EXAMINATION OF BADGES TO INCREASE NURSING STUDENT ENGAGEMENT: A QUASI-EXPERIMENTAL STUDY

by

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Abstract

Finding ways to help nursing students understand the application of didactic content can be challenging for faculty. One challenge faculty face is motivating students with thought provoking and memorable content using traditional methods. Educational games and gaming attributes have been shown to affect student motivation and support learning. The aim of this study was to gain knowledge, filling a knowledge gap, regarding which gaming attributes motivate nursing students to become engaged in course content that is not graded. Badges were used as a reward system to examine if nursing students would complete an increased number of non-graded case studies, and have a higher score on the posttest than when badges were not used. Data was collected using an A-B single group design during two consecutive specialty courses. A one-tailed dependent *t*-test was used to compare the average scores of case study posttests and the average number of case studies completed during both phases. All participants were nursing students in a three-year accelerated baccalaureate degree program attending a college of nursing located in the southwest. There was no significant difference with the use of badges on the average scores of case studies $t(24) = -1.332$, $p=0.1$. However, there was a significant difference with the use of badges on the number of completed case studies $t(24) = -2.5$, $p=0.01$. This study adds empirical evidence to the literature that gamification attributions positively influences student motivation and continued engagement in course content. Findings demonstrated a significant difference in the engagement of nursing students in non-graded coursework during the course where badges were offered as rewards as opposed to the course where badges were not offered as rewards. As technology savvy Millennials fill the classrooms and nursing faculty search for new teaching strategies to engage their students, the results of this study promotes the use of badging as a way to actively engage nursing students in course content. Additional

research with a larger sample is recommended to support the findings and examine the effect gamification attributions have on knowledge retention.

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CHAPTER 1. INTRODUCTION

Traditional methods of teaching and learning are not capturing the interest of nursing students. Thus, faculty is challenged to find new ways to engage nursing students, enticing them to be active in course content (Benner, Sutphen, Leonard, & Day, 2010; Boctor, 2013). There is a significant amount of research documenting the positive effect gaming has on a student's motivation to be engaged, leading to improved learning (Whitton, 2011). When a student's interest is captured, positive feelings ensue helping the student to focus on content promoting learning (Bandura, 1982). One such way to capture the interest of nursing students, encouraging them to become more engaged in course content, is to gamify the course content using the gaming attribute of badging (Abramovich, Schunn, & Higashi, 2013; Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012).

Badges have been used as a system of denoting rank and membership throughout history in the form of family crests, military rank, academic achievement, fraternity and sorority membership, as well as symbols of accomplishment as in sports and scouting in America. Badges are earned through either membership or accomplishment of tasks. As external displays of belonging, badges motivate and encourage others to become engaged and participate, act on, or pursue a social connection, knowledge, rank, and achievements (Zichermann & Cunningham, 2011). Badges that are visible to others can be used as communication or a road map of what achievements or tasks are available and what has its meaning (Ahn, Pellicone, & Butler, 2014). Serving as credentials for course content, others within the social and academic community are

aware of the student's achievements within that academic community (Ahn, Pellicone, & Butler, 2014). People gage their own ability to accomplish a task based on how others obtain their goals and how they have performed in the achievement of those goals (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014). According to Bandura (1982), students are motivated and gain self-efficacy through performance accomplishment, social influence, and observation of others. Maslow (1943) stated motivation must be based on goals with gratification becoming as important as deprivation. The study described in this manuscript addressed the gaming attribution of badges as motivation for nursing students to increase engagement in non-graded course activities.

Background of the Problem

Among the many challenges of nursing education is the necessity of faculty to capture the attention of nursing students, motivating them to engage in the learning process (Royse & Newton, 2007). Nursing faculty have begun to use more simulation, practical exercises, online communities such as Second Life, and gaming (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013). Among these initiatives, gaming is the only innovative strategy that allows students to be competitive and compare their performance with others, allowing for growth in goal achievement and self-efficacy (Crookes, Crookes, & Walsh, 2013; Royse & Newton, 2007). Computer based games are expensive, taking anywhere from months to years to develop. However, gamification is a framework that can be applied to any problem or course that is affected by motivation (Zichermann & Cunningham, 2011).

Context

The definition of gamification lies within the process of game thinking. Gamification uses game mechanics such as leaderboards, levels, power-ups, new avatar items such as clothing and accessories, and badges or rewards (Banfield & Wilkerson, 2014; Landers & Landers, 2014;

Zichermann & Cunningham, 2011). Badges are attached to desired outcomes to motivate players, or in this case, students to engage in the desired behavior of completing non-graded activities more thoughtfully (Banfield & Wilkerson, 2014; Landers & Landers, 2014). Badges, different from graded materials and exams, are earned at the pace each student needs or desires to achieve them (Hsiao-Cheng, 2015). Also, when the score does not affect the student's grade, it becomes easier to spend time without the stress and concern of failing, encouraging the student to become engaged intrinsically rather than extrinsically (Banfield & Wilkerson, 2014; Hsiao-Cheng, 2015). When students are intrinsically motivated, they become student-centric and are more apt to achieve academic goals. Gamification of learning objectives can be utilized to help students reach these goals (Banfield & Wilkerson, 2014).

What makes gamification so successful is competition (Banfield & Wilkerson, 2014; Royce & Newton, 2007). Competition of this style is based on the concept of social interactions with classmates and the desire to show how many badges they have as compared to others within the community. An experimental study by Landers and Landers (2014) showed the effect of using a leaderboard as a gamification attribute to motivate learners to spend time on specific tasks. Landers and Landers could show a significant difference in time spent on a task between the learners using a leaderboard and those who did not. Results of the study indicated learners in the leaderboard group spent up to 14% more time on task than learners who were not part of the leaderboard group (Landers & Landers, 2014).

Theoretical Framework

The framework for this study was comprised of motivation, goal achievement, and self-efficacy theories. Maslow (1943) created a motivation theory based on 13 theoretical demands stating the concept of gratification is as important as the concept of deprivation in motivation

theory, permitting the development of social goals. Within the esteem needs discussed by Maslow, is the need to be recognized by others, receive positive attention from others, be appreciated by others and gain a personal feeling of importance, which speaks directly to achievement. As motivation theory, has evolved over time, new theories have emerged including goal achievement. Goal achievement theory represents the reason a person engages in a certain behavior allowing them to achieve a specific goal (Dweck & Leggett, 1988). Learning goals specifically help students focus on increasing abilities fostering cognitive and affective processes, which promotes persistence to complete goals and sustain performance for difficult tasks. Learning goals and achieving those goals is specifically important for students with low esteem (Dweck & Leggett, 1988). It then becomes important to understand what students find engaging and helpful in achieving learning goals.

Dweck and Leggett (1988) divided learning goals into two categories: performance, demonstrating competence, and mastery, developing competence (Dweck & Leggett, 1988). According to Bandura (1991) progressing in mastery goal achievement strengthens self-efficacy nurturing analytical thinking and enhancing performance. Self-efficacy can be influenced by causal attributions, which affect motivation and performance through personal belief of self-efficacy (Bandura, 1991; Dweck & Leggett, 1988). Because college level students are extrinsically motivated and learn for grade recognition, self-efficacy can affect their choice of activities and level of effort (Banfield & Wilkerson, 2014). Gamification is successful through competition and social interaction fostering the students desire to be recognized by their peers (Banfield & Wilkerson, 2014; Zimmerman, 2009). Badges, as a causal attribution, become rewards with which to motivate students to grow in self-efficacy and improve their performance

allowing growth and accomplishments to be recognized (Banfield & Wilkerson, 2014; Zimmerman, 2009).

Statement of the Problem

Within the literature there is a large amount of research showing how gaming motivates students to be more engaged and how engagement in content improves learning (Baid & Lambert, 2010; Banfield & Wilkerson, 2014; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013; Landers, 2014; Landers & Landers, 2014; Whitton, 2011). However, a knowledge gap exists regarding which specific attributions of gaming motivates students to become more engaged. As nursing education moves forward with gamifying curriculum, it becomes important to understand which components of gaming motivate students (Boctor, 2013; Landers & Landers, 2014). Therefore, the researchable problem is a need to develop and test an intervention designed to increase nursing student engagement and motivation using badges.

Purpose of the Study

The purpose of this quasi-experimental study was to examine if nursing students would become more engaged in non-graded course activities with the use of badges as rewards. The aim was to gain knowledge regarding the gaming attribution badges on student motivation and engagement with non-graded coursework. The study was anticipated to fill in the gap that exists regarding which specific attributions of gaming as one aspect of gamification motivating students to become more engaged.

Significance of the Study

As a discipline with a practice based mastery, nursing education must find a sense of balance between didactic content and applied use of that content. Current teaching techniques are not bridging what is a significant gap between theoretical content and practical application

(Crookes, Crookes, & Walsh, 2013). Nursing faculty are looking for ways to make the classroom engaging and student-centered to help students conceptualize theoretical content and bridge the current gap. The upcoming paragraphs include a rationale for the study, relevance of the study, and significance.

Rationale

Nursing faculty are beginning to use a more active learning approach, becoming student centered rather than teacher centered (Baid & Lambert, 2010; Boctor, 2013). Some active learning pedagogies such as simulation and clinical have been shown in the literature to promote deeper learning (Lasater, 2007; Waznonis, 2014). Gaming is new to nursing education and has been looked upon with mixed reviews. Benner, Sutphen, Leonard, and Day (2010) stated that gaming minimizes the importance of nursing concepts, while Landers and Landers (2014) showed that gaming could bridge the gap between theoretical nursing and practical nursing. According to Blakely, Skirton, Cooper, Allum, and Nelmes (2010), nursing faculty see the benefit of using gaming as an active learning strategy to engage students within the classroom but are unsure how to facilitate gaming as a learning activity. As faculty continue to look for ways to gamify their classrooms, there is a very small amount of literature on gaming in nursing education. Also, there is a large gap in the literature on the attributes of gamification such as badges and their causal effect on engaging nursing students in an academic task.

Relevance

Gamification is a framework that can be applied to any problem or academic course that is affected by motivation (Zichermann & Cunningham, 2011). Faculty could use gamification attributes within their classroom such as leaderboards, badging, and points to motivate students to read before class and be engaged in classroom activities. Leaderboards can be constructed

electronically using an excel spreadsheet that is housed in the shared documents area of the electronic learning system used for the course. Points are given for class activities such as practice questions and group work, allowing the students to see progression throughout the course. Badges can be used to support non-graded items such as simulation and skills labs encouraging students to come prepared to gain a badge, which in turn offers self-efficacy and recognition. Gamification attributes can be put into place for any activity the instructor would like the students to focus on and offers a formative assessment of where the class is in their understanding of content.

Gamification and its attributes is a framework that has been applied to student engagement problems and courses that are affected by motivation with success (Boctor, 2013; Landers & Landers, 2014; Zichermann & Cunningham, 2011). Knowing that gaming works on motivation is only the beginning, it then becomes important to understand how each gamification component does or does not affect motivation and learning behaviors (Landers, 2014). Game elements such as badges, points, and levels may help in some learning environments, but not in all (Landers, 2014). There are those in education who feel gaming is for entertainment and not for learning (Michael & Chen, 2005). With no true theory linking gamification to learning, there is a theoretical gap that must be explored (Landers, 2014). As educators continue down the path of gamified learning, it becomes important from a scientific perspective, to add to the gamification literature which elements, or attributes, motivate students (Landers, 2014). Understanding how each gamification component affects students helps generate new gamification theories with which serious gaming for education can be created (Landers, 2014).

Significance

Traditionally, teacher-centered methods such as lecture have been utilized with clinical activities to connect didactic content with application (Benner, Sutphen, Leonard, & Day, 2010; Baid & Lambert, 2010; Boctor, 2013). This method may not be as useful with students who have been educated using innovative technology (Banfield & Wilkerson, 2014; Landers & Landers, 2014). Nursing faculty are beginning to use a more active learning approach, becoming student centered rather than teacher centered; however, room for improvement remains (Baid & Lambert, 2010; Benner, Sutphen, Leonard, & Day, 2010; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013). Some active learning pedagogies such as simulation and experiential learning have been shown in the literature to promote deeper learning (Jeffries, 2005; Lasater, 2007; Waznonis, 2014). Innovative techniques are needed for engagement in the classroom and enhancing learning opportunities (Bristol, 2014; Ironside, 2005; McLaughlin et al., 2013; Schwartz, 2014).

Grounded within education is the concept of engagement and learning; however, more research is needed to connect gamification attributes to theoretical models for the intention of improving learning (Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012; Landers, 2014; Phillips, Hortsman, Vye, & Bransford, 2014). As demonstrated in Landers and Landers (2014) study, one small component of gamification can make a big difference in motivating students to become more engaged in non-graded activities increasing time spent on a task. The study described within this manuscript will take another step in advancing the scientific knowledge in the application of gamification attributes for motivating students to become more engaged in completing non-graded coursework.

Research Questions

A challenge for many faculty is finding a way to motive students in becoming more engaged in course activities that do not offer grade points (Boctor, 2013). Nursing students want content that is communicated in a way that is motivating, thought provoking, and memorable, helping them bring didactic knowledge to the clinical setting (Crookes, Crookes, & Walsh, 2013). The interactivity of gamification makes the process of learning more engaging and memorable to students (Crookes, Crookes, & Walsh, 2013; Royse & Newton, 2007). What needs to be better understood is which elements of gaming are most engaging for nursing students in helping course content to be memorable.

Research Questions and Hypotheses

Research question 1. Is there a statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded?

H_1: There is statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

Research question 2. Is there a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded?

H_1: There is a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

Definition of Terms

For the purpose of this study, the following definitions are provided.

Badge

A small object such as a token, pin, picture, or shield worn or displayed as a sign of membership, allegiance, or achievement. Within education they may be used as an alternative assessment to increase student motivation (Abramovich, Schunn & Higashi, 2013).

Leaderboard

The purpose of a leaderboard is to offer a simple comparison or ranking system (Zichermann & Cunningham, 2011). Leaderboards contain an ordered list with a score beside each name, showing the order in which players are ranked.

Gamification

As defined by Zichermann and Cunningham (2011) "gamification is the use of game-thinking and game mechanics to engage users and solve problems" (pg.xiv).

