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Innovative strategies: Increased engagement and synthesis in online advanced practice nursing education☆

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ABSTRACT

Introduction: The struggle to maintain quality education in the online environment has brought about the redesign for the family nurse practitioner courses.

Background: The family nurse practitioner program uses graduate Health Education Systems Incorporated examination as a quality indicator and program benchmark. A downward trend in Health Education Systems Incorporated examination scores stimulated a need for change. Two strategies were implemented to enhance engagement and improve synthesis of clinical information. Case-based learning and gamification involves the use of game thinking and game mechanics in non-game contexts to engage users in solving problems while the case-based discussions act as formative assessment tool, providing information on student's progress and development.

Objectives: To assess the implementation of innovative strategies on the Health Education Systems Incorporated examination scores and to enhance students engagement and synthesis of clinical information.

Method: Case presentations were created in the Learning Management System an online program, for every module. Interwoven throughout the module are various game elements. The game elements include voluntary participation with immediate feedback that can be both positive and negative and provides a social connection. The student has the freedom to fail and the freedom to choose without significant repercussions.

Results: The results showed examination scores increased significantly. Using a one-way analysis of variance to compare Health Education Systems Incorporated examination scores between semester cohorts of students, followed by a post hoc pairwise comparison a statistically significant difference ($p < .001$) between previous semesters was identified.

Conclusion: Although there are many approaches for online learning, using case presentations can mirror different social and cultural situations to challenge the learner. Case-based discussion and gamification strategies are effective in engaging students in a challenging environment. Student responded positively to case-base presentation with game elements. Using this approach is designed to challenge and add value to the learning experience.

1. Introduction

Technology is reshaping the educational landscape. Changes in education, shortened programs, flipped classrooms, and online learning have created the need for innovative and creative thinking. The family nurse practitioner program uses the graduate Health Education Systems Incorporated (HESI) examination as a quality indicator and program benchmark. The downward trend in HESI examination scores stimulated a need for change. The program began the transition to online learning which opened up a full realm of possibilities. Several differences between face to face and online education were of concern, the program applicants and the disappearance faculty-student interaction in the classroom.

Graduate program applicants are a new generation of students, and they are part of a digital age already immersed in the online world through smartphones, tablets, and laptops where information is readily available. Their expectations and attitudes reflect this environment (Koivisto et al., 2016). This new generation of students has a slightly

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different perspective than past generations (Williams et al., 2017). Today's students have been raised to question everything around them and challenge the status quo. The assessment of student's knowledge and clinical skills is paramount to their readiness to practice. Adult learning principles are being tested when educating today's students in the online environment. “Effectively engaging a response from millennials can be done by (1) helping them to understand what they are doing, why they are doing it, and how it can become part of the future greater good; (2) keeping teaching fast-paced by integrating relevant and up-to-date technology; and (3) using a more hands-on approach and outside-the-box thinking when presenting conventional ideas” (Williams et al., 2017).

Two strategies were implemented to enhance engagement and improve synthesis of clinical information. The first is the case-based discussions, integral to problem-based learning and the second is gamification. Case-based discussions act as a formative assessment tool, providing information on students' progress and development. Gamification is a multifaceted concept that has been in use for over a decade to create meaningful learning experiences. Gamification involves the use of game thinking and game mechanics in non-game contexts to engage users in solving problems. The Department of Defense uses gamification to train soldiers and reduce training injuries with a 20% high level of confidence in the translation of information to training related task (Yunyongying, 2014). Gamification has also been used to address the challenge of physical activity. The benefits of physical activity are well known, yet many people opt to continue riding the escalator and not climbing the stairs. However, in one town they changed the stairs into a musical piano keyboard each step producing sound, and people began using the stairs (Kapp, 2012). More recently gamification is being introduced in graduate medical and pharmacy education but is still relatively new in advanced practice nursing education.

