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Gamification: Game-based Learning / Serious Games and 21st Century Soft Skill Development in Nursing Education

Stephanie Marie Adams

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Gamification: Game-based Learning / Serious Games and 21st Century Soft Skill Development in Nursing Education

by
Stephanie Marie Adams

A Dissertation
Submitted in partial Fulfillment of the Requirements for
The Degree of Doctor of Education
In Curriculum and Leadership Higher Education Administration

Keywords: Gamification, Game-Based Learning, Serious Games, Nursing Education, 21st Century Skills

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Dedication

To my son Jackson, I dedicate this work to you as you have been the inspiration through it all. With your kind heart and warm spirit, you've held my hand along the way. You are the most precious person in my life, and my love for your is immeasurable. Thank you for being my biggest cheerleader, and thank you for believing in me.

To my parents, I dedicate this work to you for your unconditional love and support. You have been my rock and foundation, and I am proud to be your daughter. Thank you for keeping me grounded and focused and for never doubting this goal would be achieved.

To my sisters, I dedicate this work to you for your patience and encouragement. You have been the lighthouse beacon that I needed to stay the course and know the shore could be reached. Thank you for reminding me everyday that "if it were easy, everybody would do it."

And lastly, to my friends, I dedicate this work to you for your unwavering support. To have friends that are family is a rare and precious gift. Thank you.

Acknowledgements

The journey of completing this doctoral has been challenging, inspiring, exhausting, and can often times feel endless. Many people have helped me on this journey, and I would like to acknowledge those who have provided support and guidance along the way. First, I would like to recognize my dissertation chair, Dr. Robert Waller. Thank you for always encouraging me and for pushing me to challenge myself and achieve this amazing goal. I am forever grateful. To Dr. Sri Sitharaman, thank you for encouraging and guiding me through this process to create a study that went beyond what I could have ever hoped for. To Dr. Aaron (Chip) Reese, you were my first professor in this program, and through that course I gained an appreciation for academic writing that is as strong today as it was those years ago. Thank you, Dr. Reese, for lighting the spark that lead me to this achievement.

Thank you to my colleagues and friends at Columbus State University for the support and encouragement that was and continues to be treasured.

And lastly, thank you to my family and friends without whom I could not have achieved this goal. Your unconditional love and support are felt every day, and I am blessed beyond measure for each and every one of you.

STEPHANIE MARIE ADAMS

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EDUCATION

Texas Tech University
Master of Arts, Communication Studies **2002**
Thesis: "An Investigation on how sex and race influence interpretation of facial expressions"

Columbus State University
Bachelor of Arts, Communication **2000**

TEACHING EXPERIENCE

University System of Georgia
eCore Instructor, Communication **2015 - Present**
Part-time instructor of Public Speaking. This 100% online course is part of the USG eCore program. Students enroll in online courses that are open to all USG institutions.

Columbus State University
Part-Time Professor, Communication Department **2004 - Present**
Developed syllabus, course structure, and administered all grades for COMM 1110 (Public Speaking) for traditional classroom and online instruction.
Committee member for Exit Panels for graduating seniors.

Adjunct Instructor, Office of Basic Studies **2005 - 2018**
Developed syllabus, course structure, and administered all grades for ITDS 2735 (Life and Career Planning)
Created a Freshman Learning Community for the School of Nursing to incorporate ITDS 2735.

Adjunct Instructor, Office of Basic Studies **2010 - 2012**
Developed syllabus, course structure, and administered all grades for FRYS 1105 (Freshman Learning Community).

Texas Tech University
Graduate Teaching Assistant, Communication Department **August 2000 –**
December 2011
Prepared and implemented lesson plans and tests for Public Speaking courses

RELATED EXPERIENCE

Columbus State University
Student Services Coordinator, School of Nursing; April 2019 – Present
- Manage student services and related operations to include processes for admission, retention, recruitment, advising, and registration for BSN and MSN/FNP programs.
- Create and maintain database of advising records for BSN and MSN/FNP students to include the establishment of paperless processes such as electronic advising records and distance advising.
- Analyze, collect and report data of RPG (Retention, Progression and Graduation) for all nursing degree programs.
- Maintain knowledge of current University System of GA rules regarding core curriculum and transfers
- Participate in active recruitment for the School of Nursing which may include participation in Visitation Day, attend off-campus recruitment activities, etc.
- Assist students with Enrollment Service processes to include admission to the university.
- Work collaboratively with university departments such as Admissions, Registrar, Bursar, Financial Aid, and CSU Advise.
- Increased efficiency in areas of advising procedure, student record keeping, communication to students, and general policy and procedures.
- Assist with policy development and implementation.
- Demonstrate and nurture cultural competence when working with students, staff and faculty in a diverse university environment.
- Implemented Google form process for advising and registration for the MSN/FNP program.
- Implemented Google form process for the BSN application and admission process.

Columbus State University
Director of PACE Office (Advising Center), School of Nursing; March 2012 – April 2019
- Created the first advising center for the School of Nursing to include implementation of advising standards and best practices.
- Increased efficiency in areas of advising procedure, student record keeping, communication to students, and general policy and procedures.
- Manage the operations and personnel.
- Managed aspects of data collection and reporting of data for all nursing degree programs.
- Coordinate and supervise the advisement of current pre-nursing and nursing students and the recruitment of prospective nursing students.
- Collaborate with Enrollment Services, Registrar's Office and other pertinent entities on campus to facilitate enrollment, registration, etc. for pre-nursing, nursing, RN-BSN, and MSN students.
- Advise pre-nursing and nursing students (pre-licensure, post-bac, ROTC, and RN-BSN)

- Create and maintain database of advising records for pre-nursing, RN-BSN and MSN students to include the establishment of paperless processes such as electronic advising records and distance advising.
- Analyze and trend data of RPG (Retention, Progression and Graduation) of all advising populations (pre-nursing, nursing, and RN-BSN)
- Assisted with policy development and implementation.
- Coordinate the selection of the incoming junior class each year which includes: assure that all admission requirements have been met for each student: GPA, A2 TEST, read and evaluate references, and develop letters of acceptance, letters of wait-list, and letters of non-acceptance for all applicants
- Participate in active recruitment for the School of Nursing which may include participation in Visitation Day, attend off-campus recruitment activities, etc.
- Maintain knowledge of current University System of GA rules regarding core curriculum and transfers
- Annually review each student record using ISIS and DER reports to determine student's progression toward graduation.

Columbus State University

Academic Advisor, Academic Center for Excellence (ACE); January 2010 – February 2012

- Managed student records for degree completion and graduation to include evaluation and implementation of necessary changes on Degree Evaluation Reports
- Coordinated and supervised degree progress for students majoring in Communication, Criminal Justice, Associates of General Studies, Associates of Criminal Justice, Undeclared, and students classified as Basic Studies
- Collaborated with Enrollment Service and the Registrar's Office in reviewing current and transfer student's transcripts for degree progress
- Advocated for advisees through established departmental partnerships with the Office of the Registrar, Admissions, Recruitment, and Financial Aid
- Programmed events for department that contributed to student awareness of CSU majors and programs offered by the Academic Center for Excellence
- Participated in campus advising workshops that focused on standards and best practices
- Provided outreach services to students at Fort Benning campus
- Monitored at risk students through MAP Works

Columbus State University

Student Development Specialist, Office of Student Life; July 2009 – December 2009

- Coordinated the CSU Leadership Certification Program in collaboration with the Cunningham Leadership Institute
- Managed the CSU Community of Organizations to include over 120 active student organizations
- Event coordination and management of all events for the Student Activities Council
- Assessment liaison for the Office of Student Life and Development

- Managed online calendar for Division of Student Affairs
- Coordinated, conceptualized and implemented the Parent Orientation program in conjunction with the student orientation program
- Contributed to policies and procedures of the Office of Student Life and Development
- Managed the website for the Student Activities Council and Student Organizations

Columbus State University

Assistant Director of Student Life and Development, Office of Student Life; June 2005 – July 2009

- Responsible for management of student organizations to include the development of new organizations
- Advised and supervised the Student Activities Council in programming signature events for the general student body for the Main campus and RiverPark campus
- Coordinated, conceptualized and implemented the Parent Orientation program in conjunction with the student orientation program
- Contributed to policies and procedures of the Office of Student Life and Development
- Managed the website for the Student Activities Council and Student Organizations
- Assessment liaison for Student Life and Development
- Assisted the Director of Student Life and Development

Columbus State University

Coordinator of Student Programming, Office of Student Life; June 2003 – June 2005

- Advised the Student Activities Council in coordinating student programming and event planning
- Prepared and managed the Student Activities Council's organizational budget
- Trained students on all procedures of finance to include purchase requests, petty cash, and contract approval
- Assisted the Director of Student Activities with Orientation and Greek life
- Greek Life responsibilities included assisting with Greek Council, Panhellenic, and the Interfraternity Council in regard to recruitment, risk management, and other general needs of the organizations

Texas Tech University

Graduate Teaching Assistant, Communication Department; August 2000 – December 2001

- Prepared and implemented lesson plans and tests for Public Speaking courses
- Motivated, coached, and developed student's Public Speaking skills, *Communication Consultant for TEA (Texas Education Agency)*
- Created database of corrections for Publishing Companies using Microsoft Access
- Ensured completion of material by set deadlines and coordinated return of materials

CERTIFICATIONS

2015 (March) - The eCore Faculty Certification Program
2013 – Best Practices in Advising and Retention, AIMS Network and GOAL (Georgia Opportunities for Adult Learners)
2012 – Essential Coach Training, Center for Coaching Excellence

MEMBERSHIPS

2022 Graduate Nursing Admissions Professionals (GNAP)
2015 to Present – NACADA Member
2008 – Present: Phi Kappa Phi
2011 – Young Professional Association
2003 – 2010: National Association for Campus Activities (NACA)
2003 – 2009: National Orientation Directors Association (NODA) – At 2004 National Conference acted as State of Georgia Director for Kim Padgett who was acting director.
2003 – 2009: Southern Regional Orientation Workshop (SROW)
2008 Co-Host of the Southern Regional Orientation Workshop (SROW) Conference held at Columbus State University

COMMITTEES

2018 – Present: COEHP Recruitment Committee
2016 – Present: Honors and Scholarship Committee (School of Nursing), Chair
2014 – Present: COEHP RGP Committee
2013 – Present: Student Success Committee (School of Nursing)
2012 – Present: Community Advisory Board (School of Nursing)
2021 COEHP IDEA Committee
2019 – 2021: COEHP Technology Advisory Committee (TAC)
2018 - 2019 Academic Advising Standing Committee (Faculty Senate), Chair
2018 COEHP Strategic Planning Committee, Co-Chair
2012 – 2014: COEHP Executive Council Member
2012 – 2013: Advisory Board Member
2012 – 2013: Leadership Committee, School of Nursing
2011 Sophomore Year Experience Committee
2009 – 2010: Black History Month Co-Chair
2008 Board of Regents Visitation Committee
2007 Student Affairs Strategic Planning Committee
2007 CSU 50th Anniversary Committee
2006 – 2011: Drug and Alcohol Education Task Force and Biennial Review Committee
2004 – 2009: Homecoming Committee Co-Chair
2004 – 2009: Black History Month Committee
2004 – 2008: Freshmen Year Experience Committee
PROFESSIONAL REFERENCES
Available upon request.

Abstract

This study examined the development of 21st century skills through gamification, game-based learning (GBL), and serious games in nursing education in institutions of higher education in the United States. This paper reviews the history of gamification in nursing pedagogy through three domains of research. It includes an overview of research related to the development and implementation of gamification, GBL, and serious games in nursing education as well as the impact on the development of 21st century skills in digital natives. The focus was on the historical literature related to gamification, GBL, and serious games at institutions of higher education in nursing education to identify and analysis occurrences of 21st century skill development in historical research. Results were obtained through qualitative content analysis through the MAXQAD qualitative software program. Overall, the findings supported the use of gamification, GBL, and serious games in nursing education contributed to the development of 21st century skills among nursing students at institutions of higher education in the United States.

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Chapter I: Introduction

The use of gamification in serious games and game-based learning (GBL) is gaining momentum in nursing education as nursing educators in higher education utilize the concepts and practices associated with gamification to engage 21st century students through innovative pedagogy (Elaachak et al., 2016). Unlike gaming models designed for entertainment, GBL and serious games connect learning outcomes to practices in gamification to engage students in developing specific skills, and the emergence of concerns over 21st century skill development has led to a need to explore greater development of 21st century skills; also known as pervasive skills (Elaachak et al., 2016).

As higher education delivery models continue to shift towards online learning, the use of GBL and serious games provides educators an opportunity to explore new technology and develop gamification models that contribute to skill development such as 21st century skills (Romero et al., 2015). Nursing education is an area where inclusion of game-based learning (GBL) and serious games has shown progress in contributing to the development of 21st century skills (Wehbe-Alamah et al., 2015).

While evidence-based learning is the standard pedagogy associated with nursing education, including game-based learning (GBL) and serious games contributes to the "improvement of reasoning and clinical skills of nursing students" (Elaachak et al, 2016, p. 705). Including gaming models in nursing education provides educators to introduce pedagogy that engages students through education models that are educational and entertaining (Wehbe-Alamah et al., 2015).

Statement of the Problem

The problem to be examined in this study was 21st century skill development in nursing students through use of gamification, game-based learning (GBL) or serious games in nursing education. With an increase in demands for 21st century skill development in recent nursing graduates, how are these skills being development in nursing students through nursing education (Elaachak et al., 2016). Innovative inclusion of gamification through game-based learning and/or serious games contribute to the innovation of educational pedagogy that incorporates gaming elements, and the use of gaming elements may contribute to the development of 21st century skills in education (Wehbe-Alamah et al., 2015).

Purpose of the Study

The purpose of this study is to categorize research related to the use of gamification as Game-Based Learning (GBL) and serious games in nursing education to contribute to the development of 21st century; skills that contribute to "learning, working and living," (Romero et al., 2015, p. 149). The study will explore research on GBL/serious games to show how increasing the use of GBL and serious games in nursing education contributes to student-centered education and contributes to the development of 21st Century Skills.

Research Questions

The following research questions provide a guide to the content analysis study:

- Research Question 1 – What research in nursing education that includes gamification to develop 21st century skills have been conducted?

- Research Question 2 – Which trends are prevalent in research related to the use of gamification in nursing education?

Conceptual Framework

The researcher proposes to conduct a study of published empirical research related to the inclusion of gamification, Game-Based Learning (GBL), and serious games in nursing education that contribute to the development of 21st century skills. Using a Content analysis design, the researcher will categorize areas of research related to gamification design, game mechanics, application of gamification, implementation of GBL/serious games, and evaluation of GBL/serious games.

Figure 1

Conceptual Framework
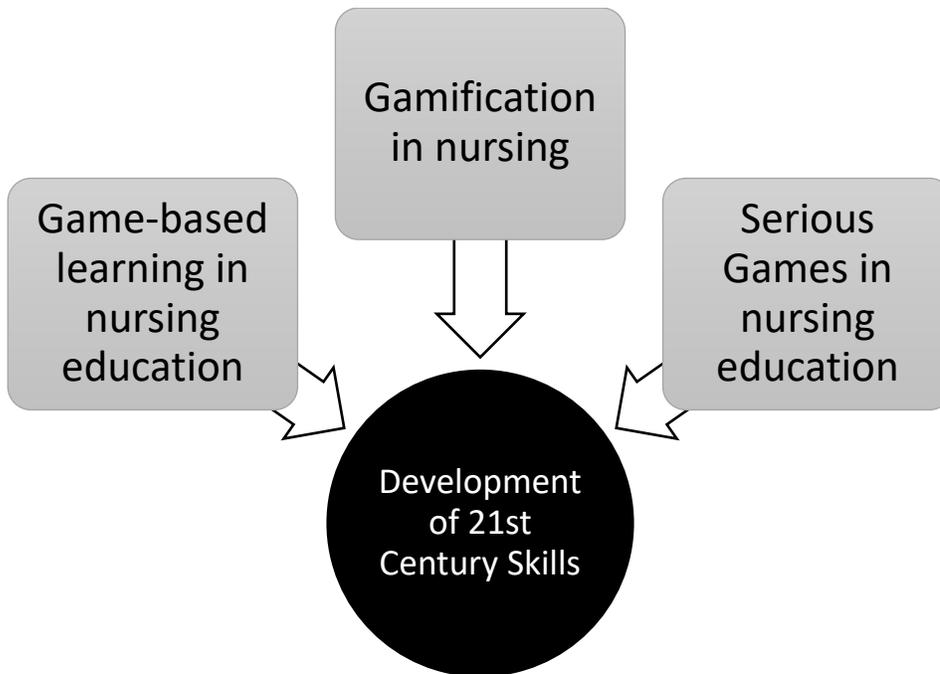
Note. The conceptual framework of the study connects research of gamification, game-based learning, and serious games in nursing education that contributes to the development of 21st century skills.

Significance of the Study

Universities strive to improve nursing education through the inclusion of gamification (Wehbe-Alamah et al., 2015). Innovation in these pedagogical practices contribute to nursing students' knowledge, retention, and application of nursing skills to include 21st century skill sets which result in a stronger pool of nursing graduates who in turn impact the nursing profession. The study will explore the inclusion of GBL and serious games in nursing education with regards to new technology and gamification models that contribute to the development of 21st century skills. Specifically, the content analysis study will explore related research to study the effects GBL/serious games on reasoning and clinical skill development through educational and entertaining pedagogy (Wehbe-Alamah et al., 2015).

Limitations

This study will be limited to the information gained from research studies examined in the study. Additionally, the study is limited to the categories identified for the content analysis method. The study is limited to the amount of research the researcher can obtain from the available resources in the years of 2016 – 2021.

Delimitations

This study will be delimited to research conducted on the inclusion of gamification, serious games, and game-based learning in nursing education that contributes to the development of 21st century skills. Studies conducted in the United States in higher education in the field of nursing between the years of 2016 and 2022 will be included. Studies will be delimited to research conducted at colleges, universities, and junior colleges in the United States.

Definition of Terms

- *Gamification*: Gamification is defined as "an integration of game elements and game thinking in activities that are not games" (Kiryakova et al., 2014). Gamification "is defined by many as a way of using gaming principles in nongame contexts" (Brull & Finlayson, 2016, p. 372). Gamification provides tangible interaction with content that contributes to connection with learning outcomes as well as contributes to critical analysis, comprehension, and application of course material (Baker et al., 2012; Kiryakova et al., 2014, Stott & Neustaedter, 2015). Gamification is the use of technology in gaming.

- *Serious Games:* Serious games are defined as games used specifically for educational purposes (Backlund & Hendrix, 2013; Bellotti et al., 2013; Connolly et al., 2012; Kato, 2010; Vlachopoulous & Marki, 2017).

- *Game-based learning:* Game-based learning incorporates gaming models into pedagogical practices (Jayasinghe & Dharmaratne, 2013; Gerstein & Friedman, 2016). Game-based learning (GBL) can be applied to any level of education, and Game-based learning incorporates formats and styles of gaming into the educational setting (Jayasinghe & Dharmaratne, 2013).

