Using the Flipped Classroom Design:
Student Impressions and Lessons Learned

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In a flipped classroom design, students learn the basics of course material at home and then apply their new knowledge to assignments, group work, and tests in the classroom. This course structure may be beneficial to students at regional campuses; because many of our students are working parents, they may prefer the flexibility of having lecture as at-home podcasts to review on their own time while using class time for group work instead of negotiating multiple out-of-class schedules for group work. We used a flipped classroom design for a Psychology Research Methods and Statistics course for Fall Semester 2012. Lecture material was placed on Blackboard as PowerPoint slides and MP3 audio files; class time was spent doing individual assignments over chapter content, group work on research articles and data collection projects, and whole-class activities for reviewing the material. This was the first time we instituted this structure, thus we found it to be important to gauge student perceptions on this design. Do our students prefer this format? Did they find it to be more work than they wanted or can handle with their specific life circumstances? We surveyed students about their experiences with this structure and requested suggestions for improving the design. Overall, the students had positive reactions to this course design. We discuss the results of this survey and the lessons we learned about using the flipped classroom design for this type of course.

Teachers and faculty face challenges in the 21st century that they did not face in the past. More students are entering college who need more remedial work, who are distracted by technology in their pockets, and who expect their professors to do more than what was done when those same professors were students themselves. An increase in the number of students who are underprepared for college work means that these students need more support to learn the material covered in the classroom; however, there is a finite number of minutes in a class session, and students who are "getting" the material suffer when a professor has to review the same concept multiple times for those students who are having difficulty

understanding the topic. That more students are distracted by their cell phones and laptops means that more students are only partially paying attention to the lecture, which leads to the instructor spending more time on unnecessary questions, responding to e-mails, and extending office hours in order to cover material that was already reviewed in class. In previous decades, students expected the old-school drill in the classroom–the professor lectured at the front of the room while students took notes; today**,** it appears that students expect personal instruction and "bells and whistles" in the classroom.

Meeting these challenges in education can be a daunting experience for faculty. However, the current pedagogical trend to offset all three of these issues is the flipped classroom (Carpenter & Pease, 2012; Tucker, 2012; Wilson, 2013). In a flipped classroom, what used to be considered homework in the traditional setting is now done during class time, and instead of listening to a lecture and taking notes on it in class, students now do that portion of the work at home. More specifically, lecture material is available to students on-line through audio or video podcasts and must be reviewed at home before class. Then students come to the classroom to do individual and group assignments, exams, and projects. Thus, students who are having trouble learning concepts can listen to the lecture multiple times at home until their understanding improves; assignments must be completed in class so there is not time for students to be distracted with social media or other online materials–that is**,** students must be focused on finishing the work instead of checking Facebook; and professors have the opportunity to work one-on-one with each student during the class session while providing more interesting assessments and technology activities while all of the students are together.

This approach to flipping the classroom is gaining ground in high school settings across the country, and it is starting to make its way into the college setting. However, it is still a new technique, and it is not clear how college students perceive this educational approach. Do college students like the switch? Do they appreciate having class time devoted to group activities that are hard to schedule outside of the classroom? Or do they prefer the conventional approach emphasizing lecture and structured discussion?

Though the use of the flipped classroom design in various disciplines has been reported in popular media and news reports (e.g. Defour, 2013), finding peer-reviewed literature on students' perceptions of its use in

college classrooms is difficult, particularly when it comes to math-based courses. Wilson (2013) shared her experience turning her conventionally structured undergraduate statistics course into a flipped-classroom course. Students were required to read the text and access additional information online, especially through Kahn Academy (www.khanacademy.org) to prepare for class. Once inside the classroom, students completed individual and group activities, reflection papers, group homework, and exams. Wilson (2013) found that students' written comments in open-ended evaluations of their progress on course objectives, and of herself as a teacher and the course as a whole through Individual Development and Educational Assessment (IDEA) Center ratings increased significantly after she shifted from the traditional class structure to the flipped classroom structure. She also found that the flipped classroom structure produced an increase in exam scores across the two designs. However, the primary mode of assessment for students' attitudes toward the course and instructor came from Individual Development and Educational Assessment (IDEA) Center ratings, which do not provide specific questions related to the flipped classroom design.

Wilson's (2013) study, however, was based on her classes at a smaller, Midwestern college with an academically well-prepared student body; students enrolling in her institution typically have GPA's above 3.0 in high school and score in the mid-20's on the ACT (http://www.capital.edu/admission_requirements/). Our student population at the University of Cincinnati Blue Ash is very different, with a higher proportion of underprepared students (two-thirds of incoming students require some level of preparatory math) and students from lower SES backgrounds who may not have the technology at home needed to access on-line lectures or other internet resources, or the study skills required to manage a substantial amount of groundwork at home on their own (as we would expect when using a flipped classroom design). It may be the case that Wilson's (2013) students' positive evaluations of the flipped classroom were a consequence of having academically prepared students who are already comfortable with advanced levels of technology use, and as such, were ready to learn lecture material via podcasts at home – would students from our less prepared population also see the flipped classroom as a positive experience?

Thus, this project was to determine student perceptions on the flipped classroom structure used for a Research Methods and Statistics in

Psychology course. Our primary goal was to gain information from surveying students on their experiences with this course structure that would then allow us to make adjustments to the structure in order to maximize student satisfaction and performance at mastering course material from this framework.

Methods

Participants

Students from two sections of Research Methods and Statistics I participated in this study. At the beginning of the semester, 25 students were enrolled in each section; by Week 15 at the end of the semester, only two students had withdrawn from the course. Of the 48 remaining students, 25 completed the survey for this study; students from one section were asked to complete the survey at the end of a class period, while students from the other section were given the opportunity to take the survey home to complete and return it to the current instructor (due to time constraints in class). The vast majority of completed surveys came from the class that did the survey in class, while only a few students in the other class returned the survey after leaving the classroom. Thus**,** the bulk of the survey responses represent one section of the course, though both sections received the same lectures, assignments, and exams for the course.

Flipped Classroom Structure

For both sections, the first week of class was presented in a traditional format, with the lecture for Chapter 1 occurring in class. All subsequent lecture material was provided on Blackboard™ via Microsoft 2010 PowerPoint™ slides, pdf files, and MP3 audio podcasts generated via Audacity™ software. Students were required to review the lecture material on their own time (either at home or at another location where they could access the material, including our computer labs that are staffed by student workers well-versed in those software options) over the weekend prior to doing activities in class for a given chapter. Because the course is a four-credit-hour course, the basic timeline per week was as follows:

- Hour 1: In-Class Review or Whole Class Activity for the Chapter.
- Hour 2: Individual Assignment.
- Hours 3 and 4: Group Assignment and Exam (When Applicable).

A few intermittent weeks contained class time devoted to the final group project so that students could use dedicated class time to conduct a literature search, collect data, analyze data, and do peer reviews of drafts for their research project.

Assessments included individual assignments, group assignments, exams, and the final group research project. Individual assignments consisted of hypothetical situations for which students needed to answer questions based on the chapter material for the week; these were open-book, open-note assignments that were to be completed and turned in by the end of the class, similar to an open-book quiz. Group assignments consisted of questions pertaining to a journal article selected to represent the chapter concepts for that week; students needed to read the article before class and then discuss the article together to answer the questions as a single unit, and these assignments were also due at the end of the class period. Exams included multiple choice and short answer or computational problems. The final project research project involved the students conducting survey research on coping styles and academic performance of University of Cincinnati Blue Ash College students. For this project, each group needed to find relevant background literature and share their sources, collect survey data from students on campus, compile their data into an Excel file, analyze the data using appropriate descriptive statistics, and individually submit an APA-style research paper detailing the research they conducted. For any classroom work, be it individual or group assignments, or completing steps for the research project, the instructor was available to answer questions and assist in trouble-shooting any issues that arose.

Survey on Flipped Classroom Structure

At the end of the semester, students were asked to complete a survey containing 18 Likert-based questions and four open-ended questions (see Appendix A). The Likert-based questions asked students to rank statements on a scale of 1 (strongly disagree) to 5 (strongly agree). We created questions specific to the course, and they included both positively- and negatively-worded statements so as to prevent students from simply answering questions with the same number rating without reading the questions (i.e. if a student gave the same rating of 4 for two oppositely-worded questions, it would be clear that the student did not read the questions, and thus the survey for that student would not give a valid

picture of her perception of the course). The open-ended questions were to elicit specific responses on what students liked and did not like about the flipped classroom design, as well as suggestions on how to improve the flipped classroom structure.

Surveys were coded and data were analyzed in SPSS™ 19.0. Mean scores for Likert-based questions were calculated to get a sense of overall opinions of the flipped classroom structure. We also looked for themes in the open-ended responses to determine general feelings about the modified arrangement of the course.

Results

As a group, student perceptions of the flipped classroom design were positive (see *Table 1*). Many of the positively-worded statements concerning components of the flipped classroom design averaged scores reflecting agreement with the statements, and a few of the negatively-worded statements averaged scores reflecting disagreement with the statements. The positively-worded statements that students agreed with included**:** "I liked having the lectures as audio podcasts with Power Point slides on-line," "I liked doing the individual assignments in class instead of having it as homework for each chapter," and "I liked having the group assignments in class**-–** reading the articles and answering questions in a group helped me to see how the concepts work in real research." The negatively-worded statements that students disagreed with included**:** "I didn't like having the group assignments – I would have preferred to do those activities on my own," "I felt like it was a waste of time to work on the group project material during the class period," and "I found the flipped classroom to be a miserable experience – I didn't like it at all."

Table 1. Mean Scores for Likert-Based Survey Questions

Question		M
1.	I liked having the lectures as audio podcasts with Power Point slides on-line.	3.96
2.	I found it tedious to download the audio podcasts and Power Points and then have to review them.	2.50
3.	It was hard for me to understand the lectures when I had to review them on my own.	2.59
4.	I really appreciated being able to go back to the audio podcasts segments I didn't completely understand the first time I listened to them.	4.18

5.	It was difficult to follow the audio podcasts and pdf files for the segments on calculating statistics.	3.04
6.	The examples used for the audio podcasts and pdf files for the statistics segments were helpful for my learning statistics.	3.96
7.	I liked doing the individual assignments in class instead of having it as homework for each chapter.	4.14
8.	I liked having the group assignments in class – reading the articles and answering the questions in a group helped me see how the concepts work in real research.	4.00
9.	I didn't like having the group assignments – I would have preferred to do those activities on my own.	2.36
10.	Reading the articles for the group assignments allowed me to see which Uptown Psychology faculty I might want to do research with in the future.	3.00
11.	I liked having the opportunity to work on the group project during class time.	4.33
12.	I felt like it was a waste of time to work on the group project material during the class period.	1.96
13.	Having the flipped classroom structure made me come to class more prepared than I usually am for traditional lecture classes.	3.59
14.	I managed to find a way to not do the readings or podcasts before class and still do well on all my assignments.	2.46
15.	I find the flipped classroom structure to be more interesting and engaging than the traditional lecture structure.	3.46
16.	I prefer the flipped classroom structure over the traditional lecture structure.	3.41
17.	I found the flipped classroom structure to be a miserable experience – I didn't like it at all.	2.09
18.	If I had to take this class again, I would rather have it in a traditional lecture structure.	2.41

Collectively, about two-thirds of the students who completed the survey approved of the flipped classroom design. When presented with the statement "I prefer the flipped classroom structure of over the traditional lecture structure," 15 students agreed or strongly agreed, while five students disagreed or strongly disagreed. When presented with the statement "I found the flipped classroom structure to be a miserable experience," 17 students disagreed or strongly disagreed, while three students agreed or strongly agreed. For the statement "If I had to take this class again, I would rather have it in a traditional lecture structure," 14

students disagreed or strongly disagreed, while five students agreed or strongly agreed.

Certain themes regarding what they liked and did not like about the structure of the course emerged in the open-ended questions. Students liked doing "homework" in class and being able to ask the professor questions while they were working on the assignments; they also liked having unlimited access to the podcasts for review. Not surprisingly to most professors, students were not fans of group work overall; they also did not like not having direct access to the professor while they were reviewing the podcasts. When questioned about what they imagined as their ideal flipped classroom design, many indicated having less group work and more homework options; interestingly, however, nine of the 22 students who answered this question indicated they liked the current design and had no suggestions for improvement.

Discussion

The purpose of this study was to determine student perceptions of a flipped classroom structure for a Research Methods and Statistics in Psychology course at University of Cincinnati Blue Ash College, a two-year regional campus that has a higher proportion of underprepared and nontraditional students than what one would see at a four-year research university. Specifically, we wanted to see if students would adjust to this form of pedagogy and develop a preference to it, as well as benefit from it academically by making it to the second course in the sequence.

Overall, our students were generally positive about the flipped classroom structure for this course. They indicated that they were more prepared when coming to class, more engaged while in the classroom, and appreciative of some of the distinct features of this course design (e.g. on-line podcasts that could be reviewed multiple times, class time devoted to group project work, etc.). Though a few students indicated that it was difficult to follow the review of math through the on-line podcasts, most students were still able to master the course material, including the math content. Of the 50 students originally registered for the two sections of the course, 42 (84%) passed with the required C- or better final course grade, with 26 of those 42 (62%) students getting a solid B grade or higher. In addition, 31 of the 42 (74%) students who were eligible to continue to the second course in the Research Methods and Statistics in Psychology sequence chose to register for our sections knowing that the same basic

structure would be used again; because all University of Cincinnati students may take courses across colleges, this is a sizable percentage of students who wanted to continue with the flipped classroom structure when they had the opportunity to take the second course in the sequence in a more traditional format at another college.

Based on the results of our survey and the students' academic performance in the course, the basic flipped classroom structure will remain the same in future semesters (e.g. on-line podcasts, individual and group assignments in class, etc.). However, other aspects of the structure will be modified; we plan to use more in-class review activities for extra practice before moving to the individual and group assignments, to allow students to choose their groups for the final group project component of the course, to allow a few opportunities to take home assignments if most students are having difficulty with a particular assignment, and to condense and re-order certain chapters for better course flow. These changes reflect comments made in the open-ended questions section of the survey, as well as trends in some of the Likert-scale questions dealing with these components.

As with any change in course design, there can be challenges. One challenge was adjusting one's workload to create the lectures (both PowerPoint and MP3 podcasts) and multiple assignments for the class. This also increased the amount of grading that needed completing. In addition, a few students continued to come to class without being prepared for group assignments; however, this was not a consistent problem, with a majority of this relatively small number of instances occurring once or twice for any given student. The greatest number of students across both courses were prepared for class, engaged in quality discussion with group members, and asked questions that were indicative of being at least moderately knowledgeable on the subject matter (i.e. from the podcasts) while completing both types of assignments.

Ultimately, educators in the 21st century will encounter a variety of issues that they did not have in the past, from an increase in underprepared students to an increased need to incorporate technology in their courses so that their students gain practice in using all the tools they may be exposed to when entering the workforce. Using the flipped classroom structure (Carpenter & Pease, 2012; Tucker, 2012; Wilson, 2013) can facilitate effective responses to both of those issues as long as educators are cognizant of the support students need to be successful in those courses (e.g. access to computer labs, clear directions for accessing podcasts, etc.).

The flipped classroom structure essentially becomes a practice run in becoming a competent employee in the white-collar workforce: it requires outside preparation to be an active contributor for problem solving and project completion when working collaboratively with co-workers towards the goals of the employer. By incorporating this new pedagogical platform at two-year colleges that can provide more one-on-one guidance and technological assistance (e.g. computer labs, tutoring centers, etc.) than what may be available at four-year colleges and universities, we can make it more likely that our more non-traditional student population can "catch up" and perhaps surpass their traditional student counterparts as they join the work world and compete in the global economy.

References

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Appendix A

PSYC2001C Survey on Course Design
Fall Semester 2012

This is a quick survey to get your thoughts on the flipped classroom structure we used for PSYC2001C this semester. Because this is the first time we have attempted this teaching format, we'd like to get some input from you on what you liked, what you didn't like, what worked, and what didn't work. We can then use this information to make some adjustments to the planned structure of PSYC2002C that you will take next semester.

Please answer the following questions, both multiple choice and open response. Do NOT write your name on this survey, as we want your responses to be anonymous. You are not required to complete this survey – it is completely voluntary; turning in this survey with your responses implies consent to use your responses in future course construction and any presentations/publications we may develop on how this structure worked in our classroom. By completing this survey, you will help us learn what worked in the flipped classroom structure and what might need to be modified.

Rate the following statements as to your level of agreement, from strongly disagree to strongly agree. Circle the level of agreement you have for each statement.

1. I liked having the lectures as audio podcasts with Power Point slides on-line.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

2. I found it tedious to download the audio podcasts and Power Points and then have to review them.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

3. It was hard for me to understand the lectures when I had to review them on my own.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

4. I really appreciated being able to go back to the audio podcasts segments I didn't completely understand the first time I listened to them.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

5. It was difficult to follow the audio podcasts and pdf files for the segments on calculating statistics.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

6. The examples used for the audio podcasts and pdf files for the statistics segments were helpful for my learning statistics.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

7. I liked doing the individual assignments in class instead of having it as homework for each chapter.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.

d) Agree
e) Strongly Agree

8. I liked having the group assignments in class – reading the articles and answering the questions in a group helped me see how the concepts work in real research.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

9. I didn't like having the group assignments – I would have preferred to do those activities on my own.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

10. Reading the articles for the group assignments allowed me to see which Uptown Psychology faculty I might want to do research with in the future.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

11. I liked having the opportunity to work on the group project during class time.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

12. I felt like it was a waste of time to work on the group project material during the class period.

a) Strongly Disagree

b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

13. Having the flipped classroom structure made me come to class more prepared than I usually am for traditional lecture classes.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

14. I managed to find a way to not do the readings or podcasts before class and still do well on all my assignments.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

15. I find the flipped classroom structure to be more interesting and engaging than the traditional lecture structure.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

16. I prefer the flipped classroom structure over the traditional lecture structure.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

17. I found the flipped classroom structure to be a miserable experience – I didn't like it at all.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

18. If I had to take this class again, I would rather have it in a traditional lecture structure.

a) Strongly Disagree
b) Disagree
c) Neutral – It didn't matter to me either way.
d) Agree
e) Strongly Agree

On the next page, you will find some open-answer questions. Please answer them as completely as possible. Your answers to these questions could lead to some specific modifications to the course structure or to maintaining what you consider to be the best parts of the structure.

1. The three things I liked best about the flipped classroom structure were:

2. The three things I hated the most about the flipped classroom structure were:

3. The ideal flipped classroom structure would be:

4. Do you have any other comments to the flipped classroom structure that you would like us to know? Use the back of this page if necessary.

Personal Biography

Sarah Cummins-Sebree, professor of psychology at University of Cincinnati Blue Ash College, teaches Research Methods and Statistics in Psychology as well as Introductory Psychology and Human Development. Her teaching research focuses on motivation and academic performance in Introductory Psychology students and implementation of new pedagogy in psychology courses. Her discipline-specific research includes multimodal perception and the development of postural control in children.