

Standardized vs. Student-Driven Exam Review in a High School Family and Consumer Sciences Classroom

Cheryl L. Lee
Appalachian State University

Michelle Rogers
South Caldwell High School

The purpose of this study was to investigate the effects of review formats utilized in the high school family and consumer sciences classroom to determine their influence on student performance on standardized tests. Students in two child development classes participated in the study. Students in the control class were only given sample questions from a standardized test bank when they reviewed, while students in the experimental class created their own review materials and activities in addition to their work with standardized questions. Both classes were assessed with identical multiple-choice exams, one at mid-term and the other at the end of the course. The class mean of the treatment group was higher than the class mean of the control group on both exams, although the difference was not statistically significant.

Exam reviews help students prepare for exams and result in better test scores, especially when these reviews are compared to situations where no reviews are conducted (King, 2010). Typical reviews are teacher directed with the teacher providing review outlines or study questions. If classroom time is utilized for this purpose, teachers usually go over content that might be examined and answer questions students raise. However, students often find such reviews boring and disengaging, experiencing them as additional class lectures. Additionally, only the few who are prepared for these reviews actually appear to benefit from them (King, 2010; Paul, Hollis, & Messina, 2006).

Could exam reviews be conducted differently so that students are actively involved in the process resulting in higher test scores? The purpose of this study was to investigate a standardized vs. student-driven exam review to observe the influence of each on student performance on standardized tests. It was hypothesized in this study that the student-driven exam review method would result in higher test scores than the standardized review method.

Review of Related Literature

Educators have created and experimented with new ways to implement exam reviews with the goals of both improving test scores and creating positive attitudes toward the given subject. Most of these approaches appear to be teacher-directed, with the teacher creating and directing the review.

One approach involves gamification, wherein teachers implement games such as bingo or jeopardy to review material, especially facts and definitions. Games are often used because students appear to enjoy them, and they can be readily created for any subject area (Hackathorn,

Cornell, Garczynski, Solomon, Blankmeyer, & Tennial, 2012; Kaupins, 2005; Middlecamp, 2003; Kostic, Grooms, & Yadon, 2015). In their research on the effectiveness of trivia games on exam scores, Keck (2000) and Paul et al. (2006) found that students who engaged in the trivia games achieved higher scores (Keck, 2000; Paul et al., 2006). Trivia games helped students determine how and what to study, as well as areas in which additional study was needed.

Practice tests are an additional alternative to the traditional exam review. Students particularly appear to enjoy this type of review when the review is conducted online. One benefit is that students can receive immediate feedback related to their performance. Such reviews not only check students' knowledge levels, but also provide them a preview of the format and wording of exam questions (King, 2010; Pemberton, Borrego, & Cohen, 2006; Sturm-Beiss, 2013; Teplitski, Irani, Krediet, Di Cesare, & Marvasi, 2018). It is thought that the practice of taking an exam and receiving some incorrect answers helps students to identify their weaknesses and then engage in deeper cognitive thought to improve understanding of the material.

Clickers, handheld electronic devices that enable a student to respond anonymously to a question posed by the instructor, provide a slightly different version of the practice exam review. Student responses can be displayed in real time for both the teacher and students to view. Student engagement is increased during a Clickers-based review as all students can participate. Clickers have been used in a variety of disciplines, including the sciences, business, psychology, and family and consumer sciences (FCS) (Bunce, Vanden-Plas, & Havanki, 2006; Elliott, 2003; Gentry, 2007; MacArthur & Jones, 2008; Reay, Li, & Bao, 2008; Simpson & Oliver, 2007; Sutherlin, Sutherlin, & Akpanudo, 2013; Walker, Spangler, Lloyd, Walker, Wessels, & Summerville, 2018; Willoughby & Gustafson, 2009). Since most studies have focused on the implementation of these devices, little is known about their effectiveness in improving exam scores. However, in his chemistry courses, King (2010) concluded that utilizing Clickers in exam reviews resulted in higher grades relative to other reviews.