1.1. Case Based Scenarios

Case-based learning is a well-established approach to education where students apply their knowledge to real-world scenarios, promoting higher levels of cognition (Allchin, 2013). Case-based learning is student-centered and acknowledges the importance of actively engaging students (Allchin, 2013). Case discussion can be a formative assessment tool and provide insight on students' progress and development. The case discussions allow the students a safe environment to make medical decisions without fear of harming an individual. Case presentations are created in the Learning Management System (LMS) for every module and designed to increase in difficulty. Interwoven throughout the module are varies game elements. Students are required to post a treatment plan with a rationale for the case scenarios presented. They can discuss the posting among themselves, and the faculty provides weekly feedback and guidance on the clinical decisions.

1.2. Gamification

Although games are a large part of today's culture, “there is a lingering culture bias against games” (McGonigal, 2011 p14). Gamification is not simply playing games. Gamification uses several core concepts or game elements which are goal oriented with clearly defined rules to complete the assigned task. Gamification in online learning attempts to create a community of inquiry independent of time and location (Garrison, 2011). Student engagement and interactivity are difficult to capture in traditional online teaching (Rojas et al., 2016). One of the more common problems is the lack of interaction between the student and the faculty, as well as among students (Moore and Kearsley, 2011). The frequency and intensity of the faculty's influence on students, when there is student-faculty interaction, is much greater than when there is only student-content interaction (Mann, 2011; Moore, 1989). The interaction between student and faculty allows the student to draw on the faculty's experience related to the content discussed supporting the individuals learning (Moore, 1989). Live interactive lecture provide an opportunity for student to engage faculty in questions an answer session.

1.3. Game Elements

Gamification has been shown to improve motivation and participation in multiple settings, concepts that are important to APRN education (Nevin et al., 2014). Because the concept of gamification encompasses so many different game mechanics (Hanus and Fox, 2015) the most appropriate for online learning systems to promote medical education and skills preparation is still undetermined (Rojas et al., 2016). Gamification uses elements of games, not the entire game. Gamification for graduate education involves providing clear goals, levels of difficulty, challenges to be completed. Rojas et al. (2016) conducted four focus group sessions to determine the game elements they believed maximized motivation. The common themes identified are point systems, a leaderboard, levels, and module division. Point system involved peer base assessment - where peers rate the quality of others work rather than being assigned points. The leaderboard was reported to be a “double-edged sword” (p. 332) – not everyone wanted their class standing known and module division which allowed them to know “how much of the course they have accomplished” was considered a positive element (Rojas et al., 2016). The most used gamification design principles in education involve visual status, social engagement, freedom of choice, freedom to fail and rapid feedback.

Gaming involves trial and error, the freedom to fail, and then with practice, experience and knowledge success emerges. Gamification is goal-oriented with a focus on progress. It engages the student and promotes collaboration. These strategies can change real-world scenarios into a series of challenges, allowing students to concentrate on learning specific tasks or skills sequentially (Yunyongying, 2014). In one advanced practice course, the modules were redesign to levels which become progressively more involved as the student progresses. The student must complete one level before advancing to the next.

One activity that uses several game elements begins with the “freedom to choose.” The student can choose the challenge they want to complete. For example, with the focus on the Social Determinants of Health, the students choose a specific health disparity and population of interest. They must also decide if they are going to work in groups or individually. A collaborating faculty is chosen to act as a guide. The students are then free to create an educational game, make a video, develop a website or course module, teach a class or participate in a community project.

2. Methods

Case presentations are created in the Learning Management System (LMS) for every module and designed to increase in difficulty. Interwoven throughout the module are varies game elements. The game elements include voluntary participation, (self-assessment quizzes) immediate feedback: both positive and negative, the freedom to fail, freedom to choose and a social connection. The case is designed to increase in complexity as the student progresses through the course. Currently, students are required to develop a plan and an intervention to reduce health disparities in the population of their choice.

Self-assessment activities in the form of multiple quizzes are present in each module. Students may take designated quizzes as often as the like. Some of the quizzes have YouTube videos embedded, followed by several questions. There are also bonus challenges throughout the course. The student is free to choose whether they want to participate in the bonus challenges. Bonus quizzes randomly open for 24 h (12:01 am–11: 59 pm) and then close, so they are no longer accessible. This design explicitly targets engagement. A score of 80% is required to complete the bonus challenge and received credit.

