A CASE FOR A PARTIAL FLIP:

A BLENDED MODEL FOR A COLLEGE TRIGONOMETRY COURSE

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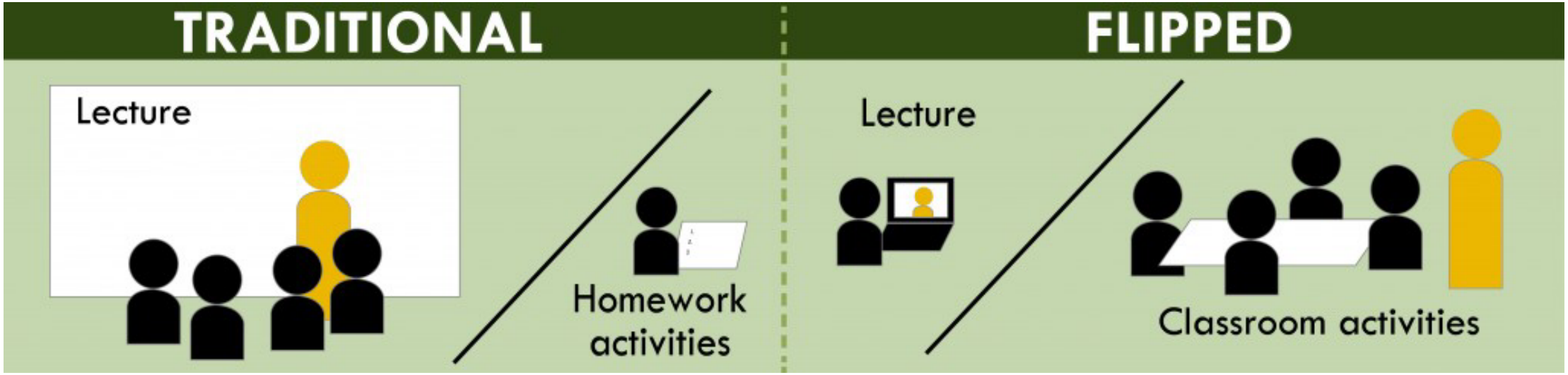
A Partial Flip?



Goal: Keep all of the pros of fully flipped instruction while eliminating many cons

Methodology

Model: One day of flipped instruction, two days of traditional lecture

Created 15 instructional videos on my iPad Pro using Doceri app and Apple Pencil

Created Video Quiz assessment due each Monday excluding exam weeks (11 total quizzes)

Final Anonymous Survey was created using likert scale to address research questions

