
Students' Perceptions and Satisfaction with Adaptive Quizzing

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Adaptive quizzing is an emerging technology that can be implemented in courses by faculty as a learning strategy. The purpose of this article is to discuss student perceptions and satisfaction with adaptive quizzing as a learning strategy. Students perceived that adaptive quizzing increased their understanding of course content, helped them to prepare for exams, and was easy to use. All students responded that they were satisfied with adaptive quizzing. Results showed that students were satisfied with adaptive quizzing as a learning strategy, perceived that adaptive quizzing increased their knowledge in course content, and perceived that adaptive quizzing prepared them for course exams and quizzes.

Introduction

The purpose of this article is to discuss student perceptions and satisfaction with adaptive quizzing as a learning strategy. As educators we must develop creative and innovative strategies to encourage students to familiarize themselves with new material and learn course content. Technology has promoted the development of innovative strategies to prepare nursing students for courses and the National Council Licensure Examination (NCLEX).

Adaptive quizzing is an emerging technology that can be implemented by faculty to assist students in course preparation. It is similar to the computerized adaptive testing utilized by the National Council of State Boards of Nursing (n.d.). Adaptive quizzing provides a questioning format that adjusts to each student's learning needs. As students answer questions, the difficulty of future questions is based on their responses, with the intent of improving mastery of content. Students work at their own pace taking quizzes and getting immediate feedback to increase their mastery level of course content.

Generally, faculty are able to assign quizzes and due dates for students with an adaptive quizzing program based on course concepts, accessing statistics and reports that demonstrate students' progress and level of understanding. Reports provide information on concepts that

students misunderstand based on class performance data. This allows faculty to correct misunderstandings prior to course exams.

Additionally, adaptive quizzing programs typically offer students the ability to create their own quizzes. The personalized quiz builder gathers data from a student's prior performance to create individualized quizzes that focus on exactly what the student needs to understand and continues to adapt with each additional quiz. Answers with rationales and referenced textbook pages for remediation are provided after each question or at the end of each quiz. However, students do not necessarily need to have the textbook that accompanies the adaptive quizzing program. They can utilize other textbooks and resources for remediation of the content. In addition, students are provided with feedback reports about their performance that is broken down so they know where they need to focus their study efforts.

Literature Review

Literature related to nursing student satisfaction with adaptive quizzing in nursing is non-existent; and literature related to the utilization of adaptive quizzing in nursing education is limited. Therefore, the focus of this literature review will be on utilization of testing to promote learning among students.

Testing effect is a phenomenon of enhanced retention of material from taking a test on the material versus studying of material (Roediger & Karpicke, 2006b). This has been repeatedly studied and proven in laboratory settings among cognitive psychologists (Karpicke & Grimaldi, 2012; Karpicke & Roediger, 2007; Roediger & Butler, 2011; Roediger & Karpicke, 2006a; Roediger & Karpicke, 2006b). This research suggests that the implementation of testing to improve learning and retention of material may enhance educational achievement.

Test-enhanced learning has also been studied in actual higher education settings. Investigations found that repeated testing improved long-term retention of material compared to studying (Larsen, Butler, & Roediger, 2009; Larsen, Butler, & Roediger, 2013). Frequency of self-testing has also been investigated. The results demonstrated a significant correlation between the number of attempts at self-testing through practice quizzes and subsequent examination scores (Panus, Stewart, Hagemeyer, Thigpen, & Brooks, 2014).

Testing is considered a type of formative assessment. Roediger and Karpicke (2006b) noted "Formative assessment is often referred to as

assessment *for* learning, in contrast to assessment *of* learning” (p. 201). This method of assessment provides feedback that teachers can use to direct instruction and students can use to direct studying (Black & William, 1998). The adaptive quizzing program allows faculty and students to review student performance and provides information on strengths and weaknesses as well as misconceptions. This assists faculty and students to address the weaknesses and misconceptions prior to summative evaluations for course grades.

Additionally, adaptive quizzing provides the student immediate feedback on their performance after quizzes that include rationales for questions answered correctly or incorrectly. Studies have demonstrated that testing with feedback leads to greater learning benefits than testing without feedback (Roediger & Butler, 2011; Pennebaker, Gosling, & Ferrell, 2013). A study conducted on an on-line platform that provided students immediate feedback during repeated testing found improved performance in the class, as well as in other current classes and future classes (Pennebaker, Gosling, & Ferrell, 2013).