- *21st Century Skills:* 21st century skills are those skills that contribute to "learning, working and living," (Romero et al., 2015, p. 149). 21st century skills are skills associated with contemporary lifestyles in a global world where "complex thinking, learning, and communication skills (are considered) higher-order skills, deeper learning outcomes, and complex thinking and communication skills" (Saavendra & Opfer, 2014).

- *Digital Natives:* Defining characteristics of digital natives include begin born after 1980 and existing in a world where sophisticated technology is a cultural norm (Day-Black, 2015; Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009).

Summary

This study is a content analysis study of research conducted on gamification, serious games, and game-based learning in nursing education that contributes to the development of 21st century skills in nursing students. Identification of effective GBL/serious games in nursing education contributes to the advancement of strategies of gamification in higher education. Data will be collected using a content analysis design.

Chapter II: Review of Literature

This study will provide insight into changes that are occurring in nursing education to make nursing education more vibrant, exciting, and participatory through engaging gamification pedagogy that connects with the learning styles of digital natives. A review of literature is provided to explore the emergence of gamification in nursing education as disruptive innovation as well as provide a foundation for the research questions proposed for this study.

There was a considerable amount of material that emerged in the 1990s and early 2000s related to the use of gamification nursing education and is included in the historical overview section of the study. The literature review is divided into three domains:

Historical Overview (1990 – 2000; 2001 2010; 2011 - Present)

Gamification, Game-Based Learning (GBL) / Serious Games

Nursing Education and Gamification; 21st Century Skills and Nursing Education, Digital Natives

Additionally, a brief section of oppositional research will be provided.

New research has emerged since 2016 to support the inclusion of Game-Based Learning (GBL) and serious games in nurse education to contribute to the development of 21st century skills that are valuable to the health care field. This study will examine research in nursing education between 2016 and 2021 related to the development in implementation of GBL/serious games in nursing education to identify gamification design, game mechanics, application of gamification, implementation of GBL/serious games, and evaluation of GBL/serious games. A brief summary will be provided following the literature review.

Historical Overview

The inclusion of gamification through serious games and game-based learning can be explored through early research such as Cassario's (1987) use of board games to examine the efficacy of game-based learning on students "learning of conceptual models of nursing" which concluded that "gaming can be an effective teaching strategy for reinforcing and motivating students to learn" (p. 169). Gamification in nursing education has been explored as a pedagogical format for online clinical instruction, and the use of gamification has historically shown to positively impact the development of 21st century skills in nursing students.

1990 – 2000

The decade of 1990 to 2000 saw the use of low-tech gamification in nursing education in higher education as well as in continuing education for nursing professionals. The results of these studies contributed to the expansion of gamification in nursing education as an educational strategy. The trend of modeling popular television games as well as popular board games is evident in the 1990s in studies from Northrop (1992), "Domino Pharmacology Review Game," Hermann and Bays (1991) "Draw to Learn & Win," Sparber's (1990) disaster medical board game modeled after the popular board game Monopoly, and Gruending et al. (1991) Jeopardy, popular television game show, inspired game. According to Blake and Goodman (1999), modeling educational games from popular television games continued as a trend in the 1990s as new technology provided the opportunity for educators to expand on previously designed education games. In Bloom and Trice's (1994) use of the television game show Jeopardy, the researchers developed a game called "Jeopard-Eye" which was incorporated into a senior practicum course for nursing students to assist with preparing for exam content related to various eye diseases. Bloom and Trice (1994) found that the students provided positive feedback on their

level of enjoyment with the gaming approach that contributed to retention of information about eye diseases. A key takeaway from the study conducted by Bloom and Trice (1994) was the importance of the competitive piece of the game and competitiveness contributed to student motivation to play the game.

In Kuhn's (1995) article on gaming in nursing education, a review of literature on gaming in nursing education was provided, and several trending gaming educational strategies were presented in the article. Notable games from the article that were available for nursing education programs to purchase included the "NCLEX-RN Challenge" which was designed to prepare students for the NCLEX board exam that follows graduation as well as the "Critical Care Challenge" which was related to critical care education.

Saethang and Kee (1998) conducted a study on how the use of gamification impacted "teaching non-critical care nurses how to safely administer critical cardiovascular drugs" (p. 61). The purpose of the study was to develop a game-based teaching method for non-critical nurse faculty administering medication to end-stage cardiovascular disease patients, and the goal of the study was to contribute to level of skill and confidence in the non-critical care nurses when working on this task (Saethang & Kee, 1998). The gaming method was a board-game design where participants were divided into teams, spun an arrow on a colored wheel, and answered questions from the selected category on the colored wheel. Saethang and Kee (1998) concluded that this interactive, competitive game contributed to student engagement and retention of information. Wargo (2000) developed the "Blood Clot" game related to education on disseminated intravascular coagulation (DIC), and the "purpose of the game was to reinforce learning of lecture material and to increase retention (of information from the lecture)" (p. 150). The game was played in teams where students used gaming chips to fill a circle on an index card

that represented a blood clot, and students earned the chips by answering questions from the lecture on disseminated intravascular coagulation (DIC) (Wargo, 2000). The team to cover the circle that represented a blood vessel to achieve a blood clot was determined as the winner. Wargo (2000) reported that students learned through "positive reinforcement, group involvement, and communication" (p. 151) which did contribute to retention of lecture material. Youseffi et al. (2000) move beyond the use of gaming as a tool for improving retention as they developed the "Recall Rummy" game which was designed to assist student with learning common skills used in a general hospital setting. Through this game, nurse educators recreated an engaging game for small groups as well as individual games, and the students benefited from the game through their development of common skills used in a general hospital setting (Youseffi et al., 2000).

2001 – 2010

The use of clinical simulation labs has long been an effective teaching tool in nursing education, and through the foundation of this learning model, educators have explored expanding this teaching model to include gamification through serious games and game-based learning. The use of the clinical simulation lab contributes to a nursing students' engagement in gaining knowledge of patient care that extends beyond the classroom and teaches the importance of patient privacy, humanizing patient care through interactive mannequin simulations, role play related to real-life patient scenarios, reacting to real-life patient outcomes, and effective assessment of patient care (Tarrow, 2005). Traditional nursing education through clinical simulation laboratories has evolved as gamification has been included in nursing education through various examples of serious games and game-based learning. Metcalf and Yankou (2003) studied nursing student knowledge of the endocrine system through an ethics game

designed to examine students' use of ethical principles through ethical decision-making, and the researchers found that that students' knowledge and application of ethical principles related to patient care was improved with game-based learning.

Glendon and Ulrich (2005) researched two games that contributed to knowledge and critical thinking skills in nursing students. The first game, *What's That Intervention?*, followed the format of the television show Family Feud, and Glendon and Ulrich (2005) found that this gaming model contributed to students' integration of knowledge in the context of applying the appropriate interaction to a given scenario. The second game, *Name That Drug*, focused on vocabulary of medications administered by nursing students, Glendon and Ulrich (2005) found student engagement in the activity to be high and contributed to student knowledge of the subject matter. Cowen and Tesh (2002) conducted research on the efficacy of gaming in nursing education on student knowledge of pediatric cardiovascular dysfunction and found that students in the test group that included game-based learning scored higher on the post-test analysis that measured student knowledge of pediatric cardiovascular dysfunction than those students in the control group that did not include game-based learning. Cowen and Tesh (2002) concluded that the use of game simulations in nursing education promoted "critical thinking, and perhaps enhances student learning of complex content, such as pediatric cardiovascular dysfunction (p. 509)." Cowen and Tesh (2002) also note that students in the test group that included game-based learning reported higher satisfaction ratings of the course citing the gaming components as "the best part of the course" (p. 509). According to Sealover and Henderson (2005), the use of games as an education strategy contributes not only to retention and application of skills, but the use of games in nursing education contributes to the development of soft skills such as "communication, problem solving, leadership, and decision making" (p. 247).

Royse and Newton (2007) found that the use of gaming modality in nursing education "is effective in enhancing the ability to retain knowledge, promotes problem-based learning, and motivates students to learn" (p. 266). Stanley and Latimer (2011) designed a simulation game to "allow students nurses to explore aspects of nursing theory and its relationship to practice in a safe and controlled environment" (p. 20). The gaming design centered around a hospital ward model where students engaged in clinical laboratory simulations designed to measure patient care and treatment that required students to engage in critical thinking and application of nursing concepts and practices (Stanley & Latimer, 2011). *The Ward* simulation game provided researchers with insight on the positive impact of game-based learning in the areas of efficacy in teamwork, decision-making, critical thinking, and the management of patient care in clinical laboratory simulations. In one of the earlier studies related to gamification in nursing education, Boctor (2013) found the use of the gaming model known as *Nursopardy* (a take on the game show Jeopardy) contributed to exam review, preparation, and student learning experience. Initial modes of instruction that incorporated game-based learning and serious games included more entertainment elements rather than current learning modality of gamification models, and the emerging trends of interactive serious games leads to opportunities to expand on traditional modality of nursing instruction (Royse & Newton, 2007).

2011 – 2020

There is evidence that digital delivery and gamification contributes to engagement and retention of knowledge for nursing students (Brull & Finlayson, 2016; Day-Black, 2015; Malicki et al., 2020; Woolwine et al., 2019). Interactive gamification provides an opportunity to include learner-centered engagement models of education that contribute to the traditional formats of instructional delivery (Brull & Finlayson, 2016; Malicki et al. 2020). The use of technology

through simulation laboratories has shown that nursing education is positively impacted by advanced methods of pedagogy that includes technical aspects relevant to the digital learner of today (Brull & Finlayson, 2016). "As an interactive teaching and learning strategy, serious games in nursing education supports concepts of active learning (Day-Black, 2015, p. 90)." The global pandemic of 2020 brought challenges to nursing education related to face-to-face clinical instruction, and through this challenge an opportunity arose to explore the use of online clinical instruction through various pedagogical formats.

Malicki et al. (2020) provide a document analysis of research related to gamification in nursing education that supports the claim that theory content and skill content were areas that demonstrated the highest levels of impact through the inclusion of gamification models. Woolwine et al. (2019) contend that the use of gamification contributes to learner outcomes, engagement, and knowledge retention. Malicki et al. (2020) document that "leveraging game design principles to optimize learner experiences was evident in most articles with good- to high-quality evidence" (p. 512). Brull and Finlayson (2016) identify benefits of gamification to include flexibility of delivery through a range of technology accessible to nursing students (i.e. tablets, laptops, smartphones, and other electronic educational devices), asynchronous delivery models that contribute to flexibility of instruction to adult learners, relatability of technology as a preferred method of learning for digital natives, modality of gamification as related to learning styles and preferences, and the safety of the digital environment with regards to patient interactions. Scenario based gaming models provide nursing students with the opportunity to "use trial and error without putting a patient in danger" (p. 374) and this contributes to critical thinking and real-world application of nursing care (Brull & Finlayson, 2016). Gallegos et al. (2017) concluded that gamification is valuable to nursing education as serious games and game-

based learning contributed to student engagement and an enhanced learning experience, and through the use of content relevant to levels of nursing education, there is potential for gamification to provide effective platforms for nurse educators to utilize serious games and game-based learning that will contribute to student understanding and implementation of nursing concepts and practices.

Themes from historical research that emerged as relevant to positive outcomes as a result of the inclusion of gamification models include the positive impact of providing real-time feedback to participants, use of real-world scenarios that impact decision making, the impact of useability of the gaming model as related to technical aspects of the gaming design, providing immediate feedback during the gaming and learning process (Malicki et al., 2020). Knowledge retention is an additional theme related to the benefits of gamification in nursing education (Woolwine et al., 2016). Marquez-Hernandez et al. (2019) conducted a systematic review of studies related to the use of gamification in nursing education, and in that study, they concluded that nursing students benefited from the use of gamification in nursing education through increased knowledge and retention of knowledge in nursing studies. In addition, Marquez-Hernandez et al. (2019) found that areas of student satisfaction, motivation and learning were positively impacted by serious games in nursing education. To measure the experience of engagement with serious games through gamification in nursing education, Marquez-Hernandez et al. (2019) recommended additional research that targets "a deeper look into the emotions and experiences developed while using gamification in training of future nursing professionals" (p. 38). Marquez-Hernandez et al. (2019) reported high scores in the area of critical thinking for students in the study conducted on inclusion of gamification in nursing education. Gamification in nursing education has a positive impact on knowledge using real-time feedback, visual

components relatable to the digital native, and experiential learning (Gallegos et al., 2017).

Gallegos et al. (2017) identified six themes related to game-based learning which include navigation, motivation, gaming concept, knowledge, technology, and target population. While students in the study had difficulty with navigating the game-based learning platform, reported that the motivation aspects of the gaming model could be improved, and reported that improvement to the technology platform was needed to meet their expectations, this study provided foundation for future research as results from the qualitative study showed that students were engaged in the concept of gamification in nursing education with improvements to models that were targeted to their specific grade level.

Malicki et al. (2020) concluded that research supports the inclusion of gamification in nursing education to contribute to learning outcomes and should be considered a valuable addition to traditional pedagogy in nursing education. The use of gamification and serious games in education provides nursing educators with the opportunity to bridge the gap of generational differences with digital natives in "ways of using and making sense of information, ways of learning, and expectations of about life and learning, all due to exposure of digital technology (Day-Black, 2015, p. 91)."

The global pandemic of 2020 brought challenges to nursing education related to face-to-face clinical instruction, and through this challenge an opportunity arose to explore the use of online clinical instruction through various pedagogical formats. Initial modes of instruction that incorporated game-based learning and serious games included more entertainment elements rather than current learning modality of gamification models, and the emerging trends of interactive serious games leads to opportunities to expand on traditional modality of nursing instruction (Royse & Newton, 2007). Recent studies support these early claims in supporting

how the use of gamification in nursing education contributed to learning outcomes, critical

thinking, clinical scenarios/simulations, knowledge, and application of nursing concepts and

practices. Johnsen et al. (2016) found that serious games were "perceived by the study

participants as being useful, usable, and satisfying," (p. 47) and the use of gamification design

through serious games allowed the incorporation of different approaches to health care (home

health model). Johnsen et al. (2016) concluded the usability and participant satisfaction were

areas where additional research would benefit the use of serious games in nursing education.

Koivisto et al. (2016) explored the impact of gamification in the clinical setting with game-based

learning as related to clinical reasoning when engaged in simulated patient care, and they found

that the game-based learning experience "provid(ed) opportunities for clinical reasoning by

acting and thinking while gaming" (p. 27). According to Koivisto et al. (2016), the use of game-

based learning in the clinical setting contributed to student learning outcomes related to decision

making, cooperation/collaboration with fellow students, engagement/interaction in the learning

environment, critical thinking, and critical application of nursing concepts and practices. The

positive outcomes of the research conducted by Koivisto et al. (2016) support collaborative and

practical application of knowledge gained through gamification models. Nursing education is

founded in the incorporation of evidence-based practice (EBP), and EBP is considered a core

competency for nursing professionals that is critical to develop through nursing education.

Through the research study, Davidson and Candy (2016) concluded that students' level of

engagement was increased in a course that incorporated game-based learning that include

gamification in areas of student choice, customization of learning, and the use of a gaming

strategy known as nursing badges; students earn nursing badges through the online game-based

model as they complete assignments in the course. The use of nursing badges for this course

positively impacted learning outcomes for students (Davidson & Candy, 2016). Gomez-Urquiza et al. (2019) created an escape room gaming model to measure student satisfaction as related to "helping (students) in their learning process and towards the exam preparation, as well as to access its impact on motivation towards studying" (p. 76). The results of the study showed the use of the Escape Room game-based learning model contributed to higher retention of knowledge as well as improved exam scores, higher self-reports of student motivation as related to studying, and higher student motivation as related to teamwork (Gomez-Urquiza et al., 2019). Brown et al. (2019) explored the innovative strategy of the escape room model to create "a Breakout EDU escape room teaching strategy" (p. 4) to research the efficacy of the escape room game-based learning model on renal simulation in the clinical laboratory setting. The escape room model involved creation of scenarios where nursing students were required to work through a patient simulation and utilize knowledge based problem solving to treat patient simulations as related to the renal health or disease of the simulated patient scenario, and the results of the study showed that use of the escape room gaming model contributed to "the development of key nursing competencies, such as delegation, teamwork, and collaboration" (p. 5). Roman et al. (2020) focused on the use of the escape room game-based learning model "to find out the perceptions and experiences of final year nursing students in an Objective Structured Clinical Examination (OSCE)" (p. 403), and the study focused on how the escape room model contributed to student learning outcomes, impacted students emotionally as well as evaluation of the students' experience with the serious gaming model. The qualitative descriptive study included escape room elements through which senior level nursing students participated in clinical laboratory simulations designed to measure learning outcomes of the nursing program (Roman et al., 2020). The study concluded that the use of the serious gaming model of the escape

room yielded positive returns in areas of student learning outcomes as well as the nursing students' perceptions and experiences with the OSCE (Roman et al., 2020).

Application of gamification in nursing education has been made through the inclusion of premade games as well as the inclusion of characteristics of gamification in current traditional pedagogy (Brull & Finlayson, 2016). It is the importance of application of concepts and patient care that makes gamification so relevant in nursing education as the gaming model contributes to real world application from student to patient (Day-Black, 2015). Adaptation of pedagogy to meet the needs of digital natives is critical to nursing education, and use of gamification in nursing education contributes to the development of 21st century skills that are of importance to employers (Brull & Finlayson, 2016; Day-Black, 2015; Woolwine et al., 2016). According to Day-Black (2015), digital natives benefit from the use of gamification using serious games in nursing education when the design of the serious game includes real life scenarios with patient outcomes, and "gaming allows the student to learn through meaningful experiences in a time and place that is relevant to them" (p. 90). Marquez-Hernandez et al. (2019) concluded that most studies on the use of gamification in nursing education examined "knowledge, skills, and self-efficacy," but that further research is needed to measure the benefits of serious games and gamification in the areas of the actual experience of these concepts through gaming models. Pront et al. (2018) conducted a literature review of the efficacy of videogame-based learning in nursing education as it contributed to "decision-making, motivation, and nursing-related skills, and how videogames are currently employed," (p. 28) and the researchers identified themes related the positive impact of videogame-based learning on improved cognitive skill development, student engagement and interaction, critical thinking skills, knowledge retention and application, decision-making, and student satisfaction. Ozdemir and Dinc (2022) conducted

a systematic study of mixed-methods of game-based learning in nursing education as related to how game-based learning impacted student learning outcomes. This international study concluded that game-based learning had the greatest impact on "improvement of cognitive learning outcomes of nursing students." Nasiri et al. (2019) conducted a systematic review of literature related to the use of game-based learning in education games related to nursing education in the perioperative field, and through the collective literature gathered, the researchers concluded that the use of game-based learning in the perioperative field contributed to student knowledge in the operating room as well as contributed to the clinical reasoning. However, the researchers concluded that additional evaluation and research is needed to substantiate reliability and validity of game-based learning as related to the use of gamification in the perioperative field (Nasiri et al., 2019).