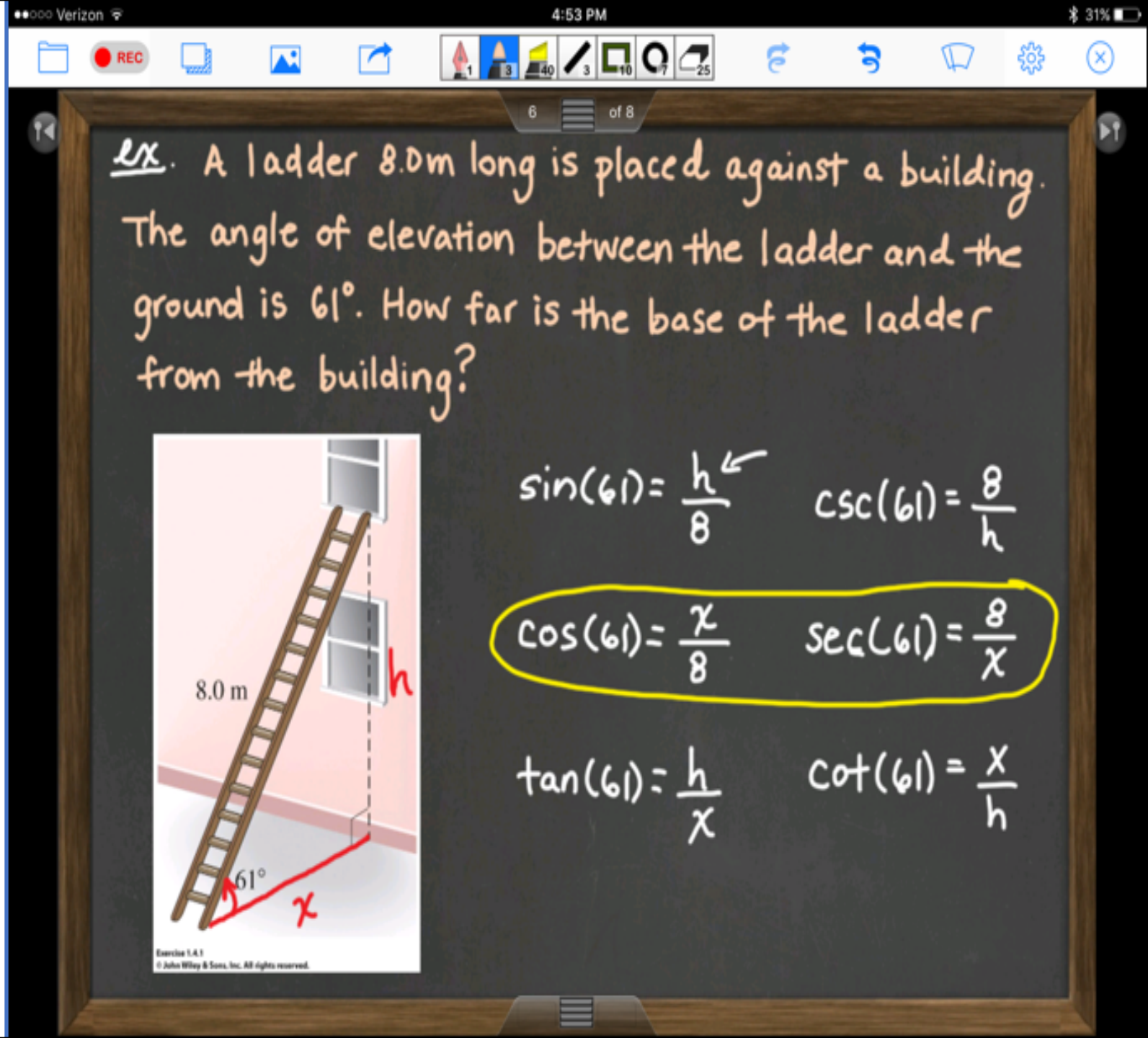
Format of the Partially Flipped Course

MONDAY	WEDNESDAY	FRIDAY
• Assessment: Video Quiz (due beginning of class) • Review/questions (5-10 min) • In-Class Activity	• Assessment: Online HW (due at midnight) • Homework questions (5-10 min) • Lecture	• Assessment: Quiz (20 minutes) • Lecture

Note: All instructional materials, including solutions to video quizzes, select homework problems, extra worksheets, links to instructional videos, and class notes were available on the course ICON site

Instructional Videos

- Created with Doceri for iPad on iPad Pro 12.9"
- Some were pulled from YouTube
- Average Length: 9:52
- Introductory content only
- Video Quiz created before the instructional video



Video Quizzes

- 10 points each
- Worth 1/3 of total quiz grade
- Submitted online before class or at the beginning of class
- Format: True/False, Multiple Choice, Fill in the blank, Plot, Graph, Short Answer
- Average Length: 6 questions

6. (1 pt.) Given the diagram to the right which of the following statements is false:

a. $\tan 55° = \frac{y}{x}$

b. $\cot 55° = \frac{x}{y}$

c. $\tan 31° = \frac{y}{4.8}$

d. $\cot 31° = \frac{x+4.8}{y}$

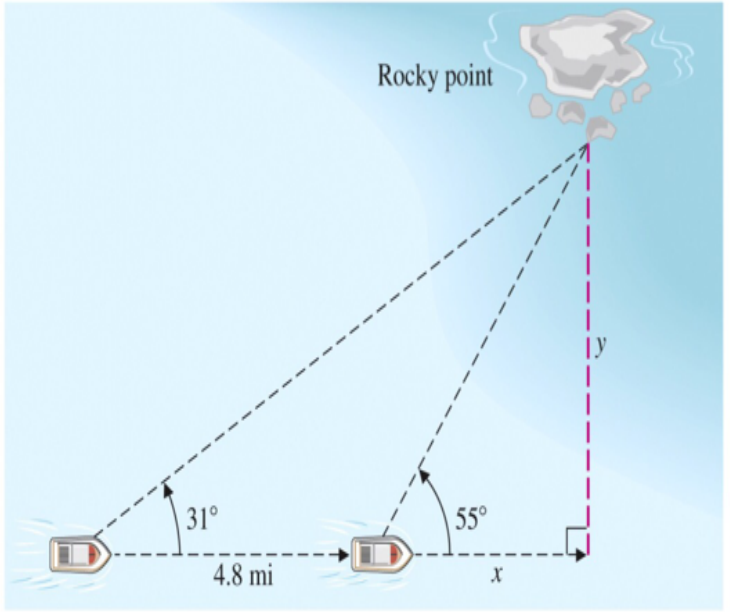
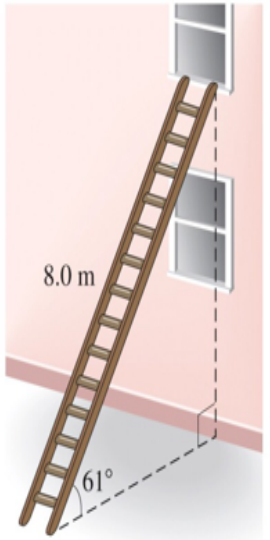
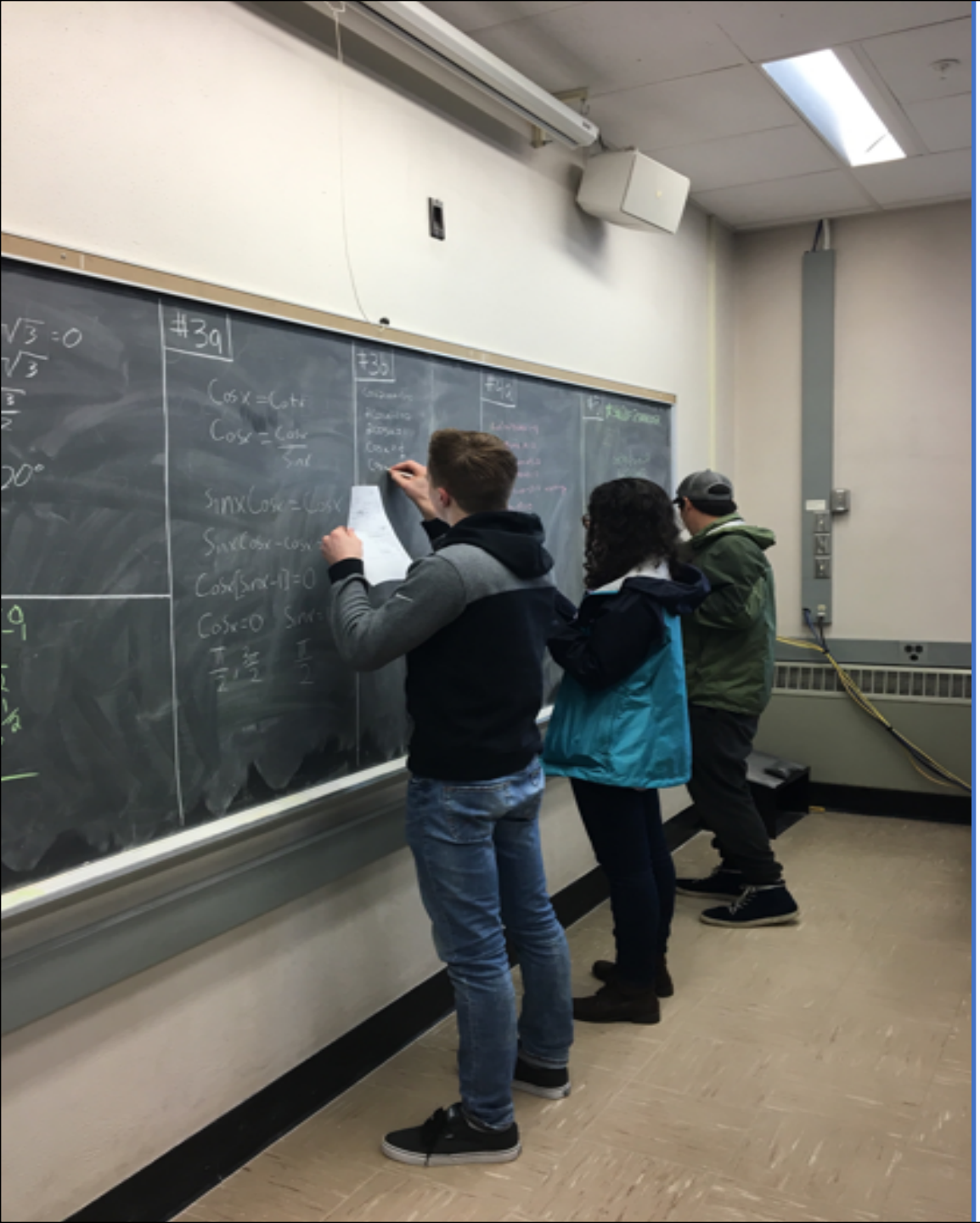


