with Dr. Heeren and with the other students as well, especially students in their learning team.

I was impressed that even though this was the first semester that Dr. Heeren taught 452, he seemed to be in a comfort zone with the class and the students responded positively to his style. Keeping students interested and engaged this late in the semester can be a challenge.

I am honored that Derek has chosen to follow essentially the same subject matter that I taught in 452 but noted that he added some new and more cutting edge topics into the course such as variable rate irrigation. I encourage Derek to continue to make annual updates of the material based on industry needs and his recent research.

Dean Eisenhauer

May 13, 2016

Appendix B: Survey Form

MSYM/WATS/HORT 452/852

Anonymous Survey

December 9, 2015

1. Year (junior/senior/other) _____

2. Major _____

3. Is this course required or an elective? _____

	Agree Strongly	Agree Moderately	Disagree Moderately	Disagree Strongly
4. I have trouble paying attention during the lecture.				
5. I learn better independently than in teams.				
6. The lecture moves too slow.				
7. The readiness tests are helpful because they require me to discuss the course material with my teammates.				
8. The team based learning is helpful.				
9. The lecture style is engaging.				
10. I think an alternative style of teaching (different from a traditional lecture) would be helpful.				
11. The course content is difficult to understand.				
12. It is difficult for me to keep up with the pace of the material in the lecture.				
13. For me, the lecture is more helpful for learning the material than the readiness tests, labs, or reading the textbook.				
14. The material covered is interesting.				
15. It would be better to remove the readiness tests so that there is more time for lecture.				
16. The instructor does not keep the course interesting.				
17. The labs are helpful for me to be able to visualize and understand the concepts presented in the lecture.				
18. The instructor communicates the concepts well.				
19. The course material could be covered effectively without the labs.				

20. How could the lecture style be improved?

21. How could the team based learning be improved?

22. What topics would you like to see added or removed from the laboratory exercises?

Appendix C: Survey Results

Topic	Question	Mean Score		
		2014	2015	Difference
<i>Course Content</i>				
	14. The material covered is interesting.	3.0	3.0	0.06
	11. The course content is difficult to understand.	3.0	2.7	-0.28
<i>Instructor</i>				
	18. The instructor communicates the concepts well.	3.4	3.2	-0.19
	16. The instructor does not keep the course interesting.	3.0	3.1	0.10
<i>Student Learning (during lecture)</i>				
	13. For me, the lecture is more helpful for learning the material than the readiness tests, labs, or reading the textbook.	2.4	2.6	0.20
	4. I have trouble paying attention during the lecture.	2.2	2.7	0.47
<i>Mode of Delivery (during lecture)</i>				
	9. The lecture style is engaging.	2.6	2.7	0.05
	10. I think an alternative style of teaching (different from a traditional lecture) would be helpful.	2.5	2.7	0.13
<i>Speed of Delivery (during lecture)</i>				
	12. It is difficult for me to keep up with the pace of the material in the lecture.	3.1	2.9	-0.26
	6. The lecture moves too slow.	3.1	3.1	-0.02
<i>Team Based Learning</i>				
	8. The team based learning is helpful.	3.5	3.3	-0.19
	5. I learn better independently than in teams.	2.9	3.0	0.10
<i>Laboratory Exercises</i>				
	17. The labs are helpful for me to be able to visualize and understand the concepts presented in the lecture.	3.4	3.4	0.06
	19. The course material could be covered effectively without the labs.	2.8	3.1	0.27
<i>Readiness Tests</i>				
	7. The readiness tests are helpful because they require me to discuss the course material with my teammates.	3.2	2.8	-0.47
	15. It would be better to remove the readiness tests so that there is more time for lecture.	3.0	2.7	-0.32
Composite		2.95	2.93	-0.02

*Differences greater than 0.20 were considered significant and are marked in bold.