2.1. FNP Track Benchmark

The Family Nurse Practitioner Program uses the Health Education Systems Incorporated (HESI) examination scores as a benchmark for the program's effectiveness. The HESI company provides exams and other study material to help prepare student nurses for their professional licensure exam and are often used to predict the students' likelihood of success. We also use the HESI results to improve the program and subsequently the outcomes. The Family Nurse practitioner program underwent considerable change three years ago. The program courses increased their online presence. Gamification was implemented in 2016 to help engage students and improve outcomes.

2.2. Statistical Methods

IRB approval was obtained for use of students HESI results. A One-way analysis of variance (ANOVA) was used to compare HESI exam scores between semester cohorts of students. The ANOVA was followed by post-hoc pairwise comparisons of HESI scores between semester cohorts with the Tukey test. Statistical analysis was conducted using IBM SPSS Statistics 25.0.

3. Results

Descriptive statistics by semester and the Mean HESI score for each semester was compared using the ANOVA for eight semesters (HESI statistics Table 1). This test indicated a statistically significant difference between the semesters ($p < .001$). The primary interest was in comparing the most recent semester with the previous semesters when the HESI scores began to decline, and the course redesign was implemented. The mean HESI score for Fall 17 was significantly higher than the previous three semesters ($p < .001$ for all three previous comparisons). See Graph 1 mean plot of HESI scores.

4. Discussion

Although there are many approaches for online learning, using case presentations can mirror different social and cultural situations to challenge the learner. Case-based discussion and gamification strategies are effective in engaging students in a very challenging environment (Looyestyn et al., 2017; Glover, 2013; Urha et al., 2015). Gamification is a tool or strategy that can be used to make learning more engaging. The implementation of gamification strategies does require considerable thought, planning and time to create and implement. One goal is to encourage high-quality interaction so using qualitative measures, such as ratings by other learners can significantly contribute to students' motivation (Glover, 2013). The literature supports gamification to enhance engagement. The effectiveness of specific game elements has yet to be empirically tested. Gamification has been successful in increasing the students' engagement and time spent in the online courses. The implementation of gamification correlates with increased HESI examination scores. However, the design of the study limits this inference. The HESI examination scores had plummeted in 2016 triggering the need for increased rigor and innovation. Appealing to a diverse population of student and creating a community of inquiry is challenging. Innovation can improve collaboration and provide quality learning in the online environment.

4.1. Limitations

The study was not a randomized trial of gamification, with students randomly assigned to an intervention or control group. Education is both a cumulative and a complicated process; it is difficult to distinguish the specific effects of gamification. Student test score gains are also strongly influenced by school attendance and a variety of out-of-school learning experiences at home, with peers, at museums and libraries, in summer programs, online, and in the community (Baker et al., 2010). Various teaching styles may also impact the students learning.

5. Conclusions

Gamification has a place in education to enhance engagement, motivation, and learning. Gamification is a tool to be used in conjunction with other available media. The majority of the students found the synchronous lectures to be beneficial reporting the interaction with faculty allowed them to ask questions and seek clarification. Students responded positively to the case base format (student response Table 2).

Table 1
Graph of program HESI results.

