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Improving Student Engagement in Nursing Education through Game-Based Learning

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Abstract
Educators have identified that engaging nursing students in their education increase retention rates in nursing education programs. As a pedagogical tool, using game-based learning activities allowed educators to create student-centered active learning opportunities to increase the engagement of the nursing student. The problem was that the effect of adding game-based learning to traditional lectures on student engagement behaviors in undergraduate nursing classes was unknown. The purpose of this mixed-methods study was to examine how adding game-based learning to traditional lectures affected student engagement behaviors in undergraduate nursing classes. The theoretical framework was based on the theory of Constructivism, which is the concept that students are lifelong learners who prefer to take an active role in their education. The research questions for this study explored the relationship and effect of adding game-based learning activities to traditional teaching methods and an improved student engagement level in nursing students. A Pearson Correlation Coefficient test was performed to monitor the correlation between the addition of game-based learning and improved student engagement for the quantitative section of this study. For the qualitative portion, in-person interviews were conducted with the participants, and a codebook was created to identify themes for final analysis. A convenience sample was used to recruit participants in a Bachelor of Nursing undergraduate entry level nursing course, resulting in 47 out of 72 students agreeing to participate. Quantitative findings from the study revealed that there was a minimal correlation between adding game-based learning activities to traditional teaching methods and improved engagement in nursing students. The qualitative analysis discovered that students preferred game-based activities. The participants found that the combination of both game-based activities and traditional teaching methods increased their enjoyment of the course and improved their engagement. The quantitative analysis did not find a strong relationship between adding game-based learning activities and increased student engagement. The findings suggested that student engagement in nursing education improved when game-based learning was combined with traditional teaching methods. This finding can potentially improve nursing education by providing educators with another pedagogical method to create a more active learning environment for nursing students to improve their engagement.
Keywords: Nurse education, game-based learning, student engagement, engagement.
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1. Introduction

The goal of college-level nursing education programs is to graduate competent and educationally prepared nurses to become part of the healthcare team in their communities (Denham et al., 2018). Nurse educators are responsible for successfully facilitating the acquisition of knowledge and skills needed for nursing students to eventually become competent nurses (Denham et al., 2018). Unfortunately, it is not always easy for nurse educators to fulfil that obligation. Nursing students face challenges and stressors that make it difficult to succeed in nursing classes. Work requirements and familial obligations add stress and anxiety to sometimes already high academic rigors (Denham et al., 2018). Educational stressors include didactic assignments, clinical assignments,

patient care responsibilities, and retention of large amounts of nursing content (Shdaifat et al., 2018). When stressors become overwhelming, keeping the learners engaged can be challenging (Castro et al., 2019).

Improving student engagement and outcomes in nursing education programs at universities across the United States is an ongoing challenge (Malicki et al., 2020; McMillan et al., 2020; Reed, 2020). Universities encourage nursing educators to create a successful continuum of intentional learning when students lack engagement and motivation (Reed, 2020). Nursing instructors are attempting to identify techniques that can be utilized in their classrooms to improve the engagement of their students (Malicki et al., 2020). In educational environments where didactic instruction is used, the integration of game-based learning allows the instructor more opportunities to facilitate experiences that help engage the student (Sykes, 2017). Examining the effect of game-based education on nursing students' engagement may increase educators' use of this learning strategy in nursing education.

Instructors in nursing education find that adding game-based learning to their traditional teaching methods increases nursing students' critical thinking and student engagement (Castro et al., 2019). Using pedagogical methods such as didactic lectures and PowerPoints alone distracts students from the material (Malicki et al., 2020). It is proposed that this distraction occurs due to a lack of active involvement in the learning process (Malicki et al., 2020). Adding game-based learning to traditional pedagogical techniques can create an enjoyable and interactive learning environment, keeping the students' attention while increasing their engagement through active learning (Arif et al., 2019).

