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## Clickers in Nursing Education: An Active Learning tool in the Classroom

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### Abstract

**A**mong the many challenges nurse educators face today is the need to keep the classroom learning experience captivating and interesting. The use of active learning techniques in the classroom is vital because of their positive impact on nursing students' learning. One strategy, clickers, or personal response systems was used to promote classroom interaction to enhance ability to retain knowledge, motivate students to learn, and develop students' critical thinking skills in an undergraduate nursing health assessment course. Although clickers have been associated with many positive student outcomes, there have been few empirically based reports to validate outcomes. The purpose of this study was to assess and describe baccalaureate nursing student's satisfaction with the use of clickers in the classroom as a tool to promote active





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learning. Student's satisfaction was measured on the Clicker Satisfaction Survey developed by the authors which measures the seven principles of good practice in undergraduate education according to Chickering and Gamson (1991). A convenience sample of 29 sophomore nursing students in an undergraduate baccalaureate program were assigned clickers for 10 weeks during a semester in a health assessment course and completed an eight item instrument with a likert scale measuring the concepts under study. Overall, findings demonstrated that students were satisfied with the use of clickers in the classroom and encouraged the instructor to continue to use them for this class in the future. Students' overall perceived the clickers to help with their knowledge acquisition and retention, however further studies would be needed to document this correlation utilizing a control versus experimental group. Interestingly, students' did not find clickers to be a major motivating factor for attending class but this could be explained by the mandatory attendance policy in the school of nursing. It is incumbent on nurse educators to move to adopt more nontraditional methods of instruction. Further research is needed to validate learning outcomes providing evidence-based educational technologies and techniques for the next generation of nursing educators and students. The outcomes of this study achieved the positive impact of one nontraditional technology, clickers as a useful tool in accomplishing this task.

**Key words:** personal response system, clickers, nursing education, classroom response systems, assessment





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### Introduction

Preparing the future generation of nurses requires attention to learning styles and interests of students. Actively engaged students will stay attentive and absorb more of the content to strengthen learning outcomes (Moredich & Moore, 2007). Synonyms for clickers include audience response systems (ARS), personal response systems (PRS), or student response systems (SRS). These response systems consist of three parts - clickers (small remote control-like devices used by students), receivers (which receive the clickers' signals), and a software program contained on the instructor's computer. The clickers emit infrared signals that are picked up by a receiver and sent to the instructor's computer.

Clickers, as personal response systems, have been recently adapted as a tool to enhance the social context of learning in the nursing classroom. Traditional lectures are frequently described as tedious and boring relying on a one-way communication from instructor to student with the specific activity of listening, whereas active learning involves students doing tasks which inspire their interest in the subject matter. This approach makes learning more exciting and encourages students to think for themselves and to understand the material. Clickers are personal response systems that are handheld, pocket-size remote control-like devices that use signals to transmit and record





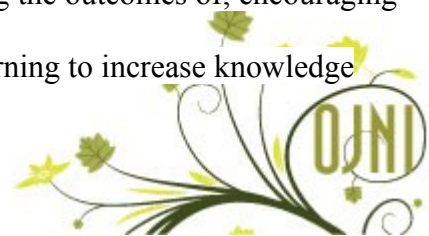
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audience responses to questions immediately during class. Through the use of clickers, subject material is presented, and then applied to unique problems, and following a clicker question a discussion briefing occurs thus assisting the student to assimilate the information and integrate it into their existing knowledge of the content. The literature indicates that the use of clickers promotes advanced reasoning skills (Debourgh, 2008). The purpose of this study was to assess and describe baccalaureate nursing student's satisfaction with the use of clickers in the classroom and describe clickers as a tool to promote active learning.