Figure 1.4.5

7. (2 pts.) A ladder 8.0m long is placed against a building. The angle of elevation between the ladder and the ground is 61 degrees. How high will the top of the ladder reach up the building? (Round your answer to the nearest meter, i.e. 3.78m rounds to 4m.)





Monday Class

- Short review of video quiz content
- Interactive activities to expand upon video content

11 flipped periods:

- Group Worksheets (6)
- Indirect Measurement Activity
- Top Chef Graphers Game
- Trashketball Game
- Jeopardy Game
- Speed ‘Equating”

Results

Video Quiz Average: 7.98/10

Passing Rate for Video Quiz: 88.55%
(percent of class scoring at least 7/10)

20/24 students with final grade of 70% and above

21/24 completed the final survey

Video Quiz Scores

Assessment	Class Average	High Score	Low Score (excluding 0)	Submissions	Scores of 7 or Above
Video Quiz 1	9.905	10	8	23	23
Video Quiz 2	7.92	10	4	23	18
Video Quiz 3	8.03	10	2	22	18
Video Quiz 4	7.6	10	4	20	19
Video Quiz 5	7.7	10	5	22	17
Video Quiz 6	7.88	10	2	23	15
Video Quiz 7	8.25	10	7.5	21	21
Video Quiz 8	8	10	6	21	20
Video Quiz 9	7.33	10	7	19	19
Video Quiz 10	7	10	7	19	19
Video Quiz 11	8.14	10	5	16	13

The final survey addressed the following:

1

Students' perception of the utility of the flipped instructional period and videos/slides on course assessments

2

Students' perception of their own learning after viewing the video/slides and the flipped instructional period

3

Students' attitudes towards the partially flipped format

Final Survey Results

Survey Questions	Agree	Neutral	Disagree
I prefer in-class activities to lecture based instruction	6	11	4
I prefer a mix of in-class activities and lecture based instruction	16	4	1
The format of this class is enjoyable	13	5	3
I would enroll in another course that uses videos outside of class	16	2	3
I recommend that faculty who teach other math courses develop videos for students to view outside of class	18	0	3
I prefer lecture based instruction to in-class activities	8	8	5
Watching the videos helps me understand concepts that are new to me	18	1	2
I feel confident about the material after watching the video and/or viewing the video slides	9	9	2
The in-class work helps me learn the course content	18	2	1
I felt confident about the video content after completing the in-class activities on Monday	13	5	3
It is helpful to work through problems on Monday when other students and the instructor are available to answer questions	16	5	0
Watching the videos helps me complete the in-class activities	15	5	1
I used the videos and/or slides of the videos to prepare for quizzes	11	6	4
I used the videos and/or slides of the videos to prepare for exams	9	5	7
Watching the videos and/or viewing the slides of the videos helps me complete the video quizzes	18	2	1
The in-class activities helps me do the homework	15	3	3
I would watch the instructional videos and/or view the slides of the videos if I did not have to complete a video quiz afterward	10	3	8

Attitude towards flipped instruction

Utility of flipped instruction for assessments

Perception of learning via flipped instruction

Miscellaneous

Final Survey Results

What was the students' perception of the utility of the flipped instructional period and videos/slides on course assessments?