Game-based learning is quickly being identified as a way for instructors in higher education to increase student engagement in the classroom (Adamson et al., 2021; Wang et al., 2018; Zirawaga et al., 2017). Although data exists to show the benefits of game-based learning in higher education, there is little evidence of its use in nursing education (Malicki et al., 2020). Game-based learning is an instructional concept that enhances student learning by introducing course content in a game format (Barber, 2021). The introduction of game-based technology may improve the participation of students, their knowledge comprehension, and problem-solving skills, as well as their ability to apply concepts and principles (Arif et al., 2019; Castro et al., 2019). With increased student participation and engagement, instructors may also see increased motivation, communication, critical thinking, and course outcomes (Ashtari & Taylor, 2021; Castro et al., 2019). In educational environments where didactic instruction is used, the integration of game-based learning allows the instructor more opportunities to facilitate experiences that help engage the student (Sykes, 2017).

1.1 Background of the Study

For several decades, there has been increased interest in improving student engagement for learners in higher education (Zhoc et al., 2019). According to Chickering and Gamson (1991), student engagement improved when active learning was utilized in the classroom. Students may not reach their learning potential when listening to didactic lectures from teachers and memorizing content. The students may learn best when they can relate the content and activities to their daily lives (Chickering & Gamson, 1991). Over the past few decades, this interest in increasing student engagement has prompted more research in education in both areas (Zhoc et al., 2019).

The exclusive use of traditional teaching pedagogies, such as didactic lectures to deliver course content, may sometimes make students disengaged and disinterested (Chickering & Gamson, 1991). Research indicates that students become disengaged due to a lack of active participation in acquiring knowledge (Ashtari & Taylor, 2021; Malicki et al., 2020). Kuh et al. (2008) addressed that improved student engagement is influenced by activities that include the student being an active learner. Therefore, instructors seek educational approaches that increase student engagement and involve active participation from the learner (Gallegos et al., 2017). Educators are discovering that game-based learning can captivate the students' attention, creating an engaging situation (Arif et al., 2019; Castro et al., 2019). Using game-based learning allows the educator to diversify the routine lectures and introduce periods of enjoyment and active learning into the course (Castro et al., 2019; Tesema et al., 2020).

Tesema et al. (2020) stated that many higher education facilities do not adequately meet the expectations of students in the 21st century. Researchers investigating the field of student engagement have discovered that students in higher education anticipate using technology in their classrooms and disengage when it is not utilized (Ashtari & Taylor, 2021). Educators have found that by introducing game-based learning into the classroom, they increase the educational tools available to help improve student knowledge (Arif et al., 2019; Dichev & Dicheva, 2017).

Available evidence in the literature discusses the benefit of using game-based learning in higher education. However, there is very little information on the benefit of game-based knowledge to nursing education programs (Malicki et al., 2020). There is also minimal research on the benefit of game-based learning in higher education and science-based classes (Gallegos et al., 2017). However, a review of research results indicates that game-based learning can increase students' motivation and engagement, which may help bridge this disconnect in nursing education (Castro et al., 2019; Gallegos et al., 2017).

Student Engagement in Nursing

Nursing education is not an easy path to choose. A nursing program is fast paced, loaded with content, and includes theory classes and clinical rotations. Nursing education can cause high anxiety and stress among nursing students (Dawood et al., 2016). This stress and anxiety have been seen to alter the students' ability to focus and concentrate while advancing through their nursing classes (Dawood et al., 2016). There is evidence that high levels of stress and anxiety can lead to academic burnout in nursing students (Iorga et al., 2017). Understanding this concept has increased nursing education programs' desire to examine their efforts to improve student engagement in nursing education (Betts et al., 2017). Nursing programs have identified that improving student engagement can increase the students' academic progression, satisfaction, and overall graduation rates (Waldrop et al., 2019). In an age with such an intense nursing shortage, ensuring retention rates among nursing students is more important than ever (Bumby, 2020). Identifying the student's risk of anxiety and stress can help the educator intervene with educational activities such as game-based learning that can help lower stress levels and increase student engagement.