In summary, there is historical literature that supports the use of gamification through serious games and game-based learning in nursing education, and much of this research substantiates the use of gamification in nursing education as related to increased student knowledge, critical thinking, decision-making, and the application of nursing skills in clinical laboratory simulations. There are examples of specific game designs related to nursing content in specific areas of study. In addition, there are many examples of gamification used in the development of serious games and game-based learning models for specific content areas in clinical laboratory simulations and setting. Emerging focus on 21st century skills by employers suggests that continued study is needed in areas of 21st century skill development through gamification in nursing education not extensively explored through previous research.

Historically, the availability of higher education has been limited to the elite, but demographic changes as well as the growing increase of the global student population are

evolving rapidly (Christensen, 2013; Raanan, 2016). This is largely due to the increased

enrollment of more diverse student populations, increased demands for post-secondary prepared

individuals, and increased availability of higher education using technology, and this growth in

higher education has contributed to sustainability issues that cannot be fully met by the existing

institutional models (Arnold, 2014; Baker et al., 2012; Christensen, 2013; Raanan, 2016). This

leads to disruption in higher education which is characterized by two main conditions; "a

significant market segment (that) is not served by current providers (and the development of)

technology that is capable of serving that segment" (Raanan, 2016, p. 417).

Dr. Clay Christensen (2013) is considered the leading scholar on disruption in higher

education, and he theorizes that the rise of organizations engaging in disruptive innovation will

contribute to the decline of traditional institutions of higher education that do not engage in

disruptive practices. The increased use of technology regarding method and delivery of

instruction as well as the development of tools that contribute to student-centered education

opportunities contribute to positive disruption in higher education (Aloudat, 2017; Christensen,

2013).

Today's higher education leaders are faced with the complexities of strategic planning

and management of the mission and vision of an institution that includes academic and social

endeavors of an institution. This requires leaders and organizations to be adaptable to innovation

rather than reactive to disruption, and to lead in a time of change concerning an increased use of

technology in the classroom (Aloudat, 2017; Christensen, 2013; McCormack et al., 2017).

Disruption occurs in higher education when a population is not being provided service or

inclusivity due to issues related to technology, accessibility, financial issues, and other barriers

that prevent engaging in post-secondary education (Aloudat, 2017; Christensen, 2013; Raanan,

2016). Innovation is an institution's response to a disruption that creates a new approach to eliminate barriers in higher education (Christensen, 2013; Raanan, 2016).

A contributing factor to disruption in higher education is increased inclusivity and enrollment, and the major premise of meeting these challenges is to create innovation that will contribute to solution-orientated management of higher education institutions (Baker et al., 2012; Raanan, 2016). Emerging accessibility of higher education through innovation has led to an increase of a diverse student population that is increasingly focused on job preparation and gaining expertise that will assist with post-graduate employment (Raanan, 2016). This shift in the value of a degree conflicts with the historic view of the purpose of a degree, and in addition, the increase in inclusiveness of post-secondary education has led to opportunities for individuals to engage in a college education who historically would have been prohibited from doing so (Christensen, 2013; Raanan, 2016).

Raanan (2016) provides additional insights as to whether disruptive innovation can be avoided in higher education as well as how to work through disruptions. While there are individuals in higher education who feel that disruptive innovation will not affect higher education, Raanan (2016) argues disruptive innovations are inevitable in higher education, and a strategic risk management approach may be beneficial to manage the evolving landscape of higher education. There is evidence of innovative practices emerging in higher education, such as Massive Open Online Courses (MOOCs), and how these innovative practices contribute to inclusivity and availability of higher education to underserved student populations (Davis et al., 2013). It is well supported that the historical framework of higher education is changing permanently, and that institutions that identify and move toward the future with disruptive innovation will survive this new landscape of higher education (Raanan, 2016). To be successful

with this change, institutions may be required to engage in restructuring of services as well as examination of core values, missions, and objectives, and the identity of an institution may be affected by emerging innovations that are necessary to meet the needs of the new population of students who are engaging in higher education (Aloudat, 2017; Christensen, 2013; Raanan, 2016).

Hasanefendic et al. (2017) introduce the term "institutional entrepreneurs" in their article about innovation in higher education, and this concept of the institutional entrepreneur is intriguing as these individuals can be instrumental in creating change and encouraging risk-taking concerning innovation at higher education institutions. While change and risk-taking in higher education can be slow to occur, entrepreneurial educators and leaders who strive to create innovation can assist with breaking down the barrier of maintaining the status quo (Hasanefendic et al., 2017). Change often does not occur swiftly at institutions of higher education, and individuals who are resistant to change create a barrier to innovation (Aloudat, 2017; Christensen, 2013; Raanan, 2016).

Individuals who undertake innovative practices may be met with implementation challenges as innovation can be constrained by various attributes in higher education; leadership, viewpoints of contributing donors/alumni, and culture of risk avoidance. (Hasanefendic et al., 2017). Raanan (2016) provides a dichotic examination of risk and reward in proposing that risk exists whether individuals/institutions avoid or implement innovation related to innovative disruption. Which way does an institution move? Towards or away from disruption? Institutional culture and leadership will affect the direction an institution may move regarding disruption, and in addition, the strategic planning of a university system will affect an individual institution's approach to disruptive innovation.

Gamification and Game-based learning (GBL) / Serious Games

Gamification

According to Kiryakova et al. (2014), "gamification is an integration of game elements and game thinking in activities that are not games." Many scholars contend that a major challenge in higher education today is the lack of connection students have concerning engagement in meaningful learning outcomes (Baker et al., 2012; Kiryakova et al., 2014, Stott & Neustaedter, 2015). According to Brull & Finlayson (2016), "gamification is defined by many as a way of using gaming principles in nongame contexts (p. 372). Gamification provides tangible interaction with content that contributes to connection with learning outcomes as well as contributes to critical analysis, comprehension, and application of course material (Baker et al., 2012; Kiryakova et al., 2014, Stott & Neustaedter, 2015). Evolving changes to pedagogy in higher education have led to innovative disruption related to increasing student engagement, which contributes to student success. One innovation that has sparked interest in the past ten years is the increased interest and implementation of techniques of gamification (Arnold, 2014; Baker et al., 2012; Kiryakova et al., 2014). The use of gamification in private sectors of industry has grown in popularity and profitability, and the next logical step in the use of gamification is in higher education (Stott & Neustaedter, 2013).

Today's college students are digital natives who have been engaged in technology throughout their formative education, and their use of technology is profound in all aspects of their lives. This use of technology has contributed to how digital natives learn and engage in education, and institutions of higher education should evolve to incorporate the disruptive innovation of gamification into pedagogical paradigms within the classroom (Kiryakova et al., 2014). Elements of gaming such as adherence to rules, rewards and penalties for gaming actions,

and investment in achieving gaming objectives can be transferred to the classroom by inclusion in pedagogy (Arnold, 2014; Woolwine et al., 2016). These elements of gaming are familiar to digital natives who have experience in the popular culture of gaming online and through gaming systems (Arnold, 2014). Simply put, gaming is a part of digital natives' lives, and higher education would benefit from implementing elements of gaming into the classroom. This paper will provide insight into the characteristics of gamification and how utilizing gamification in higher education contributes to student engagement and student outcomes.

Gamification allows the use of common rules and practices of gaming in an educational setting (Jayasinghe & Dharmaratne, 2013). Elements of gamification that are unique and contribute to student engagement include the aspect of the freedom to fail; students have an opportunity to repeat work as they learn the material (Stott & Neustaedter, 2013). The process of learning is the central focus as instruction is provided in a game type dynamic (2013). By exploring content through multiple attempts in a game format, students can engage in self-assessment as well as receive immediate feedback with regards to areas being studied that have yet to be mastered (Arnold, 2014; Stott & Neustaedter, 2013).

An additional characteristic of gamification that contributes to student engagement and success is the aspect of storytelling whereby the story element of the content, through a gamification format, contributes to students' connection to the material being examined (Stott & Neustaedter, 2013). Furthermore, if the storytelling components relate to a real-world scenario, through case studies for example, where the student has a connection not only to the material but to the application of the material, effectiveness of the gaming dynamic are shown to contribute to greater student outcomes (Kiryakova et al., 2014; Stott & Neustaedter, 2013).

Real time feedback is a characteristic of gamification that compliments expectations of digital natives as well as contributes to immediate critical analysis of material (Arnold, 2014). Today's educators are challenged to create innovative pedagogical strategies that contribute to student success with learning outcomes but also to contribute to student engagement in higher education (Dicheva et al., 2015).

According to Dicheva et al. (2015), one of the challenges of implementing gamification in higher education is the demand for greater use of technology which may not be practical for some institutions of higher education. In addition, while online education is growing in popularity, from a historical perspective, the pedagogical use of online strategies is relatively new, and higher education is amid examining how online education is impacting student learning outcomes as a disruptive innovation. The inclusion of gamification in the online format may muddy the waters with regards to analysis and examination of efficacy of online education. Leaders in higher education must be diligent in promoting innovations such as online learning, to include gamification, but it is also necessary to maintain a watchful eye through measurement and examination on how disruptive innovations such as gamification impact the future of higher education.

According to Vlachopoulous and Marki (2017), interest in using game-based learning and gamification in higher education has increased in recent years as educational games, digital game-based learning, and applied games are implemented into pedagogical practices. Terminological ambiguity is an issue within higher education as there is a lack of consistency and agreement on shared terminology concerning aspects of game-based learning and gamification (Vlachopoulous & Marki, 2017). Gros (2017) provides seven genres of game categories that have emerged as most accepted: action games, adventure games, fighting games,

role-playing games, simulations, sports games, and strategy games. An additional genre of gaming developed by Sawyer (2002) is serious games, which refers to games that are used for educational purposes (Vlachopoulous & Marki, 2017).

Connolly et al. (2012) provided insight into the connection between entertainment gaming and education gaming which they defined as serious games, and the empirical evidence found through their research supports the notion that GBL has a positive impact on the game interaction as well as learning. The review of research design related to serious gaming included the use of simulations and puzzles, and throughout the research study, evidence was brought forth to support the major premise that serious gaming or GBL impacted the development of learning and behavioral skills (Connolly et al., 2012). Furthermore, research conducted by Connolly et al. (2012) included an examination of the impact of serious games (GBL) on different academic disciplines.

Bellotti et al. (2013) define serious games as "games that have been designed and used with a different purpose than pure entertainment" (p. 1). Serious games are those used specifically for educational purposes (Backlund, & Hendrix, 2013; Bellotti et al., 2013; Connolly et al., 2012; Kato, 2010). The importance of examination of performance and evaluation of the serious game user is considered equally impactful when studying how learning is impacted using serious gaming in education (Bellotti et al., 2013). The lack of consistency in evaluative methodology that exists in research related to the impact of learning by serious games is an area where Bellotti et al. (2013) considers not only the impact of methodology but the human factor as well. An individual's learning style, proficiencies, background, and area of study may work more effectively with certain serious games methodologies to yield a varying result in which learning is impacted (Bellotti et al., 2013). By examining the user of serious games as well as the

user's assessment of the serious game experience, Bellotti et al. (2013) proposed the development of research guidelines be developed to contribute to consistency and replication of research related to serious games.

The question of effectiveness of serious games as educational tools is addressed by Backlund and Hendrix (2013) through review of scientific studies, and through this review, evaluation of consistency in methodology used in serious games in education as well as the effectiveness of said games is reviewed to investigate the overall educational aspect of serious games as pedagogical tools. Issues such as "user acceptance, technological restrictions, and questions concerning curricula and content" (p. 1) may impact the effectiveness of serious games as educational tools (Backlund & Hendrix, 2013). The purpose of serious games as pedagogical tools is to create a computer-based tool that incorporates entertainment elements of gaming to then engage the user in an aspect of learning related to a specific construct or discipline, and by examining the effect of serious gaming in education on the user, the aim is to measure completion of educational objectives (Backlund & Hendrix, 2013). The challenge with measuring learning through serious games in education settings includes factors such as instructor preference and construct of the game utilized in the educational setting, and the research in this area may be strengthened by focusing on skill development as well as overall attitudinal results rather than specific learning outcomes related to discipline specific content (Backlund & Hendrix, 2013).

The impact of serious games on cognitive process and motivation is another area to consider when examining previous research, and when considering the inclusion of serious games in higher education, it is relevant to examine whether serious games contribute to greater results in developing cognitive process as well as impacting motivation (Wouters et al., 2013).

As previously mentioned, the varying methodologies of serious games (game-based learning; GBL) influences the collective agreement amongst researchers regarding effectiveness of GBL as educational tools. When discussing areas of learning where GBL may be most effective, Wouters et al. (2013) narrows the discussion to the impact game design, learned content, and effectiveness of GBL over traditional pedagogical models. Focus was given to examining the design of specific research models that promoted multiple interactive sessions for participants, and by comparing the serious game model to conventional models of learning, the research yielded results in favor of the use of serious games as participants gained higher cognitive processes and higher motivation by serious games (Wouters et al., 2013).

Game-based learning (GBL) / Serious Games

According to Jayasinghe and Dharmaratne (2013), the term *Edutainment* describes the practice of incorporating entertainment models into education pedagogy. Innovative strategies such as Game-based Learning and Gamification are affecting instruction practices in higher education. Movement from transmission-based learning to transformative learning to include the need for development of strong 21st century skills contribute to the growth in the use of Game-based Learning and gamification in higher education (Jayasinghe & Dharmaratne, 2013). The use of virtual learning through Edutainment contribute to evidence-based learning where student become skilled in application of complex concepts and develop 21st century skills rather than engage in route-based, transmission learning (Jayasinghe & Dharmaratne, 2013).

The classroom in higher education is moving from the traditional brick-and-mortar model to the online format, and with this movement, the adoption of gaming models into pedagogical practices is contributing to innovative student-based learning where technology allows students to experience transformative learning (Jayasinghe & Dharmaratne, 2013; Gerstein & Friedman,

2016). Game-based learning (GBL) can be applied to any level of education, and this innovation includes formats and styles of gaming that digital natives have experience with outside of the educational setting (Jayasinghe & Dharmaratne, 2013). Drawing on the gaming experience of digital natives, higher education strategies that include game-based learning contribute to the development of 21st century skills.

Game-based learning (GBL) provides opportunity for students to enhance critical thinking skills, self-regulatory skills, self-management, but there are deficiencies noted where novice GBL learners displayed difficulty with managing metacognitive skills (Chen & Law, 2016). Students engage in active learning through game-based learning (GBL), and this is due to GBL having a foundation "in active learning methodologies" as well as "learning activities (that build) on engagement and challenges to achieve the intended learning objectives" (Romero et al., p. 149, 2015).

Game-based learning (GBL) may include a variety of pedagogical approaches, but the primary techniques are "simulations, narrative or storytelling" (Sousa & Rocha, 2017). Research shows the GBL impacts the development of soft skills such as leadership and concept development, and the use of collaborative GBL is strongly connected to the development of leadership skills (Sousa & Rocha, 2017, p. 360). The use of active-learning through GBL contributes to the development of soft skills, such as leadership skills, and 21st century students' proficiency of game-based technology contributes to a skill set of "gamer disposition" (p. 149) which in turn contributes to the possible effectiveness of GBL in higher education (Romero et al., 2015). As 21st century students are already proficient in game-based technology, the inclusion of game-based learning in higher education promotes skill sets already in place, and the use of GBL in higher education engages 21st century students' knowledge of game-based

technology (Romero et al., 2015). This in turn contributes to the success of GBL in higher education as 21st century students have a solid base of knowledge regarding the format of game-based components (Romero et al., 2015).

Game-based learning (GBL) has been a staple in private sectors and education (P-12 and higher education) for over a decade, and evidence shows that the use of GBL, especially through multiplayer game GBL, contribute to leadership skills as well as "social, cultural, or organizational value" (Sousa & Rocha, p. 360, 2017). The successful use of GBL contributed to the use of GBL methodologies specifically developed for higher education (Nino & Evans, 2015). In their study of how GBL contributes to skill development, Nino and Evans (2015) examined how GBL strategies contribute to the development of soft skills for engineering students. Use of a constructivist approach and how this approach contributes to the development of soft skills was a focus of the research (Nino & Evans, 2015). Nino and Evans (2015) pose the question of whether the prevalent use of gaming in society as a form of entertainment contributed to the success of GBL in learning environments. The traditional classroom structure has been impacted by the prevalence of gaming and social media in today's learners, and the use of GBL may contribute to effective development of soft skills often found under development in 21st century students (Nino & Evans, 2015).

The methodology used in GBL is one of the primary influencers in the development of soft skills, and this methodology presents an advantage in the evidence-based learning process as it is "organized by phases and pre-defined goals (that) focus on the identified programs, involving step-by-step learning" (Sousa & Rocha, p. 361, 2017). GBL theory is defined by three perspectives, and these perspectives include the use of technology through a gaming format, the inclusion of gaming components with corresponding gaming activities which occur within the

GBL exercise, and the gamification of learning by "role-playing, achievement, competition, and reward system" (Kapp, 2012; Sousa & Roche, 2017, p. 361).

In Sousa & Roche's (2017) study of leadership style and skill development, the research study focused on the second perspective of game-based learning (GBL) theory to include gaming components to develop leadership skills through social gaming exercises. The purpose of the study was to "test the impact of a leadership training program, based on the GBL methodology for leadership skills," to measure the development of leadership skills though the social gaming concept (Sousa & Roche, 2017, p. 361). In addition, the research conducted by Sousa and Roche (2017) examined what leadership styles merged from the research study to include an investigation into whether novel leadership styles were present as a result of the study. The mixed methods approach was conducted in the research study to examine leadership development through the GBL techniques (Sousa & Roche, 2017). The results of the research study conducted by Sousa and Roche (2017) included evidence of the five leadership styles that supported previous studies by the researchers, and the data collected confirmed that the use GBL methodology impacts the development of leadership styles and skills.

In Nino and Evans' (2015) review of literature on the constructivist aspects of game-based learning, research was conducted to examine how the use of video game format contributed to the development of "knowledge, skills, and attitudes" (p. 143). In addition, through the different studies examined, the researchers explored whether video games were indeed viable instructional models that contribute to constructivism (Nino & Evans, 2015). The constructivism learning theory was selected for this research study as the researchers "argued that video games are mainly connected to this learning theory," (p. 144) and the role of the learner in video game game-based learning is independently based which is a component of

constructivism learning theory (Nino & Evans, 2015). By focusing on the development of KSA's of engineering students, the researchers argued that the learning theory most connected to the engineering field is constructivism as engineering students must learn skills related to problem solving based on their independent knowledge (Nino & Evans, 2015). The focus of the study was to identify the KSAs that are best developed using video games through a constructivist learning theory approach (Nino & Evans, 2015). Through the studies examined, Nino and Evans (2015) propose that GBL contributed to the development of soft skills such as leadership, social, and communication skills.

