Flipping the Classroom Without Flipping Out the Students

Working With an Instructional Designer in an Undergraduate Evidence-Based Nursing Practice Course

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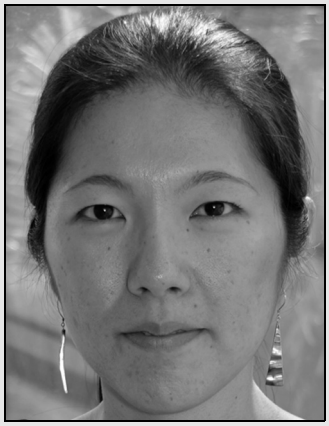
Introduction

Obtaining and keeping the interest of college students requires a variety of innovative teaching strategies. An example of a creative teaching strategy includes the usage of the flipped classroom approach. This approach has gained increased attention as a way to promote active learning, which encourages students to use problem-solving and multiple senses in their learning and to apply the knowledge they gain (Bergmann & Sams, 2014). The flipped classroom is a pedagogical model that utilizes technology



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to move the classroom lectures to "preclass" work, therefore using the class time for interactive learning. Students learn course content independently by reading, listening to a recorded lecture, or reviewing an assigned video outside of class (Herreid & Schiller, 2013). Hence, teachers who implement the flipped classroom approach expect students to take ownership of their learning by completing the necessary "preclass work" outside of the classroom, with classroom time utilized to develop critical thinking skills through reviewing case scenarios, group discussions, student presentations, and evidence-based journal reviews. The flipped classroom approach promotes active student engagement rather than passive reception of lecture content (Hawks, 2014). Teaching approaches that go beyond the traditional lecture format are considered the most effective in engaging students and promoting learning (Ferreri & O'Connor, 2013).

The flipped classroom approach has been used in nursing education to promote active learning. Researchers report different types of evaluation data, from students' satisfaction to course grades and evaluation. Among those, a study reporting course grades has shown an increase in exam scores with a flipped classroom (Missildine, Fountain, Summers, & Gosselin, 2013). However, rigorous research on this method of teaching is limited (Presti, 2016), as is literature on the best teaching practices of this method. The purpose of this paper is to describe the process of developing a flipped classroom approach for an undergraduate evidence-based nursing practice course and discuss lessons learned from the process and the evaluation data. The process involves a subject matter expert (instructor) and an instructional designer.

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History of the Flipped Classroom

The pioneer of the flipped classroom approach is Harvard professor Eric Mazur, who in the late 1990s utilized a strategy called peer instruction, which involved having his physics students complete preclass work so that they could interact with one another and engage with the professor during class (Crouch & Mazur, 2001). In 2007, Bergmann and Sams, two high school chemistry teachers, also developed the flipped classroom approach as an alternative learning experience for student athletes who were unable to attend class while competing (Hawks, 2014). This innovative approach allows the students to review the content prior to class, so that when they actually attend class they may review what they learned and seek clarification if necessary; the teacher also assists the students by bridging the gap between what they reviewed and actual case situations. This teaching method encourages the students to develop strong critical thinking skills.

Theoretical Frameworks

The flipped classroom includes components of both behavioral and constructivist learning theories (Hawks, 2014). The behavioristic principles support faculty design and control over a structured learning environment, a teacher centered approach. In contrast, the constructivists believe that learners build knowledge in order to make sense of their personal experiences and that they are active in finding meaning, a student centered approach (Billings & Halsted, 2012). According to constructivist theory, students are engaged and take ownership of their learning. The flipped classroom's behavioral principles include the "preclass" work (outside of the classroom), while constructivism principles include the teacher helping students use their personal experiences to make sense of new knowledge and promote deeper learning.

Nursing Education and the Flipped Classroom

Geist, Larimore, Rawiszer, and Sager (2015) evaluated the difference in content knowledge gained when comparing the traditional classroom to the flipped classroom. The researchers used a pretest–posttest nonequivalent control group quasi-experimental quantitative design (n= 86). Two cohorts in a baccalaureate nursing program received two different pedagogical approaches for a pharmacology course. Analysis revealed that students who experienced the flipped classroom approach had significantly higher unit exam scores. However, performance on the final exam did not reveal a significant difference. The researchers concluded that the knowledge increase on unit exam scores and the students' favorable responses support the use of the flipped classroom.

Missildine et al. (2013) examined the effects of a flipped classroom and innovative learning activities on academic success and nursing student satisfaction. The researchers utilized a quasi-experimental design (n = 589) to compare three different approaches to learning: traditional lecture only (LO), lecture and lecture capture backup (LLC), and the flipped classroom approach including lecture capture with innovative classroom activities (LCI). Examination scores were higher for the flipped classroom LCI group (M =81.89, SD= 5.02) than for both groups (the LLC group [M= 80.70, SD =4.25; p = 0.003], and LO group [M = 79.79, SD = 4.51; $p <$ 0.0001]. Nursing students were less satisfied with the flipped classroom method than with either of the other methods ($p <$ 0.001).

In response to students who expressed a lack of engagement in their coursework, Critz and Knight (2013) utilized the flipped classroom approach for two classes of graduate students (n =20) taking a pediatric course in the Family Nurse Practitioner program. In an effort to energize and engage the students, the flipped classroom approach was utilized. The teachers developed 11 preclass modules consisting of short prerecorded PowerPoint lectures, videos, and reading assignments from at least four recent peer reviewed journals. Students were expected to complete the "preclass" assignments and take a 10-question quiz on the information. These quizzes were composed of application questions; correct answers and feedback were available for all questions following the completion of the quiz. At the end of two semesters, the researchers surveyed the students about their satisfaction with the flipped classroom approach. The researchers developed an anonymous 10-item online survey utilizing Survey Monkey. Test items were rated using a 5-point Likert scale ranging from 1 (*being extremely worthwhile*) to 5 (*being not at all worthwhile*). Students were provided additional space for comments. Responses from the 20 participants indicated that 60% felt the material covered was extremely worthwhile,

whereas 40% reported it was very worthwhile. Students commented that they found both the evidence-based articles and the short narrated lectures useful (Critz & Knight, 2013).

Harrington, Bosch, Schoofs, and Beel-Bates (2015) compared learning outcomes of the two pedagogies as measured quantitatively through exam questions, quiz scores, and course grades. Baccalaureate nursing students (n = 82) were randomly assigned to either the flipped classroom or traditional classroom. The researchers concluded that there were no statistically significant differences between groups in outcomes measures between the two pedagogies. Additionally, the equivalence interval results suggest that the innovative flipped classroom approach was equally effective for student learning (Harrington et al., 2015).

The literature presents mixed findings on students' satisfaction and exam scores. The flipped classroom approach may be effective in promoting student engagement. Although exam scores may be higher with using flipped classroom, some students reported less satisfaction with this approach. The challenges with utilizing the flipped classroom approach is that students are accustomed to having an instructor-centered approach and are not used to having to prepare prior to class time to actively participate. Hence, this may be the reason that students report less satisfaction with the flipped classroom approach. To enhance the benefit of the flipped classroom approach, a culture change must take place for both instructors and students.

Steps When Using Flipped Classroom in Nursing Education

Getting the Students Ready for the Flipped Classroom Approach

Prior to the implementation of the flipped classroom, it is imperative to educate the students about the new learning format and why it is being utilized (Hawks, 2014). During the initial course overview class, teachers must prepare the students for a shift in the learning culture; this may be accomplished verbally in class as well as by providing the students with a written handout explaining the new teaching strategy (Schlairet, Green, & Benton, 2014). Students are often more open to change if given an explanation about the utility of the change and how it will benefit them. Some students may resist this new teaching strategy because they are accustomed to passive learning. This novel approach requires the students to take a more active role in the learning process, and to complete the "preclass" work so that class time may be used to promote student-teacher interaction, student-student interaction, and critical thinking with the application of new knowledge. Any suggestions or feedback received from the students should be taken into account in fine tuning existing flipped classroom content and developing new material.

Required Preclass Work

The flipped classroom approach also requires teachers to shift paradigms, transitioning from the traditional comfort zone of performing lectures to preparing preclass work and case scenarios for discussion and fostering critical thinking skills. According to Schwartz (2014), teachers must appreciate that preclass work is initially labor intense; however, the benefits of increased learning will pay off over time. The flipped classroom approach is a student-centered learning environment in which the personal responsibility of learning has shifted from the teacher to the student (Schwartz, 2014). Teachers must prepare each class with the learning objectives and preclass learning content at least a week or two before the actual class. Preclass activities may include voiceover PowerPoint presentations, assigned readings from course textbooks or journals, online

videos, and web links. Short quizzes should be incorporated into the preclass content so that students can assess their knowledge; these quizzes also add an element of accountability to ensure the students are focusing on the specific content covered (Hawks, 2014). Students who complete the assigned preclass assignments are better prepared to participate in the classroom activities and may begin to apply the knowledge gained (Schwartz, 2014).

Classroom Activities

During the in-class activities, the role of the teacher changes from being the conveyer of content to the class facilitator (Schwartz, 2014). The role of the teacher is to promote class discussion of the content reviewed by moderating individual or group discussions, incorporating case studies/clinical scenarios, and reviewing an evidence-based journal or research article on a current practice change. These engaging activities allow the students to apply the knowledge they have acquired and to develop stronger critical thinking skills, which are essential in nursing practice.

Method

Rationale for Flipped Classroom in Evidence-Based Nursing Practice Course

The instructor (first author) was seeking ways to actively engage students in a classroom and was eager to try a new method of teaching. Through learning about flipped classrooms at conferences and from her personal experiences as a student, she decided to apply this approach when she taught an evidence-based nursing practice course. This required course was for accelerated undergraduate nursing students (second degree nursing students who complete the nursing program in three semesters). In this course, students learn about the process of evidence-based nursing practice and the basics of quantitative and qualitative research, and they gain skills to critique research articles. The instructor identified the need to incorporate a flipped classroom approach because unlike most nursing courses, this course does not have a clinical component and thus does not include the opportunities for students to apply knowledge that they have learned provided by courses with clinicals. Although there is no clinical component providing the opportunity to apply course content, knowledge and application of evidence-based practice is nonetheless essential for bachelor of science in nursing prepared nurses, as it is one of the competency areas in the Quality and Safety Education for Nurses project (2014). In addition, employers increasingly expect that new bachelor of science in nursing graduates provide evidence-based care to their patients.

Preparation Process

The collaboration with the school's instructional designer was critical to the preparation process. In order to develop an innovative learning strategy, it is essential to have the subject matter expert and a skilled instructional designer who knows how to best utilize current technologies (Miller, 2010). The instructional designer has specialization in instructional technology and distance education. Thus, the instructional designer provided guidance on best practices of implementing flipped classroom approach in a health education environment.

The suggestions received included the following: (1) given that much preparation is required for in-class activities to meet the learning objectives (Carvalho & McCandless, 2014), pilot a flipped classroom approach with one unit as opposed to the entire course (Steed, 2012); (2) Because some units are particularly important and application of concepts is critical, select one of these units for the flipped classroom to

emphasize these concepts (Carvalho & McCandless, 2014); (3) Preclass modules should be divided into manageable and meaningful small sections; (4) Integrate audiovisual sources such as YouTube videos or TED talks to deliver content in multisensory manner; (5) Develop pre- and postquizzes to test students' knowledge so that knowledge acquisition can be observed; (6) Add practice questions after each module to provide students the opportunity to apply the learned knowledge immediately; (7) Because students may not be used to complete preclass online modules, provide clear student expectations including specific and detailed instructions for the preclass online modules; (8) Consider the usage of low-cost technology such as PowerPoint voice-over. The literature showed that developing an interactive learning modules using PowerPoint is valuable, and students' satisfaction was high (Kumar, 2016).

Implementation Process for Evidence-Based Nursing Practice Course

The instructor decided to utilize a flipped classroom approach with one of two lectures on quantitative research (causality, quantitative research design, validity, sampling method, and data collection methods).

The instructor, along with the instructional designer, decided to divide the content into five sections based on the learning objectives. Then the instructor recorded her PowerPoint lecture slides with voice-over narration, including the scripts in the slide comments. In this way, students who are visual learners can read and listen to the content. A microphone with headset was provided to the instructor so she could complete the recording. She recorded the slide directly from the PowerPoint. A cloud storage application called BOX was used to upload the completed recorded lectures, allowing the instructional designer access. Implementing an online lecture utilizing a PowerPoint with voice over provides students with control over the presentation; students can navigate through the slides and jump from one slide to another. Furthermore, the narrated PowerPoint is easy to modify and maintain (Marlin, 2016).

The instructor also created 10-item pre- and postquizzes (using the same questions) and included practice questions at the end of each PowerPoint module to reinforce learning. Two YouTube videos were used to aid in reinforcing understanding of the content. Once the recorded lectures were completed, the instructional designer converted the PowerPoint files to HTML 5 web-deliverable modules using the iSpring suite (authoring tool). iSpring is a software program that enables nonprogramers to design and develop course content. It is a plugin to enhance a PowerPoint file's functionality. iSpring allows users to incorporate quizzes, videos, and audio into the PowerPoint and publish the file in flash and/or html5 format. iSpring includes simple learning management system integrations, is easy to use, and has impressive reviews (Landay, 2010). The Blackboard learning management system was used to deliver the modules to the students. All modules were a part of a unit in the course. The unit is designed based on adaptive release, in which students must first access first the unit overview, learning objectives, to do list, required reading, and a pre quiz. Once students complete the prequiz, then they will have access to the modules introduction (voice over). In order for students to proceed with the following module, they need to complete the practice questions within each recorded module. Once students complete the last module, they must complete a post quiz to reinforce learning. An evaluation survey followed the post quiz to gather students' feedback about their flipped classroom approach in order to improve the program.

Preclass Module Instructions

The instructor told students about the flipped classroom on the first day of class when she reviewed the syllabus. Because students were expected to complete preclass online modules, which differed from the expectation in other classes, she introduced this assignment at the beginning of the course. The preclass online modules were available to students 1 week before the flipped classroom lecture day. Students accessed them via Blackboard, and each module was embedded into a specific course unit within Blackboard. At the start of the unit, instructions and table of contents were displayed. *The instructor and the instructional designer restricted the modules so that only one module was accessible at a time* because each module builds on the previous module, so completing them in order was determined to be important. The modules were further restricted so that students must listen to the current slide before moving to the next. Students received 1 point toward the final grade by completing pre- and postquizzes, all five modules, and a brief survey. Students were asked to score more than 80 out of 100 on the postquizzes (multiple attempts were allowed).

In-Class Activities

In class, the instructor sought questions regarding the preclass online modules first. The objective of the quantitative research module is to be able to critique research articles using the learned knowledge. As a class, we went over the article critique sheet and critiqued a research article that students read for their previous assignment. Then they were divided into groups to work on their final project, which was to critique four articles, summarize the findings, and present a poster. The instructor and her teaching assistant were available to answer any questions.

Evaluation

The percentage of preclass module completion as well as pre and post quiz scores was monitored via Blackboard gradebook. Students completed two brief surveys, one right after they completed the preclass online modules and the other at the end of the semester (approximately 6 weeks after the flipped classroom). The first survey was to rate the overall quality and perception of conduciveness with this learning style, comment on strengths and areas of improvement, and identify technical difficulties. The end of the semester survey asked students to reflect on the flipped classroom after all the course contents were covered. Questions were about perception of the flipped classroom effectiveness, preference for future learning, and any other final comments about the flipped classroom. The survey contained both quantitative (e.g., rate the effectiveness with 1–5 Likert scale) and qualitative questions (open-ended comments section). Descriptive statistics were obtained from the quantitative questions, and qualitative questions were analyzed using content analysis (Hsieh & Shannon, 2005). In particular, a conventional content analysis (data-based) approach was used as the authors aim to allow the data emerge and come up with the main themes.

Results

Out of 73 students, 72 completed the preclass modules (completion rate: 99%). The mean score for prequizzes was 67.46 ($n = 71$; $SD = 31.66$), and the mean score for post quizzes was 97.78 ($n = 72$; $SD = 5.62$). During the first survey, 85% of the students found the preclass modules to be good/very good or had a neutral response. Seventy-nine percent of the students either strongly agreed/agreed or were neutral in their opinions that the preclass online modules were conducive to their learning. Forty-five percent of students

mentioned technical difficulties during completing the modules. At the end of the semester survey, 82% of the students rated a flipped classroom approach as either very effective/effective or neutral. Forty-three percent preferred this method of learning for their future courses, and 29% indicated that they had no preference (see Table 1). For the qualitative questions, students overall liked the clear and concise presentations and examples provided in the modules. Some students liked that they were able to complete the modules at their own pace, while others thought it was difficult to find their own time to complete them as their schedule was packed with classes and clinicals. Some students liked the innovative learning approach, while others preferred a traditional in-class lecture style. Other major comments included technical problems, wanting to download PowerPoint slides, and desiring a way to listen/complete the modules faster than the given speed.

Discussion

This study described the process of creating and evaluating data of a flipped classroom approach used in an undergraduate evidence-based nursing practice course. The preclass online modules had a high completion rate, and students scored as instructed on the postquizzes (over 80%). Students identified several strengths and areas of improvement that were highly connected. The authors discuss each point by providing the context and integrating their perspectives. Then, they provide perspectives on developing and executing the flipped classroom.

Students' Perspectives

Students liked the flexibility of completing the modules at their own pace, time, and place of choice. However, these students were enrolled in an accelerated undergraduate nursing program in which students complete the program in three semesters. They took 21 credits in the summer semester during which they com-

Table 1. Survey Results

Survey Questions	Answer Choices	Percentage
• Survey administered immediately after the preclass online modules • How do you rate the overall quality of the module?	Very good/good	51
	Neither good or bad	34
	Really bad/bad	12
	Missing	3
• Was online format conducive to your learning?	Strongly agree/agree	54
	Neither agree or disagree	25
	Strongly disagree/disagree	21
• Was there a technical difficulty completing the modules?	Yes	45
	No	55
• Survey administered at the end of the semester • How would you perceive the effectiveness of learning using the flipped classroom approach compared to a traditional classroom approach?	Very effective/effective	50
	Neutral	32
	Very ineffective/ineffective	18
• Would you prefer to have more flipped classrooms integrated into your course work?	Yes	43
	No	27
	Does not matter	29

pleted the evidence-based nursing practice course. Therefore, they needed to manage their time effectively to complete the preclass online modules. Even though the instructor announced the flipped classroom and its expectation on the first day of the class to provide a rationale and mentally prepare the students, they perceived that it was difficult to find time to complete the modules.

Resistance to a new method of learning has been identified as a barrier to a flipped classroom approach, as students are accustomed to a traditional lecture style (Schwartz, 2014; Simpson & Richards, 2015). There are several strategies to mitigate such resistance. One is to flip the entire course, which forces students to operate under different expectations, including the completion of work prior to the class meetings. Another strategy is to incorporate the flipped classroom into a hybrid course (combination of online and face to face instruction). Critz and Knight (2013) found that students did not perceive the preclass modules as burdensome because preclass coursework was expected for this type of pedagogy. The third strategy is to implement the flipped classroom with nursing students in traditional programs. They may perceive less burden from the preclass modules as their schedules tend to be more flexible. The last strategy is to change the norm of classroom by incorporating the flipped classroom in every course, even though it requires the commitment of instructors and the school as a whole.

The instructional designer pointed out the importance of detailed preclass module instruction. Some students stated that they would have liked to download the module PowerPoint slides to review the materials. There was instruction on how to do so under the written introduction of the preclass modules, and the instructor demonstrated how to download the PowerPoint slides in class. Details may have been lost for some students, despite multiple attempts to communicate the message. In addition, a narration transcript in the sidebar of each module was displayed for students who prefer reading rather than just listening. Including a function to listen with different speeds (faster or slower) would accommodate different students' learning preferences.

Authors' Perspectives

The flipped classroom does require advance preparation of voice-over PowerPoint slides, evaluation materials, and in-class activities. The instructor initiated the preparation and discussion with the instructional designer the semester before the flipped classroom to provide adequate time to compile and prepare the materials, and to troubleshoot. As advised by the instructional designer, the instructor started with one flipped classroom session. This was a good approach on the instructor's end, accounting for the preparation involved in it.

The instructional designer and the instructor tested the modules; however, there were technical issues. There was a system glitch between the two platforms (iSpring and Blackboard) that the instructional designer and the instructor were not aware of; there were delays with *iSpring* communicating with Blackboard after students completed each module and its practice questions. Therefore, Blackboard's adaptive release function did not get activated and thus did not show the next module to complete. In the future, the solution would be to not rely on *iSpring* to trigger Blackboard function; rather, the practice questions should be built using the test tool in Blackboard, and the modules will include only content requiring students to check a preview box when finished reviewing the content that would trigger adaptive release. This process allows students to proceed to the next item of the unit content. Allowing additional time to test the modules and troubleshoot

would be one of the solutions to avoid technology-related problems.

Even though advance planning is needed to create a flipped classroom for the first time (Hawks, 2014), the preclass online modules can be used in subsequent semesters. Therefore, if an instructor teaches the same course, he or she can reuse the material (Everly, 2013; Schwartz, 2014). It is important for the class activities to be directly applicable to the contents learned in the preclass online modules. The instructor went over a sample article in class and gave time for students to work on the group final project, which included critique of chosen articles that employed quantitative research concepts learned in the preclass online modules. The downside of this structure was that some groups were at the point to critique their articles, but others were not ready to do so as they needed additional time to search for the articles. Retrospectively, it would have been most effective to have a group in-class assignment in which students critiqued a piece of a sample article and discussed their findings in class.

The evidence-based nursing practice course was required in the program, yet does not have a standardized test (e.g., Health Education Systems, Inc., Assessment Technology Inc.), or exams, and half of the course grade came from individual short writing assignments. Therefore, students may not have perceived this course as a priority for advanced preparation. Given that context, the flipped classroom preclass online modules allowed them to immerse themselves into the content before class time. Although it was small, students had an incentive to complete the preclass online modules, which created opportunities for learning that otherwise did not occur for the busy students.

Limitation

There are several limitations identified in this study. This was the first time the instructor taught the evidence-based nursing practice course; therefore, there are no comparison data with the traditional lecture format that she could have used. The main instructor implemented a flipped classroom for the first time. There are several things that she needs to work on before launching the online modules, including a mechanism to resolve technical difficulties, which would allow her to troubleshoot faster, as well as creating more focused in-class activities. It has been a steep learning curve; however, the instructor believes that she should to continue working on the flipped classroom to improve students' learning experiences rather than relying on traditional lecture style learning.

Conclusion

Even though there are areas requiring improvement, students were able to complete what was expected for the course for the most part. The need for advanced planning is inevitable; however, the preclass online modules are reusable, and thus, this advanced planning and preparation has a long-term pay off. With the use of technology, instructors can create a learning environment that accommodates different students' learning speed and styles. Above all, the flipped classroom approach allows students to focus on the application of the course material, be an active learner, and take ownership of their learning. If more instructors use the flipped classroom approach, students would be accustomed to its expectations. It is the instructors' responsibility to create an active learning environment by incorporating innovative teaching strategies such as the flipped classroom. In this way, the culture of higher education learning will shift to integrate active learning approaches.

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