While some educators have varied the methods by which they conduct their exam reviews, others have more actively involved the students in the exam review. Lee (2006) implemented a three-part, student-driven exam review in a college-level algebra class. The first part of this approach required students to write a review summary of each course concept deemed important by the instructor allowing students the opportunity to demonstrate their conceptual knowledge, refresh their understanding of concepts, and narrow the range of concepts to study for a test. The second component of Lee's (2006) approach required students to develop possible exam questions while working in groups. This promoted discussions in which students demonstrated their knowledge as they explained their ideas for possible questions; students also evaluated possible questions posed by their peers. The third component of Lee's (2006) approach required the students to make a group presentation of the exam questions they developed to the class. During the presentation, class members provided feedback to presenters to edit or improve their questions. This activity encouraged students to become more focused and actively involved in the review process by giving them the opportunity to listen to their classmates' reasoning skills as they demonstrated their problems. It also provided students with new ways to solve problems as they studied others' work. Lee (2006) concluded that students appeared to value and enjoy this interactive exam review.

Bhatia and Makela (2010) found that collaborative test reviews resulted in higher test scores among students in a history of textiles college course. Review questions were prepared by the instructor, and then students worked in small groups to answer the questions. Each group

was then assigned to lead a discussion on one topic from the review, thereby sharing their collective knowledge with other groups at the review. This provided students an opportunity to gain a better understanding of concepts, focus their study, and learn together.

Whether or not they lead to higher test scores, non-traditional exam reviews appear to be preferred by students (Hackathorn et al, 2012; Kaupins, 2005; King, 2010; Lee, 2006; Nwosu, Mason, Roberts, & Hugel, 2013). However, in many cases, the non-traditional exam review did appear to correspond to higher test scores for students (Bhatia & Makela, 2010; Keck, 2000; King, 2010; Paul et al., 2006).

Method

The sample for this study consisted of students in grades 9-12 who were enrolled in two parenting and child development classes at a rural high school. Students were assigned to the two classes before the study began. One class met during first period (8:00 a.m.), while the second class met during third period (11:30 a.m.). The first period class was randomly assigned as the control group. This class consisted of 21 female students: two were of Hispanic origin while 19 were Caucasian. The class included nine freshmen students, eight sophomores, three juniors, and one senior. The third period class was then assigned as the treatment group. This class consisted of 24 students: 18 females, and six males. Since four students in the treatment group were classified as ESL and did not speak English well, their results were not included in class averages, leaving an actual sample size of 20 Caucasian students, 17 females and three males. This class included five freshmen students, nine sophomores, four juniors, and two seniors.

For both the control and treatment groups, all classroom activities and instruction were identical throughout the semester. Both classes were taught by the same teacher, used the same textbooks, received the same teacher notes and hand-outs, and participated in the same learning activities.

A quasi-experimental design was used in relation to the exam reviews for the two groups. The control group engaged in traditional, standardized exam reviews. Throughout the semester, the students received practice questions from the test-item bank and were instructed to study these questions for the mid-term and final exams. Before each exam, the teacher directed an in-class review, reading out the questions for students to voluntarily answer aloud.

Like the control group, the students in the treatment group also received practice questions from the test-item bank and were instructed to study them for the mid-term and final exams. However, the in-class review was conducted in a different manner: First, students were provided a list of important course concepts (e.g., nuclear family, blended family, authoritative parenting style) and instructed to briefly summarize the meaning of each concept. After completing their summaries, the students selected their own small groups of two or three and proceeded to develop two review activities for the classroom. One activity was to create a written assessment tool that contained practice test questions in a variety of formats (true-false, multiple choice, matching, short answer, etc.). The second activity was to create an interactive classroom review which could be performed in a large group or small team format (e.g., team games such as jeopardy, active games such as indoor "baseball," flashcards for small group, etc.). This review would promote active student participation while providing immediate feedback. The groups then led the class through their review activities, with the teacher acting as facilitator rather than director. The result was a peer-led exam review in which all students were actively involved.