Nursing Education and Gamification

The use of game-based learning (GBL) has been in practice regarding nursing education since the 1980s, and many serious games have been developed to contribute to the education of nurses regarding specific content related to the nursing field (Castro & Gonclaves, 2018; Elaachak et al., 2016; Wehbe-Alamah et al., 2015). Examples of research conducted in the 2000s on serious games and nursing education include the Cranial Nerve Wheel Competencies game developed by Jones, Jasperson, and Gusa (2000) which tested nurses' knowledge of the twelve cranial nerves, and in addition Cowen and Tesh (2002) developed a serious game to explore how nursing students learned about "pediatric cardiovascular dysfunction content" through lecture-based pedagogy versus "lecture-game approach" (Elaachak et al., 2016, p. 706). Another notable research study conducted by Metcalf and Yankou (2003) explored how the use of GBL impacted the development of ethical decision-making skills, and Frazer (2007) conducted a similar study to explore how GBL contributes to nursing students' retention of content related to the nursing field (Elaachak et al., 2016). A GBL serious game, "Hospital Haste," was developed in 2012 by Alawar entertainment to assist in teaching nursing students effective time management (Elaachak

et al., 2016). Wehbe-Alamah et al. (2015) cite studies related to the development of educational games and content related to general healthcare education, and some of these include games associated with care of patients with cancer (Oncology Game), treatment of burns (Burn Center and Pulse!!), training for pediatric care, and other general areas of health education (Wehbe-Alamah et al., 2015).

Castro and Gonclaves (2018) explore how the use of gaming in nursing education contributes to the development of essential information and communication technology which is utilized by nursing professionals in the healthcare system. Gamification elements utilized by Castro and Gonclaves (2018) included a progression bar, opportunity to for the participant to level up as they progressed through the game, earn a ranking for games played, and receive rewards for games completed. Results from the study concluded that gamification contributed to contributed to students learning experience (Castro & Gonclaves, 2018). Woolwine et al. (2019) further explore the connection between the use of gamification and learner engagement. "Using gamification as a teaching methodology has been linked to increased internal and external motivation and knowledge retention of the learner" (Woolwine et al., 2019, p. 255). Brull et al. (2017) conducted a hospital-based research study which examined how gamification may impact knowledge retention of participants, and in this research study, participants who were taught through a gamification module reported greater satisfaction with the learning experience and scored higher on post-tests then participants who were not taught through a gamification module. "Gamification of learning experiences leads to positive outcomes. Learners have increased satisfaction, engagement, and knowledge retention" (Brull et al., 2017).

However, with regards to the development of 21st century skills in nursing education with game-based learning (GBL) and serious games, research is more recent (Elaachak et al., 2016).

There are some examples of research connecting GBL and serious games to some pervasive skills like empathy. Kato (2010) concludes that GBL and serious gaming contributes to improvement in knowledge and competency in practices associated with the treatment of individuals in various health care scenarios, and in addition, the use of GBL and serious games contributes to the development of empathy in the individuals providing health care. Johnsen, Fossum, Vivekananda-Schmidt, Fruhling, and Slettebø (2016) explored how the use of serious games impacted "students clinical reasoning and decision-making skills in caring for patients with chronic obstructive pulmonary disease" (p. 905). While participants had some difficulties with the technology incorporated into the study, it was concluded that the video game module contributed to student retention of knowledge (Johnsen et al., 2016).

21ˢᵗ Century Skills and Nursing Education

The technical aspect of nursing education requires strong evidence-based education that focuses primarily on the medical services provided through technical means, and as the high demand for skilled nurses increases, nursing education must balance the need for technical and non-technical skill development (Laari & Dube, 2017). Soft skill development is emerging as a critical skill that has been previously underdeveloped in nursing education, and the issue of incorporating soft skill development in nursing education has become an international issue (Laari & Dube, 2017). The pressure for nurse educators is to quickly and efficiently move nursing students into the work force as national and international shortages continue to be reported, and the focus of nursing education through evidence-based learning, is on critical competence and application of nursing skills developed through nursing education (Laari & Dube, 2017).

Laari and Dube (2017) provide evidence that nursing students understand the relevance of soft skills in the healthcare field, and furthermore, nursing students engaged in the study agreed that the education they received in nursing school did not fully contribute to the development of strong, transferable soft skills that provided a base of knowledge and implementation when the students moved into the workplace. Soft skills have become a criterion of consideration for hiring as well as evaluation of current employees in the nursing field, and as soft skills become a more prevalent criteria for employment, nurse educators are challenged to meet the needs of contributing to the development of soft skills, or non-technical skills, through evidence-based learning models (Mohamed et al., 2019).

The movement towards focus on development and application of 21st century skills yields "skill sets" that contribute to the definition of "twenty-first century skills." An overarching definition of 21st century skills includes that these skills are associated with contemporary lifestyles in a global world where "complex thinking, learning, and communication skills (are considered" higher-order skills, deeper learning outcomes, and complex thinking and communication skills" (Saavendra & Opfer, 2014). Romero et al. (2015) proposed that 21st century skills are those skills that contribute to "learning, working and living," (p. 149) and it is these skills that set apart 20th century skill development from 21st century skill development. Sousa and Roche (2017) identify leadership skills as a 21st century soft skill that contributes to the development of "abilities and degree of influence…making decisions" (Sousa & Roche, p. 361, 2017). Transferable skills from college to the workplace have become a focus in research related to soft skill competencies (Gerstein & Freidman, 2016).

The prevalence of technology in society for common day occurrences such as social interaction, purchasing, online gaming, and researching provides 21st century students with the

basic skill sets associated with GBL, and 21st century students, as digital natives, have developed

skills related to the use of technology that are transferrable to competency-based learning

through GBL methodologies (Gerstein & Freidman, 2016).

Nino and Evans (2015) found through the investigation of game-based learning (GBL)

research studies that GBL contributed to the development of "higher-order thinking and

decision-making skills, persistence, socialization, leadership skills, self-confidence, and

autonomy and self-regulation" (p. 145). The use of GBL in higher education promotes the

development of 21st century skills as GBL is more student-centered as it focuses on the emerging

development of skills through student interaction with GBL methodology (Nino & Evans, 2015).

There are three generally accepted views of teaching; teaching as transmission, teaching

as transaction, and teaching as transformation (Johnson, 2015). "Serous games refer to games

that are driven by educational goals not entertainment (Day-Black, 2015)."

The transmission model of teaching is teacher-centered where information is passed from

teacher to student, and the primary focus is providing specific knowledge to a student to result in

the "students' ability to demonstrate, replicate, or retransmit (the) designated body of knowledge

back to the teacher or some other measuring agency or entity" (Johnson, 2015).

Through use of previous knowledge and experience, students create meaningful

knowledge through the constructivist philosophy of transaction (Johnson, 2015). As students

make connections between previous knowledge and experience in the context of new

information, they can solve real world problems as well as contribute to the creation of ideas,

products, etc. that are valuable in today's global world (Johnson, 2015).

The preferred teaching model that contributes to the development of 21st century skill

development is the transformation model, and this model is grounded in the holistic educational

experience (Johnson, 2015). The pedagogy in compulsory education historically consists of the transmission model of learning (Saavedra & Opfer, 2014). Application and skill development are not the focus with the traditional transmission model, and this model of education does not support the development of 21st century skills which are learned through metacognition, teamwork, technology, and creativity.

Digital Natives – 21st Century Students

The majority of 21st century students currently enrolled in higher education are digital natives, and digital natives have been surrounded by technology their entire life to include the use of technology in the classroom (Day-Black, 2015; Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009). Digital natives have had technology implemented in all aspects of their lives to include gaming, social media networking, advanced systems and processors, etc. (Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009). In the ground mark published article which defines and characterizes digital learners, Prensky (2001) described digital natives as those students who were born after 1980 and exhibit proficiency with technology developed and implemented during their lifetime, and additionally, the user distinction described by Prensky (2001) as digital immigrant includes those individuals who have experienced the rise and implementation of technology during their adult years. Differences that exist between digital natives and digital immigrants include the complex narrative of technology that digital natives may show greater proficiency with as digital natives were raised with the lexicon of digital technology while digital immigrants adapted to the influx of technology over time (Day-Black, 2015; Prensky, 2001). Digital natives now represent the overwhelming majority of students in higher education, and the use of technology had to develop alongside the skill set of digital

natives to engage students in a medium of education that reflects the strong use of technology in the everyday lives of digital natives, and by incorporating technology, which digital natives are so familiar with (like game-based learning), educators have an opportunity to challenge traditional route methodology to create a more transformational learning format (Selwyn, 2009). Selwyn (2009) argued that the relationship between digital natives as learners and digital immigrants as professionals in roles related to education would benefit from creating a balance in the use of technology to compliment this symbiotic relationship, and while technology as an educational tool is essential in propelling educational pedagogy forward, incorporating the knowledge and skills related to digital immigrants' traditional pedagogical style improves the quality of education as well.

Defining characteristics of digital natives include begin born after 1980 and existing in a world where sophisticated technology is a cultural norm (Day-Black, 2015; Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009), but these may be overly broad defining characteristics as factors related to socioeconomic status, ethnicity, gender, etc. may not fully be taken into consideration (Margaryan et al., 2009). When discussing the characteristics of digital natives, it is relevant to consider contributing factors not related to generation assignment as well as the presence of technology in a broad global sense, and the prevalence of use of social media among the digital native generation, while considered a social technology, may not contribute significantly to a digital natives' overarching knowledge of sophisticated technology (Margaryan et al., 2009). Rather than focus on the exposure to technology to define an individual as a digital native, it is argued that investigation into how learning with technology, specifically game-based learning, is impacted (Margaryan, 2009).

Prensky (2001) argued that there are cognitive, developmental differences between digital natives and digital immigrants due to the available, sophisticated technology prevalent in a digital natives' education and social experiences, but there is debate as to whether digital natives are as effective in their use of technology as previous assumptions would imply (Helsper & Eynon, 2009).

Implications and Future Research

There are positive and negative viewpoints of disruption in education as related to technology. Many of the positives include the creation of advanced technology that allows for maximum engagement between students and faculty to include collaboration on a unique scale as well as the personalization of the classroom which is very attractive to millennial and technology savvy students (Aloudat, 2017; Bujack et al., 2012). Aloudat (2017) provides insight into the Social Media Learning Paradigm where educational strategies are designed to meet the learning styles and use of technology by students who are digital natives.

Disruptions of technology in higher education that are considered as having a negative impact include the cost of investing in technology that is ever advancing, the reliance on technology as it is incorporated in academic practices, the impact of technology students with regards to how they learn, behave, engage, and exist as individuals in an academic setting (Aloudat, 2017). Societies growing dependency on technology is another concern related to disruption in education as well as the potential for manipulation of technology for academic gain (Aloudat, 2017).

Regardless of the positive or negative interpretation of disruption in higher education, technology will continue to be utilized as a method of instruction, and institutions of higher education should explore how this disruption will affect sustainability. One organization that is

examining disruption in higher education is Georgia Institute of Technology with the development of The Center for 21st Century Universities, and the mission of this center is to explore disruptive changes and how these changes affect higher education (Bujack et al., 2012). Institutions of higher education would benefit from the development of endeavors that explore disruption in higher education and create strategies for how best to evolve in the global environment where use of technology in higher education practices is sure to continue to grow.

How can gamification be utilized in higher education today and in the future? According to Kiryakova et al. (2014), the use of gamification in higher education will contribute to a style of pedagogy that connects students to learning objectives and contributes to increased student engagement and proficiency in areas of study. In implementing gamification, options to explore include allowing multiple attempts that contribute to the permission to fail, adaptability of the gaming dynamics towards various learning styles and characteristics of students, levels of difficulty that contribute to mastery of the content, and the use of varying paths of learning that contribute to individualized strategies of examination and mastery of the content (Arnold, 2014; Baker et al., 2012; Kiryakova et al., 2014; Stott & Neustaedter, 2013). Marquez-Hernandez et al. (2019) note that an area of continued research is needed to measure the emotional impact of gamification as related to the experience of gaming itself in nursing education.

Increased development of online classrooms provides tremendous opportunity for the implementation of gamification in higher education, and specifically, gaming dynamics that contribute to critical thinking and problem solving would provide opportunity for student success (Arnold, 2014; Baker et al., 2012; Kiryakova et al., 2014; Stott & Neustaedter, 2013). The use of gamification in online classrooms moves higher education away from the traditional brick and mortar format, and this disruptive innovation must be considered as leaders in higher education

look towards the future of higher education. Disruption occurs as students are drawn more to the online format, and it is essential the leaders in higher education consider who online learning provides adequate student success and engagement in course material (Arnold, 2014; Baker et al., 2012; Dicheva et al., 2015; Kiryakova et al., 2014; Stott & Neustaedter, 2013).

Oppositional Research

Evidence suggests that the inclusion of gamification in higher education is beneficial to institutions of higher learning, educators, and students, but there are concerns related to the implementation of gamification as well. Vinichenko et al. (2019) discuss the feasibility and expediency of gamification in higher education, and their research suggest that a fragmented approach to incorporating gamification of major elements of a learning activity was preferred by the participates rather than the emersion of gaming elements through the learning activity. This suggests that limiting gaming elements in specific exercises may contribute to greater participant outcome (Vinichenko et al, 2019). In addition, Vinichenko et al. (2019) contended that the cost of incorporating gamification through technological advances may be too great to bear with an initial, total emersion into gamified pedagogical practices, and it may be a more practical and cost-effective approach to include gamified elements over a period that leads to segmented advancement of technological gamified resources (Vinichenko et al, 2019). Hernandez-Fernandez et al. (2020) questioned the practicality of the inclusion of gamification in a three-year, comparative study that sought to measure academic results through comparing outcomes from gamified activities and non-gamified activities. Hernandez-Fernandez et al. (2020) found that greater academic results occurred in the group of students who were less engaged in gamified activities, but results of the study did show that motivation increased in participations engaged in gamified activities (Hernandez-Fernandez et al., 2020).

Dale (2014) concluded that in the business world gamification may be a costly disadvantage to companies as they concluded that the percentage of gamified applications that failed after implementation outweighed the overall benefits to the companies that invested in said applications. While this is outside of the scope of the current study as related to higher education, it does bring to the conversation an interesting opinion as related to the cost-benefit of gamification. Ponti et al. (2015) examined the "tension between gamification and science" (p. 680). Specifically, Ponti et al. (2015) concluded that gamification contributes to "the effectiveness of skilled players who know how to use scripts properly, but they can also be used to motivate inexperienced players" (p. 683) to make poor selections in the gamified activity leading to lower success of learning outcomes. The oppositional research discussed provided a brief view into aspects of gamification that may be under opposition.

Summary

Disruptive innovation is a part of the future of higher education, and strategic identification of disruption is critical to an institution's sustainability (Arnold, 2014; Baker et al., 2012; Christensen, 2013; Raanan, 2016). Higher education is changing regarding business structure and instructional model, and leaders in higher education should be forward thinking and consider how innovations in disruption can benefit their individual institutions (Christensen, 2013; Raanan, 2016).

With disruption on the horizon, institutions will look to leaders who lead innovative strategies that will positively affect the entire institutions (McCormack et al., 2017). Disruption is a part of the future of higher education, and effective leaders in higher education should consider increasing the use of technology in the classroom, recruitment of a more diverse student population, and developing strategic goals that contribute to a general understanding and

implementation of innovations (Arnold, 2014; Baker et al., 2012; Christensen, 2013; Kiryakova

et al., 2014; Raanan, 2016; Stott & Neustaedter, 2013).

Chapter III: Methodology

Game-Based Learning (GBL) and serious games include design elements that connect learning outcomes that engage students in the development of 21st century skills. There is emerging evidence through research that the use of GBL and serious games, or gamification, in nursing education contributes to the development of 21st century skills for nursing students. Increased use of technology in nursing education provides an opportunity to explore the benefits of GBL and serious gaming models in nursing education as it may impact the development of 21st century skills that are most sought after by employers (Wehbe-Alamah et al., 2015).

The focus of this study was to categorize research related to the use of Game-Based Learning (GBL) and serious games in pedagogical practices in nursing education for the purpose of identifying those practices that contribute to the development of 21st century skills in nursing students.

Research Questions

The guiding research questions for the study were:

- Research Question 1 – What research in nursing education includes the use of gamification as a means of developing 21st century skills?

- Research Question 2 – Which trends are prevalent in research related to the use of gamification in nursing education?

Research Design and Rationale

The study employed a content analysis approach. Content Analysis data collection is the systematic review of literature related to a given research subject for the purpose of discovering themes and trends (Hsieh & Shannon, 2005; Stemler, 2000). Content analysis of the proposed subject of gamification in nursing education as it contributes to 21st century skill development

provided an opportunity to synthesis research related to the topic for purposes of historical

preservation as well as to substantiate the use of gamification in education (Stemler, 2001).

According to Hsieh and Shannon (2005), there are "three distinctive approaches (to content

analysis): conventional, directed, or summative" (p. 1277).

"In conventional content analysis, coding categories are derived directly from text data.

With a directed approach, analysis starts with a theory or relevant research findings as

guidance for initial codes. A summative content analysis involves counting and

comparisons, usually of keywords or content, followed by the interpretation of the

underlying context" (Hsieh & Shannon, 2005, p. 1277).

According to Krippendoroff (1989), "content analysis is a research technique for making

replicable and valid inferences from data to their context" (p. 403). Bernard Berelson (1959) was

the leading researcher in defining content analysis, and Berelson (1952) proposed that the

content analysis research method contributed to the coding of content for the purposes of

interpreting and categorizing content (Graneheim & Lundman, 2003; Hsieh & Shannon, 2005;

Krippendoroff, 1989; Krippendoroff, 2004; Potter & Levine-Donnerstein, 1999).

According to Graneheim and Lundmann (2003), contend that content analysis research

focuses on either manifest content or latent content. Manifest content is the "analysis of what the

text says with the content aspect and describes the visible, and obvious components" (Graneheim

& Lundmann, 2003, p. 106) of the content. Latent content is the "analysis of what the text talks

about with the relationship aspect and involves an interpretation of the underlying meaning of the

text" (Graneheim & Lundmann, 2003, p. 106).

A conventional historical content analysis was conducted to identify themes and trends in

research on the outcomes of the use of gamification in nursing education to develop 21st century

skills in nursing students through a latent content approach. The context analysis was proposed

as a content analysis that examined historical content of research related to the use of

gamification in nursing education as it relates to the development of 21st century skills in nursing

students. "Content analysis allows researchers to establish their own context for inquiry to enable

aggregate accounts of inferences" (Krippendoroff, 1989) of content provided in examined

research. As a latent content approach, the research proposed to interpret how evidence of 21st

century skill development using gamification in nursing education provided meaning to the use

of the pedagogical style of gamification.

The researcher proposed to examine research related to the use of gamification to

development of 21st century through nursing education by exploring the content of related

research conducted between 2016 and 2021 for the purpose of a historical content analysis of

research outcomes. As an emerging style of pedagogy, the relevance of researching historical

occurrences of 21st century skill development through gamification in nursing education

contributes to the promotion of gamification in nursing education. The research proposed that the

current study would establish historical context to the value of gamification in nursing education

as it relates to 21st century skill development, and through content analysis, the current study

would contribute to the continued use of gamification in nursing education.