Research Design

A quantitative quasi-experimental design was used for this study. Quasi-experimental design is used when random sampling is not possible (Creswell, 2009). True experiments use randomized sampling, whereas naturally occurring groups, or convenience sampling, is used in quasi-experimental research (Creswell, 2009). Convenience sampling was used for this study, as the sample was drawn from nursing students within a specific course (Creswell, 2009).

The specific design used was an A-B single group design. Phase A in this single group design examined participant behavior prior to an intervention taking place offering a baseline of that behavior (Bloom, Fischer, & Orbe, 2009). Phase B introduced an intervention to the same participants examining any change or lack of change in behavior (Bloom, Fischer, & Orbe, 2009). The independent variable, or intervention, were digital badges as rewards for the dependent variable, Higher Education Systems Incorporated (HESI) Case Studies, for students who completed these non-graded course activities. Used as rewards with students in middle school, digital badges have been shown to influence motivation to complete academic work allowing students to improve academic performance (Abramovich, Schunn, & Higashi, 2013).

This basic single subject design is a way to evaluate informed practice when using the specific intervention of badging as a reward to complete non-graded course activities (Bloom, Fischer, & Orme, 2009). Used as a common way to compare single subject groups, this design establishes a baseline in a targeted behavior (Ravid, 2011). The baseline behavior is compared to the same targeted behavior in the second phase, where the intervention is used to change the targeted behavior (Ravid, 2011). Although single subject design is most often considered experimental, there was no way to randomize the nursing students admitted into the study creating a convenience sampling. For this reason, a quasi-experimental method was used.

Assumptions and Limitations

This section includes a description of the assumptions, limitations, and delimitations of this study. Assumptions, statements presumed to be true, were made in this study regarding methodology, theory, and sampling methods. Delimitations consider the variables within the study (Voght, 2005). Several aspects could not be controlled within the study and have been designated as limitations. Boundaries set for this study are stated in the delimitations section.

Assumptions

Three assumptions were made in this study: one methodological assumption, one theoretical assumption, and one sampling assumption. The methodological assumption is that study participants would complete the case studies on their own and not as a group activity. Secondly, students would spend more time on task during Phase B to complete the case studies to achieve a badge. The final assumption was that this group of students represented pre-licensure nursing students in a baccalaureate program.

Limitations

Considered a limitation, a convenience sampling was used with only the students who were willing to allow the researcher to look at their scores participating. This type of sampling limited the number of students available. Offering digital badges rather than tangible badges was considered a limitation. Badges were offered digitally rather than as a tangible item that could be displayed in the classroom environment and on their person. Not knowing how students completed the case studies was also considered a limitation as they may have completed them in a group setting to gain a badge.

Delimitations

Nursing students who previously completed the course where badges were being used as rewards were not included in the study. The study was delimited in this manner as participants needed to be a part of two courses, one following the other, to compare their behavior. No other students were limited from becoming a part of the study.

Organization of the Remainder of the Study

Covered within the first chapter are the purpose of the study along with the problem statement. Addressing the stated problem is an overview of the theoretical framework and the two research questions being asked. For further understanding, there was an explanation of the relevance and significance of the student for nursing education. Also, there is a brief introduction the methodology that will be expanded in Chapter 3.

Included in Chapter 2 is an extended explanation of theoretical framework used in this study along with the synthesis of the research literature related to the problem of badging as a gamification attribute to help motivate and engage nursing students. Chapter 3 will include a description of the methodology and design used in this study to answer the research questions in response to the stated problem. Chapter 4 will present the collected data and results after all data was analyzed. The final chapter, Chapter 5 will offer a summary of the results in relation to the literature, the limitations, implications for practice, and recommendations for further research.

CHAPTER 2. LITERATURE REVIEW

The study described in this document addressed the use of badges as a gamification attribute to reward nursing students for completing non-graded course work. Many nursing students struggle to understand the nursing implications of patient conditions, grasp the meaning of diagnostic results, and comprehend an increasingly technological and multifaceted skill set. New pedagogies are needed to help nursing students gain and apply nursing knowledge (Benner, Sutphen, Leonard, & Day, 2010). Motivation theory provided the main guiding framework for this study, however, self-efficacy theory served as a supporting framework. According to Bandura (1991), it is self-efficacy that fosters analytical thinking. A review of the literature included dissemination of nursing content by faculty, active learning approaches, causal effects of gamification and its attributes, motivation through goal achievement, and its positive impact on self-efficacy in motivating students.

Methods of Searching

A literature review was completed for this study using various resources such as electronic nursing databases, scholarly journal articles, and published books. Databases used included Ovid Nursing Full Text Plus, Education Database, Psychological Database, Sage Journals Online, and Sage Research Methods. The key terms *game, badges, motivation, engagement,* and *nursing* were used to search from 1980 to 2016. The database contained several original articles on goal theory and self-efficacy.

Among the articles discovered during the literature search was a mix of quantitative and qualitative studies along with several mix methods studies. Chosen articles for theory focused on motivation, engagement, goal-achievement, and self-efficacy. Gaming articles chosen focused on games used in education, their outcomes, and type of games used. Articles included

in this study also focused on games that examined specific gaming attributions such as badges and leaderboards. Articles found in nursing education focused on active learning strategies, dissemination of curricular content and games used. A search of nursing databases offered articles focused on the outcomes of different teaching strategies and pedagogies. To capture a deeper review of the literature, a search of the bibliographies of chosen articles offered additional references that related to the topic of the article.

Theoretical Orientation for the Study

The Theory of Human Motivation was created to formulate a positive theory of motivation that would conform to known human behavior (Maslow, 1943). The functionalist tradition of James and Dewey fused with the holism of Wertheimer, Goldstein, and Gestalt Psychology (Maslow, 1943) assisted in creating what Maslow called *The Theory of Human Motivation*. Synthesized with the energy of Freud and Adler, this theory was called a *general dynamic* theory (Maslow, 1943). Contained within the motivation theory are five levels of needs: physiological and safety, which are considered lower level needs, love, esteem, and self-actualization which are considered the higher-level needs (Maslow, 1943).

Physiological needs focus on what is needed to maintain life such as food, water, oxygen, elimination, and a place to be free from the elements (Maslow, 1943). Upon meeting the physiological needs, motivation changes to that of the safety needs (Maslow, 1943). Although to a lesser degree, safety needs are as much a requirement to maintain life as the physiological needs. Per Maslow, a well-managed environment that is free of wild animals, extreme temperatures, assault, murder, and tyranny will meet the safety needs. Meeting safety needs is found in a job with tenure, financial stability, health insurance, and the comfort of a familiar environment.

Once a person meets their lower level needs, an intense need for friends, a lover or partner, and possibly children will arise (Maslow, 1943). A sense of belonging and the need for affection will become an aspiration. In addition to a sense of belonging, the esteem needs will motivate a person to self-respect and respect from others (Maslow, 1943). At the top of Maslow's hierarchy is self-actualization (Maslow, 1943). Once all needs are satisfied, there could still be a restlessness or discontent if the person is not doing what they are best matched to do (Maslow, 1943). This study will focus on the esteem needs as it connects to real achievement, respect for self, and earn respect from others.

Motivation Theory – Esteem Needs

Maslow (1943) stated that all people within our society have a need and desire for a high evaluation of themselves that includes self-respect or self-esteem of others. Classified into two subsidiary sets, Maslow considered the basis of these needs to be firmly based on real achievement and respect from others. The first of these two subsidiary sets are the desire for strength, achievement, adequacy, confidence with which to face the world, and for independence and freedom. The second is a desire for reputation or prestige, recognition, attention, importance or appreciation (Maslow, 1943). Satisfaction of the esteem needs allows a person to feel self-confident, have self-worth, the strength of character, feel capable, and have a purpose within the world (Maslow, 1943). Satisfaction of the esteem needs allows a person to feel self-confident, have self-worth, the strength of character, feel capable, and have a purpose within the world (Maslow, 1943). Not meeting the esteem needs produce feelings of discouragement, compensatory emotions, or neurotic trends (Maslow, 1943).

According to Maslow (1943), there is a need for recognition, importance, and appreciation that speak directly to behavior and achievement. Although motivation theory is not

synonymous with behavior theory, Maslow stated that behavior is frequently motivated and situationally determined. Strength, achievement, and the feeling of being necessary in the world, arise from meeting the esteem needs (Maslow, 1943). Bandura (1991) adds to motivation theory with self-efficacy from the achievement of goals. Per Bandura, self-efficacy nurtures analytical thinking and enhances performance through the individual's belief in themselves. Knowing this, it becomes important to motivate students in a way that improves their self-efficacy.

Maslow's (1943) motivational theory stated the human need to be recognized by others, gain positive attention, feel important, and be appreciated for what they do and who they are is a basic need to gain self- actualization. Being recognized and appreciated for one's accomplishments fosters achievement behavior and motivates the continuation of that behavior (Dweck & Leggett, 1984). A person engages in a behavior to achieve one or more specific goals (Dweck & Leggett), achieving those goals fosters self-efficacy, which in turn nurtures analytical thinking (Bandura, 1984). For this reason, it becomes important to discover what will motivate students to be engaged in course content helping them to achieve their goals and foster self-efficacy. Badges allow students to achieve goals on several levels allowing them to be recognized, gain attention and be appreciated within their social environment fostering goal achievement and self-efficacy. According to Bandura (1991), self-efficacy can be influenced by causal attributions, which affect motivation, continued engagement, and performance through the personal belief of self-efficacy.

Self -Efficacy and Motivation

Self-efficacy beliefs and personal goal setting arise from a self-appraisal of perceived capabilities (Bandura, 1993). A strong perception of self-efficacy fosters the setting of higher challenges and solidifies a commitment to meet them (Bandura, 1993). Also, the comparison of

others ability influences how one judges their ability to accomplish a goal (Bandura, 1993). Grading practices are one way in which students receive their comparative feedback on scholastic performance, which can have a formidable effect on efficacy. It is a belief in self that plays an essential part in the regulation of motivation (Bandura, 1993). According to Bandura, motivation cognitively guides actions through the exercise of forethought. It is forethought that brings about planning, anticipated outcomes, and prospective actions (Bandura, 1993).

There are three types of self-influences that manage motivation based on setting self-goals; "affective reactions to one's performance, perceived self-efficacy for goal attainment, and readjustment of personal goals based on one's progress" (Bandura, 1993, p. 131). It is one's self-efficacy beliefs that contribute to motivation by determining actual goals, the amount of time and energy spent on those goals, how long to persist when complications occur, and what reaction one has to failure (Bandura, 1993). Those who have a strong self-efficacy will work harder to achieve their goal and will increase their effort when they fail.

Goals and Achievement

Elliot and Dweck (1988) stated there are two major goals pursued regarding achievements; performance goals and learning goals. Performance goals are used to maintain a positive outlook on one's ability, while learning goals are used to increase one's ability to gain mastery in a new task (Elliot & Dweck, 1988). Goals create different behavior by influencing task choices (Elliot & Dweck, 1988). Performance goal oriented people will choose a task that maximized their positive judgments and pride while diminishing any negative effect. Learning goal oriented people will choose differently. A learning goal oriented person will choose according to what will increase their growth and ability, as well as their pride and pleasure.

Goals are a way of increasing and maintaining a person's self-esteem and their concept of self (Dweck & Leggett, 1988).

Theoretical Implications

Many students are motivated to attend class and become engaged in the material to pass a course or achieve a certain grade point average. Still, other students are motivated to become engaged in course content by a passion for more information. It is these students who have a higher self-efficacy (Bandura, 1991; Banfield & Wilkerson, 2014). According to Bandura, self-efficacy nurtures analytical thinking and enhances performance through the individual's belief in themselves. Knowing this, it becomes important to understand what motivates students to become engaged allowing them to achieve goals in a way that also improves their self-efficacy (Bandura, 1991; Banfield & Wilkerson, 2014). The desire to have self-esteem and esteem for others falls into the category Maslow calls the *esteem needs*. Achievement of the esteem needs connects to self-confidence, strength, achievement, and the feeling of being necessary in the world (Maslow, 1943).

Using a leaderboard alone as gamification of a course may not motivate all students to become engaged as there can only be one person in first place. However, when using badges, each student has the possibility of achieving one or more badges depending on their motivation to obtain them. Badges are visible to all classmates within the group offering each student recognition for their achievements in place of one student at the top of the leaderboard. Also, each student can display and share achieved goals offering recognition, attention, and increased self-efficacy among their peers in the classroom. Theoretically, students would be motivated to become more engaged in course content and spend more time on task to achieve self-efficacy which will lead to better analytical learning (Bandura, 1991).

Review of the Literature

Patterned after the Nightingale model, traditional models of nursing education contain an overwhelming amount of content in the classroom and a clinical environment that concentrates on behavioral outcomes and not clinical reasoning (Stanley & Doughtery, 2010). A continuous influx of didactic content, changes in technology, and evidence-based practice continues to add to an already dense curriculum (Stanley & Doughtery, 2010). Over time, content has been added to include health promotion and wellness concepts, genetics, cultural competency, bioterrorism, emergency responsiveness, and leadership, adding more requirements and competencies to the curriculum (NLN 2005; Tanner, 2007; Stanley & Doughtery, 2010).

Faculty members are comfortable with teacher-centered classrooms and are reluctant to discard lectures and replace classroom time with new methods and activities (Missildine, Fountain, Summers, & Gosselin; 2013). Per Missildine, Fountain, Summers, and Gosselin, students like attending classrooms that are lecture only as they do not need to work as hard. Incorporating activities into the classroom causes dissatisfaction among some students as they are required to work harder (Missildine, Fountain, Summers, & Gosselin, 2013). However, using student satisfaction may not be a good indicator of learning (Benner, Sutphen, Leonard, & Day, 2010).

Many students have very different learning preferences than previous generations and are accustomed to a highly technological world (Baid & Lambert, 2010). Many instructors continue to favor PowerPoint presentations as a mainstay in nursing classrooms (Nowak, Speakman, & Sayers, 2016). However, teacher-centered methods such as PowerPoint presentations clash with the learning styles of students today (Boctor, 2013). The task of delivering complex content in what amounts to a short time frame creates a struggle for many faculty. Using PowerPoint slides

offers a canvas for extensive and detailed information with the additional ability to present charts, pictures, videos, and graphs (Nowak, Speakman, & Sayers, 2016). Although an easy way to offer detailed information, reading slides decreases retention of information and defies cognitive load theory (Mayer & Johnson, 2008).