For both the control and treatment groups, identical standardized exams were administered at mid-term and at the end of the semester. The mid-term exam was generated by the teacher from the course practice test bank provided by the state. The final exam was the end of course exam directed by the state instructional management system. All exam questions had been tested by the state to assure their validity and reliability. As some students were absent on those days, the final sample included the 20 students in the control group and 17 in the treatment group who completed both exams.

Results

T-tests for independent samples were conducted to determine whether the experimental group and control groups differed regarding their mid-term and final exam scores. Data analysis showed did not uncover a significant difference between the treatment and control group scores on the midterm exam ($t = -.207, p = .837$). There was also not a significant difference between the groups' scores on the final exam ($t = -1.05, p = .300$). However, as shown in Table 1, although not significant, it should be noted that the scores for the treatment group were higher on both the mid-term and final exams.

Table 1
Results of Independent T-tests on Mid-Term and Final Exam Scores

| | Mid-Term Exam | | | | | Final Exam | | | | |
|-----------|---------------|-------------|-----------|----------|------------|------------|-------------|-----------|----------|------------|
| | <u>N</u> | <u>Mean</u> | <u>SD</u> | <u>t</u> | <u>sig</u> | <u>N</u> | <u>Mean</u> | <u>SD</u> | <u>t</u> | <u>sig</u> |
| Control | 20 | 86.40 | 10.72 | | | 20 | 86.20 | 10.18 | | |
| | | | | -.207 | .837 | | | | -1.05 | .300 |
| Treatment | 17 | 87.12 | 10.26 | | | 17 | 89.06 | 5.12 | | |

When asked orally whether they preferred the student-driven format of review as opposed to the traditional, standardized review format, 14 of the 17 students in the treatment group indicated they did prefer the student-driven format. One student remarked, "I felt like I could understand it better because I had to teach it to someone else." Another said, "Before I could explain my activities to the group, I had to make sure I really knew the information myself." Students in the treatment group were observed as more actively involved in the review process and more motivated to participate through all phases of the review activities than the students in the control group.

Discussion and Implications

This study found that allowing students to be actively involved in creating and conducting their own exam review resulted in higher test scores than when students experienced a traditional exam review, although the differences in the test scores were not statistically significant. Engaging students in the exam review process also resulted in more positive student attitudes toward the exam. However, this finding is limited to a relatively small sample that was not randomly selected due to the restriction of school class scheduling. In addition, the time of day, with one class occurring early in the morning and the other at mid-day, may have influenced student attitudes and performance. Further research involving larger samples and a variety of FCS courses would hopefully provide additional helpful data.

The potential benefit of students' active participation in not only their exam reviews, but also their classroom learning experiences, is evident given the positive student attitudes in this study. These benefits are not limited to any subject or age group, so they could apply generally to FCS courses. Learning is enhanced in a collaborative, social, goal-oriented classroom environment. By taking an active part in learning and understanding content with their peers, students gain valuable transferable skills and may also perform better on tests.

FCS educators should use these findings to create review sessions that are both beneficial and enjoyable to students. In addition, they should feel free to experiment with different types of reviews to determine which appear to be most effective with the various classes and audiences. Perhaps combining review formats might prove effective, for example, beginning the exam review with a trivia type game and following that with a discussion of the most missed topics. Or, after each question is answered, students might provide additional information about the topic, going deeper in their reflection of that concept. This active involvement in exam reviews could reduce students' test anxiety, increase their enjoyment, and ultimately increase their knowledge of the concepts which would hopefully increase their test scores.

