Effectiveness of an Adaptive Quizzing System to Improve Nursing Students’ Learning

E’Loria Simon-Campbell, PhD
College of Health Sciences - School of Nursing, Sam Houston State University, Huntsville, TX, USA
Julia Phelan, PhD
Center for the Study of Evaluation, UCLA/CRESST, Los Angeles, CA, USA

Background

Nursing school graduates must pass the NCLEX-RN before they become a practicing nurse and NCLEX-RN pass rates have emerged as an indicator of program quality for state boards of nursing and the nursing schools’ community of interest (Holstein, Zangrilli, & Tahoa, 2006). The first time pass rate score of nursing programs is important to both students and nursing programs. If students are not successful on the NCLEX-RN they are unable to pursue their chosen career resulting in loss of income and potential impact on self-esteem (Frith, Sewell, & Clark, 2006). For nursing programs, low NCLEX pass rates have an adverse effect on enrollment, accreditation, funding, and faculty recruitment and retention. Strategies for increasing NCLEX-RN pass rates range from modifying admission criteria, altering the number of times students can retake courses once in the program, and implementing remediation and progression policies. End of Program - High stakes testing uses a signal assessment/testing score as a means determining a student’s readiness for the NCLEX-RN Exam and may be used to prevent a student from graduating (Spurlock, 2006[EC1]). The implementation of high stakes testing has not been shown to be effective in improving education program quality and could hinder the ability to address the actual causes of low NCLEX-RN pass rate (Spurlock, 2013).

The National League of Nursing’s Presidential Task Force on High stakes testing developed the Fair Testing Guidelines for Nursing Education in order to examine the use of testing as a graduation requirement in nursing programs. These guidelines note the importance of evaluation methods to support student learning and to improve and evaluate teaching and program effectiveness (NLN, 2012). Moselbee and Benton (2016) encourage the move from high stakes testing to comprehensive competency, which supports improvements to both nursing curriculum and faculty development in an effort to reduce the stress of high stakes testing among nursing students and produce positive student outcomes (diagnostic standardized exam scores, NCLEX first time pass rates, student retention, and student satisfaction).

Purpose

The current study focused on the implementation of a strategy which combines ongoing learning and remediation in a more personalized approach to out-of-class studying involving digital learning materials. Basic online assessment tools have been used and studied with an eye to determining how they can best be utilized in out-of-class environments. Online quizzing systems are a way of efficiently providing the potential benefits of in class formative assessment, but in an easier to administer and monitor environment.

Method

In this study, we explored the impact of the implementation of an adaptive quizzing system (AQS) during the final semester of a BSN program on nursing students’ performance. The AQS provide students an environment in which they can effectively and efficiently practice and learn nursing skills and concepts over time as well as to prepare for exams (like the NCLEX). It allows students to practice and learn in a low-stakes, authentic environment to help prepare for higher-stakes exams (e.g., NCLEX-RN). This type of practice can also be invaluable to populations such as EL (English learner) or LEP (limited English proficient) students as well as those requiring extra support in content mastery and test-taking strategies.
The project was a retrospective study conducted at a baccalaureate school of nursing in the southeast United States. The study implemented a retrospective descriptive and correlational design to explore the relationship between usage and mastery measured in the AQS, course outcome data, standardized testing (ATI) scores, and NCLEX outcomes. Retrospective data were collected from 36 senior-level nursing students.

Results

Students answered an average of 574 quiz questions and had an overall average quizzing mastery level of 3.48 (max = 8). Students took an average of 5.94 practice exams and had an overall exam mastery level of 6.62. There was a strong, positive correlation between the number of AQS questions a student answered and overall mastery level. Thus, we see as students answer more questions, their mastery of the course material increases accordingly. All students in the group passed the NCLEX-RN (on the first or second attempt). In the most recent two prior years before the AQS was implemented, the NCLEX-RN pass rates at the study school were 73.91% (2014) and 88.06% (2015). The 2016 study cohort had a 100% pass rate (88.9% passed on their first attempt).

Surveys

Students were given the opportunity to complete three online surveys. Of the 36 eligible students 25 responded to Survey 1, 21 to Survey 2, and 20 to Survey 3. Twenty students responded to all three survey measures (a 55.5% response rate).

Survey 1: The first set of questions asked students to respond to statements about their motivations and study habits. The most important motivations for students were improving skills and understanding course work. Most highly rated goals were to learn and master new skills. Less important to students were items relating to comparisons to other students. The second set of questions focused on learning and study practices and attitudes. The most highly ranked item in the set was related to students finding relationships between what they are learning and already know (M = 4.28). Several items related to difficulties students may have studying. The third set of questions focused on study habits in general. The most highly ranked general study habits chosen by students to be most true of them, were when studying they tried to determine which concepts they did not understand well (M = 3.96), and they tried to relate new material to what they already knew (M = 3.96). The lowest ranked study habits relate to the underlying concept of retrieval practice. Students were less likely to study by writing summaries of the main ideas they had learned, or making up questions to focus reading.

Survey 2: Students provided survey-feedback on their usage and opinions on the AQS. Of the 21/36 students who responded, the majority indicated that use of the AQS improved their performance in the course. The majority of students also indicated that the AQS was helpful in preparing for exams, getting feedback on strengths and weaknesses, increased knowledge of course concepts as well as preparing for the NCLEX.