Participants

The Carnegie Institute (Shulman, 2001) classifies institutions of higher education by

background, degree-granting capabilities, accreditation, and research classification. Colleges and

universities are classified as doctoral/research institutions, master's colleges and universities,

baccalaureate colleges, associate's colleges, specialized institutions, as well as tribal colleges and

universities (Shulman, 2001). The researcher proposed to conduct a content analysis of research

related to the use of gamification in nursing education for the purpose of developing 21st century skills from institutions of higher education. Only research from institutions that were classified as doctoral/research institutions, master's colleges and universities, and baccalaureate colleges in the United States were included (Shulman, 2001). The researcher proposed to include scholarly research studies available through public domain that were conducted at the above classified institutions of higher education. This study was be limited by the number of institutions from each classification mentioned above depending on the results of the research studies identified in the related research.

Content Analysis Procedures

The researcher proposed a content analysis of research conducted between 2016 and 2022 in the field of nursing education in Higher Education on how gamification in nursing education contributed to the development of 21st century skills in nursing students. The researcher proposed to use the qualitative software program MAXQAD to conduct a qualitative content analysis. The researcher proposed to use MAXQAD reporting software to create tables to identify themes related to the proposed research questions. According to Graneheim and Lundman (2003), a researcher must determine the unit of analysis when conducting content analysis. Units of analysis are "parts of the text that are abstracted and coded, or every word or phrase written in the transcript" (p. 106). The unit of analysis proposed for the current study is the categorization of themes in the research examined in relation to specific models of gamification (Game-based Learning and Serious Games) and outcomes of the use of gamification on the development of 21st century skills. Specifically, the researcher proposed that themes of gaming models would emerge as prevalently used in nursing education for the purpose of developing 21st century skills. In addition, the researcher proposed that themes of specific 21st century skills (communication,

organization, critical thinking, and other skills) would emerge in the reviewed research. The themes identified through the proposed content analysis would provide historical context of the substantive impact of the use of gamification in nursing education to develop 21st century skills.

Limitations

According to Connelly (2013), "limitations focus commonly on internal and external validity of the study" (p. 325). A possible limitation for the study was a lack of research available on the topic of gamification in nursing education as it impacts nursing education which, according to Connelly (2013), can be "a positive argument for conducting a qualitative study in order to identify the phenomena" (p. 325). The researcher was the sole coder for the proposed study which presented the limitation of "self-reported data not verified through other sources" (Connelly, 2013, p. 325). As the researcher was the sole colder for the proposed study, there was a possibility of researcher bias (Creswell, 2016). The researcher maintained a reflective journal throughout the data collection and analysis processes to address biases and assumptions throughout the study (Creswell, 2016).

Ethical Assurances and Negotiating Access

The standards mandated by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1978) in the Belmont Report were adhered to regarding respect for persons, beneficence, and justice. The intellectual property rights of the research studies included in this current study were documented, cited, and given proper acknowledgement. The researcher engaged in ethically responsible practices of data collection and data analysis by securing research studies gathered for this study on their personal computer which is password protected. This research study was conducted on the approval of the Columbus State University International Review Board (IRB). The research conducted in the

study relied on archival research gathered from public domain internet resources. Therefore, no human subjects were included as participants in the proposed study.

Researcher's Role

The researcher engaged in interpretive qualitative research in the proposed study "as an interpreter of the data and an individual who represents information" (Creswell, 2016, p. 248). The researcher used their expertise and prior knowledge to guide the research study while disregarding personal experience as related to the research. The researcher acknowledged that researcher bias is a subjective quality of qualitative research and made efforts through their experience and expertise to objectively report findings based on the qualitive methods employed in the study.

The researcher has been employed in higher education for eighteen years and has held many positions related to student activities, orientation, recruitment, and advising. As a former director of an advising center in the School of Nursing at Columbus State University, the researcher had the opportunity to engage in collaborative research projects related to recruitment, retention, and advising. As a doctoral candidate, the researcher has studied qualitative, quantitative, and mixed-methods research methods.

The researcher currently serves in an administrative role in the School of Nursing at Columbus State University where they engage in data collection related to recruitment, retention, and accreditation. The researcher has expertise in the area of data collection through years of relevant data collection methods and reporting.

The researcher has been a part-time instructor for 23 years and has expertise in content design and implementation of course material both in face-to-face and online learning environments. Through their experience in instructing courses in Public Speaking, First-year

Freshman Seminar, Life and Career Planning, and honors level Life and Career Planning, the researcher has expertise in pedagogy, course management, and course evaluation. It is this expertise that equips the researcher with the knowledge and objectivity to evaluate and analyze research material pertinent to the proposed study.

Researcher as Instrument

According to Xu and Storr (2012) when the researcher is the active respondent in a research study it requires the researcher to engage in a way of thinking of themselves as an instrument in the qualitative research process. The researcher was the instrument in the proposed study engaged in evaluation of relevant content, and as such, had the potential to influence the outcome of the study with researcher bias (Chenail, 2011). "Researcher bias is the process whereby the researcher's personal beliefs, experiences, and values influence the study methodology, design, and/or results" (Greene, 2014, p. 4). To guard against research bias, the researcher employed the following tools: maintain a research journal to note daily activity and personal reflection of research as it is conducted; peer debriefing; developing and maintaining an audit trail; self-reflection (Greene, 2014). "Transformation of the researcher as instrument is made visible through the use of reflective journals" (Peredaryenko & Krauss, 2013, p. 4).

Stability, reproducibility, and accuracy are necessary for reliability measures (Krippendoroff, 2004; Potter & Levine-Donnerstein, 1999). For the purpose of the proposed study, the researcher conducted the content analysis coding. As an experienced educator with 18 years of experience in higher education administration as well as 23 years as an instructor of communication, the researcher has knowledge the appropriate knowledge of content analysis and has been an administrator with the School of Nursing for 10 years. To avoid researcher bias, it

was proposed that that the researcher engage in coder training, coding practice, and repetitive trial coding to avoid researcher bias which would promote reliability.

Trustworthiness

According to Chenail (2011), "the researcher as instrument can be the greatest threat to trustworthiness in qualitative research" (p. 256). Xu and Storr (2012) contended that trustworthiness is established by the researcher through the consistent effort to address and prevent issues related to validity. According to Potter and Levine-Donnerstein (1999), a challenge for researchers of latent content analysis is the objectivity of the patterns examined by the research, and they pose the question "can coders be objective in their decision making" (p. 265) with regards to identify patterns of latent content. Potter and Levine-Donnerstein (1999) argued that repeated research of similar focus that examines the patterns of latent content by multiple coders provides opportunity for validity in the outcomes of said research through establishing consistent research outcomes. The researcher proposed that the research conducted in the study would contribute to the validity of historical research that has been conducted on gamification in nursing education as it contributes to the development of 21st century skills. The research proposed to establish validity through a two-step process suggested by Potter and Levine-Donnerstein (1999). Step one of the processes was to develop a coding scheme where the researcher would "develop a coding scheme that consists of rules and tells the coder how to put their observations into data categories" (Potter & Levine-Donnerstein, 1999, p. 266). Step two of the process was be to "assess the decisions made by the coders against some standard. If the codes match the standards for the correct decision making, then the coding was regarded as producing valid data" (Potter & Levine-Donnerstein, 1999, p. 266). Credibility, transferability,

dependability, and confirmability were criteria that established trustworthiness in research (Greene, 2014).

Credibility

Credible interpretation and evaluation of data is the first criteria for establishing trustworthiness in research (Greene, 2014; Xu & Storr, 2012). Credibility was established through prolonged engagement through the investment of time to exhaustively identify and examine the related research (Greene, 2014). In addition, the research design, data collection method, and data analysis technique contributed to credibility. The research design of content analysis was appropriate for the study in examining relevant research to establish categories and themes related to the research questions. The content analysis design was the best approach to the proposed study as the researcher sought to identify historical evidence of categories and themes in related research that contributed to the outcomes of the research questions.

Transferability

Transferability is the how a study may be applicable in future contexts or settings (Creswell, 2016). Descriptive data collection which provides context for future researchers is key to transferability (Creswell, 2016). The current study provided descriptive data collection as related to the measured content to include the participants (research studies examined), data collection and data analysis. The transferability of the study was limited by the perimeters of the design to include the defined timeframe of research conducted between 2016 and 2022, context of nursing education, context of gamification, and context of 21st century nursing skills. The findings of the study would contribute to the future examination of the phenomena of gamification in nursing education by providing historical content analysis of said research as it

relates to the development of 21ˢᵗ century skills in nursing students who will impact the nursing profession.

Dependability

According to Long and Johnson (2000) dependability "ensures that data collection is undertaken in a consistent manner free from undue variation which unknowingly exerts an effect on the nature of the data" (p. 31). The researcher established dependability by conducting an audit trail of procedures and process of data collection, and the researcher provided a summary of the audit trail in the findings of the study to include details of the processes of data analysis.

Confirmability

"Both dependability and confirmability are established through an auditing of the research process" (Creswell, 2016, p. 204). The researcher conducted an audit of processes of data collection and analysis to attend to the issues of dependability and confirmability. Research notes provided though the research journal included details of the research processes to then be audited and reported by the researcher.

Data collection

Procedures and data collection methods for the proposed study were as follows. The researcher conducted a content analysis research study that examined research related to the use of gamification in nursing education as it contributes to the development of 21ˢᵗ century skills. The researcher gathered research studies conducted between 2016 and 2022 that took place at institutions that are classified as doctoral/research institutions, master's colleges and universities, and baccalaureate colleges in the United States (Shulman, 2001). The research examined scholarly journal articles from public domain scholarly research search engines. The researcher gathered qualifying studies for the purpose of analyzing content to establish themes related to

types of gamifications used in the research studies, types of 21ˢᵗ century skills developed in the

research studies, and the outcomes of the research studies.

The following criteria were set to qualify a research study for analysis: (1) research study

must have been conducted between 2016 and 2022, (2) research study must have been conducted

in a nursing education program for the purpose of 21ˢᵗ century skill development, (3) research

study must include characteristics of gamification, (4) research study must be available through

public domain, scholarly internet sources.

MAXQAD software was be utilized for the qualitative content analysis. Content analysis

of the research studies examined followed the qualitative method of analysis. The researcher

compared two available qualitative analysis software options, MAXQAD and NVivo. Table 1

provides the comparison of the two qualitative software options.

Table 1

Comparison of MAXQAD and NVivo qualitative software programs.

MAXQAD	NVivo
Annotations	Annotations
Collaboration Tools	Collaboration Tools
Data Import/Export	Data Import/Export
Data Visualization	Data Visualization
Media Analysis	Media Analysis
Mixed Methods Research	Mixed Methods Research
Multi-Language	Multi-Language
Qualitative Comparative Analysis	Qualitative Comparative Analysis
Quantitative Analysis	NONE
Statistical Analysis	NONE
Text Analysis	Text Analysis
User Research Analysis	NONE
NONE	Sentiment Analysis

MAXQAD was selected as the qualitative software program for the current study because

of the additional features available over NVivo. In addition, MAXQAD provides features that

NVivo does not, and these include mobile application features, live online training, and

youtube.com subscription of tutorials. MAXQAD offered a more affordable student version, and customer service reviews were higher for MAXQAD with regards to ease of use, customer service, feature, value for money, and higher likelihood to be recommended by users.

Data analysis

The researcher proposed to code the content of the examined research by sectioning and classifying the text through the examination of the type of gamification included in the research study (Game-Based Learning, Serious Games, and other types of gamifications) as well as the 21st century skill developed as a result of the use of gamification in the research study. This study utilized the following steps: (1) identify the research studies to be examined and store the research studies on the researcher's computer as a downloaded and saved file or a bookmarked file (depending on the access); (2) record descriptive information for each study to include the title, researchers, institution where study was conducted, participates, instruments of gamification, 21st century skills tested, outcomes, and other categories as they emerge in the current study; (3) utilize MAXQAD to record findings; (4) analyze data collected through MAXQAD for categories and themes related to the current research questions; (5) report findings.

Reporting data

The purpose of the content analysis was to provide summative, historical data related to the use of gamification in nursing education to develop 21st century skills. Findings were organized by the two research questions, and the findings were presented in a through reporting resources available in MAXQAD.

Summary

Historically, nursing education has included pedagogy associated with evidence-based practice (Romero et al., 2015). As institutions of higher education employ novel pedagogy in instruction, the use of gamification emerged as an innovative and impactful style of instruction that contributes to learning outcomes as well as 21st century skill development (Wehbe-Alamah et al., 2015). This content analysis synthesized research conducted in nursing education and the use of gamification to develop 21st century skills in a historical context for the purpose of identifying categories and themes of research conducted and the outcomes of said research. This study provided evidence of the significance of gamification in nursing education as it contributes to 21st century skill development which results in a stronger pool of nursing graduates who in turn impact the nursing profession.

Chapter IV: Report of Data and Data Analysis

The current study examined the use of gamification, game-based learning (GBL), and serious games on the development of 21st century skills in nursing education. The researcher believed that the content analysis of relevant studies was appropriate and yielded information to the conceptual framework of the current study. A content analysis research design is a procedure for coding categories derived from text data, and through summative content analysis, the researcher believed this study would yield results to support the research questions by identifying and comparing examples of keywords and phrases related to the current research topic to lend support of the use of gamification in nursing education (Heish & Shannon, 2005).

This chapter details the implementation of the content analysis to determine the significance of the use of gamification, GBL, and serious games in nursing education to contribute to the development of 21st century skills. The research design was qualitative and utilized a content analysis process. The method of qualitative content analysis is a research technique that allowed for replicable and valid interpretations of text data (Krippendoroff, 1989). The interpretation and categorization of content may best be examined through the coding process of content analysis to identify common outcomes of the studies examined (Graneheim & Lundmann, 2003). The overarching purpose of the current study was to identify areas in studies where gamification, GBL, and serious games contributed to the development of 21st century skills through pedagogical inclusion of gaming elements in nursing education. This chapter comprises the following elements: qualitative data collection, content analysis coding, content analysis credibility, content analysis results, research question one analysis, research two analysis, limitations, and a summary.

Research Questions

The following research questions guided the current study.

- Research Question 1 – What research in nursing education that includes gamification to develop 21st century skills have been conducted?

- Research Question 2 – Which trends are prevalent in research related to the use of gamification in nursing education?

Research Design

The research employed a qualitative content analysis design to investigate gamification, game-based learning, and serious game design in nursing education as a means of developing 21st century skills. Data was collected from Galileo (Georgia Library Learning Online) which is a research database resource available through Columbus State University. Over 130 databases are available in Galileo, and the researcher selected sixteen available databases based on the description of the database as it relates to the current topic. Databases were selected if the description of the database included one of five following descriptors: nursing, healthcare, general knowledge, academic/scholarly journal, and/or multidisciplinary database. The researcher determined these five descriptors to be the qualifiers for inclusion or exclusion from the research process as the descriptors most relevant to the topic of the current study.

To identify studies in the sixteen databases from Galileo selected for the current study, the researcher utilized six search phrases for each database and organized the results in respective folders. The search phrases were created based on the research questions of the current study. The research included the three key phrases of pedagogy related to the current study in search phrases one, two, and three: gamification, game-based learning, and serious games. To further examine studies available in the sixteen databases, the researcher added "21st

century skills" to phrases one, two, and three to create search phrases four, five, and six.

"Nursing education" was included in all six search phrases to limit the search results from the

sixteen databases to those studies relevant to nursing education. The search phrases included:

1. Gamification nursing education
2. Game-based learning nursing education
3. Serious games nursing education
4. 21st century skills gamification nursing education
5. 21st century skills game-based learning nursing education
6. 21st century skills serious games nursing education

Each of the sixteen databases were searched using each of the six search phrases which yielded

the following results (see Table 2):

Table 2

Results of Search Phrases in Selected Databases

SEARCH PHRASES	1	2	3	4	5	6
DATABASES						
Academic Search Complete	N/A	N/A	N/A	N/A	N/A	N/A
Alt HealthWatch	N/A	N/A	N/A	N/A	N/A	N/A
Chronical of Higher Ed	N/A	N/A	N/A	N/A	N/A	N/A
CINAHL	X	X	X	N/A	N/A	N/A
Consumer Health Complete – EBSCOhost	X	X	X	N/A	N/A	N/A
Consumer Health Reference eBook Collection	X	X	X	N/A	N/A	N/A
ERIC	N/A	N/A	N/A	N/A	N/A	N/A
Health Source: Nursing/Academic Edition	N/A	N/A	N/A	N/A	N/A	N/A
MEDLINE with Full Text	X	X	X	N/A	N/A	N/A
Nursing & Allied Health Database	X	X	X	X	X	X
ProQuest Dissertations & Theses A&I	X	X	X	X	X	X
Public Health Database	X	X	X	X	X	X
PubMed.gov	X	X	X	X	X	X
OVID Medical Journals and Nursing Ebooks	X	X	X	X	X	X
ScienceDirect	X	X	X	N/A	N/A	N/A
Science & Technology Collection	N/A	N/A	N/A	N/A	N/A	N/A

*Description of search phrases proceeds table 1. An "X" indicates that the results of the search

for studies in the database by the specific search phrase yielded studies to be included in the

current study. An "N/A" indicates that the result of the search for studies in the database by the specific search phrase did not yield studies to be included in the current study.

A total of eighty-six studies were identified through the search of the sixteen databases using the six search phrases. The studies were then reviewed for the country of origin where the research took place. Studies were eliminated from the current study if they were conducted outside of the United States per the parameters of investigation established in chapter three for the current study. This yielded a total of sixteen studies that met the following criteria:

- Available through public domain database in Galileo

- Identified through one or more of the qualifying search phrases

- Research conducted in the United States

The sixteen studies identified for content analysis were uploaded to the qualitative data analysis software program, MAXQAD. This software program allowed the researcher to create content analysis codes to identify key words or phrases related to the research question (Graneheim & Lundmann, 2003). The codes selected for the current study included the fourteen frameworks on 21st century skills (see Table 3) designed by Romero et al. (2015) who proposed that 21st century skills are those skills that contribute to "learning, working, and living" (p. 149).

Table 3

Summary of 21ˢᵗ Century Skills Mentioned in Related Frameworks

Mentioned in all frameworks	Mentioned in most frameworks	Mentioned in a few frameworks	Mentioned only in one framework
Communication	Creativity	Learning to learn	Risk taking
Collaboration	Critical thinking	Self-direction Planning	Manage and solve conflicts
ICT literacy	Problem solving	Flexibility, and adaptability	Sense of initiative and entrepreneurship
Social and/or cultural skills	Develop quality products/ productivity		

(Romero et al., 2015, p. 153).

Participants

The current study focused on research studies conducted at institutions of higher learning in the United States related to the research questions. Institutions of higher education are classified by the Carnegie Institute (Shulman, 2001) by background, degree-granting capabilities, accreditation, and research classification. Doctoral/research institutions, master's colleges and universities, baccalaureate colleges, associate's colleges, specialized institutions, as well as tribal colleges and universities are the defining classifications of institutions of higher education (Shulman, 2001). A content analysis was conducted in the current study of research identified through public domain databases produced at colleges and universities in the United States that met the defining classifications by the Carnegie Institute (Shulman, 2001).

