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Research paper

A low-fidelity game-based approach to teaching basic health assessment: It's not just a game!

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Abstract

Game-based teaching-learning activities positively influenced student learning in academic programs, particularly in nursing education where learning nursing concepts, disease processes, assessment skills and management may be overwhelming in the traditional classroom setting. The purpose of this paper was to describe a teaching—learning approach, and to discuss lessons learned to use games to teach basic health assessment in first-level BSN program. The approach and organization constructs were interventional, descriptive and non-experimental. In conclusion, lessons learned yield that teaching health assessment content as a game may promote student and faculty involvement, excitement, and motivation. A game checklist was developed based on feedback from students and faculty. The game led to the development of a guide for game-based approaches to teaching pre-clinical undergraduate nursing students health assessment content.

Keywords: *Games; Game-Based Teaching; Simulation; Health Assessment.*

1. Introduction

1.1. Background & significance

A low-fidelity game-based approach can assist faculty with teaching and reinforcing pre-clinical content in undergraduate nursing students. It is not just a game when teaching health assessment to beginning nursing students with a game-based teaching strategy. This form of simulation prepares graduates for success in patient health assessment, and it sparks student-faculty engagement, collaborative, and active learning. Educational games have existed for a long time. According to McKeachie (1976) an educational game has historically consisted of fun, some competition or achievement relative to accomplishment of goal(s). A well planned out game facilitates student learning and must include: 1) structure of game, 2) physical setting; 3) and evaluation. In nursing education, games maybe used in the classroom, clinical, or laboratory teaching (Saethang, 1998; Spears & Kee, 1993). Learning activities must promote develop cognitive and interpersonal skills and gain new knowledge useful in clinical practice (Gaberson, & Oermann, 1999). According to Reilly and Oermann (1992) a game is content with rules, goals, and activities to perform (pg. 143). Games may increase motivation and interest in a topic and allow the student to control the learning activity. A debriefing session at the conclusion of the game provides avenue for emphasizing essential points relative to practice and testing.
Common problem with traditional lectures is engaging today's students in the classroom, and a growing acceptance of gaming can be stimulating and motivating (Fritzsche, 1974 &1989; Hodges, 2008). Gaming can increase student problem solving, transference of learning, and skill enhancement (Henry, 1997). It is essential for nurse educators to understand the philosophy of the institution and the school of nursing and align teaching strategies with that of both philosophy and mission. Today's learners, millennials, prefer a laid back and engaging teaching strategies and not just lecture, the sage on the stage. Lectures must allow the student to engage with peers using a non-authoritative teaching approach. Games as a newer teaching strategy along with technology can allow for today's learner style and needs.
Common problem with traditional lectures is engaging today's students in the classroom, and a growing acceptance of gaming can be stimulating and motivating. Gaming can increase student ability to problem solve, and learn assessment skills.

2. Methods

2.1. Game constructs

The game constructs consisted of multiple teaching-learning strategies, including brainstorming, discussion, humor, teamwork, and coaching. The theoretical framework for incorporating games into course content included the nursing process, health assessment & theory courses, unit outcome and course competencies. Adult Learning theory was also included as the overarching theory for the game.
In a quest to teach beginning nursing students abdomen health assessment, engage students, and increase their understanding of lecture content, the Game, Abdomen Assessment, "Are You Abd. Ready?" was developed. In order to develop the game, the teacher included several measures to ensure content was covered such as teaching-learning principles, peer evaluation, and student input prior to implementation. In a meeting with faculty, a discussion of faculty interest in game and the necessary equipment and resources were available. Faculty availability ensured support of the

game logistics and allowed for shared governance with newer faculty. Next, it was important to ensure that the game was comprehensive and comparable to lecture content. To do this, the teacher compared all aspects of a previously conducted classroom abdominal assessment lecture to content of the game lecture. In a meeting with faculty, the teacher demonstrated and compared the game lecture to the traditional classroom lecture. The response by faculty was mere excitement and interest.

After receiving a positive response and support of the faculty, preliminary game development began. Because the game required some technology, it was essential to collaborate with the learning resource coordinator, laboratory coordinator, and faculty. The learning resource coordinator checks the feasibility of game logistics against required technology and provides the game teacher feedback. Upon receiving a yes to start/ok to conduct, the game development began. Game development meshed with course and lecture outcomes and competencies per syllabus. The previous lecture content was conducted over one and ½ hours, and it yielded 5-8 questions on an 80-item multiple-choice test. In terms of Blooms Taxonomy, questions varied from simple to complex or knowledge to analysis level questions. In the course, all students were required to purchase the textbook for the health assessment course. The book was very explicit with detail information, examples, pictures, and a few review questions at the end of the chapter. It was essential to utilize the required textbook to develop questions for game. An 80 item, multiple choices, true-false, and fill in the blank. The game used powerpoint slides (1 & 2 year) and narrated (3rd year) scripts. A team approach was used with support from the clinical teacher. Course prep, informed for game and instructions prior to game. An examination summary can be used to mesh content with game structure and content objectives for the abdominal assessment content, including inspection, auscultation, percussion and palpation. Other pertinent aspects within the framework are the nursing process, health assessment & theory courses, and unit/course competencies.

The game outcomes included Pros and Cons identified by teachers and students. Table 1 summarizes student and faculty descriptions of Pros and Cons with the use of game-based approach as a teaching learning strategy.