Nursing education has always been science-based, detail-oriented, and not conducive to collaborative learning. According to Docherty et al. (2018), nursing students demonstrate lower engagement in educational settings than other students in higher education due to increased amounts of information being delivered to students, not allowing much time for socialization. They also relate that nursing students feel academically challenged but do not see themselves engaged in student-centered pedagogies (Docherty et al., 2018). Docherty et al. (2018) showed evidence that the students involved in their study felt their lack of engagement related to a lack of collaborative learning. Students and educators face challenges when student engagement in collaborative learning is lacking. Educators who acknowledge a lack of collaborative experiences and attempt to increase teamwork or game-based learning find that their students exhibit more engagement in their course and see improved student outcomes.

Increasing engagement in nursing students must be a collaborative process between the nursing educators and the nursing students. Nursing students must exhibit behaviors showing they are actively engaged in their education (Bumby, 2020; Denham et al., 2018). However, the responsibility for this engagement cannot be placed exclusively on the nursing student. To improve student engagement in nursing education, teachers need to work towards improving engagement by increasing the integration of newer, more innovative teaching methods (Bumby, 2020; Castro et al., 2019; Gallegos et al., 2017; Tesema et al., 2020). Nursing education can be detailed oriented and inundated with specificity to science concepts (Denham et al., 2018). Introducing innovative teaching methods into nursing education has increased active learning potential while improving student engagement and retention (Gallegos et al., 2017). There is evidence that with the extreme seriousness of topics and knowledge in nursing education, students could benefit from enjoyable learning experiences to help engage the student and minimize their anxiety (Ignacio & Chen, 2020). Using game-based learning in addition to traditional pedagogical practices can create an enjoyable learning experience while increasing collaboration among the students and the educator.

Game-based Learning

Game-based learning has been utilized in education for decades; however, it has recently become more prominently researched as a potential pedagogical technique. Game-based learning is an instructional concept that enhances student learning by introducing course content in a game format (Barber, 2021). It is an innovative way for educators to increase student engagement while creating a goal-oriented experience (Atwood-Blaine & Huffman, 2017). Game-based learning differs from 'playing,' which is not rule based and free form (Asiri, 2019). Instead, game-based learning is goal-oriented, and rule based (Asiri, 2019). Over the last decade, higher education has seen increased use of game-based learning to improve student knowledge acquisition (Barber, 2021). Several factors have increased the popularity of game-based learning in higher education (Alexander, 2019). Alexander (2019) believes this popularity is related to the ever-growing use of gaming in society today, educators seeking more information on gaming as a possible teaching technique, and students in higher education utilizing computer games almost daily. With this increased use and interest, many educators are exploring effectively incorporating this technique into their teaching.

The use of game-based learning can potentially encourage communication and teamwork among students. Game-based learning focuses on elements such as collaborative learning, friendly competition, and enjoyment in learning (Wright, 2018). Teaching through game-based learning can enhance peer-to-peer discussions that are usually not experienced through traditional learning strategies (Adamson et al., 2021). Using game-based learning can increase peer communication and encourage team collaboration when striving to succeed in the game (Adamson et al., 2021; Arif et al., 2019; Barber, 2021). The acquisition of these skill sets is an integral part of nursing education.

Students in higher education seek opportunities to become active learners in their coursework. Game-based learning increases student knowledge retention by capitalizing on their desire to be in charge of their knowledge acquisition through active learning (Adamson et al., 2021). Alexiou and Schippers (2018) found that game-based

learning gives students a sense of control by allowing them to use different strategies to control their play and make their own decisions that influence the outcome of their portion of the game while still gaining knowledge. Game-based learning combines pedagogy with gaming technology, thus increasing the student's knowledge of the course content, and eventually improving student engagement (Alexiou & Schippers, 2018). Game-based learning has been found to increase the students' quality of work because of the student's desire to be successful in gaming activities (Atwood-Blaine & Huffman, 2017). The use of gaming in the classroom allows adult students to be more motivated and excited to learn because they are actively in control of their learning and are actively involved in problem solving (Alexiou & Schippers, 2018). When allowing students to become actively engaged in their learning experiences, the educator has created a positive learning environment for them to continue growing.