### **Theoretical Framework**

**T**he theoretical model that underpins this study is Chickering and Gamson's (1991) seven principles of good practice in undergraduate education. These principles include (1) interaction between the teacher and student, (2) student-student interaction, (3) active learning, (4) time on task, (5) rich, rapid feedback, (6) communicates high expectations of the student's ability to learn; and (7) respect for different talents, ways of learning. There is much research which indicates these practices support better learning (DeBourgh, 2008; Chickering & Gamson, 1999). Chickering & Gamson's (1991) seven principles were applied by a faculty member during instruction in an undergraduate nursing class utilizing clickers as an active learning tool. The application of clickers was to enhance active learning by improving the outcomes of; encouraging student-faculty interaction, cooperation among students, active learning to increase knowledge





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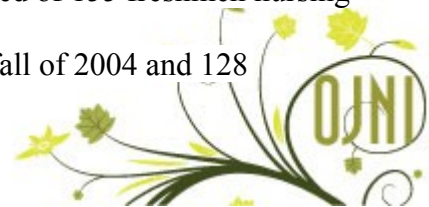
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retention, and emphasize time on task with prompt feedback. These outcomes were measured on a survey based on student's satisfaction utilizing clickers as a tool to meet these principles. Therefore, this study was significant to discover if technology such as clickers could be helpful in meeting these principles of good practice in undergraduate nursing education.

### Literature Review

Active learning has been identified in the literature as the way adults learn best. Nurse educators strive to promote active involvement of students and create a stimulating learning environment as a teaching strategy. Although personal response systems, such as clickers, used in the classroom have been associated with many positive curricular and student outcomes, there have been few empirically based reports involving nursing students to validate outcomes. A few studies that have been reported indicate that personal response systems, when used as a teaching strategy, is effective to engage students to participate and motivate them to learn (Debourgh, 2008; Hatch, Jensen, & Moore, 2005; Moredich & Moore, 2007; Skiba, 2006; Stein, Challman, & Brueckner, 2007).

Stein (2006), measured test scores of students following the use of an audience response system, ComTec Group Response Synthesis 2000 software, when used in a nursing Anatomy and Physiology course for test review. The convenience sample consisted of 155 freshmen nursing students enrolled in Anatomy and Physiology for Nursing I in the fall of 2004 and 128





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undergraduate nursing student enrolled in Anatomy and Physiology for Nursing II in the spring semester of 2005 (Stein, 2006). Average class scores on the test preceded by the interactive review session compared with scores preceded by the more traditional, lecture-style review found no significant improvement. However, Stein (2006) found that ninety two percent of the students felt that the personal response system review was more beneficial than the traditional lecture-style reviews . Although the average on class examination results between the two groups from the Stein study was not affected, correct responses to specific examination questions appeared to be positively influenced by the personal response system reviews. Stein (2006) found that 94% of students felt the use of the personal response system had a positive effect on their examination grades. Eighty nine percent of students thought discussion of the most popular "wrong" responses was helpful in clarifying lecture or textbook information. These findings support the literature that students report high levels of satisfaction with clicker use and find the immediate feedback of learning beneficial (DeBourgh, 2007; Stein, 2006; Moredich & Moore, 2007).

**T**echnology in the classroom provides many opportunities for enhancing communication, discussion and interactivity between the instructor and students. Active learning occurs when students are intentionally employing specific strategies designed to help them learn where information is acquired, acted upon, and/or ideas are shared with one another (DeBourgh, 2008;