Survey 3: This survey asked students to report on their NCLEX experience and was verified with data obtained by the school. Twenty students responded to the third student survey. Summary results are presented below. Students reported taking the NCLEX between May 25th and June 14th, 2016. Eighteen students (90%) reported passing the NCLEX and two students reported not-passing. Students reported answering an average of 123.95 NCLEX questions (SD = 75.29) with a range from 75-265. Nine students reported answering 75 questions and four students reported answering 265.

Conclusion

The findings of this descriptive retrospective analyses were consistent with the findings from another baccalaureate nursing program also located in Southeast Texas. Both studies support the utilization of adaptive quizzing as a learning strategy for nursing students both during and after nursing school and
indicate that as students actively study and learn in the system, their mastery of course content increases. Data from the AQS provide information and insight was beneficial to all stakeholders. The AQS provide students an environment in which they can effectively and efficiently practice and learn nursing skills and concepts over time as well as to prepare for exams (like the NCLEX). It allows students to practice and learn in a low-stakes, authentic environment to help prepare for higher-stakes exams (e.g., NCLEX-RN). The AQS is an effective powerful tool for formative assessment and remediation, providing instructors with meaningful data that reveals student misconceptions and areas of weakness. This provides invaluable time for faculty to evaluate both the learners’ understanding of content, critical thinking skills, and test taking ability.

Title:
Effectiveness of an Adaptive Quizzing System to Improve Nursing Students’ Learning

Keywords:
Adaptive Quizzing Systems, NCLEX and Retention

References:


Abstract Summary:
Nursing programs strive to produce graduates who are able pass the National Council State Boards of Nursing - NCLEX-RN on their first attempt. This session will provide research findings which support the utilization of Adaptive Quizzing Systems to produce both positive program and student outcomes.

Content Outline:
Effectiveness of an Adaptive Quizzing System to Improve Nursing Students’ Learning
I. Introduction

A. Example National Council Licensure Examination Registered Nurse (NCLEX-RN) 1st Time Pass Rates

B. Example High Stakes Testing

II. Body

A. Main Point #1 Technology in Nursing Education

1. Supporting point #1

   a) Implementation of Retention Strategy
   b) Ongoing Learning and Remediation outside of class

2. Supporting point #2

   a) Adaptive Quizzing System
   b) Benefits (Faculty and Student)

B. Main Point #2 Method

1. Supporting point #1

   a) Adaptive Quizzing System (Prep U PassPoint)
   b) Retrospective Description Study

2. Supporting point #2

   a) Population Characteristics
   b) Data Collection

C. Main Point #3 Results

1. Supporting point #1

   a) Student usage
   b) NCLEX 1st Time Pass Rates

2. Supporting point #2

   a) Implementation of Surveys
   b) Survey Findings

III. Conclusion
A. Example Comparison to Previous Study Findings

B. Example Benefits of Adaptive Quizzing Systems

First Primary Presenting Author

Primary Presenting Author

E’Loria Simon-Campbell, PhD
Sam Houston State University
College of Health Sciences - School of Nursing
Assistant Professor - Coordinator of Adult Health Nursing
Huntsville TX
USA

Professional Experience: Bachelor of Science in Nursing - 1995 Master of Science in Nursing - 2005 Doctorate of Philosophy in Nursing - 2011 Three time recipient of the Texas A&M University Teaching Excellence Award. Nursing Faculty since 2000 (LVN, BSN, and MSN program in both Traditional and Online settings) Served as Coordinator of Progression, Retention, and Graduation for five years Implementation of Adaptive Quizzing Software in Adult Health Nursing and graduating seniors in generic BSN programs Has conducted both qualitative and quantitative research studies pertaining to Health Disparities and Retention of Nursing Students. Published nursing researcher and numerous podium and poster presentations. Recently published previous research study results in Nurse Educator(2016)

Author Summary: Dr. Simon-Campbell is a highly dedicated professional who knows how to motivate her students to strive for excellence and become Life Long Learners. She has in-depth knowledge of the subject matter and does not hesitate to share her expertise with others. Dr. Simon Campbell is a dynamic and powerful communicator who possesses the gift of being able to make complex subjects understandable. She utilizes creative and innovative instructional techniques for the retention of nursing students.

Any relevant financial relationships? Yes

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Description of Potential Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>I am a Nurse Educator Consultant (NEC) for Lippincott, no salary is associated with this role</td>
</tr>
</tbody>
</table>

Signed on 06/15/2017 by E’Loria Simon-Campbell

Second Author

Julia Phelan, PhD
UCLA/CRESST
Center for the Study of Evaluation
Senior Researcher
Los Angeles CA
USA

evaluation and research division of K12 Inc. (including Senior Manager Evaluation and Research). Author or coauthor of many publications, book chapters, presentations and reports primarily relating to assessment, learning, adaptive learning models, online education and associated research projects. Numerous presentations at scientific/educational meetings

**Author Summary:** Dr Julia Phelan serves as Project Director/Senior Research staff for the National Center for Research on Evaluation, Standards, and Student Testing at UCLA. She has numerous publications related to assessment learning, adaptive learning models, online education and associated research projects.

Any relevant financial relationships? Yes

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Description of Potential Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>Dr. Phelan advises on design and implementation of efficacy studies and collaborates wit</td>
</tr>
</tbody>
</table>