1.1.1 *Purpose of the Study and Research Questions*

The purpose of this mixed-methods study was to examine the effect of adding game-based learning to traditional lectures on student engagement behaviors in undergraduate nursing classes. Heidi Mennenga's (2009) quantitative instrument, The Team-Based Learning Student Assessment Instrument, was used to gather quantitative data. The instrument was sent to the study participants via Qualtrics. The assessment instrument used Likert-scale questions related to student engagement (Mennenga, 2009) to gather quantitative data from students in face-to-face undergraduate nursing classes where game-based learning was used in addition to traditional pedagogical instructional methods. The following research questions guided this mixed methods study:

RQ1 (Quantitative): *What is the difference in student engagement behaviors when game-based learning is added to traditional lectures in undergraduate nursing classes?*

RQ2 (Qualitative): What are the perceptions of undergraduate nursing students about their engagement behaviors when game-based learning is added to traditional lectures and PowerPoints for content delivery?

Hypotheses

H_1: Introducing game-based learning and traditional lectures improved student engagement in nursing students.

2. Methodology and Sample

Interviews with the students were used to collect qualitative data to expand understanding of student engagement behaviors and perceptions when game-based learning was used in nursing classrooms. Students were invited to participate in the interviews face to face. In interviews, the predetermined questions may lead to greater student dialogue, to gain deeper perspectives. A cohort of 72 undergraduate nursing students in the first semester of their nursing classes was used for the population in the study. A sample size of 47 participants was needed for this study. These students attend a face-to-face, accredited Bachelor of Science in Nursing (BSN) program in the western region of the United States. Gathering data on the effect of game-based learning on student engagement may influence nursing educators to utilize this teaching method in their courses and improve student success rates.

3. Data Analysis and Results

The qualitative data collection was scheduled face-to-face interviews between the student researcher and individual participants. The quantitative data were collected via the Qualtrics survey over seven days, giving the participants ample time to complete it. The instrument used for this study was the revised Game-Based Learning Student Assessment Instrument (GBLSAI) (Appendix E). Mennenga (2009) created the original Team-Based Learning Student Assessment Instrument (TBLSAI) instrument. This instrument measured student engagement when a team-based learning method was introduced in addition to the traditional teaching methods generally used in a higher education classroom (Mennenga, 2009). The original instrument had 45 items and was created because Mennenga (2009) could not find an instrument that effectively measured team-based learning and student satisfaction. Four team-based learning experts confirmed the instrument's validity (Mennenga, 2009). However, after reviewing the instrument, the expert panel suggested that seven items be removed and an additional item be included (Mennenga, 2009). After considering the suggestions, Mennenga (2009) changed the instrument to 39 items. After the changes, when reviewed by the expert panel, the instrument showed a scale content validity of .89.

Research Question One

RQ 1: What is the difference in student engagement behaviors when game-based learning is added to traditional lectures in undergraduate nursing classes?

H_1: Introducing game-based learning and traditional lectures will improve student engagement in nursing students.

The first research question addresses if there is any difference in undergraduate nursing students'

engagement behaviors when game-based learning activities are used in addition to traditional lectures. There was limited literary evidence of the connection between improved student engagement and game-based learning directly pertaining to undergraduate nursing students. Esterhazy and Damsa (2017) found that game-based learning could increase the variety in student acquisition of knowledge, increasing their motivation to learn. This motivation can be seen as a precursor to improved student engagement, yet even this information did not directly address whether using game-based learning and lectures in nursing education will improve the students' engagement.

Qualitative analysis was completed by using a Pearson Correlation Coefficient. The analysis of the data resulted in identifying a minimal correlation between improved student engagement and game-based learning. Although this result is only a minimal correlation, it supports the hypothesis that game-based learning improves student engagement. Therefore, the hypothesis was accepted.

Research Question Two

> **RQ2**: What are the perceptions of undergraduate nursing students about their engagement behaviors when game-based learning is added to traditional lectures and PowerPoints for content delivery?
>
> **H_1**: Introducing game-based learning and traditional lectures will improve student engagement in nursing students.