Survey

A cohort of pre-licensure students taking a Foundations of Nursing course at a regional university campus was surveyed to evaluate adaptive quizzing. Out of a class of 38 students, 36 chose to complete the survey. After an exempt approval from the Institutional Review Board and an explanation of the survey, students were sent a link to the survey through their university e-mail accounts. When the students accessed the link, they were directed to an informed consent which included the option of agreeing or disagreeing to complete the survey.

The survey was developed using an electronic software program. It included questions on utilization and satisfaction of adaptive quizzing. Students were also able to provide written comments regarding the adaptive quizzing program.

Adaptive quizzing implementation

Faculty chose to implement adaptive quizzing in the Foundations of Nursing course, because it is one of the first nursing courses completed by students. In this course, students often report struggling to adapt to the format and difficulty of nursing questions on exams compared to other non-nursing courses. The adaptive quizzing program coincided with the required

textbook for the course. For this study faculty chose to use mastery level assignments. Mastery level is a measurement of the difficulty level of the questions a student answers correctly. To prepare students prior to class, faculty created 15 mastery level assignments on course content. These had to be completed by the student prior to the content being presented in class by the faculty. Students who achieved the assigned mastery level by the due date were given one point for the assignment in the course. Adaptive quizzing points accounted for 7.5% of the course grade (15 points out of 200).

All 38 students enrolled in the course completed the majority of the assignments; most students completed all the assignments. There were 4,469 quizzes taken with an average number of quizzes per student being approximately 118. The students answered 35,702 questions total with the average number of questions per student being approximately 940. The amount of time spent on each adaptive quizzing assignment was reported by students to be 1 to 2 hours.

Student Perceptions and Satisfaction

The survey, assessing student perceptions and satisfaction with adaptive quizzing, was completed by 36 pre-licensure students. When rating their satisfaction with adaptive quizzing, all students responded that they were satisfied. Thirty-nine percent indicated they were extremely satisfied, 47% were very satisfied, and 14% were moderately satisfied. No students responded that they were not satisfied. Student satisfaction could be related to the students' positive perceptions regarding the content, structure, and function of adaptive quizzing as a learning strategy. A summary of student perceptions of adaptive quizzing are shown in Table 1.

Table 1. Students' Perceptions of Adaptive Quizzing

Survey Question	n	%
Adaptive quizzing increased my knowledge related to the content on the quizzes.	32	89
Adaptive quizzing made content discussed in class more understandable	33	92
Adaptive quizzing correlated with the content of the course	36	100
Adaptive quizzing assisted me in preparing for course exams and/or quizzes	32	89

Adaptive quizzing was a useful learning strategy	35	97
Adaptive quizzing would be beneficial in other nursing courses	34	95
Adaptive quizzing was easy to access	33	92
Adaptive quizzing was easy to complete	32	89
I will continue to use adaptive quizzing as a learning strategy	26	72

Students provided written comments regarding the use of the adaptive quizzing program, as well as ways to improve the experience. Positive comments included:

“Offered us a great study tool the (sic) correlated very closely to classroom content. It was very helpful in the sense that it didn't give you the same questions on every quiz.”

“Easy to access, loved having reasons why questions were right-explanation.”

“I found that practicing more questions helped me to better understand the material and I got more out of these assignments than just reading the material. It is an interactive way to learn important material.”

Student comments related to improving the use of the program for the course included:

“I feel that although they were beneficial, they required a lot of time and focus outside of class and usual studying to complete.”

“Have the assignments due the week after the content was covered in class. Therefore, it would be more like a review for us.”

“Offer more points for the quizzes.”

Conclusions

The results demonstrated that students were satisfied with the adaptive quizzing program and found it easy to utilize. As faculty strive to implement innovative teaching strategies to enhance student learning, student satisfaction with the strategy should be considered. Approaches to learning that students find unappealing may not be used by students and waste student time and money.

A goal for implementation of adaptive quizzing was to increase students' preparedness for class, exams, and quizzes. Students reported that the adaptive quizzing program was beneficial at increasing their knowledge related to course content. They also perceived that the program assisted in preparing them for course exams and quizzes.

Student satisfaction and increase of knowledge in course content may explain why the students noted they would continue to use the program in the future as a learning strategy. Faculty expected that students would perceive that adaptive quizzing increased their knowledge due to exposure to the questions and feedback provided. It was reassuring to faculty to note that student perceptions matched faculty expectations.

Although the number of students completing this survey was small, the information adds to the body of knowledge on the use of adaptive quizzing in nursing education. It may be a beneficial learning strategy that can be implemented into nursing courses by faculty in order to promote a higher level of student preparation prior to coming to class. As a result, students may gain a better understanding of course content and score higher on exams. Future studies looking at the relationship between adaptive quizzing with course grade and NCLEX pass rates may also be useful.

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