Survey Questions	Agree	Neutral	Disagree
Watching the videos helps me complete the in-class activities	15	5	1
I used the videos and/or slides of the videos to prepare for the quizzes	11	6	4
I used the videos and/or slides of the videos to prepare for exams	9	5	7
Watching the videos and/or viewing the slides of the videos helps me complete the video quizzes	18	2	1
The in-class activities helps me do the homework	15	3	3

Final Survey Results

What was the students' perception of their own learning after viewing the video/slides and participating in the flipped instructional period?

Survey Questions	Agree	Neutral	Disagree
Watching the videos helps me understand concepts that are new to me	18	1	2
I feel confident about the material after watching the video and/or viewing the video slides	9	9	2
The in-class work helps me learn the course content	18	2	1
I felt confident about the video content after completing the in-class activities on Monday	13	5	3
It is helpful to work through problems on Monday when other students and the instructor are available to answer questions	16	5	0

Final Survey Results

What were students' attitudes towards the partially flipped format?

Survey Questions	Agree	Neutral	Disagree
I prefer in-class activities to lecture based instruction	6	11	4
I prefer a mix of in-class activities and lecture based instruction	16	4	1
The format of this class is enjoyable	13	5	3
I would enroll in another course that uses videos outside of class	16	2	3
I recommend that faculty who teach other math courses develop videos for students to view outside of class	18	0	3
I prefer lecture based instruction to in-class activities	8	8	5

Final Survey Results

Miscellaneous

Survey Questions	Agree	Neutral	Disagree
I would watch the instructional videos and/or view the slides if I did not have to complete a video quiz afterward	10	3	8

Final Survey Q1) *What, if anything, did you like about the partially flipped format of the course?*

"I like the fact that I can actually ask questions if I need to! It's very unusual/new to me to be allowed to do so. I also like how much more personal the classroom feels. The "Food Wars" game was kind of fun too…"

"Video quizzes were actually good with the new concepts, it layed out the big idea and helped me understand it better."

"It kept the material more fresh in my mind. It also provided another avenue for my brain to learn."

"Easier to study with the videos. More accessible examples and explanations."

"I liked being able to have a better idea of the material before coming into class on Monday. It was [nice] not to feel overwhelmed with notes."

"The video quiz was a good boost to my grade."

"Class was enjoyable, I also liked having access to all the notes online [and] videos."

Final Survey Q2) *What, if anything, did you dislike about the partially flipped format of the course?*

"The video quizzes meant there was an extra assignment to complete each week."

"Sometimes the group activities made me nervous but sometimes they were fun—like jeopardy. Probably good to get out of comfort zone."

"The in-class activities did not usually line up with the problems on Wiley-Plus. Wiley-Plus was also a pain in the neck, not very user friendly."

"Since we are just learning it, we might not understand a concept completely or might have questions that cannot be answered until after the video quiz. So the video quiz grades can hurt you."

"Maybe more lecturing because you might end up in a group who still doesn't grasp the new material and then from there it would be hard to learn anything."

"I did not like the speed or discussions."

"Sometimes I felt like we didn't cover enough of the material in class in order to do well on the homework.

Final Survey Q3) *If you could offer one suggestion for change in the format of the course, what would it be?*

“If possible do the video quiz in class the following day that way the teacher can answer a few questions and if everyone is struggling on a concept it can be reviewed before the quiz. Also no Wiley Plus.”

“Make homework due on the day of the [in-class] quiz!”

“Maybe hand out video quiz PDFs if that material won’t be lectured on. I didn’t take notes on video qui info, then in group activities had nothing to solve the problems with —> lacked the notes.”

“Something other than Wiley.”

“Make video quizzes optional or worth less points. It was stressful having to teach yourself something that would reflect on your grade.”

“Don’t make the video [quizzes] due on Monday, or if you’re going to, post them before the weekend.”

“More in-class examples! They’re good learning tools.”

Reflections

Instructional Videos

- Should be available at least 1 week in advance
- Students appreciated having a PDF version of the video slides
- Enjoyed using Doceri; will use i-Movie as an editor in future
- Next will incorporate more IBL into in-class worksheets

Assessment

- Online HW system did not align well with course format
- Online quizzes troublesome using Canvas by Instructure (fill in the blank and images)

Future Applications

- Will adopt model to future courses
- Model could still be used with all videos pulled from sources online
- Model can be adapted for use with guided notes instead of videos
- Learn more about open source documents like WebWork to use as assessment with this instructional method

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