The second research question addresses the perceptions of the participants when game-based learning is added to their traditional lectures or PowerPoints for the delivery of content. The literature suggests that student engagement can be influenced by the instructors' teaching practices (Millea et al., 2018; Tani et al., 2021). Increasing student engagement can also enhance their motivation, confidence, and learning ability (Castro et al., 2019). Frantz et al. (2017) published research showing that when the instructor's pedagogical techniques engage nursing students, it improves their confidence and social skills, which are important traits in nursing careers. Using game-based learning is an innovative way for instructors to increase student engagement while creating a goal-oriented experience (Atwood-Blaine & Huffman, 2017).

Quantitative analysis was conducted by creating a codebook of the statements received during the face-to-face interviews. Through an inductive approach, themes began to present themselves related to game-based learning being fun, engaging, and an active learning technique. After an extensive and exhaustive review of the data transcription, the theme of passive learning continued to emerge related to traditional teaching methods such as lectures in the classroom. The participants' information proved they are partial to using gaming in the classroom. The participant responses also confirmed a connection between the combined use of game-based learning activities with traditional teaching methods to create an engaging way to deliver content. These perceptions prove the hypothesis that introducing game-based learning and traditional lectures will improve student engagement of nursing students. Therefore, with the content received from the participants, the hypothesis was accepted.

Although the quantitative analysis proved a minimal correlation between game-based learning and improved student engagement in undergraduate nursing students, a correlation was seen. The qualitative analysis provided a stronger relationship between the variables from the students' perspectives. These findings provide a positive perspective for educators to consider including game-based learning activities in their classroom experience to improve the engagement of their nursing students. Using game-based learning as a pedagogical technique allows the student to actively participate in their learning, which increases their engagement, judgment, and motivation, and initiates higher levels of thinking and learning (Ignacio & Chen, 2020).

4. Conclusions

This mixed-methods study explored the correlation between adding game-based learning to traditional teaching methods and increased student engagement in nursing education. This study was guided by the framework of Constructivism and suggested that students are lifelong learners who prefer active learning to passive learning with a motivation to be in control of their learning process (Fernando & Marikar, 2017). This study found a minimal statistical correlation between the variables of game-based learning and improved student engagement. Although there was only a minimal statistical correlation between the quantitative results, the qualitative analysis revealed that most students prefer traditional teaching methods and game-based learning. The student participants in this study validated the need for traditional teaching methods and endorsed the concept of active learning activities such as game-based learning methods. The findings of this study have strong significance for nursing educators seeking to improve their students' engagement by introducing different teaching methods. Further evaluation of the barriers that impact nursing students' lack of student engagement is recommended.

This study attempted to fill a gap in the literature related to the use of game-based learning in nursing education by obtaining the perspective of nursing students. The study contributes to the small amount of available literature by showing a positive correlation between the use of game-based learning activities in addition to traditional teaching methods and the improvement of student engagement. The initial study compared

the variables of game-based learning and student engagement in nursing education, and future research can expand the exploration of the concept that there is a correlation and potentially why that correlation exists and what could make it stronger.

Additional research can use the concept that student engagement can be improved by adding innovative pedagogical methods to nursing education. Future studies could build on the idea by investigating other innovative ideas and seeing which, if any, result in a positive correlation to improved student engagement. The theoretical framework of Constructivism is based on the concept of active learning. This framework can also be used in future research as long as the concept behind the innovative idea is built around active learning.

There are also research opportunities that can build directly off this study's research data. Future researchers could explore the academic success of students that have been exposed to game-based learning activities as well as traditional teaching methods. This study has proven the correlation between improved student engagement when game-based learning is used with traditional teaching methods; however, there is a large gap in current literature showing any correlation between improved student academic outcomes in nursing education when game-based learning activities are combined with traditional teaching methods. A research study seeking data for academic success could also follow a student's journey and show the results for academic achievement, program completion, and success.

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