Table 1: Student and Faculty Descriptions of Pros and Cons

Pros	Description of Game: Teaching Learning Strategy
Students/ Faculty	Exciting, fun, and engaging
Students/ Faculty	Technology friendly
Students/ Faculty	Different, challenging, and stimulating
Students	Motivating
Faculty	Collaborative effort with colleagues/peers
Students	Student and teacher driven activity
Students	"Brag rights" of the winning team
Students	Allow students to practice leadership style
Students	Practice critical thinking
Cons	Description of Game As Teaching Learning Strategy
Faculty	Development can be time consuming and stressful
Faculty	Resources
Students/ Faculty	Difficulty in maintaining control of game
Students	Loosing team(s) morale
Students	Game bias
Students/ Faculty	Technology "bleeps"

Teams of Pre-Clinical groups and non-traditional licensed students All students were challenged to take part into a game of learning. This unique way of learning is designed to test student learning by motivating them to be prepared for lecture by studying intensely before class. Games are a lot of fun especially if you participate.

In a group, students were challenged to trust each other and rely on each other to critically think before giving the answer according to the readings in the health assessment textbook. Students must read in order to win the game.

For Part's I and II, the team had to balance knowledge with power and act on understanding of material by giving appropriate and accurate answers, quickly. During Part II, honesty, dedication, trust in team and believing that two students can pull off the demo and get the team the most points possible to win. In a basic health assessment course, the game had to explicitly cover the lecture content, including course and lecture objectives and the required course textbook. More importantly, the game was designed to engage students in the learning experience. The game throughputs consisted of a narrator, student teams, team captain, moderator/non-clinical faculty, and judges of Part I: non-clinical faculty with correct answers/required textbook. Other essential throughputs were judges of Part II: non-clinical faculty with tally sheets per clinical team, display board/traditional classroom black board/project & screen/smart desk, laboratory/classroom, computerized game/computer, answer devices (colored flags, buzzers), and Prize/Reward.

Game destination: "The Abd. Ready Center" was located in the lab/classroom. A place where the student can could play and strut their team's knowledge of abdominal assessment skills or learn how they might need to prepare or study more to enhance their knowledge of the assessment. The team with the most points was deemed "Abd. Ready" Champions. Deserving all respect from their peers and faculty.

Part I: Questions & Answers-intense questions/statements administered to all teams. Tallying of points was done by non-clinical group faculty. Total possible points for this section was 65 questions.

Part II: "Demo Dem Abs"-each clinical teacher demonstrated to their team the abdomen assessment. Student/Teacher had 10 minutes to teach this to your group. As a team, the students decided who would perform the assessment accurately. Two Fearless & Abd ready students (one as the patient and one as the nurse) demonstrated the abdominal assessment and represented the entire group. The Abdominal assessment was demonstrated for the moderators. Students had 10 minutes to conduct the abdominal assessment. The moderators judged the assessment for accuracy according to the abdominal assessment tool per health assessment course. Points were tallied for display on traditional classroom black board. These points were added to Part I. The team with the most points won the game. Students were instructed a head of time before day of game where to locate the tool and have been instructed on how to use it for game-day purposes. Part I and II points were summed, and the team with the most points won the game. All student teams received a prize, and the winning team gained "brag rites."

3. Discussion

Game-based approaches to teaching are being used more and more as a result of better technology, changes in methods of teaching, millennials are more technology savvy, the push for students to use technology, and technology is more user friendly. Students do not view gaming as a course requirement but as a fun activity. The goal of gaming is to provide a collaborative learning opportunity between the student and faculty allowing for student learning in a more entertaining and enjoyable method while assessing for theory, and clinical knowledge retained as identified by the course and clinical objectives (Strickland & Kaylor, 2016). Game-based approaches to teaching allow the student to be engaged with the learning activity, become an active learner, as well as practicing as a leader, as evident of being a team captain (Strickland & Kaylor, 2016)

Benefits of gaming include the opportunity for other students to hear the answer and rational and retain the knowledge, allows the opportunity for several faculties to assess and evaluate questions to be used and the answers that may be appropriate, and allows the student to use their critical-thinking skills. Other benefits of gaming are to provide the students with another method of learning that uses both cognitive and affective learning, which may be easier for the student to remember and recall the content (Strickland & Kaylor, 2016). Gaming also encourages faculty to be more

technology savvy and creative with delivering the content (Strickland & Kaylor, 2016). The use of gaming also allows the opportunity to assess teaching effectiveness and provides an opportunity for faculty to evaluate student strengths and weaknesses (Strickland & Kaylor, 2016).

3.1. Lessons learned

Lessons learned for faculty roles during teaching include leadership skills and competencies. In addition, the lessons learned from use of games include the following:
1) Develop game to meet the course objectives or competencies; 2) Encourage student participation through learning incentives; 3) Student and faculty preparation; 4) Collaborate with faculty; 5) Incorporate the use of technology; 6) Develop an evaluation tool; preferably anonymously; 7) Research student -faculty perceptions; 8) Developer's role free of bias; 9) Include students as facilitators and evaluators; and 10) Pilot the game/simulation prior to using as course content method.
After the gaming is over, debriefing should occur. Debriefing provides another opportunity for faculty to assess teaching effectiveness, get feedback and questions from students, provides reinforcements to student learning, and allows the students to reflect and connect the gaming experience with theory and clinical (Strickland & Kaylor, 2016).

4. Conclusion

Gaming is a fairly new teaching method that allows creativity, assessment, and evaluation of the content while also allowing the ability for students to connect theory with clinical (Strickland & Kaylor, 2016). Although, gaming is fairly new, additional research is needed. Gibson and Bear (2013) reported learning was no different from the traditional lecture as compared to gaming; the goal of the outcome of traditional lecture and gaming was to increase student learning. The assessment did not support gaming over lecture for the teaching-learning method (Gibson & Bear, 2013); however, it provides multiple learning styles (Gibson & Bear, 2013; