

Flipping the Classroom to Improve Student Performance and Satisfaction

Kathy Missildine, PhD, RN, CNE; Rebecca Fountain, PhD, RN; Lynn Summers, MSN, RN; and Kevin Gosselin, PhD

ABSTRACT

This study aimed to determine the effects of a flipped classroom (i.e., reversal of time allotment for lecture and homework) and innovative learning activities on academic success and the satisfaction of nursing students. A quasi-experimental design was used to compare three approaches to learning: traditional lecture only (LO), lecture and lecture capture back-up (LLC), and the flipped classroom approach of 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 the LLC group ($M = 80.70, SD = 4.25$), $p = 0.003$, and the LO group ($M = 79.79, SD = 4.51$), $p < 0.001$. Students were less satisfied with the flipped classroom method than with either of the other methods ($p < 0.001$). Blending new teaching technologies with interactive classroom activities can result in improved learning but not necessarily improved student satisfaction. [*J Nurs Educ.* 2013;52(10):597-599.]

Despite the easing of the nursing shortage, Buerhaus, Au-erbach, and Stalger (2009) cautioned that the need for nurses will worsen to critical proportions as the economy recovers. The student attrition rate may be viewed as one reason for the nursing shortage. Students lost through attrition have met admission requirements and have successfully completed rigorous prerequisite courses but were unable to complete the nursing curriculum due to a variety of factors. Previous studies by Walker et al. (2011) have focused on methods to increase student retention, including an examination of student preadmission characteristics and the use of innovative teaching protocols. The current study expanded those efforts to improve the success of currently enrolled students by using a flipped classroom approach, coupled with innovative teaching techniques.

The purpose of the current study was to determine the effects of the flipped classroom approach using innovative teaching methods on the academic success of baccalaureate nursing students in two adult health nursing courses, as measured by examination averages and student satisfaction. Three different teaching modalities were used: traditional lecture only (LO), lecture capture as an adjunct to traditional lecture (LLC), and lecture capture with interactive teaching activities (flipped classroom; LCI). The flipped classroom using lecture capture in this study was a teaching approach in which lecture content was electronically recorded through lecture capture software, and classroom time was used in a variety of active learning activities designed to increase student engagement. The hypotheses were:

- The LCI (flipped classroom) method of teaching will result in a higher course examination average for Adult Health I students and Adult Health II students than the LLC and LO methods.
- The LCI method will result in higher student satisfaction scores than the LLC and the LO methods.

Background and Significance

A recent call for radical transformation in nursing education challenges educators to design learning experiences that will result in graduates prepared to practice in a changing health care environment (Benner, Sutphen, Leonard, & Day, 2010). Those authors identified a significant gap between nursing practice and educational preparation and recommended these paradigm shifts: teaching in context, teaching for a sense of salience, integrated clinical reasoning, and an emphasis on professional formation.

High- and low-fidelity simulation, social media, role-play, problem-based learning, case analysis, and service-learning can

Received: March 1, 2013

Accepted: April 3, 2013

Posted Online: September 19, 2013

Dr. Missildine is Assistant Dean of Graduate Studies, and Dr. Gosselin is Assistant Dean of Research, College of Nursing, Texas A&M Health Science Center, Bryan; Dr. Fountain is Assistant Professor, and Ms. Summers is Clinical Instructor, College of Nursing, The University of Texas at Tyler, Tyler, Texas.

The authors received financial support from The University of Texas at Tyler through the J. Burns Brown Fellowship award.

The authors have disclosed no potential conflicts of interest, financial or otherwise.

Address correspondence to Kathy Missildine, PhD, RN, CNE, Assistant Dean of Graduate Studies, College of Nursing, Texas A&M Health Science Center, 8447 State Highway 47, Bryan, TX 77807; e-mail: katemissi@yahoo.com.

doi:10.3928/01484834-20130919-03

provide integrative learning experiences to meet these challenges and replace the usual classroom lecture. Faculty members have not fully realized the potential of these methods and are often reluctant to abandon the lecture approach. Likewise, students are dependent on the lecture method because it is familiar, comfortable, and instructor centered, requiring little active student participation (Fitzgerald, 2008). To effectively integrate innovative instructional strategies, it may be necessary to supplement lecture with new methods, rather than to completely replace lecture.

The flipped classroom is a hybrid approach to learning, using technology to move the classroom lecture to “homework” status and using face-to-face classroom time for interactive learning. This approach in higher education usually involves faculty development of a video-recorded lecture (lecture capture) that is made available to students for viewing outside of the classroom. Classroom time is spent in discussion, clarification, exercises, or other learning activities to enhance application of knowledge (Ronchetti, 2010). This approach was first used in the 1990s (Mazur, 1997) in elementary and secondary education and was referred to as the “classroom flip” by Baker (2000, p. 9), who also coined the “guide on the side” as compared to the “sage on the stage,” which is now the mantra of those who espouse this method of teaching (Frydenberg, 2013).

The lecture capture method of content delivery may assist in achieving the goal of lecture enhancement and supplementation. Lecture capture is a software system that automatically records audio and video media that is then automatically made available for student viewing and download to personal MP3 devices or through applications available for smart phones. Recordings can be edited into segments to allow for shorter, focused study sessions. Challenges for students in the use of lecture capture include effective time management, lack of social interaction with faculty and other students, and lack of opportunity to ask questions. Faculty members are challenged to maintain classroom attendance by engaging students when lectures are offered electronically (Rogers & Cordell, 2011).

Lecture capture as an adjunct to classroom presentation has received mixed reviews. Low-achieving students (Veeramani & Bradley, 2008) and those for whom English is a second language (Shaw & Molnar, 2011) prefer courses that offer lecture capture backup. The impact of the substitution of lecture capture for traditional lecture on performance is largely unknown. The current study contributes to nursing education by measuring the effects of the use of lecture capture and innovative learning activities in the flipped classroom on the academic success of baccalaureate nursing students.

Method

A quasi-experimental design was used in two adult health courses that are offered consecutively in semesters two and three of the nursing curriculum. The study was approved by the institutional review board. Sixteen master’s-prepared faculty members teach the two courses via interactive television on three campuses. An a priori analysis of power for a one-way ANOVA for three groups (conditions) using a power of 0.80, moderate effect size of 0.25 and alpha of 0.05 resulted in a required sample size of 159, or 53 participants for each course and condition (LO, LLC, and LCI) (Faul, Erdfelder, Lang, &

Buchner, 2007). A convenience sample of 589 students was recruited for the study over a period of three semesters. A majority of the participants were White (75%) and female (81%), with a mean age of 24.32 ($SD = 6.71$) years. Participants worked an average of 13.6 hours ($SD = 10.62$) per week and were enrolled in 14.1 credit hours ($SD = 1.67$).

Three approaches to teaching Adult Health nursing were used: (a) lecture only (LO) (fall 2009), classroom lectures by faculty and via interactive television; (b) lecture plus lecture capture (LLC) (spring 2010), classroom lecture format plus lecture capture backup; and (c) lecture capture plus innovation (LCI) (fall 2010) using the flipped classroom approach, in which there were no classroom lectures. Lectures captured the prior semester were made available to students, with updates to the content as needed. Prior to the beginning of the final semester of the study, faculty on all campuses met in course groups and planned the flipped activities. Simulation case studies, games, and other exercises were implemented independently by faculty on each campus. Interactive television was used only for guest lectures during the semester. Comparable examination items on test metrics were used from semester to semester to ensure consistency. Course examination averages for each student were determined. Satisfaction data were gathered using a 16-item, faculty-developed questionnaire scored on a 4-point Likert-type scale, with higher scores indicating greater satisfaction. The internal reliability for the 16-item questionnaire was assessed using Cronbach’s coefficient alpha. Cronbach’s alpha was 0.98, indicating good internal consistency across the sample. All statistical analyses were conducted using SPSS® version 18 software. The level of significance was set at $p = 0.05$ (two-tailed).

Results and Discussion

The first research hypothesis was designed to examine differences among three educational delivery methods (LO, LLC, and LCI) on mean examination scores. A one-way analysis of variance (ANOVA) demonstrated significant differences according to the method of teaching, $F(2,586) = 10.69, p < 0.001, \omega^2 = 0.032$. Average examination scores were significantly higher for the students in the LCI group ($M = 81.89, SD = 5.02$) than students in both the LLC group ($M = 80.70, SD = 4.25, p = 0.003$) and LO group ($M = 79.79, SD = 4.51, p < 0.001$) in both courses. The change in mean grade was small but reflects an additional 47 students achieving passing grades over the course of the study. The results of these tests support the first hypothesis.

The second aim of the study was to assess the differences in student satisfaction scores across the three educational delivery methods. The satisfaction survey, completed by 445 students (75.55% response rate), was faculty developed and therefore lacked validity data; this is a limitation of the study. As the satisfaction data were not normally distributed, a Kruskal-Wallis test was conducted to determine whether satisfaction scores were higher for the LCI groups, compared with the LLC and LO groups. The result of the test was significant $\chi^2(2, n = 445) = 66.10, p < 0.001$, indicating a difference in satisfaction across the three delivery methods. Follow-up tests to examine the LO and LCI group satisfaction mean scores were significant but not in the expected direction, $z = -6.37, p < 0.001, r = 0.36$.

The LCI students ($n = 186$) had an average satisfaction rank of 131.18, whereas the LO students ($n = 130$) had an average rank of 197.59, indicating that the LCI students were significantly less satisfied than the LO group. Comparison of LCI and LLC ($n = 129$) group satisfaction mean scores was significant but also not in the expected direction, $z = -7.17$, $p < 0.001$, $r = 0.40$. The LCI students had an average rank of 127.39, whereas the LLC students had an average rank of 202.14, indicating that the LCI students were also less satisfied than students in the LLC group. A final test to examine differences in satisfaction scores across the LO and LLC group found no significant results, $z = -1.25$, $p = 0.21$. These findings contradict the second research hypothesis; students were more satisfied with the LO and LLC methods than the LCI flipped classroom approach. Thus the second hypothesis was rejected. Students reported that the LCI approach required more work, and they did not seem to perceive the value of interactive learning approaches. However, as Benner et al. (2010) noted, student satisfaction may not be a good indicator of learning.

The advantage of these approaches is best seen in the context of the four changes for nursing education recommended by Benner et al. (2010). Using the LCI flipped classroom approach, small groups of students were engaged in case studies, simulation, and other learning activities that enabled application of theoretical information to clinical practice. The faculty emphasized “teaching for a sense of salience” (Benner et al., 2010, p. 82) to develop clinical judgment. Students linked classroom and clinical learning to enable the integration of theory and clinical practice. By using lecture capture and working with small in-class groups of students, faculty are better able to model and engage students in clinical reasoning, reflection, application of relevant research findings, and clinical imagination. These approaches further the formation of the student as a professional nurse.

Limitations

The study was limited by problems of infrastructure, including classroom availability and limited access to high-speed Internet by rural students. Innovative teaching methods were developed by faculty using a guide common to the two courses, but inevitable variations in faculty approach may have affected student outcomes. Faculty did not anticipate students’ perception of loss of a supportive social system, which could be addressed through use of social media. Providing structured opportunities for questions and periodic assessment of students’ anxiety would have promoted earlier problem identification and enabled more effective interventions. The faculty continues to evaluate the flipped approach, gradually substituting active classroom learning and taped lectures for passive lecture techniques.

Implications and Suggestions for Further Study

Replication of this study with improved controls over infrastructure, resources, and student-to-faculty ratios would result in improved application of the findings. Ensuring consistent access to Internet-based lecture capture sessions for students

would enhance interpretation of results, reducing student frustration related to access and technology. The following research questions could be considered in future studies:

- What is the result of using social media resources for student support on satisfaction and course grades when using the flipped classroom approach?
- What ratio of lecture classes to innovative application classes results in best student learning and improved situated cognition in the clinical practice setting?
- Is there a difference in course grades and student satisfaction with use of different approaches to teaching? In other words, do different teaching methods have differing results; for example, are games as effective as simulation?
- Which teaching methods are more effective in teaching specific types of content or developing specific types of thinking; for example, how best to teach pharmacological content, to stimulate the development of salience or use of creative thinking?
- What are the most effective methods to ensure student preparation for the interactive sessions?

Blending teaching technologies, the flipped classroom and interactive classroom activities can result in improved learning; however, faculty will need to refine implementation techniques to gain students’ approval of these new approaches.

References

- Baker, J.W. (2000, April). *The ‘classroom flip’: Using web course management tools to become the guide on the side*. Paper presented at the International Conference on College Teaching and Learning, Jacksonville, FL.
- Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation*. Stanford, CA: Jossey-Bass.
- Buerhaus, P.I., Auerbach, D.I., & Stalger, D.O. (2009). The recent surge in nurse employment: Causes and implications. *Health Affairs*, 28, w657-w668. doi:10.1377/hlthaff.28.4.w657
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.
- Fitzgerald, K. (2008). Instructional methods and settings. In S.B. Bastable (Ed.), *Nurse as educator: Principles of teaching and learning for nursing practice* (pp. 429-472). Sudbury, MA: Jones and Bartlett.
- Frydenberg, M. (2013, January 24). The flipped classroom: It’s got to be done right. *Huff Post College*. Retrieved from http://www.huffingtonpost.com/mark-frydenberg/the-flipped-classroom-its_b_2300988.html
- Mazur, E. (1997). *Peer instruction: A user’s manual*. Upper Saddle River, NJ: Prentice Hall.
- Rogers, R.R.H., & Cordell, S. (2011). An examination of higher education students’ opinions of the lecture capture system Tegrity. *Journal of Technology Integration in the Classroom*, 3(1), 75-89.
- Ronchetti, M. (2010). Using video lectures to make teaching more interactive. *International Journal of Educational Technology*, 5(2), 45-48.
- Shaw, G.P., & Molnar, D. (2011). Non-native English language speakers benefit most from the use of lecture capture in medical school. *Biochemistry and Molecular Biology Education*, 39, 416-420. doi:10.1002/bmb.20552
- Veeramani, R., & Bradley, S. (2008). *Insights regarding undergraduate preference for lecture capture*. Retrieved from <http://www.sonicfoundry.com/white-paper/insights-regarding-undergraduate-preference-lecture-capture>
- Walker, G.C., Klotz, L., Martin, P., Miller, G.K., Missildine, K., Bishop, S., . . . Glymph, D. (2011). A regional academic partnership for the early identification and retention of at-risk nursing students. *Journal of Professional Nursing*, 27(6), e8-e13.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.