HESI statistics

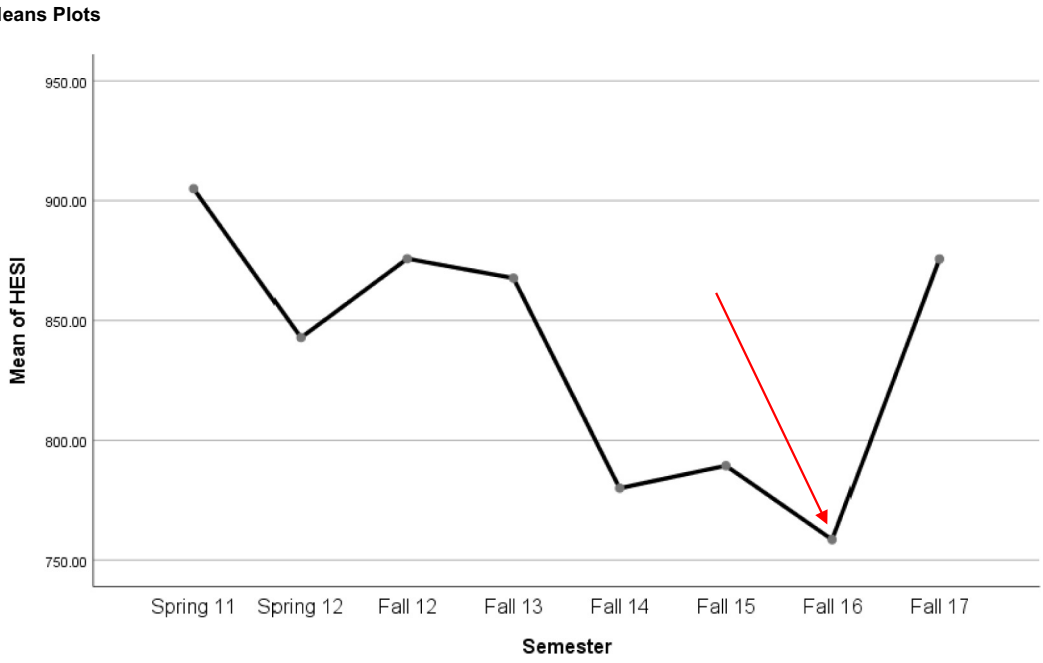
HESI

	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
Spring 11	21	**905.0000**	105.63522	23.05150	856.9154	953.0846	761.00	1089.00
Spring 12	42	**842.8333**	112.35808	17.33723	807.8201	877.8466	556.00	1105.00
Fall 12	62	**875.7742**	106.62089	13.54087	848.6976	902.8508	537.00	1090.00
Fall 13	82	**867.6585**	98.07193	10.83023	846.1098	889.2073	645.00	1067.00
Fall 14	67	**779.9701**	95.71944	11.69399	756.6223	803.3180	589.00	988.00
Fall 15	84	**789.3690**	99.77381	10.88622	767.7168	811.0213	572.00	1016.00
Fall 16	77	**758.5455**	105.13695	11.98147	734.6823	782.4086	469.00	1012.00
Fall 17	87	**875.6667**	106.17402	11.38305	853.0379	898.2954	616.00	1167.00
Total	522	829.5134	113.45108	4.96562	819.7583	839.2685	469.00	1167.00

ANOVA

HESI

	Sum of squares	df	Mean square	F	Sig.
Between groups	1,252,065.371	7	178,866.482	16.857	**0.000 (< 0.001)**
Within groups	5,453,803.035	514	10,610.512		
Total	6,705,868.406	521			



Graph 1. Graph of HESI scores: Fall 2016 implementation of new program.

Table 2
Student course evaluation comments.

Students' course evaluation comments
"The case studies helped think critically. I liked how she expected us to be very specific with treatments. It makes it more realistic".
"• Supports critical thinking. • Encourage critical thinking"
"The expectation of synthesizing our accumulation of information and knowledge is a commendable goal."
"I like the Gatewood family. The cases and questions are very good and stimulating. They may not be real but they are what we see in clinics. I believe these cases or assignments are very strong tools in teaching the course. I really enjoyed the Gatewood family".
"Discussion boards encouraged critical thinking and class participation".
"Canvas is well organized and the case study method for learning helped to synthesize already covered material. I like the 'check off and level up to next case' method for learning. The order for learning systems was well planned. Adapted well to hurricane Harvey".
"The case studies were helpful. • Learned a lot, felt more like a FNP."
"Was excited about the content, care plans were beneficial to learning".

Investigation of additional elements of gamification is underway. Gamification has shown to be effective in engaging students in a very challenging environment (Looyestyn et al., 2017; Urha et al., 2015). Online graduate programs are increasing every year and the challenge to enhance engagement and active learning is tremendous. Synchronous lectures were well received by the students and provided a connection with the faculty that allows or shared experiences. Gamification is not the answer to every learning situation, but it can be useful when it is used to encourage learners to progress through content, motivate action, influence behavior and drive innovation. Additional research is needed to determine which if any of the specific games elements contribute to improved outcomes.

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