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Royse & Newton, 2007). Utilizing clickers can be particularly helpful in classes scheduled for long hours or at the end of the day when students and faculty are tired. Clickers involve the students to apply knowledge to simulation, practice takes place in a safe environment that facilitates clinical decision making, by allowing clarification of the material from instructor providing rich feedback, without fear of any harmful real-life consequences. DeBourgh (2007) found through careful design of the questions, instructors can use vague questions to stimulate discussion. "The goal is not to teach the right answers, but to demonstrate thinking strategies, as developing this capability is far more powerful for future clinical practice than memorizing correct answers for a test." (p. 80) Placement and timing of questions in a lecture are also quite important. Studies show that learners normally lose attentiveness after 10-18 minutes of passivity in the classroom. (Moore, 2005; DeBourgh, 2007) Questions used about every 20 minutes will maintain student engagement and attention. Because students expend much more mental energy in answering a question, DeBourgh (2007) recommends using related questions, such as reusing a situation or scenario and applying sequential questions to that situation. The application of these techniques through repeated use of clickers in the classroom should terminate in increased knowledge. Clickers are one example of technology to support individualized learning and thereby allowing for time in class for interactive sessions. With the advent of wireless technology, clickers are a new tool available to enhance students' learning and attitudes.





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**H**atch, Jenson, & Moore (2005) found that clickers provided useful feedback to students as well as instructors when used in an anatomy course and an environmental science course. They found that the clickers helped keep students engaged and allowed the instructor a means to assess student knowledge quickly and monitor learning. Moredich & Moore (2007) as part of the end-of-course evaluation in Foundations of Physical Assessment found that students enjoyed the immediate feedback on quizzes that the classroom response system provides. Ninety seven percent of students in this study felt more engaged in the class with the use of clickers.

It is difficult at best to evaluate education outcomes from the use of new technology. According to Ehrmann (1997) changes in education strategies needs to be broad, deep and diffused into the fabric of the program in order to change education outcomes. The Flashlight Planning Project (Ehrmann, 1997) was developed to assess whether faculty and students find the available technology useful (or a hindrance) when they try to implement each of the seven principles of good practice in undergraduate education. One of the most important assumptions underlying Flashlight's design is that technology does not in itself cause changes in learning. Rather it is how the technology is used that matters.

### Methods

A descriptive study with a nonexperimental survey design was utilized to explore and describe student's satisfaction with the use of clickers in the classroom. The goals for this study





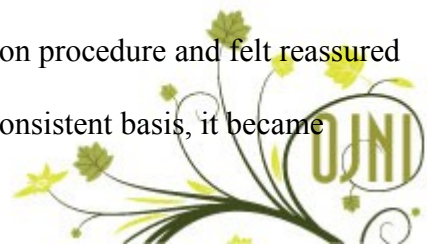


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were to determine whether the use of specifically, i>Clickers for an undergraduate nursing Health Assessment course improves student learning outcomes and increases student satisfaction with the course, identify the steps to implementing clickers as a tool for learning in the classroom and to collect evidence to encourage nurse educators to implement this technology in their classrooms.

**T**he response system used in this study was the iClicker system developed and marketed by iClicker, Inc. (<http://www.iclicker.com>). Registration of the handheld individual iclickers was conducted at the beginning of the 12 week semester when the second year nursing students were oriented during the fall semester health assessment class. Registration process was easy and took approximately five minutes. The clickers were used in every 50 minute class twice a week when a lecture was given except for a few classes that consisted of student presentations, or case studies. The lectures were presented in Microsoft PowerPoint with the inclusion of an average of five clicker questions asked per class on the class content. Prior to each lecture students gathered their assigned clicker for use in class and returned the clicker at the end. This procedure allowed for the clickers to be utilized in other nursing courses by other students in the nursing department. The nursing department was the first to purchase clickers and implement them into the curriculum at the college. Because clicker usage was not prevalent college-wide, clickers were loaned to students for class rather than the option of having students purchase a clicker for their own use limiting their application. Students never complained about the clicker distribution procedure and felt reassured that they would have it to use in class. By using the clickers on a consistent basis, it became





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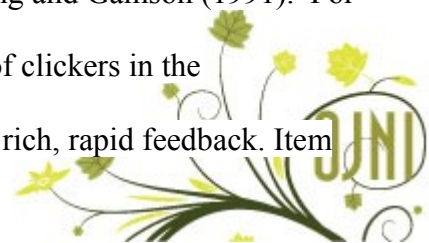
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customary for students to retrieve their clicker prior to taking their seat for each class period. No clickers were reported missing or damaged throughout the semester.

