

An Examination of the Flipped Classroom's Efficacy on Post-Baccalaureate Pre-Medical Students

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BACKGROUND

- **Hao (2016):** Only 39% of undergraduate education majors found the flipped classroom sufficient for their learning requirements.
- **Jensen, Kummer & Godoy (2015):** As long as active learning was incorporated, highly motivated students experienced similar performance and satisfaction when compared to a traditional classroom setting.
- **Missildine, Fountain, Summers & Gosselin (2013):** For three possible learning conditions (traditional lecture only, lecture + lecture capture back-up, and flipped classroom) nursing students improved the most with flipped classrooms but were the least satisfied.
- **Abeysekera & Dawson (2015):** Intrinsic motivation is key for student engagement, but research shows that higher levels of education lead to increased extrinsic motivation.

HYPOTHESIS

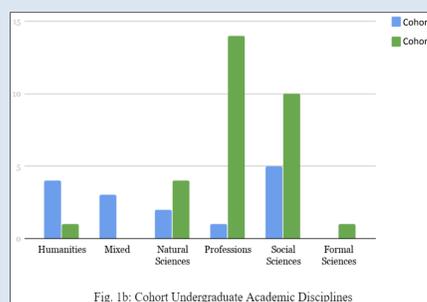
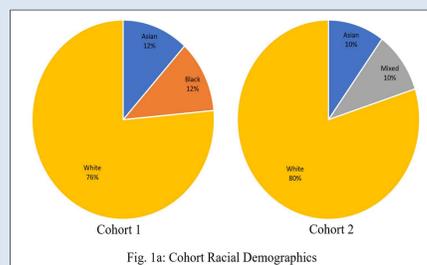
We postulate

- Students find elements of the flipped classroom useful.
- The flipped classroom is not the right fit for all students.

METHODS

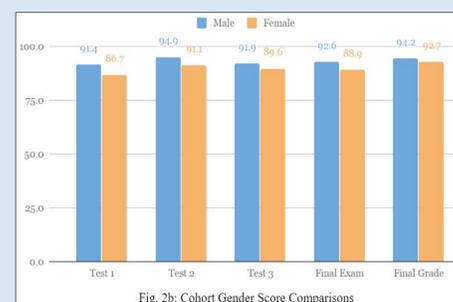
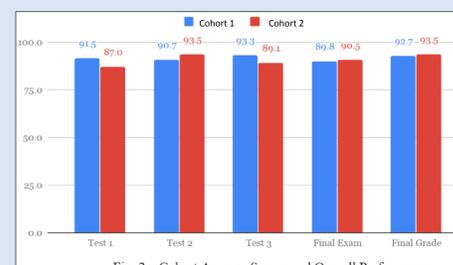
Students enrolled in the undergraduate Biology course in GWU's Post-Baccalaureate Pre-Medicine program were all taught by the same instructor for this study. 17 students (Cohort 1), enrolled in 2017-2018, had a traditional classroom with a three hour didactic lecture. 30 students (Cohort 2), enrolled in 2018-2019, had the flipped classroom with 50% less didactic lecture time and more active and independent learning. End-of-course evaluations, pre and post quizzes, exam performance, and overall course grades were compared between cohorts. Cohort 2 completed an additional qualitative survey on their perceptions of the flipped classroom.

RESULTS



Statistics	Cohort 1	Cohort 2
Gender		
% Male	38.89%	43.33%
% Female	61.11%	56.67%
Age		
Mean	25.17	24.87
Range	19	8
Minimum	21	22
Maximum	40	30
Count	18	30

"I would weigh heavily on lecture, mainly because that is my best method of learning. I would make the worksheets available the last 30 min of class and due for completion the next week. And I would assign more optional questions that are similar to the exams, because those are most helpful in studying (i.e. post/pre-quiz questions)."

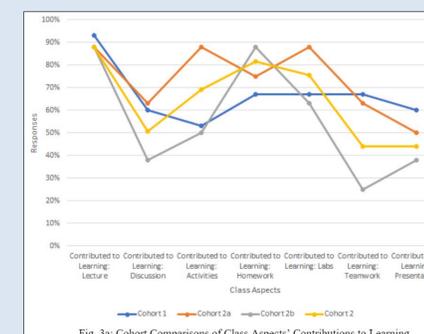


Open-Ended Survey Question Responses	Percentage
Equal amounts lecture + activities	12.5%
More lecture, less activities	54.17%
Less lecture, more activities	4.17%
Positive comments on lecture	4.17%
Negative comments on activities	4.17%
Same as prof/current class format	8.33%
Mixed codes	12.5%
Total Responses	100%

Table 2: Cohort 2 Perceptions on Flipped Classroom Aspects

"I do not believe that the class activities were helpful. I think that the post and pre quizzes were useful tools to utilize during exam preparation. But I believe at higher levels the onus should be on the student. The connection assignment was great for pre med students to understand the "so what" and esp. helpful for those who did not come from medical backgrounds."

"I would make lecture 75% lecture & 25% activities to enhance the learning experience + engagement"



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CONCLUSIONS

- Exam and course performance similar between cohorts.
- Cohort 2: Questionnaire worksheets and jeopardy most useful for exam preparation, concept comprehension and most engaging
- >50% Cohort 2 preferred more lecture over activities of the flipped classroom.
 - This and individual student responses support previous studies showing decreased student satisfaction of flipped classroom in higher education
- Both cohorts viewed lecture time more favorably than activities, regardless of classroom structure.
 - Results can be attributed to high, extrinsic motivation of post-baccalaureate students -- this course is mandatory for medical school, so more concern over good performance & less intrinsic desire to learn.
- Instructors for courses in similar career-changer programs should incorporate activities viewed by students as useful and engaging to enhance student learning and engagement.