Findings and Data Analysis

The qualitative methodology of content analysis allowed the researcher to examine sixteen studies to identify occurrences of content related to the fourteen 21ˢᵗ century skills identified by Romero et al. (2015) as six relatable frameworks of skills and the use of gamification, game-based learning (GBL), and serious games in nursing education. Reading of text to systematically assign predetermined codes allowed the researcher to conduct the content

analysis to identify common themes and occurrences as related to the search phrases and framework of skills examined in the study (Krippendoroff, 1989).

The researcher utilized the qualitative software program MAXQAD for the content analysis process. The sixteen selected studies were saved as PDF files to the researcher's password protected computer, and the studies were then loaded to the document review feature in MAXQAD. Once the files were loaded to the MAXQAD system, the researcher used the software to create the fourteen 21st century skills (Romero et al., 2015) identified in table 1 individually to a code set. This allowed the researcher to assign the definition of the code, as defined by Romero et al. (2015), as well as assign a color for each code (see Table 4).

Table 4

Definitions and Color Assignment of 21st Century Skills Mentioned in Six Related Frameworks

Definitions and Color Assignment of 21st Century Skills Mentioned in Six Related Frameworks

Code	Definition	Color
ICT literacy	Computer or digital competency	●
Sense of initiative and entrepreneurship	Ability to pursue opportunities without regard to resources currently under control	●
Manage and solve conflicts	Ability to identify and manage conflicts in different situations	●
Risk taking	Ability to make decisions under uncertainty	●
Flexibility and adaptability	Ability to reconfigure current and future actions in response to contextual demand	●
Self-direction planning	Self-direction - ability to set goals and plan for achievement of those goals Planning - ability to analyze a situation and create a mental simulation of future actions	●
Learning to learn	Ability to successfully construct and shape learners own learning process	●
Develop quality products/ productivity	Ability to meet high standards and goals for delivering quality work on time Demonstrating diligence and a positive work ethic	●
Problem Solving	Ability to develop a sequence of actions to achieve a goal	●
Critical Thinking	Ability to develop critique and self-directed thinking	●
Creativity	Ability to generate original, valuable, or useful ideas individually or collaboratively	●
Social and/or cultural skills	Ability to understand the social and cultural context Act as citizens Ability to interact with others in a given social context	●
Collaboration	Ability to of team members to coordinate to accomplish tasks Contribute to accomplishing goal of the task by contributing to decision making Being responsible for individual and group tasks/goals	●
Communication	Clearly and effectively articulate thoughts and ideas through speaking and writing	●

(Romero et al., 2015, p. 153).

The memo feature of MAXQAD allowed the research to provide a description in a

research memo of the individual sections of each examined study to be reviewed for content

analysis (see Table 4). For the purpose of this study, the research limited the reviewed sections to

information related to findings/results of the study, limitations of the studies, and conclusions of

the studies. To code each of the sixteen studies individually, the research conducted a content

analysis using the following method:

Table 5

List of Studies and Sections Reviewed for Content Analysis

Title of Study	Sections of study reviewed for content analysis coding
"Playing_for_Bragging_Rights"	Results: Learning in teams, Motivators to Play, Scholarly Significance
00024665-201809000-00007	Results: Utilization, Attrition, Retention of Knowledge, Final Examination Performance Discussion Conclusion
Creative_Gaming_A_New_Approac	Strategy Evaluation: Limitations Conclusion
Engaging_Perioperative_Learner	Program Evaluation: Learning Outcomes, Barriers Resource Considerations: Equipment, Educator, Requirements, Student Needs and Issues Program Implications Conclusion
Engaging_Students_with_Patient	Evaluation Data Student Reflections Lessons Learned Conclusion
Gamification of Nursing Education With Digital Badges	Problems: Cautions and Concerns of Gamification Conclusion
Gamification of Primary Care in a Baccalaureate Nursing Educati	THE TEACHING STRATEGY AND REACTIONS FUTURE USE AND CONCLUSION
Gamification_in_Nursing_Educat	RESULTS: Study Characteristics DISCUSSION: Synthesis, Limitations, Recommendation for Future Implementation and Translation CONCLUSION
Importance_of_Gamification_in_	This article did not include a study. Rather, this article is an overview of the benefits of gamification. All sections were reviewed.
Learning_the_Cranial_Nerves_A	Results Conclusion
Nursing_Students'_Attitudes_To	Results

	Game Play and Nursing Education
	Multiplayer Online Health Care Simulation
	Nursing Student Ranking of the Relative Importance of Knowledge and Skills
	Discussion
	Nursing Students View Games Positively
	Safety and Values in Nursing
	Violence in Video Games
	Pushing Limits in Game Design
	LIMITATIONS
	The Near Absence of New Media in Nursing Education
	What Nursing Education Needs and How Video Games and Related New Media
	Technology Can Contribute
	Current Nursing Students into the Future
	Conclusions and Future Implications
Examination_of_badges_to_incre	Dissertation – Results and Conclusions
Escape_Rooms_in_Nursing_Educat	Dissertation – Results and Conclusions
Formative_Research_on_an_Instr	Dissertation – Results and Conclusions
Game-Based_Learning_and_Nursin	Results Discussion Limitations Conclusion
The_use_of_a_game-based_learni	FINDINGS: Navigation, Motivation, Gaming Concepts, Knowledge, Technology, Target Population DISCUSSION LIMITATIONS CONCLUSIONS

Steps of Analysis

Step 1 – Reading and determining sections for coding.

The study being read and coded was activated in MAXQAD, and this activation provided the PDF saved file of the study for review. The researcher then assigned a memo to the study that identified which section(s) of the study would be coded through the content analysis.

STEP 2 – Creation of codes.

MAXQAD features included the creation of codes for the purpose of qualitative content analysis. The researcher used this feature to create the fourteen codes of 21st century skills, assign a definition of each code, and assign a coding color in MAXQAD (see TABLE 3).

STEP 3 – Content Analysis: Coding by Study.

The researcher reviewed each study one at a time through the process of content analysis and coding. The first step of coding utilized the search feature in MAXQAD whereby the research entered the 21st century skill to search for occurrences of the keyword of the skill in the designated sections reviewed in the study. When identified, the segments containing the keyword or phrase were then coded to the corresponding color of the code of the 21st century skill being examined. In the second step of coding, the researcher read the entirety of the sections of each study identified for review to identify phrases related to the definition of the 21st century skill being examined. The process of reviewing keywords of the 21st century skill and then phrases related to the definition of the 21st century skill allowed the researcher to examine and code the study in two approaches: keyword of 21st century skill as well as definition of 21st century skill. Identified phrases were coded to corresponding 21st century skills using the highlighting and assigning feature in MAXQAD.

Content Analysis Results

The researcher identified and coded content of the sixteen selected studies by the fourteen 21st century skill codes designed by Romero et al. (2015) using the methods described in the previous sections. As a general over of the results, MAXQAD coding of the sixteen identified studies resulted in a total of 105 21st century skill codes assigned. Results of the study were analyzed in MAXQAD through three parameters:

1. Code Matrix Browser – report provides frequency of codes assigned to the reviewed documents by each of the 21st century codes (TABLE 5).

2. Code Relations Browser – report provides frequency of multiple codes assigned to segments of the analyzed text (TABLE 6).

3. Coded Segments – report provides the coded segments from each individual study examined by the 21st century codes.

Code Matrix Browser. The qualitative software program MAXQAD provided the researcher with the feature of conducting a frequency count of the codes identified in each individual study (see Table 5). The study "Gamification of Nursing Education with Digital Badges" was the only study that did not yield coding as a result of the content analysis. The results of this portion of content analysis (see TABLE 6) yielded high (10 -20), medium (5 – 9), and low (1 – 4) occurrences of codes for the 21st century skills. The highest occurrence of coding 21st century skills in the studies analyzed through content analysis included Critical Thinking (19), Problem Solving (16), Learning to Learn (16), and Collaboration (12). The medium occurrence of coding 21st century skills in the studies analyzed through content analysis included ICT Literacy (8), Sense of initiative and entrepreneurship (8), Risk Taking (5), and Communication (5). The lowest occurrence of coding 21st century skills in the studies analyzed through content analysis included Flexibility & Adaptation (4), Develop quality products/productivity (4), Self-direction planning (3), Social and/or Cultural Skills (3), Manage and solve conflicts (1), and Creativity (1).

Table 6

MAXQAD Frequency Count

21st Century Skill / Research Study	ICT literacy	Sense of...	Manage and...	Risk taking	Flexibility and...	Self-direction...	Learning to...	Develop...	Problem...	Critical...	Creativity	Social and/or...	Collaboration	Communicatio...
"Playing_for_Bragging_Rights"	1	4	0	1	0	1	3	2	1	1	1	1	4	0
00024665-201809000-00007	1	0	0	0	0	0	1	1	0	0	0	0	1	0
Creative_Gaming_A_New_Approac	0	0	0	0	0	0	4	0	0	4	0	0	0	0
Engaging_Perioperative_Learner	1	0	0	0	0	1	1	1	0	0	0	0	0	0
Engaging_Students_with_Patient	0	0	0	0	0	0	0	0	3	3	0	0	0	0
Gamification of Nursing Education with Digital Badges	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gamification of Primary Care in a Baccalaureate Nursing Educati	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Gamification_in_Nursing_Educat	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Importance_of_Gamification_in_	0	0	0	0	1	0	2	0	1	1	0	0	1	0
Learning_the_Cranial_Nerves_A	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Nursing_Students'_Attitudes_To	3	2	1	2	2	1	1	0	4	5	0	1	2	5
Examination_of_badges_to_incre	0	0	0	0	0	0	0	0	2	0	0	1	0	0
Escape_Rooms_in_Nursing_Educat	0	0	0	0	0	0	2	0	1	0	0	0	3	0
Formative_Research_on_an_Instr	0	2	0	2	1	0	0	0	0	0	0	0	0	0
Game-Based_Learning_and_Nursin	0	0	0	0	0	0	0	0	2	2	0	0	1	0
The_use_of_a_game-based_learni	2	0	0	0	0	0	1	0	0	1	0	0	0	0

Note. number of occurrences of 21st century skill codes (Romero et al., 2015) by each individual study

Code Relations Browser. The qualitative software program MAXQAD provided the researcher with the feature of conducting a frequency count of multiple codes identified in each individual study (see Table 6). The study "Gamification of Nursing Education with Digital Badges" was the only study that did not yield coding as a result of the content analysis. This

portion of content analysis provided results of multiple 21st century codes assigned to the same segment of text in an individual study.

Table 7

Common Occurrences of Codes

21ST Century Skill	ICT literacy	Sense of initiative and entrepreneurship	Manage and solve conflicts	Risk taking	Flexibility and adaptability	Self-direction planning	Learning to learn	Develop quality products /productivity	Problem Solving	Critical Thinking	Creativity	Social and/or cultural skills	Collaboration	Communication
ICT literacy	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sense of initiative and entrepreneurship	1	0	0	0	0	0	1	1	0	0	1	0	0	0
Manage and solve conflicts	0	0	0	0	1	0	0	0	1	1	0	0	0	1
Risk taking	0	0	0	0	1	1	0	0	3	2	0	0	0	0
Flexibility and adaptability	0	0	1	1	0	0	0	0	2	2	0	0	0	1
Self-direction planning	0	0	0	1	0	0	0	0	1	1	0	0	0	0
Learning to learn	0	1	0	0	0	0	0	1	0	4	0	0	0	1
Develop quality products/ productivity	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Problem Solving	0	0	1	3	2	1	0	0	0	10	0	0	1	1
Critical Thinking	0	0	1	2	2	1	4	0	10	0	0	0	0	2
Creativity	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Social and/or cultural skills	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collaboration	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Communication	0	0	1	0	1	0	1	0	1	2	0	0	0	0

Note. This table provides occurrences of when codes intersected in a segment in the same document. The occurrences demonstrate when coded sections were assigned multiple codes as overlapping segments. The table was created using the "Code Relations Browser" in MAXQAD.

The occurrences demonstrate when coded sections were assigned multiple codes as overlapping segments. The results of this portion of content analysis (see TABLE 6) yielded high (10), medium (4), and low (2-3) occurrences of codes for the 21st century skills. The highest occurrence of multiple coded 21st century skills in the same segment of an individual study

analyzed through content analysis was the code Problem Solving and the code Critical Thinking with 10 occurrences. The medium occurrence of multiple coded 21st century skills in the same segment of an individual study analyzed through content analysis was the code Critical Thinking and the code Learning to Learn. There were five examples of occurrences of multiple coded 21st century skills in the same segment of an individual study analyzed through content analysis: Problem Solving/Risk Taking (3), Problem Solving/Flexibility and Adaptation (2), Critical Thinking/Risk Taking (2), Critical Thinking/Flexibility and Adaptation (2), and Critical Thinking/Communication (2).

Figure 2

Conceptual Framework of Study Connected to 21st Century Skills Development
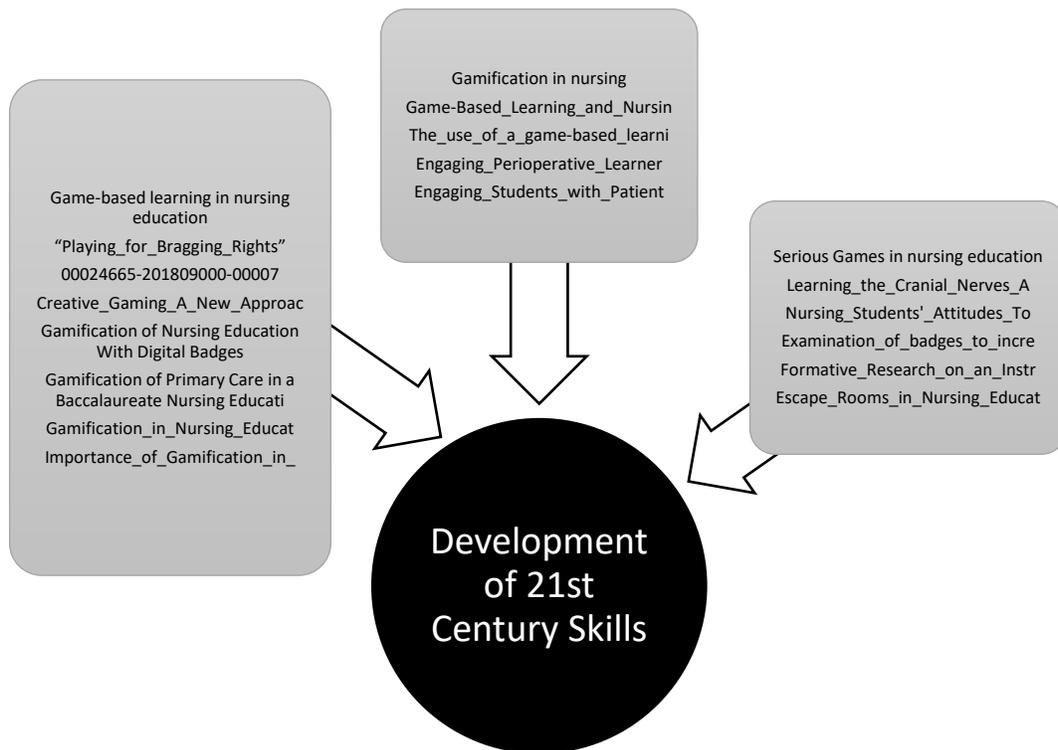
Figure 2. The conceptual framework of the study connects research of gamification, game-based learning, and serious games in nursing education that contributes to the development of 21st century skills.

Coded Segments. The qualitative software program MAXQAD provided the researcher with the feature of organizing the coded segments from each individual study examined by the 21st century codes by individual study examined in the content analysis. The study "Gamification of Nursing Education With Digital Badges" was the only study that did not yield coding as a result of the content analysis. A full list of coded segments from individual studies was provided as an appendix to the current study (see Appendix A).

Perceived Benefits

The objective of the current study was to draw a connection between the use of gamification, game-based learning (GBL), and serious games in nursing education to the development of 21st century skills. The content analysis resulted in identification of 86 studies related to the six search phrases within the sixteen selected research databases (Galileo). Of these studies, 70 were conducted at an international institution of higher education, and sixteen of the studies were conducted at an institution of higher education in the United States. Within the sixteen studies from the United States that were analyzed through content analysis, 105 segments of text were coded as related to one of the fourteen 21st century skills selected to be examined in the current study.

The content analysis of the current study yielded 105 segmented codes of text related to the fourteen 21st century skills as developed through gamification, game-based learning, and/or serious games in nursing education. The study "Gamification of Nursing Education with Digital Badges" was the only study that did not yield coding as a result of the content analysis. The

results showed that within the fifteen available studies examined, there were occurrences of high (4 occurrences), medium (5 occurrences), and low (6 occurrences) frequency of coding of the fourteen 21st century skills from segments of text. In addition, the results of the study showed that coding of the fourteen 21st century skills consisted of multi-coded segments. There was one occurrence of a high amount of multi-coded segments: Problem Solving and Critical Thinking. In addition to having the highest occurrence of multicoded segments, Problem Solving yielded the highest individually coded segments of content from the studies examined with 19 coded segments. Critical Thinking also had a high number of individually coded segments of content from the studies with 16 coded segments and learning to learn also had 16 coded segments. Additionally, Critical Thinking was coded in individual segments 12 times should be considered a trending code within the current study.

Institutions of higher education would benefit from the inclusion of gamification, game-based learning (GBL), and serious games in nursing education as evidence from the current study showed connection between the use of gaming elements in nursing education on the development of 21st century skills. The evidence of international implementation of the studied gaming elements is an indicator that institutions in the United States to be trending globally. However, the large discrepancy between the number of studies conducted internationally as compared the number of studies conducted in the United States showed that it would benefit the institutions of higher education to increase the use and study of gaming elements in nursing pedagogy to increase competitiveness in the global market with regards to providing graduates who developed 21st century skills through nursing education.

Summary

The purpose of Chapter IV was to report data gained through content analysis conducted in the current qualitative study. Data was provided as related to the frequency of 21st century code occurrences in the sixteen selected research studies examined through content analysis. In addition, data was provided related to the occurrences of multicoded segments of text from the sixteen selected research studies examined through content analysis. Lastly, data was reported in relation to research question number 1 and research question number 2.

Chapter V discusses the conclusions, implications and recommendations relevant to the findings of the study.

Chapter V: Conclusions, Implications and Summary

The content analysis study aimed to examine the development of 21st century skills by gamification, game-based learning (GBL), and/or serious games in nursing education. Students attending nursing school today are considered digital natives who are emersed in the use of technology in all aspects of their life to include education (Day-Black, 2015; Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009). Specifically, digital natives have had access to technology related to gaming, social media networking, advanced systems and processors, etc. (Helsper & Eynon, 2009; Ibrahim et al., 2017; Margaryan & Littlejohn, 2008; Prensky, 2001; Selwyn, 2009). The use of technology as an educational tool had to develop alongside the technological skill set of digital natives to engage students in education (Selwyn, 2009).