Faculty are being challenged to integrate technology into their classrooms to motivate students to learn. One method that can be utilized to obtain the attention of students and learning that is not passive is gamification (Boctor, 2013). Games, like other educational activities, must take into consideration the achievement of specific learning outcomes (Baid & Lambert, 2010). According to a study done by Blakely, Skirton, Cooper, Allum, and Nelmes (2010), 62% of nursing students found learning with games enjoyable and interesting. Although faculty found games to be beneficial, due to time constraints and the potential of negative feedback from students' games were not integrated (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010). Included in this review are the dissemination of nursing content by faculty, active learning strategies in nursing, gaming in education, and gaming in nursing education.

Dissemination of Nursing Content by Faculty

Traditionally teacher-centered methods transferred knowledge by asking students to memorize required information, a student's ability to recall this information and problem solve took place in the clinical environment (Ironside, 2005 & Stanley & Doughtery, 2010). Strategies to assist students with content consisted of study guides that listed content to be memorized, mnemonics to assist students with that memorization, and organizing frameworks to help students' problem solve (Ironside, 2005). Although schools graduated functioning professional nurses, a shift in the increased complexity of patient care requires nurses to think differently and therefore must be trained differently (Benner, Sutphen, Leonard, & Day, 2010; Tanner, 2010).

Dated methods such as PowerPoint presentation that allow instructors to present vital content by reading slides to students supports passive learning (Bristol, 2014; McLaughlin et al., 2013). Students' attention span decreases after the first 10 minutes of lecture, and despite the return of their attention toward the end of class, they only retain 20% of the presented information (McLaughlin et al., 2013). In addition to outdated methods, there is a gap between nursing practice and nursing education (Benner, Sutphen, Leonard, & Day, 2010). Nursing education has been challenged to examine the content and how it is presented to create better connections between didactic content presented in the classroom and clinical settings (Benner, Sutphen, Leonard, & Day, 2010; Giddens & Brady, 2007; Ironside, 2005; Tanner, 2010).

More recent studies within the literature are focusing on student-centered activities rather than teacher-centric activities. Many of these strategies center around simulation (Jeffries, 2005; Tanner, 2010), case studies (Sandstrom, 2006), concept maps (Beyer, 2011; Hill, 2006), along with some electronic strategies such as podcasts (Abate, 2013), virtual worlds (DeGagne, Oh, Kang, Vorderstrasse, & Johnson, 2013), and interactive environments (Degagne, Oh, Kang, Vorderstrasse, & Johnson, 2013). A common thread among all teaching pedagogies is that nursing students must enter the professional world having clinical reasoning and clinical judgment to better serve their patients (Benner, Sutphen, Leonard, & Day, 2010; Dillard, et al., 2009; Lasater, 2007; Nielsen, 2009; Tanner, 2007; Theisen & Sandua, 2013; Waznonis, 2014).

Active Learning Strategies in Nursing

Active learning strategies most commonly seen in the literature consist of inpatient acute care clinical sites and simulation. What active learning strategies offer the student, is a structured experience that fosters clinical judgment and clinical reasoning outside the norm of clinical experiences (Lisko & O'Dell, 2010). Discovered within the literature as active learning

were simulation (Dillard et al., 2009; Lasater, 2007; & Waznonis, 2014) nursing rounds, (Lasater & Nielsen, 2009; Nielsen, 2009) case studies (Sandstrom, 2006), and concept maps (Hill, 2006).

Currently, the most common active learning approach in nursing education continues to be simulation. Simulation offers students a structured environment in which to practice the psychomotor skills of the nursing profession (Waznonis, 2014). Historically, simulation was used to teach nursing tasks such as starting intravenous therapy, Foley catheter placement, and wound care (Lasater, 2007). Faculty can create an experience that will pedagogically link didactic material to clinical practice (Jeffries, 2008). It is these pedagogical links that assist in developing clinical reasoning and clinical judgment required in professional practice (Jeffries, 2005; Lasater, 2007).

Simulation offers a safe environment for students to collaborate with each other without the fear of making a mistake and harming a patient (Jeffries, 2005; Lasater & Nielsen, 2009). During a clinical shift, instructors stop students when they are about to make a mistake, whereas, in simulation, instructors allow students to progress through the process, making a mistake, and working through their thought process. Although simulation is the active component of the activity, debriefing is truly the conceptual learning activity (Dreifuerst, 2009; Jeffries; Lasater & Nielsen, 2009; Nielsen, 2009; Waznonis, 2014). Once in debriefing, students can cognitively work through the scenario and discuss what they should do differently, then repeat the simulation correctly, adding a confidence building situation to the cognitive process (Dreifuerst, 2009; Jeffries, 2005; Lasater & Nielsen, 2009; Waznonis, 2014).

In addition to simulation, active learning strategies include podcasts (Abate, 2013), virtual worlds (DeGagne, Oh, Kang, Vorderstrasse, & Johnson, 2013), interactive environments (DeGagne, Oh, Kang, Vorderstrasse, & Johnson, 2013), and gaming (Boctor, 2013; Lynch-Sauer

et al., 2011). Students who listen to podcasts have been found to have higher averages on exam scores than those who do not utilize podcasts (Abate, 2013). Virtual worlds offer both synchronous and asynchronous interactions grounded in simulated or concrete experience (DeGagne, Oh, Kang, Vorderstrasse, & Johnson, 2013). Gaming is considered by some to be an innovative teaching strategy with the ability to strengthen learning outcomes (Royse & Newton, 2007). According to Lynch-Sauer et al., nursing students found video games used for learning to be a positive experience.

Gaming in Education

Complex problem solving and motivation is directly related to the interactivity of game play (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014; Granic, Lobel, Rutger, & Engles, 2014; Whitton, 2012; Whitton & Moseley, 2014). Games that are well designed and pedagogically sound can support, deliver, and assess learning due to the salient features of gameplay (Nadolny & Halabi, 2016; Whitton, 2012; Whitton & Moseley, 2014). According to Knowles (1980), adult learners need to actively participate in the process of their learning by interacting with their environment. Moreover, adult learners have a need to share some of the responsibility for their learning experience (Knowles, 1980). Games offer students a structured environment with which to engage and expand their problem-solving capabilities through the gaming experience (Allery, 2004; Nadolny & Halabi, 2016; Whitton, 2012).

Crocco, Offenholley, and Hernandez (2016) completed a qualitative study using a survey that included 9 faculty members, 18 sections of Math and English courses, and 440 students. The study was completed in higher education implementing game-based pedagogy that included game-based lessons each week. Alongside one section of a course using game-based lessons, another section of the same course did not include game-based lessons. Survey results showed

students reported they enjoyed the course and felt a decrease in anxiety about learning (Crocco, Offenholley, & Hernandez, 2016). Also, the increased enjoyment positively correlated with an improvement in students deeper learning and higher-order thinking (Crocco, Offenholley, & Hernandez, 2016).

Backlund, Engström, Johannesson, and Lebram (2010) examined the use of a driving simulator with students taking a driver education course. Both quantitative and qualitative methods were used to examine the behavior of 70 participants. The driving simulator was used to examine two behavior variables, skill and attitude along with a survey to examine the participant's experience of using the simulator (Backlund, Engström, Johannesson, & Lebram, 2010). Driving instructors judged students on their overall driving skill and attitude (Backlund, Engström, Johannesson, & Lebram, 2010). Students in the gaming course who used the driving simulator were ranked higher than students who were in the non-gaming course without the driving simulator (Backlund, Engström, Johannesson, & Lebram, 2010).

Not all games are video based or computer generated, board games have also shown to be useful in education. Eisenack (2012) created a board game to teach students the impact of climate change. Using a qualitative design, the study included 25 students ranging in ages from 15 to 30 (Eisenack, 2012). Games have a positive connotation, making them useful to communicate serious issues (Eisenack, 2012). In a game titled *KEEP COOL*, students played in groups and were asked to make decisions about the use of oil, black growth, or alternative fuels, green growth (Eisenack, 2012). Once the decision was made, students were required to deal with inevitable climate changes such as droughts, floods, or temperature rises (Eisenack, 2012). Students learned from each other through discussion of the impacts and considering what could be done to repair the damage or change the outcome.

A different type of business simulation game examined indecisiveness. Although everyone has difficulty deciding from time to time, chronic indecisiveness in a leader is undesirable (Wellington, Hutchinson, & Faria, 2016). During two semesters of a course that was taught by the same instructor with the same syllabi and textbook, students played a simulation game (Wellington, Hutchinson, & Faria, 2016). During a third semester with the same instructor, syllabi, and textbook students did not play the simulation game (Wellington, Hutchinson, & Faria, 2016). A quantitative pre-test and post-test design were used to compare a control group to an untreated group to assess self-reporting indecisiveness perceptions of 386 students (Wellington, Hutchinson, & Faria, 2016). Results of the study showed students who perceived themselves as being indecisive in their decisions before playing, considered themselves to be more decisive in decisions after playing the game (Wellington, Hutchinson, & Faria, 2016). Also, those students who perceived themselves as being decisive in decision-making considered their ability to make decisions improved (Wellington, Hutchinson, & Faria, 2016).

Gamification

Gamification in education is another aspect of games that is becoming more prevalent, making it imperative to understand what makes gaming effective as a teaching strategy (Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012). Researchers examined tasks, player roles, goal achievement, and player control (Gredler, 1996); conflict and control (Thiagarajan, 1999); challenge, risk, competition, rules, and goals (Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012). However, very little has been studied about the different gaming attributes such as leaderboards, badges, and achievements (Landers, 2014; Landers & Landers 2014; Wilson et al., 2009).

The main objective of gamifying learning is to encourage students to be motivated and engaged in the same way gamers are when they are playing games (Cheong, Filippou, & Cheong, 2014). Simply adding game elements such as leader boards and badges to a lesson plan that already exists is not enough. When implementing gamification, there are several aspects to consider; understanding those who will play, what the players will do to earn the achievements or badges, and which gaming attributions will motivate the players (Cheong, Filippou, & Cheong, 2014). Badges are a visual cue to both the player and their peers that the player has achieved a goal (Brull & Finlayson, 2016). Badges are flexible in the ways they can be used and provide a social aspect for accomplishments (Brull & Finlayson, 2016).

A recent study by Dicheva, Dichev, Agre, and Angelova (2015) examined the application of gamification in education, mapping game elements to specific educational contexts. What drives gamification forward is the ability to shape the behavior of users in a specific direction (Dicheva, Dichev, Agre & Angelova, 2015). Several businesses such as Starbucks, eBay, and Fitocracy use gaming elements such as badges to keep their users engaged and returning. Educational sites such as kahnacademy.org and codeacacdemy.com are two online education sites that use badges that fosters a friendly competition between the sites (Dicheva, Dichev, Agre & Angelova, 2015). The most common gamification design principles discovered were visible status and social engagement (Dicheva, Dichev, Agre & Angelova, 2015). The two most common game mechanisms used were leaderboards and badges (Dicheva, Dichev, Agre & Angelova, 2015).

One gamification attribute is the leaderboard, which can be used to offer a competitive edge to the gaming activity and measure time on task (Landers & Landers, 2014). Leaderboards address three of the nine gaming attributes that are considered valuable to gamified learning

(Landers, 2014). According to Landers the nine attributes for gamified learning include: 1) action language, 2) assessment, 3) conflict/challenge, 4) control, 5) environment, 6) game fiction, 7) human interaction, 8) immersion, and 9) rules/goals. Used in the study of leaderboards are conflict/challenge, rules/goals, and assessment. In an experimental study with 109 students by Landers and Landers, conflict/challenge included a competition for first place on the leaderboard. Rules and goals defined how students would progress and gain points needed to achieve first place on the leaderboard. The assessment was the leaderboard itself allowing for a visual progression. Also, the leaderboard formally recognized students for achieving goals and gaining rank. Moreover, leaderboards allow students to be recognized by their peers speaking to self (Bandura, 1991; Landers & Landers, 2014). Landers and Landers found students spent more time on task and achieved higher scores than those students who did not use a leaderboard.

Badges are another attribute being used in education an alternative assessment to increase motivation (Abramovich, Schunn, & Higashi, 2013). A quantitative pre-test and post-test study of 36 seventh graders and 15 eight graders measured achievement goal orientation (Abramovich, Schunn, & Higashi, 2013). Both higher and lower achievement students were used to assess motivation changes (Abramovich, Schunn, & Higashi, 2013). An advantage of badges over a leaderboard is that more than one student can achieve each badge; however, not all students will achieve all badges. Students can pick which goals they wish to achieve, gaining feedback for their accomplishment in the form of a badge (Abramovich, Schunn, & Higashi, 2013). In addition, badges allow the student to compare themselves to their peers. Moreover, badges allow peers to see student achievements. Using attributions of gaming such as leaderboards, achievements, and badges can help students visualize desired goals as well as the achievement of those goals (Abramovich, Schunn, & Higashi, 2013).

Badges are used in a way that does not affect student grades. The aim of badging is to generate competitive motivation (Pirker, Riffnaller-Schiefer & Gütl, 2014). Types of achievements badging can be used for include challenges and participation in achievements, learning, time management, or contribution to a team assignment or class discussion (Dicheva, Dichev, Agre & Angelova, 2015). One of the many benefits of using the gamification attribution such as badges is the ability of students to access them through multiple portals (Brull & Finlayson, 2016). Badges, like other gamification attributes, can be accessed using computers, tablets, smart watches, and smartphones (Brull & Finlayson, 2016).

Gaming is an innovative strategy that allows students to be competitive and compare their performance with others allowing for growth in goal achievement leading to self-efficacy (Banfield & Wilkerson, 2014; Crookes, Crookes, & Walsh, 2013; Royse & Newton, 2007). Gamification is a framework that can be applied to any problem or course that is affected by motivation (Zichermann & Cunningham, 2011). Knowing that gaming works on motivation is only the beginning, it becomes important to understand how each component motivates a student to become engaged in course content.

