A flipped classroom approach for select topics in introductory undergraduate epidemiology

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BACKGROUND

PH3133 is the undergraduate introductory epidemiology course. Unlike many introductory courses it is more focused on methodology then simply a core of information and terms. This requires students to do a good deal of critical thinking and there are important quantitative components necessary in order to achieve these goals – often more so than students are expecting for an introductory course. In addition, unlike the graduate level versions of this course there are no built in lab/discussion sessions. Students are generally be adept at applying formulas but often uncomfortable knowing when to apply them. Student feedback has consistently indicated a desire for more “practice” time and some frustration with making the leap from information to application.

The lecture notes were annotated and animated to be “stand alone”. The primary objective was to

- provide students with similar experiences outside class contributed a lot to my learning for complex class concepts
- provide them with similar experiences outside class
- increase student engagement in class
- increase student engagement in class
- decrease the need for office hours
- decrease the need for office hours
- increase mid term and final exam grades
- increase mid term and final exam grades
- allow students to take advantage of “repetitive” materials
- allow students to take advantage of “repetitive” materials
- increase student satisfaction

OBJECTIVES

The primary objective was to help students better meet course objectives which required applying and interpreting information from lecture to problems in epidemiology, i.e. critical thinking skills. The topics chosen for this approach have been the ones that tended to generate the most office hours. Therefore another objective was to be able to decrease the need for so many students to come to office hours in order to complete the assignments. Office hours are very useful, but they can be an inefficient teaching method when one is answering the same questions repeatedly and many students simply don’t or can’t make it to them. Since both the graduate versions of this class (online and residential) provide lab groups undergraduates flipped classes can provide them with similar experiences.

Finally, utilizing the PRET review and reflection process.

METHODS

The “flipped classroom” was used for 6 classroom sessions during 3 non-consecutive weeks of the class. For the in class portion student will be assigned to a small group (3 or 7 each) that I will have randomly assigned in lab. They will be in the same group for both days of each week, but in different groups for the 3 different weeks. Actual in class time will be spent working on the exercises due that week. These exercises will be similar to the ones used previously, allowing me to have a baseline of comparison. Exercises were collected after the 2nd of the week and released the 2nd with a formative assessment.

Out-of-class learning activities during the intervention included: Viewing short instructional videos (for more than 15 minutes each or 45 minutes total per class) and the lecture slides. The assigned videos were carefully selected from tutorials publicly available on YouTube which underlined lecture information. The subject matter for all these lessons is very standard to intro-epi courses so there is a great deal of available material online. The lecture notes were annotated and animated to be “stand alone”.

In-class learning activities during the intervention included: A brief introduction to each exercise and guidelines on first class of the week in the second class; a brief class wide discussion of formative evaluations and feedback, from the Tuesday class. For both days the remainder of class time is spent in small groups with the instructor available to answer questions and provide clarifications.

Normal Classroom:

Lecture/Instruction

Flipped Class:

Instruction/ Lecture

Applications/exercise outside class

RESULTS

All students were able to complete the exercises in the class room time provided, however some time was spent looking for the answers in the posted materials and several students admitted they had not looked at the lecture notes prior to the class.

As expected grades on the assignments done in the flipped classes were improved over past grades on similar assignments.

Overall class engagement in ALL sessions appeared to greatly improve.

Midterm and final exam grades were higher than in the previous semester (however the final exam was in a new format so comparisons are questionable).

From the PRET reviewers: “Overall students felt the approach was helpful and enjoyed the group work and more ability to ask for guidance as they worked on problems. The main student criticism appears to be with the preparatory material; that it was either repetitive or they didn’t know which parts to prioritize.”

From the students on classroom evaluation from comments on course strengths:

“I very much like the flipped class structure. It was useful for mathematical concepts and I eventually understood them.”

“Flipped class concept is VERY helpful, I think they should be done for all of the exercises.”

“Flipped classes allowed chance to apply lectures”

“Flipped class contributed a lot to my learning for complex topics”

“interesting subject, I really liked the flipped classes, the out of class work was reasonable and genuinely helpful”

“The flipped classes added to my understanding of how to apply concepts.” “flipped classes allowed chance to apply lectures”

“lots of applied work, opportunities to not only learn about general ideas, but to also see how they are applied in public health/epi”

(none they were not specifically asked about the flipped classes, and there were no negative comments on these classes)

DISCUSSION/CONCLUSIONS

I am excited to continue exploring the use of the flipped classroom. I plan to incorporate it into the course again this year, increasing it to 4 weeks total instead of three. In response to the focus group feedback I plan to label “repetitive” materials so students can take advantage of them if needed but avoid them as not to expand the objectives/goals and be more explicit as to the nature of these goals. Hopefully this last point will help better prepare students for the types of exercises and that they will go beyond the lecture materials.

The complaint regarding not knowing what material to prioritize places me in a bit of a quandary. The exercises are purposely meant to not be ones where they could simply "fill in the blank." From the slides and reading. From speaking to the students I know some of them understand this (and even appreciate it!) but clearly not all did. At times I needed to tell them the answer was simply met in the slides because they needed to apply the concepts that were in the slides.

The concept of a flipped classroom is seriously undermined when students do not view the instructional material on their own and this is one reason I would not adopt this approach for all sessions but consider the application for selected topics highly successful.

REFERENCES

1. Bishop JL, Verleger MA. The flipped classroom: A survey of the research, ASE National Conference Proceedings, Atlanta, GA 30 (9)

RECOMMENDED READING


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