Chapter I describes the purpose of the current study to identify trends in research studies conducted in the United States that examined the use of gamification, game-based learning (GBL), and serious games in nursing education to develop 21st century skills in nursing students. Gamification, game-based learning and serious games connect learning outcomes to practices in gamification to engage students in developing specific skills, and emerging trends of 21st century skill development through the use of gamification has led to a need to explore the connection between the gamification in pedagogy and the development of 21st century skills (Elaachak et al., 2016; Romero et al., 2015; Wehbe-Alamah et al., 2015). Meeting the needs of digital natives with gamified pedagogy in nursing education contributes to the development of 21st century skills that are of importance to the nursing field in general (Brull & Finlayson, 2016; Day-Black, 2015; Woolwine et al., 2016). Day-Black (2015) contends that today's employers are increasingly focused on efficacy related to 21st century skills, and the emerging focus on 21st

century skill development through gamification in nursing education may contribute to the development of pedagogical practices in nursing education.

Chapter II contained a review of literature of the through a historical overview of material related to the use of gamification in nursing education between the 1990s and early 2000s. The literature review was divided into three domains. Domain one, 1990-2000, provided a review of literature related to the use of low-tech gamification in nursing education, higher education, and continuing education for nursing professionals. The most prevalent trend of gamification in domain one was the modeling of popular television game shows as well as popular board games to create thematically similar games for educational purposes in nursing education (Bloom & Trice, 1994; Goodman, 1999; Gruending et al., 1991; Kuhn, 1995; Northrop, 1992; Saethang & Kee, 1998; Sparber, 1990; Wargo, 2000; Youseffi et al., 2000). Domain two, 2001-2000, provided a review of literature related to the introduction of technology to implement characteristics of gamification into nursing education. The most prevalent trend was the introduction of gamification, game-based learning (GBL), and serious games in clinical lab simulation to contribute to the development of knowledge, evidence-based practice, ethical principles, and critical thinking skills in nursing students (Boctor, 2013; Cowen & Tesh, 2002; Glendon & Ulrich, 2005; Metcalf & Yankou, 2003); Royse & Newton, 2007; Sealover & Henderson, 2005; Stanley & Latimer, 2011; Tarrow, 2005). Domain three, 2011-2020, provided a review of literature related to the expansion of gamification in nursing education beyond development of knowledge and retention of knowledge to include learner-centered engagement that contributed to student satisfaction, motivation, critical thinking, problem solving, technological literacy, and application of nursing concepts and practices (Brown et al., 2019; Brull & Finlayson, 2016; Day-Black, 2015; Gallegos et al., 2017; Johnsen et al., 2016; Gomez-

Urquiza et al., 2019; Koivisto et al., 2016; Malicki et al., 2020; Marquez-Hernandez et al., 2019; Roman et al., 2020; Woolwine et al., 2019). The historical literature provided in Chapter II provided evidence that the use of gamification in nursing education increased student knowledge, critical thinking, decision-making, and the application of nursing skills in clinical laboratory simulations.

Chapter III of the current study presented the research questions, research design and rationale, participant information, content analysis procedure, limitations, ethical assurances and negotiating access information, as well as addressed confidentiality, the role of the researcher as instrument, trustworthiness, credibility, transferability, dependability, and confirmability. Chapter III provided the procedures for data collection and data analysis to include how the data would be reported. The methodology for the current relied on the content analysis of studies related to gamification, game-based learning, and serious games in nursing education to promote the development of 21st century skills. Content Analysis data collection is the systematic review of literature related to a given research subject for the purpose of discovering themes and trends (Hsieh & Shannon, 2005; Stemler, 2000). The content analysis technique in the current study identified themes and trends in the analyzed studies related to outcomes of the use of gamification in nursing education to develop 21st century skills in nursing students through a latent content approach. The researcher established a context of inquiry through content analysis that allowed reporting of occurrences of 21st century skill development in nursing education with gamification (Krippendoroff, 1989).

Analysis and Discussion of Research

The aim of the study was to examine gamification, game-based-learning (GBL), and serious games as included in nursing education to develop 21st century skills in nursing students

at institutions of higher education in the United States. Examining the broad literature review and content analysis allowed the researcher to evaluate gaming elements in nursing education as related to the development of 21st century skills. The findings offer nursing educators insight into the opportunities available in the use of gamification in nursing pedagogy. The researcher conducted an examination of available studies related to the topic of the current study through qualitative content analysis. Two research questions guided this study, and a thorough review of literature in Chapter II of the current study and data from the content analysis allowed conclusions to be drawn from the current study.

Research Question 1

The current study results suggest that a larger percentage of conducted studies related to gamification in nursing education have been conducted at international institutions rather than in the United States. Study results show that while limited, the number of studies analyzed from the United States yielded results that the use of gamification in nursing education is present at institutions of higher education in the United States.

A notable study conducted in the United States by Day-Black (2015) on perceived benefits of serious games in nursing education determined that the use of gamification through connecting content and gaming elements relevant to digital natives contributed to student learning. Evidence of strong international studies was provided in the current literature review through examining several notable international research studies. Malicki et al. (2020) found that interactive gamification contributed to learner-centered engagement models. Brull and Finlayson (2016) concluded the inclusion of gamification in nursing education benefited positive student outcomes, and student feedback suggested that the students perceived the gamification experience as relevant to the digital learner of today. Gallegos et al. (2017) concluded student

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engagement and an enhanced learning experience resulted when serious gaming models were included in nursing education. These notable studies and others highlighted in the literature review of the current study formed the foundation for research question 1. The results of the current study supported the findings of research question 1 in providing evidence that there is a trend of research being conducted regarding the use of gamification, game-based learning (GBL), and serious games in nursing education. The evidence of a larger occurrence of international studies conducted on gamification in nursing education was found in the current study, and research related to gamification in nursing education conducted in the United States is needed to contribute to the global implementation of gamification in nursing education.

Research Question 2

While research related to 21st century skill development does not imply greater valuate added to any of the fourteen 21st century skills examined in this study, the result of the current study shows that the number of occurrences of coded segments (individual and multicoded) of the examined studies for Problem Solving, Critical Thinking, and Learning to learn support research question #2 in identifying trends within current research.

There were four 21st century skills that were coded with the highest number of occurrences: Critical Thinking (19), Problem Solving (16), Learning to learn (16), and Collaboration (12). Segments from the coded text provide connection between the definition of these four highly coded 21st century skills and the impact of gamification, game-based learning, and serious game use in nursing education on the development of said 21st century skills: Critical Thinking (Definition) - Ability to develop critique and self-directed thinking.

Four examples of coded segments of the 21st century skill Critical Thinking provide examples of the connection between the definition of the 21st century skill and the selection of

the coded text. The researcher selected the following segments to be coded for the 21st century skill Critical Thinking as the segments included content related to student development of self-directed thinking as well as individual critique/review of processes of the activity provided in the gamified study.

Figure 3

Examples of Critical Thinking Development

Nursing_Students'_Attitudes_T o	Student respondents understood that being good-hearted and ex-pressing sincerity are useful attributes when communicating with patients, but also that analyzing clinical facts, critical thinking, and interpersonal skills are equally important—these latter elements being skills that can be developed through serious games.
Game-Based_Learning_and_Nursin	GBL using Minute to Win It was effective for teaching and improving students' CJ in caring for patients experiencing PPH. GBL supported students' ability to make accurate and safe CJs.
Game-Based_Learning_and_Nursin	GBL enhanced students' ability to recognize patient changes and act accordingly to promote positive patient outcomes.
Creative_Gaming_A_New_Ap proac	Another student stated, "These bonus activities were unique in that they helped me to better understand how all of the body systems are connected to one another and translate this concept into a more thorough physical assessment strategy."

Note: Examples of text that was coded as critical thinking development using gamification in nursing education.

These examples (see Figure 3) of critical thinking development using gamification in nursing education supported previous research conducted by Koivisto et al. (2016) where the previous research concluded that the impact of gamification in the clinical setting using game-based learning positively impacted critical thinking skills. In addition, results from the current study supported Marquez-Hernandez et al. (2019) conclusion that students developed critical thinking in the study conducted on inclusion of gamification in nursing education. The literature review of efficacy in videogame-based learning in nursing education conducted by Pront et al. (2018) included that gamification nursing education contributed to 21st century skills including critical thinking which lends support to the current findings. Nasiri et al. (2019) concluded

through a systematic review of literature of game-based learning in education concluded that the use of game-based learning in the perioperative field contributed to student use of clinical reasoning in the operating room which supports findings of research question 1 of the current study.

Problem Solving (Definition) - Ability to develop a sequence of actions to achieve a goal.

Four examples of coded segments of the 21st century skill Problem provide examples of the connection between the definition of the 21st century skill and the selection of the coded text. The researcher selected the following segments to be coded for the 21st century skill Problem Solving as the segments included content related to student self-reporting of increased problem-solving skills and the enhancement of problem-solving process.

Figure 4

Examples of Problem-Solving

Engaging_Students_with_Patient	The results of the quiz and survey indicate that the OER innovation was an effective pedagogical approach to enhance nursing students' knowledge and confidence related to the nurse's role in patient safety to include recognizing safety risk and intervening when a safety concern presents.
Gamification of Primary Care in a Baccalaureate Nursing Educati	Our teaching team highly recommends this gamification experience to actively engage undergraduate nursing students in critical thinking and problem solving related to SDOH, LOP, and personal resiliency
Importance_of_Gamification_in_	Using game mechanics and other types of gaming strategies allows learners to solve problems in an engaging and fun way (Bruder, 2015).
Nursing_Students'_Attitudes_To	When we combined undergraduate and graduate responses, two reasons for playing games stood out: to "help me relax" and to "challenge me in problem solving."

Note: Examples of text that was coded as problem-solving skills using gamification in nursing education.

These examples (see Figure 4) of the development of problem-solving skills using gamification in nursing education supported previous research conducted by Davidson and Candy (2016) where the research concluded the use of a gaming strategy known as game-based learning contribute to the development of problem-solving skills with regards to how students

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made choices through the exercise and customized the solution of the activity. In addition, results from the current study supported Brown et al. (2019) conclusion that the innovative strategy of the escape room model contributed to the development of problem-solving with students engaged in a renal simulation in the clinical laboratory setting. Ozdemir and Dinc (2022) found evidence of the development of problem-solving in students engaged in a systematic study of mixed-methods of game-based learning in nursing education. Oppositional research conducted by Hernandez-Fernandez et al. (2020) suggested that greater academic results were found from activities where gamification was not included, but the current study found high occurrences of problem-solving as well as critical thinking as a result of the use of gamification in academic activities.

Learning to learn (Definition) - Ability to successfully construct and shape learners own learning

Four examples of coded segments of the 21st century skill Learning to learn provide examples of the connection between the definition of the 21st century skill and the selection of the coded text. The researcher selected the following segments to be coded for the 21st century skill Learning to learn as the segment included content related to student engagement in the learning process, positive emotional response to the learning activity, and the willingness to engage in future learning activities like the gamified activity from the study.

Figure 5

Example of Learning to Learn

"Playing_for_Bragging_Rights"	Students were overwhelmingly positive in describing how Kaizen helped them learn course content. Many spoke of using Kaizen to study for tests, especially for the final examination
"Playing_for_Bragging_Rights"	A significant finding from this study was that students were overwhelmingly positive about using a gamified platform for its educational rewards. In fact, they expressed a need for more questions and additional study methods within the game. They perceived that playing the game increased their knowledge retention, and they believed that it helped improve test-taking skills.
Importance_of_Gamification_in_	Leaderboards show approximately how many people are playing a game and how the gamer is doing comparatively. Many leaderboards show only the top players. Leaderboards provide a bit of competition and can be a fun way to motivate players to continue learning the content (i.e., to get higher on the leaderboard).

Learning_the_Cranial_Nerves_A	In keeping with gamification learning theory (Lee & Hammer, 2011), students reported that they enjoyed learning in a fun and stress-free environment and also stat-ed that playing the game helped apply knowledge learned during lecture, rather than just memorizing facts

Note: Examples of text that was coded as learning to learn skills using gamification in nursing education.

These examples (see Figure 5) of the development of learning to learn skills using gamification in nursing education supported previous research conducted by Roman et al. (2020) where the inclusion of game-based learning contributed engagement in the learning process as well as an elevation in student willingness to engage in the activity. In addition, results from the current study supported research conducted by Royse and Newton (2007) which concluded that students reported that the incorporation of game-based learning and serious games contributed to their adaptability through entertainment elements. Visual components of gamification in nursing education were found by Gallegos et al. (2017) to have a positive impact on student self-directed study. Oppositional research conducted by Ponti et al. (2015) suggested that motivation for learning may be impacted negatively with regards to gamified activities with inexperienced participants, but the results of the current study found that gamification contributed to inexperienced participants in the area of learning to learn.

Collaboration (Definition) - Ability of team members to coordinate to accomplish tasks. Contribute to accomplishing the goal of the task by contributing to decision making. Being responsible for individual and group tasks/goals

Four examples of coded segments of the 21st century skill Collaboration provide examples of the connection between the definition of the 21st century skill and the selection of the coded text. The researcher selected the following segments to be coded for the 21st century skill Collaboration as the segments included content related to student engagement in the

teamwork through coordinating and accomplishing tasks through the gamified activity in the study.

Figure 6

Example of Collaboration

"Playing_for_Bragging_Rights"	Another student strongly expressed that being on a team was exciting because it inspired her to do well not only for herself but also for her team members.
Escape_Rooms_in_Nursing_Educat	virtual escape room encouraged thinking about the leadership material in a new way, promoted engagement with teammates, and allowed learning from peers
"Playing_for_Bragging_Rights"	A few students related that they texted team members as the game was almost over, rallying everyone to try to beat the team that was winning.
00024665-201809000-00007	Notably, there was a decreased risk of attrition for every additional badge earned, and members of teams who added new players in round 2 were more likely to continue playing.

Note: Examples of text that was coded as collaboration skills using gamification in nursing education.

These examples (see Figure 6) of the development of collaboration skills using gamification in nursing education supported previous research conducted by Seathang and Kee (1998) concluded that use of an interactive, competitive game contributed to student engagement with peers and retention of information. In addition, research by Wargo (2000) on the use of a gaming model to reinforce learning of lecture material on blood clots resulted in students reporting positive outcomes as well as positive learning outcomes from the team-based exercise. Stanley and Latimer (2011) developed a simulation game called *The Ward* which provided insight on the positive impact of game-based learning in the areas of efficacy in teamwork which supports the results discussed in relation to research question 2. Results from research conducted on an escape room gaming model developed by Gomez-Urquiza et al. (2019) provided evidence that the results of the study showed higher student motivation as related to teamwork which supports the findings of the current study. Oppositional research conducted by Vinichenko et al. (2019) suggested that greater participant outcomes resulted from limiting gaming elements in

specific exercise, but the results of the current study showed that gamification contributed to collaboration among nursing students as participants.

The content analysis of the current study yielded results to support the research questions in that research is being conducted in the area of how implementation in pedagogical practices of gamification, game-based learning, and serious games in nursing education contribute to the development of 21st century skill development.

Limitations

The current study was limited to the number of studies available for content analysis as the search of identified databases yielded sixteen of 86 studies that met the qualifying criteria for selection for analysis. The researcher determined to limit the study to only research conducted in the United States as results from the current study's literature review provided evidence of a wealth of international research related to the development of 21st century skills through gamification, game-based learning, and serious games in nursing education. The study was limited to coding of occurrences of fourteen 21st century skills developed by Romero et al. (2015).

Implications for Practice

Results of the current study show that there is evidence of the development of 21st century skills within the identified research related to gamification, game-based learning, and serious games in nursing education. Problem solving, critical thinking, learning to learn, and collaboration emerged as the most coded four 21st century skills in the available research either as an individual code or multicoded item. Problem solving and critical thinking emerged as the 21st century skills with the most occurrences of multi-coded segments.

The implementation of gamified elements in pedagogical practices in nursing education will allow an increase in engagement between students and faculty to contribute to the development of 21st century skills for digital natives (Aloudat, 2017; Bujack et al., 2012). Implementation of learning outcomes in nursing education related to problem solving, critical thinking, learning to learn, and collaboration as supported by the current study as these 21st century skills emerged as the most coded four 21st century skills in the available research either as an individual code or multicoded item. Inclusion of game-based elements in nursing education to contribute to lesser coded 21st century skills to expand on current understanding of how these skills develop and benefit nursing students. Expansion of research in the United States on gamification in nursing education is needed to compete on a global scale and stay on trend with international research related to the current topic. Implementation of gaming elements in simulation labs could be immediate such as designing escape room scenarios that contribute to learning outcomes in nursing education.

Recommendations for Future Research

There are considerations like the cost of implementing gamified elements in nursing education by institutions in the field of nursing education, but the findings of this study suggest that the investment in these pedagogical practices positively impact students with regards to how they learn, behave, engage, and exist as individuals in an academic setting (Aloudat, 2017). Institutions of higher education would benefit from the development of gamified practices in nursing education to address the demands nursing educators face in connecting content to the development of valued 21st century skills that allow nursing graduates to complete in a global market and contribute to the field of nursing as nurses who exhibit said 21st century skills when practicing patient care. Connecting students to 21st century learning objectives contributes to

increased student engagement and proficiency in areas of study related to the field of nursing (Kiryakova et al., 2014).

Future areas of research may include the exploration of how gaming dynamics specifically contribute to the development of 21st century skills. The current study analyzed content as related to occurrences of the development of 21st century skills in current studies conducted in the United States, and future studies are needed to build on this foundation of knowledge to explore how gaming characteristics like options to explore include allowing multiple attempts that contribute to the permission to fail, adaptability of the gaming dynamics towards various learning styles and characteristics of students, levels of difficulty that contribute to mastery of the content, and the use of varying paths of learning that contribute to individualized strategies of examination and mastery of the content may contribute to 21st century skill development in nursing students (Arnold, 2014; Baker et al., 2012; Kiryakova et al., 2014; Stott & Neustaedter, 2013). Another area of future research that will benefit the major premise of the current study is the investigation of the emotional impact of gamification in nursing education by exploring the student experience and related outcomes as related to the development of 21st century skill development (Marquez-Hernandez et al., 2019).

Opportunity for future research is expansive with the post-COVID era of increased development of online classrooms which provides opportunity for the implementation of gaming dynamics in pedagogical practices in nursing education (Arnold, 2014; Baker et al., 2012; Kiryakova et al., 2014; Stott & Neustaedter, 2013). Future research on the studies reviewed for the current content analysis would be valuable in exploring the specific pedagogy included in the reviewed studies. This future research could include detailing the implemented pedagogy as connected to outcomes related to 21st century skill development to explore whether there is

evidence of specific characteristics of the included pedagogy that impacts development of 21st century skills. Evidence of strong international research related to the use of gamification in nursing education contributes to the need for future research to be conducted in the United States to contribute to global competitiveness with regards to graduating nursing students who are able to compete on the global stage, and it is evident through the results of the current study that additional research is needed in the United States at institutions of higher education to explore the topic of gamification in higher education as means of developing the sought after 21st century skills needed in today's college graduates (Arnold, 2014; Baker et al., 2012; Dicheva et al., 2015; Kiryakova et al., 2014; Stott & Neustaedter, 2013).