**D**ata collection occurred at the completion of the course. A cover letter that described the purpose of the study, informed consent forms, and a paper-pencil survey instrument, the Clicker Satisfaction Survey (Table 1) was distributed to the students. For the purpose of this study, satisfaction is conceptually defined as a positive experience where students encouraged the professor to keep clickers in the class. It is operationally defined as a score of strongly disagree to strongly agree on item 1 of the Clicker Satisfaction Survey. Active Learning is conceptualized as students engaging in a high level of participation in learning and is a method instructionally designed to promote interaction during the learning process to provide both students and faculty with assessment feedback reflecting students understanding of the course material.

### Instrument

The instrument, Clicker Satisfaction Survey, was developed by the authors with content validity established through review of the items by three expert nursing faculty. The paper and pencil evaluation consisted of eight-items utilizing a 5-point Likert scale (1 strongly disagree to 5 strongly agree) to measure student's satisfaction. The tool was designed to reflect the principles of good practice in undergraduate education according to Chickering and Gamson (1991). For example, Item 1 reflects students overall satisfaction with the use of clickers in the classroom. Items 2 and 4 reflect the principles of time on task and rich, rapid feedback. Item





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3 focuses on the principle of interaction between the teacher and student, and student-student contact. Item 5 reflects principle # 3 active learning and Item 6 reflects the principle of respect for different talents or ways of learning. Items 7 and 8 both reflect principles of communication of high expectations of the student's ability to learn and active learning by assessing clickers as a motivational tool. The survey responses were anonymous and participation voluntary, however, three students did not participate for unknown reasons. Institutional Review Board approval for the study was obtained from the college prior to data collection. The instrument did not contain an open response section which would have provided more information not covered in the survey items.

### Sample

**A** convenience sample of 29 sophomore nursing students voluntarily participated in data collection. Participants were selected based on their enrollment in an undergraduate Health Assessment course in the fall of 2007 in which the instructor was using clickers in the majority of class sessions. Students had no prior experience with clickers. The sample consisted of 28 females and 1 male. All respondents were 100% white Caucasian with an age range from 20 to 26 years old.





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### Data Analysis

The data from the 29 surveys were analyzed for frequency and distribution. The highest capable total score of 40 (indicating highly agree) and the lowest score of 8 (disagree) as determined by adding the responses to the 8 Likert-scale questions. The 29 surveys were individually scored and a further analysis was conducted to determine a frequency distribution of responses for each item as reported for the entire sample.

### Results and Discussion

Responses from student's surveys exhibited overwhelming positive satisfaction with use of clickers. Table 1 illustrates the scores on the Clicker Satisfaction Survey. The first item of the survey dealt specifically with student satisfaction. 100% of students agreed or strongly agreed that clickers were enjoyable and should remain in use in this class. Item #2 and Item #4 were analyzed together as they both dealt with time on task and rich rapid feedback clickers provide. Again, 98% of students surveyed enjoyed the feedback clickers provide. Providing feedback to students during learning engages them in active learning and positively impacts achievement. (DeBourgh, 2007). Item #3 focused on measuring the impact of clickers on interactions and 98% of students were in agreement that they enjoyed the interactions that clickers provided in the class.





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Question #5 identified student's perceived association of clickers as an active learning tool to gauge learning. Eighty nine percent, strongly agreed or agreed that clicker questions helped them know how well they were learning the course material. Item #6 surveyed student's perception related to the principle of different ways of learning through the integration of clicker questions in class in providing assistance in preparation for exams. The majority of the students agreed ( $n = 24$ ) with only seven percent of students ( $n = 2$ ) who disagreed. One explanation for student's having a disagreement with this statement is that this was the first opportunity the faculty had implemented clicker technology into the lecture therefore, it becomes newly apparent that the quality and level of difficulty of the clicker questions is vital in making this connection to increase learning and preparation for exams.