Gaming in Nursing Education

Within the literature, only a few articles address games used in nursing education. Boctor (2013) found that nursing students enjoyed a competitive team game played within the classroom finding it helpful in reviewing material. Tietze (2007) examined student understanding of course content using a simple bingo game. Also, video games have been found to be useful as nursing students respond positively to the use of video games (Lynch-Sauer et al., 2011). Video games are created to simulate nursing activities, allowing students to practice and learn in a safe and structured environment (Lynch-Sauer et al., 2011). Creating large-scale virtual environments

and video games can be resource draining on time and finances (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010).

One article was discovered addressing nursing education for staff development. Popil and Dillard-Thompson (2015) used a game based teaching strategy to promote active learning for home health nurses. In this qualitative study, 15 home health nurses were asked to play an online game with computer generated multiple choice questions on health assessment topics (Popil & Dillard-Thompson, 2015). Participants were asked to complete a 20 questions survey before playing the game and again after completing the game (Popil & Dillard-Thompson, 2015). Survey results of 15 home health nurses showed that 60% of the participants felt the game was an effective learning tool on the post survey as compared to the 15% on the pre-game survey (Popil & Dillard-Thompson, 2015).

Games within nursing education have been shown to be effective for the reinforcement of knowledge; however, there were limited articles found that use serious games as a teaching pedagogy in nursing education (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Lynch-Sauer et al., 2011). A study by Blakely, Skirton, Cooper, Allum & Nelmes focused on the perspectives of educators and examined virtual games as an experiential activity for advanced practice nursing students. Despite the use of simulation gaming as an experiential strategy, faculty preferred the historical method of teaching by lecture (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010).

Baid and Lambert (2010) considered the importance of games in nursing education to be fun activities and a way to inject humor into the curriculum. Baird and Lambert stated games help develop skills and critical thinking along with adding fun to the curriculum. Active learning

strategies, such as games, offer a way to facilitate learning, infusing a positive impact on the learning experience of nursing students (Baid & Lambert, 2010).

Simulation, also considered by some as a form of gaming continues to be used in nursing as a favored teaching strategy. Shannon (2015) used simulation to improve knowledge and skills for disaster awareness. Nursing students were placed in a simulated emergency and told they needed to help; no other direction was given. At the end of their experience, students were asked to complete a 15-item survey to assess their overall experience (Shannon, 2015). Each of 63 students in the class participated in this quantitative study. Of those 63 students, 92% reported the simulation supported their learning process improving their critical thinking and decision-making ability (Shannon, 2015).

Benner, Leonard, Sutphen, and Day (2010) stated games trivialize nursing curriculum, but actively support the use of simulation as a way for students to practice their craft in a safe structured environment. Many nursing programs do not offer grade points for simulation, making it difficult to offer students feedback other than in debriefing (Driefuerst, 2009). Using gaming attributions such as badges could offer a way to evaluate students in a positive way, maintaining simulation as a safe environment where students can learn without fearing life-altering errors.

Methodological Issues

There is very little literature on the topic of gaming that relates specifically to nursing education. However, the topic of simulation and gaming has been examined to better understand its use in all levels of education (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013; Eseryl, Law, Ifenthaler, Ge, & Miller, 2014; Landers & Landers, 2014; Lynche-Sauer et al., 2014; Royce & Newton, 2014; Tietze, 2007). One quantitative study by Tietze (2007) used a

bingo game to motivate students to engage with course material in an *Introduction to Clinical Pharmacy Skills* course at the Philadelphia College of Pharmacy. Descriptive statistics with a two-sample t-test for assumed and unequal variances was used to examine the number of bingo spaces each student earned. Each bingo card contained a multitude of activities that differed in complexity and the time it took to complete them (Tietze, 2007). The objective of the game was to increase student engagement with course content. The results found students who achieved bingo also achieved higher average scores than the average scores of the previous six semesters while those students who did not achieve bingo, achieved a lower course average than the previous six semesters (Tietze, 2007).

Blakely, Skirton, Cooper, Allum, and Nelmes (2010) used a mixed methods approach to study educator's perspectives in the use of educational games in nursing education. The qualitative phase consisted of interviews with 13 educators were teaching either nurses, midwives, or paramedics in higher education (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010). Blakely, Skirton, Cooper, Allum, and Nelmes based this study on the idea that simulation does not offer a competitive atmosphere in the same way gaming does (Allery, 2004). Also, gaming creates a community amidst students in the class that promotes critical thinking (Glendon & Ulrich, 2005). The qualitative analysis analyzed themes from verbatim transcripts of face to face interviews and phone interviews. The quantitative phase consisted of an online survey asking professional health educators their perception of gaming. Data was analyzed using a x^2-test for measures of association. Results showed that despite the evidence that games enhance learning, few instructors used games as a teaching pedagogy (Blakely, Skirton, Allum, & Nelmes, 2010).

Boctor (2013) completed a study that evaluated the effectiveness of a classroom game titled *Nursopardy* created for a fundamentals nursing occurs. The game Nursopardy was based on the television game show *Jeopardy*. Dividing the classroom of nursing students into two teams created a competitive and social atmosphere. Although some students may find a competitive atmosphere intimidating (Royse & Newton, 2007), it is competition and social recognition that makes gaming so successful (Banfield & Wilkerson, 2014; Royse & Newton, 2007). According to Boctor, the game offered a lively debate, along with the opportunity to discuss rationales to correct and incorrect answers. Using a 5-point anonymous Likert scale survey, Boctor found students not only enjoyed the activity but felt it was helpful in reinforcing the material (Boctor, 2013).

Lynch-Sauer et al. (2011) used a computer-based video game to study student attitudes toward gaming in nursing education. The study done by Lynch-Sauer et al. (2011) had four components: 1) obtain nursing students' attitudes toward video games, 2) describe nursing students' experience, 3) understand the role of video games in nursing education, and 4) describe the use of video games in nursing education. Using a 30-question cross-sectional survey, Lynch-Sauer et al. discovered 41% of the respondents played games outside of class, and all 218 respondents had positive perceptions of playing games in nursing education.

Banfield and Wilkerson (2014) completed a study that assessed intrinsic motivation and self-efficacy when using gamification as a pedagogy. Although extrinsic motivation is important for learning, it is intrinsic motivation that is needed to increase self-efficacy to explore, participate in, and achieve knowledge (Bandura, 1977; Kolb, 1984). Banfield and Wilkerson tested this theory using gamification pedagogy as the options of gamification are only limited by each instructors' creativity. Using the qualitative method of direct observation, the researchers

were part of the classroom activities to obtain a profound understanding of student perceptions (Banfield & Wilkerson, 2014). To measure self-efficacy Banfield and Wilkerson used *Adolescents' Development of Personal Agency: The role of self-efficacy belies and self-regulatory Skill* by Zimmerman (2006). The results of the study by Banfield and Wilkerson found that student self-efficacy dramatically increased with the use of gaming pedagogies, 90.3% of students felt they could "figure out how to do anything" on the survey (p. 297).

Eseryl, Law, Ifenthaler, Ge, and Miller (2014) used a quantitative study to examine the interrelationship between motivation and engagement in complex problem solving using game-based learning. The purpose of the study was to assess the belief that it is the interactivity of playing games that relates to motivation and problem solving (Eseryl, Law, Ifenthaler, Ge, & Miller, 2014). It is ones' self-efficacy that offers the belief that the desired goal can be achieved (Bandura, 1997). Factors that influence self-efficacy from a gaming pedagogy are performance feedback and social comparison (Bandura; Eseryl, Law, Ifenthaler, Ge, & Miller, 2014). Data consisted of the number of tasks completed and time spent in the game. Results of the study showed that engagement and motivation have an impact on student problem-solving outcomes in a game based learning environment (Eseryl, Law, Ifenthaler, Ge, & Miller, 2014).

Some themes within gaming for education literature included influence of gaming on student attitudes (Blakely, Skirton, Cooper, Allum & Nelmes, 2010), understanding of course material (Tietze, 2007), competitiveness of gaming (Banfield & Wilkerson, 2014; Royce & Newton, 2007, and student enjoyment of games (Boctor, 2013; Lynch-Sauer et al., 2011). Other themes found in the literature included motivation (Lynch-Sauer et al., 2011; Tietze, 2007; Zimmerman & Cunningham, 2011), critical thinking (Glendon & Ulrick, 2005), and self-efficacy (Banfield & Wilkerson, 2014; Crookes, Crookes & Walsh, 2013; Royce & Newton, 2007). Only

one study was found to discuss a specific attribute of gaming and how students responded to its use. Landers and Landers (2014) used leaderboards to examine the amount of time students spent on a graded assignment. Landers and Landers found the leaderboard led to an increased amount of time spent on a semester-long assignment increased. In addition, those students who spent more time on the semester-long assignment had higher scores. Moreover, there was a mix of qualitative, quantitative, and mixed studies discovered.

Studies discovered within the nursing literature included themes focused on student attitudes about gaming in nursing education (Lynch-Sauer et al., 2011), faculty perceptions of the use of gaming within the curriculum (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010), and the role of games in nursing education (Baid & Lambert, 2010). Boctor (2013) examined how a simple Jeopardy game could reinforce learning and Claman (2015) examined how multiuser virtual environments affected student engagement. Methodologies used were mostly qualitative with the quantitative study on engagement by Claman.

Although gaming has been discovered to be useful in education, there remains a gap as to which components or attributions of gaming motivate the students to be engaged. Claman (2015) found that using a virtual environment did increase engagement. However, a posttest only design was used, affirming no baseline for engagement before the use of a virtual environment. A gap in the literature was identified regarding which components of the virtual environment motivated students to become engaged.

Based on the literature reviewed a quasi-experimental A-B single system design was chosen to allow for an examination of participant behavior before and after an intervention to increase motivation. Examining participants' behavior before an intervention demonstrated a baseline of behavior (Bloom, Fischer, & Orme, 2009: Boyer, 2016). Participant behavior was

examined again after the introduction of badges as an intervention (Bloom, Fischer, & Orme, 2009, Boyer, 2016). Games offer badges as rewards for achieving defined goals keeping players engaged in gameplay (Zicherman & Cunningham, 2011).

The basis of an A-B design makes an underlying assumption that behavior will remain the same with the intervention (Bloom, Fischer, & Orme, 2009; Boyer, 2016). Participant behavior was examined before the introduction of an intervention and again after the introduction of an intervention (Bloom, Fischer, & Orme, 2009). The study described in this document used the A-B design to examine average scores of HESI Case Studies offered as non-graded course work in two consecutive nursing courses.

Case studies are a way for nursing students to apply information gained from readings and lectures to foster critical thinking and clinical judgment (Sandstrom, 2006). All clinical nursing courses from the southwest college of nursing described in this document used standardized HESI Case Studies. Nursing students were encouraged to use the case studies as a study resource.

The first of two courses examined baseline behaviors during Phase A where no intervention took place. Engagement behaviors were examined a second time using the same participants during Phase B with badges used as an intervention to motivate students to complete HESI Case Studies. The measurement of engagement behaviors included 1) the average scores of completed case studies and 2) the average number of case studies completed. The aim of the study was to examine nursing student motivation to engage in non-graded course work.

Synthesis of Research Findings

There is a large amount of research within the literature that discusses how gaming motivates students to become more engaged and improves learning at different levels of

education (Baid & Lambert, 2010; Banfield & Wilkerson, 2014; Blakely, Skirton, Cooper, and Allum, 2010; Boctor, 2013; Landers, 2014; Landers & Landers, 2014; Whitton, 2011). However, few studies are available that show gaming as a pedagogy for nursing education. Using gamification attributes in conjunction with classroom and non-graded activities may increase student motivation to engage in classroom activities and non-graded content. However, future research studies should examine the use of different types of gaming attributes on nursing student motivation and engagement (Landers, 2014). In addition to limited empirical research on gaming and it attributes in nursing education, there is a theoretical gap that should also be explored (Landers, 2014).

Critique of Previous Research Methods

There is limited research related to how gaming and its attributes motivate, engage, and affect outcomes in nursing education. Only one study by Landers and Landers (2014) relates directly to the use of a single gaming attribute in higher education. Although this study did not include nursing students, it demonstrates the use of a single gamification attribution. Landers and Landers used an experimental design to examine how a leaderboard would affect the amount of time students spent on a semester long assignment and the outcomes of the assignment. Landers and Landers suggested a theory that gamification affects learning by altering the psychological characteristic affecting learner interest, learner engagement, and learner motivation to maintain their attention on content. A leaderboard was used to represent three of the nine game attributes Landers (2014) theorized would be valuable when using gamification in learning (Landers & Landers, 2014). The three categories used were conflict/challenge, rules/goals, and assessment.

One hundred and nine students were randomly assigned to an upper division online organizational psychology course (Landers & Landers, 2014). Of the 109 students, 86 consented to have their data collected for the research with 64 completing an end of course survey for extra credit (Landers & Landers, 2014). Results of the Landers and Landers (2014) study showed students in the class using a leaderboard spent an increased amount of time on tasks connected to the semester long assignment (Landers & Landers, 2014).

Leaderboards have many uses in all types of situations as they invite challenge and competition by their very nature (Landers & Landers, 2014) Each participant has an opportunity to gain points with the goal of being in first place making it similar to conventional grading. Each student is not able to achieve an A, with a leaderboard, each person is not able to achieve first place. As students find themselves unable to gain first place, there is the risk they will become less motivated. Differently from leaderboards, badges allow for more than one player achieve a goal. Also, players would be able to choose which goals, or in this case badges, they would like to meet.

A positive aspect of the Landers and Landers (2014) study is that student outcomes increased. Those students who achieved higher points on the leader board also achieved better outcomes for the assignment than those students who were not a part of the leaderboard class. Although mediation is difficult to measure, increased time on task did lead to increased learning outcomes (Landers & Landers, 2014). The Landers and Landers study demonstrated that gamification could cause a change in student behavior, which then changes student outcomes.

Gaming was found to be a teaching strategy with the ability to strengthen learning outcomes. However, this was not a common thread in the nursing education literature (Royce & Newton, 2007). Teaching pedagogies in nursing education are shifting and becoming more

innovative. With this change in teaching pedagogies, a true shift in the paradigm of learning experiences is needed for both faculty and students (Bristol, 2014). Nursing faculty needs to find new teaching strategies that will allow them to walk away from the podium and shift the paradigm to allowing students to discover new knowledge on their own before entering the classroom (Bristol, 2014).