Dissemination

This qualitative content analysis aimed to connect gamification, game-based learning (GBL), and serious games in nursing education to the development of 21st century skills. The researcher sought to examine research conducted in the United States at institutions of higher education to provide insight into current studies that provided evidence of 21st century skill development using gaming elements in nursing education. The current study intended to show what research has been conducted in the United States on the topic of the current study. The researcher intends to share the current study's findings with the faculty of the School of Nursing at Columbus State University (CSU). The researcher will collaborate with nursing faculty at CSU to attempt to publish the findings in peer-reviewed journals. The researcher will collaborate with nursing faculty at CSU to attempt to conduct future research on the current topic.

Conclusions

This qualitative content analysis aimed to identify current trends in higher education in the use of gamification, game-based learning (GBL), and serious games in nursing education to

develop 21st century skills. An examination of the broad literature available between 1990 and 2020 as well as the content analysis enabled the research to evaluation the use of gamification, GBL, and serious games to develop 21st century nursing skills in pedagogical practices in nursing education at institutions of higher education in the United States between 2016 and 2022. The research was able to conduct a qualitative content analysis of research collected from qualifying databases available in the Galileo system provided by Columbus State University's online library resources. Two research questions guided the study, and a careful review of the literature in Chapter II and data from the content analysis allowed conclusions to be drawn on the current study. The following research questions guided the current study:

- Research Question 1 – What research in nursing education that includes gamification to develop 21st century skills have been conducted?

- Research Question 2 – Which trends are prevalent in research related to the use of gamification in nursing education?

Regarding the first research question, the researcher concluded that international institutions produced a greater number of studies on gamification, game-based learning (GBL), and serious games in nursing education to contribute to the development of 21st century skills. However, the studies from the United States analyzed through content analysis in the current study yielded results that support the use of gamification, GBL, and serious games in nursing education to develop 21st century skills.

Regarding the second research question, the researcher concluded that the number of occurrences of coded segments in the areas of problem solving, critical thinking, and learning to learn support the current trends in research related to the use of gamification, game-based learning (GBL), and serious games, and these occurrences contributed to the value of the 21st

century skills identified by Romero et al. (2015). The results of the current study supported the definition of 21st century skills by Romero et al. (2015) which may contribute to further validity of said skills to provide a much needed, generally accepted definition of 21st century skills. Establishing a generally accepted definition of 21st century skills that may be researched consistently in varying areas of disciplines would contribute to the collective exploration of the phenomenon of how educators may contribute to the development of 21st century skills in gamification, GBL, and serious games.

Concluding Thoughts

Collective analysis of the studies through a qualitative content analysis allowed for conclusions of the study to be drawn. The researcher concluded 21st century skill development was impacted using gamification, game-based learning (GBL), and serious games as pedagogical practice in nursing education. Gamification is a part of the future of higher education, and specifically, it is evident by the research conducted in this study that gamification is part of the future of nursing education with opportunities for future research to support the shift from traditional brick and mortar institutions to ones that engage in technology valued and related to by digital natives (Arnold, 2014; Baker et al., 2012; Christensen, 2013; Raanan, 2016). Nurse educators would benefit from a forward-thinking approach of the inclusion of gamified elements in pedagogical practices in exploring how gamification contributes to learning objectives as well as development of 21st century skill development, and the opportunity to increase gamification in nursing education is prevalent in international studies as well as evident in studies conducted in the United States (Christensen, 2013; Raanan, 2016). As nurse educators continue to innovate classroom models, simulation labs, and technological instruments in nursing education, the inclusion of gamification as a measurable instructional benefits nursing students' knowledge of

and implementation of nursing skills and 21st century skills. Institutions that look to lead

innovative educational strategies would benefit from exploring the use of gamification in the

field of nursing to develop 21st century skills as evidence from the current research suggests a

foundation of connection between gamification in nursing education and 21st century skill

development (McCormack et al., 2017).

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Appendix A – Coded segments of text from selected studies examined through content analysis.

Code	Color	Document name	Segment
Learning to learn	●	"Playing_for_Bragging_Rights"	Students were overwhelmingly positive in describing how Kaizen helped them learn course content. Many spoke of using Kaizen to study for tests, especially for the final examination
		"Playing_for_Bragging_Rights"	A significant finding from this study was that students were overwhelmingly positive about using a gamified platform for its educational rewards. In fact, they expressed a need for more questions and additional study methods within the game. They perceived that playing the game increased their knowledge retention, and they believed that it helped improve test-taking skills.
		"Playing_for_Bragging_Rights"	Even so, the students' positive statements about using Kaizen to enhance their learning, combined with previous research showing learning retention gains (Nevin et al., 2014) and associating consistent player style with higher scores (Roche et al., 2018), suggest that game features of Kaizen were effective in meeting learner needs.
		00024665-201809000-00007	There was also an association with positive educational outcomes, such as retention of knowledge and improved final examination grades among students who played consistently throughout the length of the game (highly engaged and highest PER groups). These findings suggest that, while student engagement may wane over time, monitoring and adapting the delivery of a game-based intervention helps to encourage the investment of different student populations and achieve im-proved educational outcomes.
		Creative_Gaming_A_New_Approac	One student answered, "I appreciated the creativity in describing pathophysiological processes by creating diagrams, flow charts, and graphics. These charts, diagrams, and graphics simplified concepts and pathophysiological processes which helped to strengthen comprehension and retention of important concepts."
		Creative_Gaming_A_New_Approac	Another student remarked, "I always knew the liver was important but now I know even more! It was interesting and educational to see how others applied their organs. The visuals provided by other students on their organ were fun to view. I learned a lot in this class overall and I can apply it every day in my clinical nursing practice."
		Creative_Gaming_A_New_Approac	Another student noted, "I found these bonus opportunities broadened my perspective as it relates to the interconnectedness of organ systems. Being able to represent my favorite organ helped to keep my interest sparked about the topic being covered. I learned a lot of useful information about other organs represented by my peers."
		Creative_Gaming_A_New_Approac	Another student stated, "These bonus activities were unique in that they helped me to better understand how all of the body systems are connected to one another and translate this concept into a more thorough physical assessment strategy."
		Engaging_Perioperative_Learner	When we implemented our GBL programs during perioperative education sessions, participants shared that the format allowed them to focus on the information and they believed that they retained the information after the session. In addition, the majority of survey responses showed that participants found the GBL experience positive regardless of their job title, generational cohort, or years of nursing experience.
		Importance_of_Gamification_in_	Gamification also allows learners to follow their progress, providing autonomous learning (Klopfer et al., 2009). Participants enjoy the freedom to fail while experimenting in a non-threatening environment (Cook, 2013; Lazzaro, 2004). Learners can experience emotions such as frustration, wonder, mystery, and amusement, each providing a personal connection to the game or others playing the game (Lazzaro, 2004).
		Importance_of_Gamification_in_	Leaderboards show approximately how many people are playing a game and how the gamer is doing comparatively. Many leaderboards show only the top players. Leaderboards provide a bit of competition and can be a fun way to motivate players to continue learning the content (i.e., to get higher on the leaderboard).
		Learning_the_Cranial_Nerves_A	In keeping with gamification learning theory (Lee & Hammer, 2011), students reported that they enjoyed learning in a fun and stress-free environment and also stat-ed that playing the game helped apply knowledge learned during lecture, rather than just memorizing facts
		Nursing_Students'_Attitudes_To	Approximately 79% of the participants ranked patient safety, 72% ranked patient-provider communication skills, and 66% ranked fund of professional knowledge as either first, second, or third most important

		Escape_Rooms_in_Nursing_Educat	However, participants overwhelmingly perceived the virtual escape room experience as an effective method to review and learn new leadership concepts.
		Escape_Rooms_in_Nursing_Educat	Participants perceived the experience favorably and advantageous in learning.
		The_use_of_a_game-based_learni	Few students were motivated by the experience points, levels, and badges that existed in the platform. Many felt that there was little purpose in attaining such rewards, and this prevented them from being motivated to participate in the game-based learning platform. One student stated: I wasn't motivated by the reward system offered in the program, as there was no correlation to a tangible reward or benefit. Additionally, several students suggested that rather than abstract rewards in gaming, they are motivated solely by what will help them achieve the best possible grade. Another student said: Because I take classes to learn and pass my program, badges and points that don't affect my grade aren't a motivator for me.
Problem Solving ●		"Playing_for_Bragging_Rights"	However, in both focus groups, students highlighted two aspects of Kaizen that motivated them: competition and personal challenge. Competition. Many students discussed intense competition that made them want to win the game. They texted team members, encouraging each other to answer questions and move up the leaderboard.
		Engaging_Students_with_Patient	The results of the quiz and survey indicate that the OER innovation was an effective pedagogical approach to enhance nursing students' knowledge and confidence related to the nurse's role in patient safety to include recognizing safety risk and intervening when a safety concern presents.
		Engaging_Students_with_Patient	In the asynchronous reflective debriefing discussion forum, 49 students shared their initial thoughts about the OER, what went well, and what should be done differently. Initial thoughts about the virtual experience were positive and focused on the experience enhancing their awareness of the importance of patient safety and the nurse's role to identify risks and intervene
		Engaging_Students_with_Patient	Students commented favorably on the opportunity to solve real-life patient problems and practice identification of safety risks and the application of safety interventions. The OER "boosted [their] confidence" to apply clinical judgment and nursing interventions in an authentic clinical setting.
		Gamification of Primary Care in a Baccalaureate Nursing Educati	Our teaching team highly recommends this gamification experience to actively engage undergraduate nursing students in critical thinking and problem solving related to SDOH, LOP, and personal resiliency
		Gamification_in_Nursing_Educat	Realistic scenarios allow users to make decisions and experiment without facing real-life risks (Cant & Cooper, 2014; Koivisto et al., 2017; Pront et al., 2018; Verkuyl et al., 2016; Verkuyl et al., 2017).
		Importance_of_Gamification_in_	Using game mechanics and other types of gaming strategies allows learners to solve problems in an engaging and fun way (Bruder, 2015).
		Nursing_Students'_Attitudes_To	When we combined undergraduate and graduate responses, two reasons for playing games stood out: to "help me relax" and to "challenge me in problem solving."
		Nursing_Students'_Attitudes_To	When asked about the hypothetical situation of a student who kills a simulated patient in a nursing-themed game, almost all respondents (96%) agreed the person would likely find out what happened and learn from the mistake; 18% thought it would convince the student to stop playing the game; 4% thought it would cause the person to give up their health care career; and 2% thought it would encourage the player to kill real patients.
		Nursing_Students'_Attitudes_To	No significant difference was obtained between the undergraduates and graduates with respect to their belief of the consequence of killing a simulated patient while playing a nursing-themed game. Approximately 93.5% of the undergraduates believed that the student would learn from their mistake, whereas all graduates surveyed believed the same
		Nursing_Students'_Attitudes_To	Participants prioritized eight categories of specific skills, knowledge, and behaviors that a nurse might acquire in nursing school, from most to least critical. The eight categories were patient safety; patient-provider communication skills; coordination of care; fund of professional knowledge; health care team integration; skills in case management; preventing provider burnout; and organizational skills (e.g., how to run an office).

		Examination_of_badges _to_incre	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).
		Examination_of_badges _to_incre	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).
		Escape_Rooms_in_Nur sing_Educat	The virtual escape room challenged participants to problem-solve through a series of six scenarios to escape the experience, requiring group members to adapt to feedback from locking or unlocking the codes.
		Game-Based_Learning_and_N ursin	GBL using Minute to Win It was effective for teaching and improving students' CJ in caring for patients experiencing PPH. GBL supported students' ability to make accurate and safe CJs.
		Game-Based_Learning_and_N ursin	GBL enhanced students' ability to recognize patient changes and act accordingly to promote positive patient outcomes.
Critical Thinking	●	"Playing_for_Bragging_ Rights"	One participant noted that students were able to ap-ply knowledge learned in Kaizen as part of their clinical group experiences.
		Creative_Gaming_A_Ne w_Approac	One student answered, "I appreciated the creativity in describing pathophysiological processes by creating diagrams, flow charts, and graphics. These charts, diagrams, and graphics simplified concepts and pathophysiological processes which helped to strengthen comprehension and retention of important concepts."
		Creative_Gaming_A_Ne w_Approac	Another student remarked, "I always knew the liver was important but now I know even more! It was interesting and educational to see how others applied their organs. The visuals provided by other students on their organ were fun to view. I learned a lot in this class overall and I can apply it every day in my clinical nursing practice."
		Creative_Gaming_A_Ne w_Approac	Another student noted, "I found these bonus opportunities broadened my perspective as it relates to the interconnectedness of organ systems. Being able to represent my favorite organ helped to keep my interest sparked about the topic being covered. I learned a lot of useful information about other organs represented by my peers."
		Creative_Gaming_A_Ne w_Approac	Another student stated, "These bonus activities were unique in that they helped me to better understand how all of the body systems are connected to one another and translate this concept into a more thorough physical assessment strategy."
		Engaging_Students_wit h_Patient	The results of the quiz and survey indicate that the OER innovation was an effective pedagogical approach to enhance nursing students' knowledge and confidence related to the nurse's role in patient safety to include recognizing safety risk and intervening when a safety concern presents.
		Engaging_Students_wit h_Patient	In the asynchronous reflective debriefing discussion forum, 49 students shared their initial thoughts about the OER, what went well, and what should be done differently. Initial thoughts about the virtual experience were positive and focused on the experience enhancing their awareness of the importance of patient safety and the nurse's role to identify risks and intervene
		Engaging_Students_wit h_Patient	Students commented favorably on the opportunity to solve real-life patient problems and practice identification of safety risks and the application of safety interventions. The OER "boosted [their] confidence" to apply clinical judgment and nursing interventions in an authentic clinical setting.
		Gamification of Primary Care in a Baccalaureate Nursing Educati	Our teaching team highly recommends this gamification experience to actively engage undergraduate nursing students in critical thinking and problem solving related to SDOH, LOP, and personal resiliency
		Gamification_in_Nursing _Educat	Realistic scenarios allow users to make decisions and experiment without facing real-life risks (Cant & Cooper, 2014; Koivisto et al., 2017; Pront et al., 2018; Verkuyl et al., 2016; Verkuyl et al., 2017).

		Importance_of_Gamification_in_	In addition, gaming provides a safe environment for failure. A player can go into an unsafe environment (e.g., a code) and practice scenarios without harming the patient. If the patient dies, the student can reboot and start again with an increased knowledge of what to do or not to do the next time. Having the ability to use trial and error without the concern of putting a patient in danger or receiving an unacceptable grade frees students to explore how to use critical thinking (Bruder, 2015).
		Nursing_Students'_Attitudes_To	When asked about the hypothetical situation of a student who kills a simulated patient in a nursing-themed game, almost all respondents (96%) agreed the person would likely find out what happened and learn from the mistake; 18% thought it would convince the student to stop playing the game; 4% thought it would cause the person to give up their health care career; and 2% thought it would encourage the player to kill real patients.
		Nursing_Students'_Attitudes_To	No significant difference was obtained between the undergraduates and graduates with respect to their belief of the consequence of killing a simulated patient while playing a nursing-themed game. Approximately 93.5% of the undergraduates believed that the student would learn from their mistake, whereas all graduates surveyed believed the same
		Nursing_Students'_Attitudes_To	Sixty-nine percent of student respondents rated "clinical facts and critical thinking," and "health professional-patient interpersonal skills" as equally important.
		Nursing_Students'_Attitudes_To	Participants prioritized eight categories of specific skills, knowledge, and behaviors that a nurse might acquire in nursing school, from most to least critical. The eight categories were patient safety; patient-provider communication skills; coordination of care; fund of professional knowledge; health care team integration; skills in case management; preventing provider burnout; and organizational skills (e.g., how to run an office).
		Nursing_Students'_Attitudes_To	Student respondents understood that being good-hearted and ex-pressing sincerity are useful attributes when communicating with patients, but also that analyzing clinical facts, critical thinking, and interpersonal skills are equally important—these latter elements being skills that can be developed through serious games.
		Game-Based_Learning_and_Nursin	GBL using Minute to Win It was effective for teaching and improving students' CJ in caring for patients experiencing PPH. GBL supported students' ability to make accurate and safe CJs.
		Game-Based_Learning_and_Nursin	GBL enhanced students' ability to recognize patient changes and act accordingly to promote positive patient outcomes.
		The_use_of_a_game-based_learni	Augmenting learning and knowledge retention is a prime reason to implement game-based learning systems, and some students felt the use of 3D GameLab© in this research course succeeded in that goal. One student wrote: 3D Gamelab© provided a different approach to learning the class material with an engaging visual mechanism.
Creativity	●	"Playing_for_Bragging_Rights"	They wished for game element features that were customizable, such as choosing their own teams and resetting questions for test review purposes
Social and/or cultural skills	●	"Playing_for_Bragging_Rights"	On the other hand, some students recognized that playing in teams was a good way to bond, especially for first-semester students.
		Nursing_Students'_Attitudes_To	For a smaller, but substantial percentage (39%), game playing is seen as a "socializing activity."
		Examination_of_badges_to_incre	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
Collaboration	●	"Playing_for_Bragging_Rights"	Students had mixed responses about their experiences playing Kaizen as teams. A few students described their team members as "apathetic" and "lazy." Some were disappointed that their teammates were not as driven to win as they were. Others explained that they had formed their own study groups and would have preferred to play Kaizen with those group members

"Playing_for_Bragging_Rights"	Another student strongly expressed that being on a team was exciting because it inspired her to do well not only for herself but also for her team members.
"Playing_for_Bragging_Rights"	They texted team members, encouraging each other to answer questions and move up the leaderboard
"Playing_for_Bragging_Rights"	A few students related that they texted team members as the game was almost over, rallying everyone to try to beat the team that was winning.
00024665-201809000-00007	Notably, there was a decreased risk of attrition for every additional badge earned, and members of teams who added new players in round 2 were more likely to continue playing.
Importance_of_Gamification_in_	Skiba (2014) stated that in the connected age, educators need to provide connected learning in a connected learning environment to support collaboration and accomplish improved outcomes.
Nursing_Students'_Attitudes_To	Complex, multiplayer games could enable nursing students
Nursing_Students'_Attitudes_To	analyze system influences on patient safety in a virtual environment much like the real world. Nursing student respondents supported the use of multiplayer online health care simulations, viewed them as a way to realistically replicate clinical experiences, and were willing to use such simulations on their own time.
Escape_Rooms_in_Nursing_Educat	virtual escape room encouraged thinking about the leadership material in a new way, promoted engagement with teammates, and allowed learning from peers
Escape_Rooms_in_Nursing_Educat	relating to characteristics of constructivism and SCT, such as assembling information, assistive learning, and collaboration (Bruner, 1961/1966; Candela, 2016; Valiga & Phillips, 2016; Vygotsky,1986), are evidenced in the subsequent findings supporting the virtual escape room as a perceived effective method for comprehending new leadership knowledge, aiding learning of leadership material, promoting teammate engagement, and learning from peers.
Escape_Rooms_in_Nursing_Educat	participants also viewed the escape room experience as a promoter to engage with 130 teammates and learn from one another.
Game-Based_Learning_and_Nursin	Minute to Win It facilitated student learning, exposure to factors influencing patient outcomes related to PPH, and extrapolated student thinking to include interdisciplinary collaboration and refine nursing scope of practice.