Lastly, items #7 and item #8 evaluated clickers as a motivational tool. The clicker software allows the instructor to award points to students through the use of the clicker. For this study students were awarded one point for answering each clicker question, and one point if they got the question right. So for instance, if ten questions were asked in class and you answered all ten correctly, you would earn 20/20 points or 100%. If you only answered all ten questions but only five correctly, you would earn 15/20 points or 75%. The awarding of clicker points is dependent upon the instructor and can be individualized for each class session. Findings related to clickers as a motivational tool revealed a lower satisfaction score for item #7: 48% strongly agree/agree, 38%





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neutral, 10% disagree, and 7% strongly disagree. A possible explanation for this result is that students involved in this study were required to attend all classes, so it is understandable that earning the points was not a strong motivator to attend class.

### **Conclusion and Implications for Nursing Education**

**F**indings from this study were an overwhelming positive response to the use of clickers in the classroom and will be helpful to other educators contemplating adapting clickers in their curriculum. With large class sizes, it is difficult to obtain instructor-student interaction. Clicker technology allows the instructor to interact with each student regardless of class size. This technology also provides on-the-spot feedback of student's understanding thus leading to clarification and teacher adjustment to instruction. As a teaching strategy for the classroom clickers can be a tool to assist students to learn and provide an environment that is rich with active learning. As a result, students showed increased satisfaction with their educational courses. This supports the work of Ehrmann (1997) on student engagement (or lack of it) can affect retention and attrition at institutions. With the high cost of recruitment at private colleges, institutions are eager to retain students whenever possible. Clickers can be a means of increasing student engagement in the classroom, thereby aiding in student retention.

A challenge for nursing education is to educate nurse educators about clicker technology





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and its implications to enhance learning of vast amounts of complex information. The notion of assisting students to learn may foster acceptance of this technology as an interactive teaching strategy. Obstacles observed in the adoption of the technology by nursing faculty would include increased preparation time to develop questions, faculty discomfort to employ the use of technical equipment, lack of technology support, and limited incentives for faculty to change from traditional instruction. Through faculty development workshops and presentations, faculty will become familiar and comfortable with this worthwhile and beneficial teaching tool.

More research in the best practice for clicker use in nursing education and correlation to education outcomes is needed. Future studies in evidence-based nursing education could include correlating clicker use and increased knowledge.





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Instrument Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. My experience has been positive and I encourage you to keep clickers in this class	22	7	0	0	0
2. The clickers provide valuable feedback.	18	10	1	0	0
3. I enjoyed the interaction that clickers provide.	20	8	1	0	0
4. By using clickers in this class, I got feedback on my understanding of class material.	15	11	2	1	0
5. Clicker questions helped me to know how well I was learning the material.	10	16	2	1	0
6. Clicker questions were helpful for preparing me for the exams in class.	11	13	3	2	0
7. Earning clicker points motivates me to come to class.	6	7	11	3	2
8. i-Clicker helps me follow the topic and pay attention better in the classroom.	13	11	4	1	0

**Table 1.** Clicker Satisfaction Survey Scores







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Assistant Professor of Nursing at Endicott College, Beverly, MA. She has five years of teaching experience in higher education nursing programs. A graduate of Boston College '87 and Salem State College '99, she is currently pursuing her DNP at Regis College in Weston, MA. Her area of research interest is evidence-based educational practices.

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Dean and Associate Professor of Nursing at Endicott College, Beverly, MA. She has over 15 years of teaching experience in higher education nursing programs. She earned her PhD from the University of Rhode Island, her MSN from Russell Sage College and a BSN from Fitchburg State College. She has received grant funds to conduct research in the areas of diabetes, critical thinking among BSN students and teaching methodology with technology in an undergraduate curriculum. She has published in OJNI, The Journal of School Nursing, and The Diabetes Educator.