Summary

Chapter 2 included a discussion of the theoretical framework used in the study described in this document. Theories used in this study consisted of Motivation, Self-efficacy, and Goal Achievement. In addition, Chapter 2 included a discussion of the dissemination of nursing content both historically and current, active learning strategies, gaming in nursing, and previous methodological studies on the topic of gaming and education. Moreover, Chapter 2 included a critique of previous research.

Chapter 3 will present an in-depth discussion of the study methodology used for the study in this document. The study methodology includes research questions, target population, sampling method, and the sample size. Chapter 3 also includes the recruitment of participants, data collection and the operationalization of variables in addition to the data analysis procedures. The final discussion in Chapter 3 includes ethical issues, the researcher's position statement, and ethical issues specific to this study.

CHAPTER 3. METHODOLOGY

Chapter 3 will review the purpose of the study, research questions, and the hypothesis. Included in the discussion is the research design, target population, sample method and size, as well as recruitment of participants. In addition, the discussion will cover the collection of data, the procedure for analyzing the data, limitations of the study, and any ethical issues. This chapter provides a comprehensive synopsis of research design and any possible concerns that may be associated with that design.

The purpose of this quasi-experimental study was to examine if nursing students would become more engaged in non-graded course activities with the use of digital badges as rewards. The aim of this study was to choose a method that would examine student behavior before the intervention and again with the intervention. It was anticipated that by using a single group design, any change in student behavior would be more recognizable with the same participant.

Research Questions and Hypotheses

Research question 1. Is there a statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded?

H_1: There is statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

Research question 2. Is there a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded?

H_1: There is a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

Research Design

For this quasi-experimental study, an A-B single group design, allowed participants to become their own control group. Phase A allowed the establishment of baseline behavior without intervention (Bloom, Fischer, & Orme, 2009; Ravid, 2011). In Phase B an intervention was introduced measuring the same behavior as in Phase A (Bloom, Fischer, & Orme, 2009; Ravid, 2011). Using an intervention in the second phase (Phase B) indicated if there was a change in the behavior of students completing non-graded course work (Bloom, Fischer, & Orme, 2009). Using a one tailed dependent *t*-test, evaluation of data demonstrated if there was a statistically significant difference in behavior of the same participants in Phase A and Phase B. Because the aim of this study was to understand if there were changes in behavior caused by the

intervention, it was important to examine the behavior prior to the intervention and again with the intervention, making the A-B single group design the most appropriate choice.

Dependent variables are used in both Phases A and B of the study described in this document. Phase A contained seven case studies acting as the dependent variables: 1) Brain Attack (Stroke), 2) Spinal Cord Injury, 3) Seizures, 4) Deep Vein Thrombosis, 5) Heart Failure with Atrial Fibrillation, 6) Chronic Obstructive Pulmonary Disease, and 7) Guillain-Barre Syndrome (Elsevier, 2016). Phase B contained seven case studies acting as the dependent variables: 1) Depression, 2) Major Depressive Disorder, 3) Schizophrenia, 4) Psychosis, 5) Alcoholism, 6) Alzheimer's, and 7) Attention Deficit Hyperactivity Disorder (Elsevier, 2016). The independent variable used during Phase B were digital badges. One digital badge was available for each case study per student during Phase B. There were no independent variables in Phase A.

Target Population and Sample

A group of people or elements that have one or more characteristics or traits in common is a population (Ravid, 2011). A sample is a smaller group of observations selected to represent the larger population (Ravid, 2011). The target population for the study described in this document focused on nursing students attending a baccalaureate nursing program in a southwest college of nursing. The sampling method for this study was a non-probability strategy using convenience sampling. The following paragraphs describe the target population, method used for sampling, size of the sample, and recruitment of participants.

Population

Participants were drawn from an accelerated three-year baccalaureate nursing program located in the southwest. The student population consisted of students attending college for the

first time, along with students who have attended college, have been unsuccessful, or have been successful in the completion of a non-nursing degree. Different from other nursing programs, this Southwest program offered a second chance for students who previously were unsuccessful in non-nursing college courses. Admission requirements included a 2.5 or higher grade point average, as well as passing an entrance exam that tested for basic reading comprehension and math.

Sample

Participants in this study consisted of students assigned to take Complex Adult Health by the registrar. The college of nursing registrar randomly placed students into one of two courses for each eight-week session of the 16-week semester while the study took place with an average class of 35 students. Although student placement was random, the sampling did not meet criteria for randomization (Creswell, 2009; Sink & Mvududu, 2010). Students included in the study were those students who were taking Complex Adult Health, where taking Mental Health directly after completing Complex Adult Health, and who signed a consent form. The only exclusion criteria were those students who had taken Mental Health before taking Complex Adult Health.

Power Analysis

The possible sample size for this dependent *t*-test analysis was 30 students. Using a confidence level of 95% with a confidence interval of 5% the calculated sample size was 28 participants (Calculator.net, 2015). This calculation used the statistics calculator on Calculate.net with a confidence level of 95%, a confidence interval of 5% and a population of 30 students (Calculator.net, 2015). Research using an A-B design uses various sample sizes including the smallest sample size of a single participant (Bloom, Fischer, & Orme, 2009).

Procedures

During a single face-to-face information session, students received a request to collect and examine data from Higher Education Systems Incorporated (HESI) Case Studies in the current course Complex Adult Health and the following course Mental Health. No change took place with the incorporation of the HESI Case Studies offered to students as a study resource in either course. In addition, grade points were not available upon the completion of the HESI Case Studies. During the course Complex Adult Health, students who completed HESI Case Studies could take the quiz at the end of the case study more than once to increase their final score. No digital badges were offered in the first course Complex Adult Health. During the course, Mental Health, students could earn digital badges for the completion of HESI Case Studies with an 85% score or higher on the first attempt. Teaching methods and distribution of grade points remained the same in both courses. Participation was strictly voluntary; no identification of students took place outside the classroom.

Students received a demonstration of the 3D GameLab during the first week of the Mental Health course. Students who signed a consent form received an invitation to be a part of the 3D Game Lab environment via their school e-mail account. Each participant received a different identification number for reporting purposes.

Participant Selection

The sampling method used for this study included a non-probability strategy. Non-probability sampling is used when drawing a sample from a population that does not lend itself to randomization (Lodico, Spalding, & Voegtle, 2010; Ravid, 2011; Waltermaurer, 2008). Non-probability sampling has four categories: convenience, quota, purposive, and snowball (Lodico, Spalding, & Voegtle, 2010; Ravid, 2011; Waltermaurer, 2008). Convenience sampling is used to

select participants per the ease of availability within a specific population (Creswell, 2009; Lodico, Spalding, & Voegtle, 2010; Waltermaurer, 2008). During the second year of the program, each student cohort is randomly split into two specialty courses for the first eight weeks of a sixteen-week semester. After the first eight weeks, the students change to the other specialty course for that semester. Students who were in the face-to-face meeting took Complex Adult health during the first eight weeks and Mental Health during the second eight weeks. Students in Complex Adult Health were part of the recruitment process. Approval from the study site and Capella was obtained prior to participants being approached for consent.

Steps in the recruitment of participants included contacting a southwest region nursing college. Once contact was established, recruitment of participants was protected by following these steps:

- Met with campus president of the college for the study and obtained permission to conduct the study
- Met with the instructor of each course and gained permission to conduct the study in their course
- Visited the Complex Adult Health classroom at the end of the first day and met with students.
- Held a face-to-face meeting with students giving each student a consent form for participation, and an envelope to return the consent form to the researcher.
- Described the study to students and answered questions from the students and faculty regarding the study.
- Students placed consent forms in the envelopes, and the envelopes were collected.

Protection of Participants

Recruitment of participants took place in the classroom during the last 20 minutes of class with the faculty member present. Students were informed all participation, including this face to face meeting, were voluntary and participation was not required. Additionally, students were informed that participation or lack of participation did not affect their grade in either course.

Each student was given a closed manila envelope containing the approved consent form. After the study was explained and questions were answered, students were requested to take out the consent form and read the contents. Students were then asked to sign the consent form if they wished to participate and place it back in the manila envelope. The envelopes were sealed and returned to the researcher.

Each student was assigned a number to replace their name to maintain the privacy of scores on the data collection document. Student names were not used in the dissemination of the study results. All data and information were kept on a password-protected portable hard drive in the researcher's office. The portable hard drive will be destroyed per Capella policies.

Data Collection

This quasi-experimental quantitative study included collection of data from the recommended Elsevier HESI Case Studies and the 3D Game Lab Website. Data included the scores and name of each HESI case study, and the number and name of case studies completed in Complex Adult Health Phase A. The only identifying information collected for this study were student names to aid in following the same student through both courses. Numbers replaced student names beginning with the number 100 allowing for no student identification within the written work.

Data Analysis-Complex Adult Health No Badges. The name and score of each HESI RN Case Study for every consented nursing student in the course Complex Adult Health was collected from the Elsevier faculty resources website. Entering each HESI Case Study individually allowed for examination of achieved student scores for each of the seven case studies available in Complex Adult Health. Documented data included the number assigned to students, scores achieved by students, and the number of completed case studies for each consented student. Data entered onto the Excel spreadsheet used ID numbers without student names.

Data Analysis-Mental Health Badges as Rewards. Scores for each HESI RN Case Study completed by consented nursing students in Mental Health were collected from the Elsevier faculty resources website. Additionally, the number of case studies completed was collected. Entering each HESI Case Study individually allowed for examination of achieved student scores for each of the seven case studies available in the course Mental Health. Documented data included the assigned number given to students, scores achieved by students, and the number of completed case studies for each consented student. Data entered on the Excel spreadsheet used ID numbers without student names.

The independent variable, digital badges, were given as rewards to student nurses for achieving a score of 85% or higher on the HESI Case Studies. Available as a resource to students taking Complex Adult Health and Mental Health, HESI Case Studies became the dependent variable. Available case studies in Complex Adult Health included COPD with Pneumonia, Heart Failure with Atrial Fibrillation, Brain Attack (Stroke), Spinal Cord Injury, Seizure Disorder, Guillain-Barre' Syndrome, and Deep Vein Thrombosis. Case studies available to students during the Mental Health course included Alcoholism, Attention Deficit

Hyperactivity Disorder, Alzheimer's, Depression, Major Depressive Disorder, Psychosis, and Schizophrenia. HESI case studies were included in clinical courses as study resources. Nursing students who completed HESI Case Studies with an 85% or higher score on their first attempt achieved badges

Data Analysis Procedures

Data included the scores for each case study completed by students in Complex Adult Health and Mental Health, in addition to the completed case studies by participating students in Adult Health and Mental Health. By examining the average scores of non-graded activities and the number of non-graded activities students completed before they were aware of badging, it was possible to determine if the gaming attribution badging influenced the motivation of students to complete recommended non-graded coursework.

Data was collected in both Phase A and Phase B using the same participants and then analyzed using a dependent *t*-test to evaluate if there was a statistically significant difference between the average scores of HESI Case Studies completed in the two phases, as well as the number of case studies completed. Phase A data included an average of the scores received on HESI case studies in each of the two nursing courses, Complex Adult Health and Mental Health in addition to the number of HESI case studies completed in each of the two nursing courses. Analyzing research question number 1 included the use of a dependent *t*-test to examine the average scores achieved when students completed HESI case studies in Phase A and Phase B. Analyzing research question number 2 also included the use of a dependent *t*-test to examine the number of HESI case studies completed by students in Phase A and Phase B.

Using a numbering system that started with 100, each participant was given and ID number to replace their name on the Excel spreadsheet containing all data. Data collected from

the Elsevier website included the title of each case study in Complex Adult Health and Mental Health along with scores achieved by each consented student. Additionally, the number of completed case studies in both Phase A and Phase B was collected.

Data Analysis Procedure Research Question 1. An average of the collected HESI case study scores in Complex Adult Health, the Phase A nursing course, and Mental Health, the Phase B nursing course, were analyzed using a one-tailed dependent *t*-test with a *p* value of .05 to determine significance (Ravid, 2015). Analyzation of data took place using SPSS Statistics Grad Pac 23 software.

Data Analysis Procedure Research Question 2. The number of HESI case studies completed in Complex Adult Health, the Phase A nursing course, and Mental Health, the Phase B nursing course, were analyzed using a one-tailed dependent *t*-test with a *p* value of .05 to determine significance (Ravid, 2011). Analyzation of data took place using SPSS Statistics Grad Pac 23 software.

During week seven of both the Complex Adult Health in Phase A and Mental Health in Phase B, an Excel spreadsheet was used to organize collected data. The Excel file contained two tabs with a separate spreadsheet on each tab. The first tab was labeled Phase A and the second tab Phase B. The Phase A tab contained a spreadsheet of seven columns labeled with the name of each of the seven HESI case studies contained in Complex Adult Health. Each row of the Phase A spreadsheet was labeled with the ID number assigned to each consented student for identification. The score received by that student for each case study was placed in the column under the title of that case study. An eighth column on the spreadsheet contained the average score each student achieved for the seven HESI case studies. A ninth column contained the number of HESI case studies completed with an 85% or higher score.

The Phase B tab contained a spreadsheet of seven columns labeled with the name of each of the seven HESI case studies contained in Mental Health. Each row of the Phase B spreadsheet contained the ID number assigned to each consented student for identification. The score received by that student for each case study was placed in the column under the title of that case study. An eighth column on the spreadsheet contained the average score each student achieved for the seven HESI case studies. A ninth column contained the number of HESI case studies completed with an 85% or higher score.

Instruments

HESI Case Studies are available to nursing students who take Specialized HESI exams given as final exams for all clinical courses, as well as an Exit Exam given at the end of the program (Elsevier, 2016). Seventy-five different HESI Case Studies are available as a study resource for clinical courses in a nursing curriculum (Elsevier, 2016). Case studies were located on the Evolve website as part of the Elsevier suite of products to assist nursing students (Elsevier, 2016). Instructors use case studies to augment classroom lectures, give as homework, use in clinical post conference, or as remediation.

HESI Case Studies use disease specific patient scenarios to engage students in course content. Additionally, each case study included questions at the end of the patient scenario to ascertain the level of student understanding (Elsevier, 2016). Upon completion of the questions, students can see their score and review rationales for the correct and incorrect answers. Faculty can see how many times each student reviews and completes the case study, how much time they spend on a task, how many correct and incorrect items they achieved, and their earned score. Each nursing course included a specific number of HESI Case Studies recommended to enhance student learning and help students think critically while applying information learned from

textbooks and classroom activities. Complex Adult Health included case studies titled COPD with Pneumonia, Heart Failure with Atrial Fibrillation, Deep Vein Thrombosis, Guillain-Barre, Spinal Cord Injury, Brain Attack (Stroke), and Seizure Disorder. Mental Health included case studies titled Depression, Major Depressive Disorder, Schizophrenia, Psychosis, Alcoholism, Alzheimer's, and ADHD.

Complex Adult Health HESI Case Studies

Seven HESI case studies included in the nursing course Complex Adult Health as resources, help faculty identify gaps within the course and build student critical thinking (Elsevier, 2016). Brain Attack (Stroke) describes a woman brought to the Emergency Room (ER) by her daughter complaining of right-sided weakness (Elsevier, 2016). Questions allowed students to focus on clinical manifestations, diagnostic tests, nursing interventions, care in a rehabilitation unit, and nutritional concerns (Elsevier, 2016). The Spinal Cord Injury case study began outside the hospital during a college football game with a player who is injured and unable to move his arms or legs. Stabilization of a trauma patient became a focus for this case study along with clinical manifestations, nursing interventions in a Neurological Intensive Care Unit, transfer of a patient to a rehabilitation unit, and cultural aspects of care (Elsevier, 2016). A third neurological case study reviewed care of a young woman with undiagnosed seizures in a physician's office. This seizure case study allowed students to focus on types of seizure activity, prioritizing care during a seizure, assessment, diagnostic tests, and medication education (Elsevier, 2016).

Two case studies involving the cardiac system were included in the Complex Adult Health case studies: Deep Vein Thrombosis (DVT) and Heart Failure with Atrial Fibrillation (Elsevier, 2016). As a complication from abdominal surgery, the women in the DVT case study

had pain in her right calf, which appeared edematous and firm. Questions focused on diagnosis, the probable cause, assessment, heparin therapy, and the legal issues of a medication error connected to the heparin therapy (Elsevier, 2016). The second cardiac case study, which addressed Heart Failure with Atrial Fibrillation, presented a patient who came to the clinic complaining of difficulty breathing, jugular vein distention, and a rapid irregular heart rate of 138 (Elsevier, 2016). This case study allowed students to focus on risk factors of heart failure, clinical manifestations, cardiac dysrhythmias, diagnostic procedures, medication, a patient complication, and a resuscitation event (Elsevier, 2016).

One Respiratory case study reviewed Chronic Obstructive Pulmonary Disease (COPD) titled COPD Pneumonia. An older adult came to the ER presenting with increased sputum production, increased shortness of breath, and a fever (Elsevier, 2016). Students engaged in questions covering assessment, Arterial Blood Gas (ABG) analysis, nursing diagnosis and interventions, medication administration, and oxygen therapy. The final case study covered the care of a Muslim patient admitted to the hospital to rule out Guillain-Barre Syndrome (Elsevier, 2016). Presenting with weakness in both legs and difficulty swallowing with choking episodes, this case study challenged students to focus on assessment, assisting with a lumbar puncture, ventilator care, complications, tracheostomy placement, and cultural and spiritual care (Elsevier, 2016).

Mental Health HESI Case Studies

Mental Health had seven HESI case studies included within the course as a resource for students. The seven case studies in Mental Health included Depression, Major Depressive Disorder, Schizophrenia, Psychosis, Alcoholism, Alzheimer's, and Attention Deficit

Hyperactivity Disorder (ADHD) (Elsevier, 2016). According to Elsevier, HESI case studies assist nursing students to build critical thinking skills.

Two case studies covered the problem of depression titled Depression and Major Depression. The Depression case study portrayed an African American widow brought to the ER by her daughter. The woman presented as disheveled, slow moving, and did not make eye contact (Elsevier, 2016). Questions included the topics of physical assessment, assessment of mental stability and depression, treatments with medication, interventions for depression, and suicide risks (Elsevier, 2016). The case study titled Major Depression portrayed a more complicated patient who was divorced with no children, traveled extensively for work, and witnessed the September 11 attack on the World Trade Center (Elsevier, 2016). A medical history included hypothyroidism, menopause, and medications (Elsevier, 2016). Different from the Depression case study, Major Depression focused more closely on assessment, planning, medications, and outcomes (Elsevier, 2016).

Different from depressive disorders are two HESI Case Studies titled Psychosis and Schizophrenia. In the Psychosis case study, the patient portrayed entered the ER accompanied by police officers and a caseworker (Elsevier, 2016). The patient had a history of not taking his medications for the past four months and previous suicidal attempts (Elsevier, 2016). Students focused on assessment, interventions, communication, antipsychotic medications, admission to the unit, safety precautions, and discharge planning (Elsevier, 2016). Schizophrenia, although different from Psychosis, can also produce violent behavior. The Schizophrenia case study presented an adult male brought to the ER believing health care providers were FBI agents who placed cameras in his home (Elsevier, 2016). Questions asked of students included assessment,

mental status exam, speech and thought processes, involuntary admission, delusional thoughts and hallucinations, group therapy, and triggers of symptoms (Elsevier, 2016).

Case studies that reviewed cognition and the interruption of thought processes included Alzheimer's and ADHD. Alzheimer's is a disease presented to students with an older adult at a routine physical exam worried about an increased forgetfulness (Elsevier, 2016). Students answered questions focusing on cognitive function assessment, early warning signs and risk factors, diagnostic studies, and distorted thought processes with progression of the disease (Elsevier, 2016). In addition, some questions challenged students with topics including legal aspects of adult care and restraints, complications of the disease, and caregiver role strain (Elsevier, 2016). Differently than Alzheimer's, the ADHD case study presented a college student who tripped and lacerated his wrist. Upon entering the ER, the patient admitted to being in the ER three times in less than a year for unusual accidents (Elsevier, 2016). Students worked through questions, which included all aspects of the nursing process, educational information for the patient, follow-up visits, and outcomes (Elsevier, 2016).

The final HESI Case Study in the course Mental Health covered the topic of Alcoholism. Police found the patient ready to jump off a bridge and escorted him to the ER for observation (Elsevier, 2016). The history given about the patient included information that his girlfriend had moved out, he lost his job, and he smelled strongly of alcohol (Elsevier, 2016). Along with assessment, students answered questions on; admission to the crisis unit, alcohol detoxification, management of alcohol withdrawal, and discharge planning that included maintenance of abstinence (Elsevier, 2016).

3D GameLab

The 3D GameLab (2016) website provides instructors with a platform to design and personalize learning activities for their students. Instructors at all levels of education can turn their classroom into a game using quests and challenges as assignments (3D GameLab, 2016). In addition to creating content, instructors can track student learning and achievement. Students choose assignments that interest them, designated as quests and challenges, completing them as quickly or slowly as they wish. The 3D GameLab website tracks outcomes designated as rewards in the form of badges, experience points, and achievements (3D GameLab, 2016).

The 3D GameLab housed links to the HESI Case Studies in the course Mental Health. Also, the 3D GameLab website was a place for students to view their badges, points achieved, and placement on the leaderboard. Once students completed a case study, the website alerted the instructor that a student had completed one of the case studies. The instructor then entered the 3D GameLab website and awarded a badge if the student completed the criteria for that badge. Displayed badges are visible to the instructor and the registered students from that class. A leaderboard, visible on the course website page, displays points awarded to each student per achieved rank.

Validity

Validity offers the researcher an ability to determine the intervention used in the study caused the outcome (Creswell, 2009). Internal validity occurs when the researcher controls extraneous variables and experiences that could cause the study to be in question (Ravid, 2009). There are five possible threats to internal validity; history, maturation, regression, selection, mortality, and diffusion of treatment (Creswell, 2009; Ravid, 2009).

Using an A-B single group design, allowing the same participants to be involved in both the pre-intervention phase and the intervention phase, reduces many of the validity threats. Two additional threats that remained were maturation and mortality. Maturation was resolved by using only the A-B phases of a single group design, allowing all participants to move forward at the same pace during a 16-week semester. The other threat to validity was mortality, where participants may drop out during the experiment for personal reasons. Forty-one nursing students attended the face-to-face informational meeting with 26 students consenting for the study. In addition, the study was only 16 weeks or one semester in length. The remaining threat was the possibility that one or more of the participants would fail the first course and be unable to move forward to the next phase of the study.

External validity must also be present for the researcher to be confident in the outcome of a study. External validity occurs when there are outside inferences from the data collected (Creswell, 2009). There were three possible threats to external validity including compensatory or resentful demoralization, compensatory rivalry, testing, and instrumentation (Creswell, 2009). The design chosen for this study decreased external threats by using the same participants in both phases of the study. Also, the instrument used in both phases of the study remained the same, with only a change in content to match the course.

Reliability

Ravid (2011) stated that reliability of an instrument offers consistency and repetitive results when used with the same groups. The consistency of an instrument is measured through multiple uses when measuring similar concepts (Ravid, 2011). When the tool is used to study similar groups as the reliability testing, the instrument is considered reliable (Ravid, 2011). Reliability measurements can range from 0 to 1.00 with 1.00 being the highest (Ravid, 2011).

Four factors can affect reliability: 1) heterogeneity of the group, 2) instrument length, 3) difficulty of items, and 4) quality of items (Ravid, 2011). Acceptable levels of reliability depend on the use of the results, for exploratory research in groups a modest level of 0.50 to 0.60 or higher is acceptable (Ravid, 2011). Reaching a level of 1.00 is desirable, but unlikely (Ravid, 2011). Most commercial instruments have a reliability level of 0.90 (Ravid, 2011).

Research by Elsevier (2016) has shown the use of HESI Case Studies improves scores on the HESI Exit Exam, which is a predictor for passing the National Council Licensure Exam (NCLEX-RN) that is required to obtain a professional registered nurse license. Exit exams are given to nursing students to assess their ability to pass the NCLEX -RN exam. Nursing students can remediate in areas where they are the weakest before taking the NCLEX-RN exam. Students use HESI Case Studies as study resources, for course content review, and remediation of standardized exams (Elsevier, 2011).

Ethical Considerations

It is critical to consider all possible ethical issues when designing a research study (Creswell, 2009; Ravid, 2011). Both study organizations approved this study in addition to site permission from the school of nursing. All participants were recruited in a face to face informational meeting and signed a consent with the assurance of the ability to withdraw if they so desired. Participants stated the understanding of their ability to withdraw without concern for consequences.

Researcher's Position Statement

An important aspect of research is for the researcher to assess their beliefs and assumptions to eliminate bias and prevent inaccurate conclusions (Palaiologou, Needham, & Male, 2016). There were no potential problems identified between the researcher and

participants. There was no potential bias identified between the researcher and the research problem.

Conflict of interest assessment. There was no prior contact or affiliation with students who took part in the face to face informational meeting or who participated in the study. There was no direct affiliation with the campus as all work for the organization is completed remotely. There was no bias or conflict of interest identified, as creating content for the course, teaching the course, or the determination of course grades was not part of this study.

Position statement. Upon review of the peer-reviewed literature, games used in education to engage students have been successful. The application of gamification concepts has proven beneficial in motivating and engaging students of all ages (Banfield & Wilkerson, 2014). Beginning research in nursing education has also begun to show interactivity pedagogies as helping students with clinical judgment and deeper learning (Benner, Sutphen, Leonard, & Day, 2011; Jeffries, 2009; Boctor 2013). Review of the literature suggests interactive pedagogies and gamification of nursing education could be beneficial to nursing students and their clinical judgment.

Ethical Issues in the Study

Bradbury-Jones and Alcock (2010) designed a framework for ethical research with nursing students to assist nursing researchers. This framework includes three main components: (1) research contribution, (2) research relationship, (3) research impact (Bradbury-Jones & Alcock). It is the belief of Bradbury-Jones and Alcock that nurse researchers assume the main responsibility for implementing ethical research.

Research contribution. Nursing students should understand that they, as participants, would be contributing to the body of knowledge with which future nursing students will be

educated. Researchers have a duty to ensure nursing students fully understand the purpose of the study and how they, as participants, will contribute (Bradbury-Jones & Alcock, 2010). Clear, descriptive, understandable language, should be used to explain all components of the study.

To comply with this level of ethical standards, a face to face meeting was conducted to explain the study and answer all questions. Using understandable language, the study, the purpose of the study, and all gamification verbiage was explained. Examples, in the form of pictures of badges, earned in the 3D Game Lab environment were included in the consent form. Following the explanation of the study was a question and answer period.

Research relationship. Participants should understand the relationship that occurs between them and the researcher. This relationship is especially important when it comes to the power structure and confidentiality for the participants (Bradbury-Jones & Alcock, 2010). Researchers who are also instructors for participants must be a serious consideration. All participants should have a clear path with which to remove themselves from the study without fear of consequences.

No interaction occurred with the nursing students who participated in any role other than the informational face-to-face meeting and demonstration of the 3D GameLab website. Information given to students included participation is strictly voluntary, there would be no effect on their grades for participating or not participating, and they could decide to end their participation at any point without fear of consequences.

Research impact. Potential participants should understand any possible risks or benefits related to the research. Per Bradbury-Jones and Alcock (2010), potential risks include both physical and psychological effects. Benefits in participation may be less obvious or intangible, but remain worthy of consideration.

As part of the consent process, identified risks and benefits were included in the communication. Determined risks for this study do not differ from the daily life of a nursing student who receives grades for assigned work. Information given to students included the possible benefits of completing the HESI Case Studies. Nationally considered as a study resource, HESI Case Studies are part of the resource package that assists nursing students in preparing for licensure exam at the end of their education (Elsevier, 2016; Lavendera, et al., 2011).

Summary

Chapter 3 included an in-depth discussion of the study methodology, including the research questions, target population, sampling method, and the sample size. Moreover, Chapter 3 included recruitment of participants, data collection and the operationalization of variables in addition to the data analysis procedures. The final part of Chapter 3 included a discussion regarding ethical issues, the researcher's position statement, and any ethical issues in the study.

Chapter 4 will present collected data in both the Complex Adult Health course and the Mental Health Course. The discussion in Chapter 4 includes results and conclusions from the analyzed data. The final chapter, Chapter 5, will offer a summary of the results in relation to the literature, the limitations, implications for practice, and recommendations for further research.

CHAPTER 4. RESULTS

The purpose of this quasi-experimental AB single group design was to examine the use of badges as rewards for non-graded coursework. Average quiz scores for standardized case studies and the average number of case studies completed case studies were analyzed. All quantitative data came from nursing students during two specialty courses in the second year of a three-year accelerated program in the Southwest region of the country. The instrument used in this study were standardized Health Education Systems Incorporated (HESI) Case Studies from Elsevier. Seven case studies were available in each of the two courses and accessed through the Elsevier website.

The purpose of this chapter is to present a report of the results of the data analysis. A dependent paired sample one-tailed *t*-test was used to analyze the data. Included is an explanation of the results for each research question, as well as two graphs and two tables.

Background

Faculty in nursing education have been challenged to capture the attention of their students and motivate them to become engaged in course content (Royse & Newton, 2007). Faculty are beginning to replace traditional methods with new innovative strategies in the classroom and simulation (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013). Some of the strategies being used are increased simulation in the classroom, online communities such as Second Life, and gamification of classroom content (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor, 2013). Although there is a large amount of literature on how gaming can motivate students to be engaged in course content (Baid & Lambert, 2010; Banfield & Wilkerson, 2014; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Boctor; Landers, 2014; Landers &Landers, 2014; Whitton, 2011), there is a knowledge gap that exists in the nursing

literature. Moreover, there is a specific knowledge gap that exists regarding which attributions of gaming motivate students to become engaged. It becomes important to discover which attributions motivate students as gamification enters the nursing curriculum (Boctor, 2013; Landers & Landers, 2014).

Review of Data Collection Process

Data for this quasi-experimental study included case study scores from the Elsevier website and badge completion data from the 3D GameLab Website. Case study titles and scores were collected from both the Complex Adult Health course and the Mental Health course. No identifying data was collected from the participants for this study.

Complex Adult Health. The name of each of seven HESI Case Studies were collected and placed into an Excel spreadsheet. Scores of case studies for each student were collected and placed in the Excel spreadsheet with the assigned number and not the student name. In addition, the number of case studies completed was collected.

Mental Health. The name of each of the seven HESI Case Studies were collected and placed in a different tab of the Excel spreadsheet. Scores for each case study were collected and placed in the Excel spreadsheet with the assigned number students were given during the Complex Adult Health course. In addition to the scores, the number of completed case studies were collected and placed on the Excel spreadsheet.

Review of Analysis Process

Data was collected from the same participants in both Phase A with Complex Adult Health and Phase B Mental Health. Data was analyzed using a dependent *t*-test to evaluate if there was a statistical difference in the average scores between the two courses when digital

badges were used as a reward. Analyzation of data took place using SPSS Statistics Grad Pac software.

Data Analysis Procedure Research Question 1. An average of the HESI Case Study scores in Complex Adult Health was determined. The determined average from Complex Adult Health was compared to the determined average of the HESI Case Studies in Mental Health. The comparison was completed using a one-tailed dependent *t*-test with a *p* value of 0.5 to determine significance of the difference.

Data Analysis Procedure Research Question 2. The number of completed HESI Case Studies in Complex Adult Health was determined. The determined number from Complex Adult Health was compared to the determined number of completed HESI Case Studies in Mental Health. The comparison was accomplished using a one-tailed dependent *t*-test with a *p* value of 0.5 to determine significance of the difference.

Description of the Sample

The sample for this study reported in this document was comprised of baccalaureate degree nursing students in their second year of a three-year accelerated program. Located in the southwest region of the country, the program has approximately 200 students who are primarily female. Registered students range in age from 18 to 50 and have varied educational backgrounds. Participants were drawn from the specialty courses Complex Adult Health and Mental Health. Convenience sampling was used as students were randomly assigned to the two courses by student services. A number was assigned to each student, replacing their name for assurance of privacy. Inclusion criteria consisted of students taking Complex Adult Health followed by Mental Health. The only exclusion criteria were students who had already taken Mental Health before Complex Adult Health (Complex Adult Health $n = 25$, Mental Health $n =$

25). Of the 40 students registered for Complex Adult Health, 10 students had taken Mental Health and four students did not wish to participate. During the first course, Complex Adult Health, one consented student withdrew from the course leaving 25 participants (figure 1).

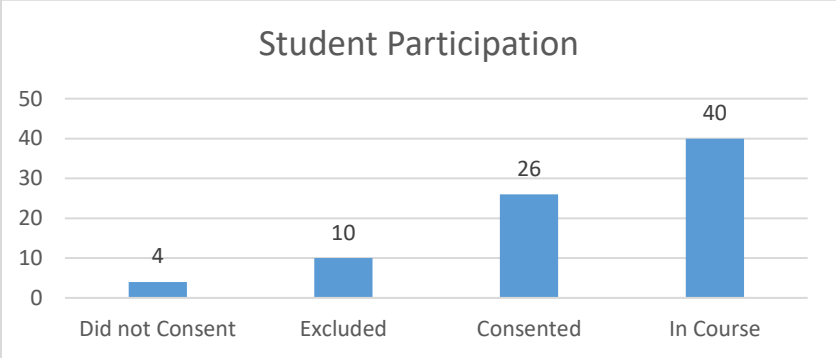

Figure 1. Distribution of participation of consented students.

Of the 25 participants, 20 were female students and 5 were male students. Demographic data was not collected as it was not relevant to the purpose of the study or the research questions.

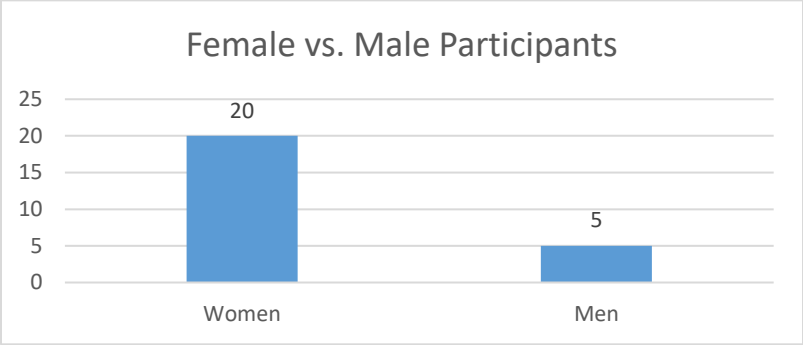

Figure 2. Female vs. Male participants

Hypothesis Testing

Results of this research study are presented here in the order of the two research questions. Following is a detailed explanation of the data analysis for each of the two research questions. This section of the document is organized by research question with the findings addressed separately.

Research Question 1 and Hypothesis

Research question 1. Is there a statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded?

H_1: There is statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

Hypothesis Testing for Research Question 1

A one tailed paired sample *t*-test of the average scores of case studies in the course Complex Adult Health was compared to the average scores of case studies in the course Mental Health (Table 1). HESI Case Studies were available to students in both courses as study resources and were not required by the instructor to be completed. Each standardized case study has a quiz for students to complete to assess their knowledge. Scores are calculated by the HESI Case Study software and reported immediately upon hitting the submit button, which offers feedback, including the correct answer, for the students review. Scores for each case study from each student in both courses were obtained from the Elsevier website and recorded on an Excel spreadsheet to be analyzed by SPSS. All data collected for both courses was entered into SPSS where the paired *t*-tests were performed.

As shown in Table 1, the average case study score in the course where badges were not offered (M = 8, SD = 27.69) was higher than the average score where badges were offered (M =

21, SD = 35.39). There was no significant effect on the average scores of completed case studies $t(24) = -1.332$, $p = 0.1$.

Table 1
Results of one-tailed t-test and Descriptive Statistics – Average Scores of HESI Case Studies

	Complex Adult Health		Mental Health			95% CI for Mean Difference			
Outcome	M	SD	M	SD	n		r	t	df
	8.00	27.69	20.96	35.39	25	-33.05, 7.13	.76*	-1.33*	24

*p<.05

Results for Research Question 1 found no significant difference in the average scores of the HESI Case Studies between the course in Complex Adult Health and Mental Health. The null hypothesis was retained therefore effect size was not calculated.

Research Question 2 and Hypothesis

Research Question 2. Is there a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded?

H_1: There is a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

Hypothesis Testing for Research Question 2

A one tailed paired sample *t*-test of the average number of completed case studies in the course Complex Adult Health was compared to the average number of completed case studies in the course Mental Health (Table 2). The same number of HESI Case Studies were available to students in both courses as study resources and were not required to be completed by the instructor in either course. The number of completed case studies for each student in both courses was obtained from the Elsevier website and recorded on an Excel spreadsheet to be analyzed by SPSS. All data collected for both courses was entered into SPSS where the paired *t*-tests were performed.

As shown in Table 2 the average number of case studies completed in the course where badges were offered (M = 1.58, SD = 2.5) was higher than the average number of completed case studies where badges were not offered ($M = 0.2$, $SD = 0.71$). There was a significant effect on the number of completed case studies when badges were offered $t(24) = -2.5$, $p = 0.01$.

Table 2
Results of one-tailed t-test and Descriptive Statistics – Number of Completed HESI Case Studies

	Complex Adult Health		Mental Health			95% CI for Mean Difference			
Outcome	M	SD	M	SD	n		r	t	df
	0.2	0.71	1.56	2.5	25	-2.48, -0.24	.18*	-2.5*	24

*p<.05

Results for Research Question 2 found a significant difference in the average number of completed HESI Case Studies in Complex Adult Health and the number of completed HESI Case Studies in Mental Health. The null hypothesis for Research Question 2 was rejected.

Results showed a significant difference of $p < 0.05$ in the number of case studies completed between the Complex Adult Health and Mental Health, for this reason, Cohens *d* was calculated to understand better if effect size would support the significance of Research Question

2 results. Cohen's formula $ES = \frac{Mean\ Phase\ B - Mean\ Phase\ A}{SD\ Gain}$ was used to calculate a *d* of 0.8, indicating a large effect sample. The calculated effect sample supports the significant difference and the rejection of the null hypothesis for Research Question 2 (Ravid, 2011).

Summary

Chapter 4 included the results of the analyzed data regarding the use of badges as motivation for nursing students to complete non-graded course work. The participants attended a southwest college of nursing with approximately 200 students on campus. Participants were drawn from the specialty course Complex Adult Health using a convenience sampling. Of the 40 students in class, 26 students agreed to participate (see Figure 1). Results of the one-tailed dependent t-tests were summarized in two tables. Table 1 summarized the results for Research Question 1 and Table 2 summarized the results for Research Question 2. The results for Research Question 1 was to retain the null hypothesis and the result for Research Question 2 was to reject the null hypothesis. Chapter 5 included a summary and discussion of the results. In addition, the limitations of the study and implications for nursing education will be included along with recommendations for future research.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Nursing faculty have been challenged to find new ways to motivate nursing students to become engaged in course content as the traditional methods of lecture pedagogies are no longer capturing the interest of students (Benner, Sutphen, Leonard, & Day, 2011). As nursing faculty continue to bring in new ideas for simulation, practical exercises, and gaming; only gaming offers a competitive way for students to compare their performance with others. Games offer a structured environment where students can safely learn to solve complex problems and achieve goals. With the prohibitive cost of computerized games, gamification becomes a way to bring game mechanics to the classroom offering the positive attributes of game thinking, which can lead to deeper learning and improved problem solving (Boctor, 2013; Eseryel, Law, Ifenthaler, Ge, & Miller, 2014; Granic, Lobel, Rutger, & Engles, 2014; Whitton, 2012; Whitton & Moseley, 2014). Games that are well designed and pedagogically sound can support, deliver, and assess learning due to the salient features of gameplay (Nadolny & Halabi, 2016; Whitton; Whitton & Moseley, 2014).

Many research studies, both qualitative and quantitative, have examined the positive attributes of gaming as a progressive teaching pedagogy. Although mentioned in the literature, there is a lack of current research that discusses the specific gamfication attributes of badging in nursing education as a motivator to encourage engagement in course content (Landers, 2014; Landers & Landers 2014; Wilson et al., 2009). The purpose of this study was to examine the use of badges in motivating nursing students to engage in non-graded coursework.

Chapter 5 presents a summary of the research findings, in addition to an analysis of the results as they relate to the theoretical framework and the current literature. Additionally,

limitations of the study and implications for the results in nursing education are discussed. Recommendations for future research in the use of gamification attributions are also presented.

Summary of the Results

A gap exists within the knowledge regarding which specific gaming attributions motivate students to become engaged in either the gamification of a course or the game itself. Therefore, the researchable problem becomes designing and examining strategies, such as badges, to increase engagement in course content. This study used a quasi-experimental A-B single group design to measure the behavior before an intervention and during an intervention.

Teaching techniques currently being used are not connecting the threads of didactic content and clinical application leaving a significant gap in nursing education (Benner, Sutphen, Leonard, & Day, 2011; Crookes, Crookes, & Walsh, 2013). Active pedagogies such as simulation and clinical experiences have been shown to promote deeper learning, but are not enough to ensure clinical judgment (Lasater, 2007; Waznonis, 2014). New teaching pedagogies must be discovered to help students be more successful (Blakely, Skirton, Cooper, Allum, & Nelmes, 2010).

Students today are motivated to learn differently than previous generations and are accustomed to a highly technological world (Baid & Lambert, 2010). Teacher-centered methods such as PowerPoints and lectures are no longer successful teaching strategies (Boctor, 2013; Nowak, Speakman, & Sayers, 2016). The interactivity of gameplay is directly related to complex problem solving (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014; Granic, Lobel, Rutger, & Engles, 2014; Whitton, 2012; Whitton & Moseley, 2014). Well-designed gamification that is pedagogically sound can support, deliver, and assess learning due to the salient features of gameplay (Nadolny & Halabi, 2016; Whitton, 2012; Whitton & Moseley, 2014).

There were two questions asked in this study:

Research question 1. Is there a statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded?

H_1: There is statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the average scores of non-graded course activities for nursing students when the game attribution badges are awarded as compared to their average scores when the game attribution badges are not awarded.

Research question 2. Is there a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded?

H_1: There is a statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

H_o: There is no statistically significant increase in the number of non-graded course activities completed when the game attribution badges are awarded to nursing students as compared to the number of non-graded course activities when the game attribution badges are not awarded.

The results of this study show that the average scores for case studies did not increase when using badges as rewards. However, nursing students did complete more case studies in the course using badges as a reward. This study becomes significant in that it demonstrates a way to motivate students to become engaged in non-graded coursework. However, what makes the study more significant is the potential for badging to help nursing students foster their belief in self. It is a belief in self that regulates motivation, and motivation that determines persistence. Badging has the potential to improve self-efficacy through goal attainment. Those who have a strong self-efficacy will work harder and increase their effort when they fail. Some nursing students showed they have self-efficacy in their persistence to obtain a badge by completing multiple case studies despite not receiving a badge for each one. It is self-efficacy that enhances analytical thinking and performance through an individual's belief in themselves, their level of engagement, and improved learning (Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012; Landers, 2014; Phillips, Hortsman, Vye, & Bransford, 2014).

Discussion of the Results

The aim of the study was to gain knowledge to fill a gap that exists regarding which specific gaming attributions motivate nursing students to become more engaged in non-graded course activities. The research in this study used a quasi-experimental A-B single group design. A convenience sample of 25 nursing students in their second year of a three-year accelerated baccalaureate program located in the southwest, were drawn from the Complex Adult Health course. The study continued with the same participants in the Mental Health course taken directly following Complex Adult Health. In using an A-B single group design, the students became their own control group.

During the Complex Adult Health course, students could engage in case studies if they desired, but no badges or rewards were offered to complete the case studies. Case studies were not required, with no specific guidelines as to how often case study quizzes could be taken to achieve the desired score. Achieved scores were collected using the Health Education Systems Incorporated (HESI) standardized case studies as an instrument in both courses. The HESI Case Studies included a posttest after reading the case study. Scores from the posttest were collected from the same students in both Complex Adult Health and Mental Health courses. In addition, the number of case studies completed was collected from the Complex Adult Health and Mental Health courses. Students received badges as rewards for completing case studies with a score of 85% or higher in the Mental Health course. No case studies were required; however, students were required to achieve an 85% on the first attempt of the quiz to obtain a badge as a reward. The data collected was analyzed using a dependent paired sample one-tailed *t*-test.

The null hypothesis of Research Question 1 was retained despite the average scores of case studies in Complex Adult health being higher than the average scores of case studies in Mental Health. Two students who completed case studies received 100% as a score for each completed case study after taking the quiz a second time. When a quiz is submitted, the student receives a score, the correct answer to each question, and a rationale for each correct answer. The findings suggest that students remediated upon receiving their first score. Only two students completed case studies in Complex Adult Health, receiving 100% for each quiz after reviewing feedback and rationales and taking the quiz a second time.

Conversely, the alternate hypothesis for Research Question 2 was supported with a higher number of case studies completed in Mental Health than in Complex Adult Health. The findings suggest that nursing students were motivated to engage in more case studies to receive digital

badges as rewards. Students did not receive a score of 85% for each case study completed. However, nursing students who did not achieve an 85% on a case study were motivated to continue doing case studies and achieved higher scores on some of the remaining case studies. Digital badges were earned by several students completing more than one case study, but not by all students who completed case studies. Despite the scores less than 85%, students persisted in completing case studies to achieve a badge. It is the persistence that shows their self-efficacy that will lead to deeper learning and improved problem-solving skills.

Conclusions Based on the Results

Faculty find it challenging to motivate students in becoming more engaged in non-graded course content (Boctor, 2013), students want content delivered in a way that is motivating thought provoking, and memorable (Crookes, Crookes, & Walsh, 2013). It has become necessary to find innovative strategies, active learning pedagogies, and experiential learning to motivate students to become engaged in course content and enhance learning opportunities (Baird & Lambert; Benner, Sutphen, Leonard, & Day, 2010; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Bristol, 2014; Boctor, 2013; Ironside, 2005; Lasater, 2014; McLaughlin et al., 2013, Schwartz, 2014). Lynch-Sauer et al. (2011) found that nursing students had positive perception about playing games in nursing education.

The results of the current study show a positive connection with the existing research on gamification in education. The main purpose of using gamification attributes is to motivate students to become engaged (Abramovich, Schunn, & Higashi, 2013; Cheong, Filippou, & Cheong, 2014; Pirker, Riffnaller-Schiefer & Gütl, 2014). Gamification creates an interactive strategy in the process of learning, and has been shown to motivate students (Baid & Lambert, 2010; Banfield & Wilkerson, 2014; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Crookes,

Crookes, & Walsh, 2013; Boctor; Landers, 2014; Landers & Landers, 2014; Whitton, 2011) and can positively shape the behavior of students (Dicheva, Dichev, Agre, & Angelova, 2015). The most common gamification attributions used in education were leaderboards and badges (Dicheva, Dichev, Agre, & Angelova, 2015). The upcoming paragraphs will include information on the relationship between the theoretical framework and the results, as well as the literature review and the results. In addition, an interpretation of the findings will be included.

Relationship between the Theoretical Framework and Results

Maslow's (1943) theory of motivation contained five levels of human needs, one of the higher-level needs is the esteem needs. Part of the esteem needs is the need for recognition, importance, and appreciation, and although this is not synonymous with behavior theory, behavior can be motivated depending on the situation (Maslow, 1943). The esteem needs are met through self-confidence, self-worth, and feeling capable (Maslow, 1943). The concepts of building self-confidence apply to gamification. Badges provide a social aspect to the classroom, which allows students to share their accomplishments (Brull & Finlayson, 2016). In sharing their accomplishments, students can compare themselves to peers in a way that is not possible with course grades. Badging, as a gamification element, allows students to be socially competitive comparing their performance to each other. Displaying digital badges in a gaming platform allows students to display their achievements to peers (Abramovich, Schunn & Higashi, 2013). Esteem needs can be satisfied by the displaying of achieved badges, which allows a person to feel self-confidence, self-worth, a strength of character, and capable. Moreover, a student obtains a level of self-efficacy by achieving goals, which nurtures analytical thinking and enhances performance (Bandura, 1991).

Relationship between the Literature and Results

This research study is one of the first to examine the gaming attribution badges as motivation for nursing students to engage in non-graded course work. Previous studies focused on games used within the classroom as active learning strategies, showing nursing students enjoyed the competitive nature of games, were a way to inject humor into the curriculum, and showed a positive effect for the reinforcement of knowledge (Boctor, 2013; Blakely, Skirton, Cooper, Allum, & Nelmes, 2010; Lynch-Sauer et al., 2011). Also, addressed in the literature was a game promoting active learning for staff development of home health nurses. The results showed participants felt the game was an effective learning tool (Popil & Dillard-Thompson, 2015).

Although there is a large amount of literature that speaks to the benefits of using gaming as a teaching and learning strategy, previous studies examining the use of gamification attributes are limited. One such study examined the use of a leaderboard as a gamification attribute. Landers and Landers (2014) found students spent a greater amount on a semester-long assignment in the course with a leaderboard. Students started the assignment earlier in the semester and finished components throughout the semester to gain points and find a place on the classroom leaderboard. Results showed students who placed on the leaderboard spent significantly more time on the assignment than those students not listed on the leaderboard (Landers & Landers, 2014).

Interpretation of the Findings

Causal attributions can influence the belief of self-efficacy influencing motivation, continued engagement, and performance (Bandura, 1991). Belief in self is what guides the actions of forethought, which brings about planning, participated outcomes and then action

(Bandura, 1991). It is the belief that a goal, such as a badge, can be achieved that regulates motivation. When a student believes, they can achieve a goal, or in this case a badge, that belief contributes to the energy spent, the amount of time spent, persistence when there are complications, and their reaction to failure when they do not achieve the goal. Students who have a strong self-efficacy will work harder to achieve a goal increasing their efforts when they are not successful. The results of this study demonstrated that nursing students completed an increased number of case studies in the course that offered badges as rewards. Although not a part of this study, it was noted that students improved some of their scores on the case study quizzes as they continued to work for badges.

Landers and Landers (2014) used a leaderboard to demonstrate the use of gamification for motivation. The use of a leaderboard allows for one person to be in first place, and although leaderboards may be more competitive, it becomes a summative assessment rather than a formative assessment. Progression is not as easily seen for each student when using a leaderboard. The advantage of badging, over the use of a leaderboard, is students can choose their goals and have an opportunity to reach several goals. The results of this study demonstrated that students will attempt to gain more than one badge. There were several students who did achieve multiple badges during the course, adding several goals achieved during the session.

Gamification attributes such as badging offer students a way to achieve goals and assess their performance (Abramovich, Schunn, & Higashi, 2013; Dicheva, Dichev, Agre & Angelova, 2015). Results of the analyzed data from this study demonstrated a significant difference in the amount of non-graded coursework that nursing students were motivated to complete. Although the average scores of the non-graded coursework were higher in the course without badging,

students achieved those higher scores by completing the quiz more than once. These findings provide faculty data to assist in creating an innovative strategy to motivate nursing students to become more engaged in study resources.

Limitations

The results of the study contained in this document may have been influenced by several factors. Students who did not complete any HESI Case Studies may have achieved higher scores in the course than those students who did complete HESI Case Studies; grades were not a part of the study. In addition, students who remediated after taking the first quiz may have higher course grades than those students who did not remediate after taking the first quiz. Moreover, the amount of time students spent on the case studies and in remediation was not a part of this study.

There are several possible limitations with the use of a quasi-experimental research design. The first potential limitation is the risk of human error in collecting, entering, or analyzing the data. A second potential limitation is the small sample size. The population was of an appropriate size; however, the sample size (*n=25)* was smaller than the 28 participants recommended when calculating the sample size. Effect size was calculated using Cohens formula $ES = \frac{Mean\ Phase\ B - Mean\ Phase\ A}{SD\ Gain}$ resulting in a *d* of 0.8 supporting the sample size of n=25 and the rejection of the null hypothesis for Research Question 2. As all participants were volunteers from one small southwest campus of a national college of nursing, the results may not be generalizable.

There are limitations to note when using an A-B design. With the study ending in Phase B, it is not possible to know if the behavior noted from the intervention would continue in the next phase. Adding another Phase A and Phase B would offer a more definitive result. In

addition, with only two phases, it is difficult to allow for alternative reasons that could be responsible for the change in behavior.

Implications for Nursing Education

The results of this study provide educators and researchers an awareness of gamification as an interactive teaching and learning strategy to engage nursing students in course content. The study also adds additional knowledge to the growing body of quantitative research surrounding the use of gaming in nursing education. As nursing faculty continues to look for ways to make their classrooms more engaging and student-centered, the study findings encourage the use of gamification attributes, such as badging, to help students engage more actively in theoretical content. As technology savvy Millennials fill the classrooms, this study promotes the use of gamification as a way to actively engage students in course content.

Recommendations for Further Research

Nursing education must find a sense of balance between didactic content and the application of that content to obtain mastery. Teaching techniques currently being used are not bridging the significant gap between theoretical content and the practical application of that content (Crookes, Crookes, & Walsh, 2013). Gamification and the use of badges allow students to achieve goals throughout the course and become active in their learning. The results of this study provide a suggested approach to help keep nursing students engaged in course content by applying gamification concepts, such as badges, to coursework.

Quantitative research added to the genre of gamification course content is important in changing teacher centered pedagogies to student-centered pedagogies in nursing education. Continued research into the benefits of gamified classrooms will assist nursing faculty in understanding the impact gamification has on motivation, engagement, deeper learning and

higher-order thinking. The sample size contained in this study was small, replicating the study with a larger sample size would be beneficial. Study findings suggest that nursing students were more engaged in course content; however, it is unclear if the increased engagement improved knowledge or retention of that knowledge. It is recommended that further research includes summative data on test scores and time spent on activities with the use of badges as rewards. Moreover, it is recommended that a mixed method or qualitative design be used to gain the perspective of nursing students in relation to badging.

Conclusion

The purpose of this quasi-experimental A-B single group design study was to examine the use of badges to motivate nursing students in becoming more engaged in non-graded coursework. The data collection plan included an examination of the average scores achieved on standardized case studies and the average number of case studies completed by the same nursing students in two consecutive courses. Quantitative data was collected from nursing students in their second year of a three-year accelerated baccalaureate program located in the southwest.

Nursing faculty must use new ways to engage nursing students and improve education outcomes. The use of active learning strategies such as gamification is one way to increase motivation for students to be more actively engaged in course content. This study provides quantifiable data that is needed to discover how gamification can be used with nursing curricula as a tool to engage nursing students. The findings demonstrated a statistically significant difference in the engagement of nursing students in non-graded course resources during the second course, as opposed to the engagement of nursing students in non-graded course resources during the first course. These findings are important as faculty are beginning to use gamification strategies in the classroom with minimal current research as a foundation for their use. Although

the sample size in this study was small, a replication of the study with a larger sample size would be beneficial in assessing the findings of this study.

Study results suggested that nursing students were motivated to be engaged in non-graded course work when using badges as rewards. Continued research in the use of the gamification attributions such as badges as active teaching and learning strategies is recommended to assist faculty with innovative ways to motivate their students to be more engaged in non-graded course components. Additional research examining the effect of gamification on knowledge retention and course outcomes is also recommended.

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STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University's Academic Honesty Policy (3.01.01) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person's ideas or works.

The following standards for original work and definition of *plagiarism* are discussed in the Policy:

> Learners are expected to be the sole authors of their work and to acknowledge the authorship of others' work through proper citation and reference. Use of another person's ideas, including another learner's, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)
>
> Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else's ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University's Research Misconduct Policy (3.03.06) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

> Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.

APPENDIX A.

Statement of Original Work and Signature

I have read, understood, and abided by Capella University's Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA *Publication Manual*.

Learner name and date: Sharon Carol Moritz

December 6, 2016