References

- Bhatia, A., & Makela, C. (2010). Collaborative test reviews: Student performance. *Journal of Family & Consumer Sciences*, 102(2), 23-26.
- Bunce, D., VandenPlas, J., & Havanki, K. (2006). Comparing the effectiveness on student achievement of a student response system versus online WebCT quizzes. *Journal of Chemical Education*, 83, 488-493. doi:10.1021/ed083p488
- Elliott, C. (2003). Using a personal response system in economics teaching. *International Review of Economics Education*, 1, 80-86. doi:10.1016/S1477-3880(15)30213-9
- Gentry, D. (2007). Using audience response systems in FCS. *Journal of Family & Consumer Sciences*, 99(2), 42-44.
- Hackathorn, J., Cornell, K., Garczynski, A., Solomon, E., Blankmeyer, K., & Tennial, R. (2012). Examining exam reviews: A comparison of exam scores and attitudes. *Journal of the Scholarship of Teaching and Learning*, 12, 78-87.
- Kaupins, G. (2005, January). Using popular game and reality show formats to review for exams. *The Teaching Professor*, 5-6.
- Keck, M. (2000). A final exam review activity based on the Jeopardy format. *Journal of Chemical Education*, 77(4), 483. doi:10.1021/ed077p483
- King, D. (2010). Redesigning the preexam review session. *Journal of College Science Teaching*, 40, 88-96.
- Kostic, B., Groomes, D., & Yadon, C. (2015). Game shows as review activities: The impact on course evaluations and student perceptions. *Scholarship of Teaching and Learning in Psychology*, 1(4), 349-361. doi:10.1037/stl0000039

- Lee, K. (2006). Using exam review sessions as an opportunity for learning, teaching, and assessment. *Assessment Update*, 18, 7-8.
- MacArthur, J., & Jones, L. (2008). A review of literature reports of clickers applicable to college chemistry classrooms. *Chemical Education Research and Practice*, 9, 187-195. doi:10.1039/B812407H
- Middlecamp, M. (2003). Uncover the disorder: A review activity for abnormal psychology courses. *Teaching of Psychology*, 30, 62-63.
- Nwosu, A., Mason, S., Roberts, A., & Hugel, H. (2013). The evaluation of a peer-led question-writing task. *The Clinical Teacher*, 10, 151-154. doi:10.1111/j.1743-498X.2012.00632.x
- Paul, S., Hollis, A., & Messina, J. (2006). A technology classroom review tool for general psychology. *Teaching of Psychology*, 33, 276-279. doi:10.1207/s15328023top3304_8
- Pemberton, J., Borrego, J., & Cohen, L. (2006). Using interactive computer technology to enhance learning. *Teaching of Psychology*, 33, 145-147. doi:0.1207/s15328023top3302_9
- Reay, N., Li, P., & Bao, L. (2008). Testing a new voting machine question methodology. *American Journal of Physics*, 76, 171-178. doi:10.1119/1.2820392
- Simpson, V., & Oliver, M. (2007). Electronic voting systems for lectures then and now: A comparison of research and practice. *Australasian Journal of Educational Technology*, 23, 187-208. doi:10.14742/ajet.1264
- Sturm-Beiss, R. (2013). The efficacy of online exam-review sessions: Reaching both high- and low-performing students. *Journal of Online Learning and Teaching*, 9(3), 431-438.
- Sutherlin, A., Sutherlin, G., & Akpanudo, U. (2013). The effect of clickers in university science courses. *Journal of Science Education and Technology*, 22(5), 651-666. doi:10.1007/s10956-012-9420-x
- Teplitski, M., Irani, T., Krediet, C., Di Cesare, M., & Marvasi, M. (2018). Student-generated pre-exam questions is an effective tool for participatory learning: A case study from ecology of waterborne pathogens course. *Journal of Food Science Education*, 17(3), 76-84. doi:10.1111/1541-4329.12129
- Walker, R., Spangler, B., Lloyd, E., Walker, B., Wessels, P., & Summerville, A. (2018). Comparing active learning techniques: The effect of clickers and discussion groups on student perceptions and performance. *Australasian Journal of Educational Technology*, 34, 74-87.
- Willoughby, S., & Gustafson, E. (2009). Technology talks: Clickers and grading incentive in the large lecture hall. *American Journal of Physics*, 77, 180-183. doi:10.1119/1.3013542

About the Authors

Cheryl L. Lee is a professor of family and consumer sciences at Appalachian State University in Boone, NC.

Michelle Rogers is a family and consumer sciences teacher at South Caldwell High School, Hudson, NC.

Citation

Lee, C.L. & Rogers, M. (2018, Fall). Standardized vs. student-driven exam review in a high school family and consumer sciences classroom. *Journal of Family and Consumer Sciences Education*, 35, 40-46.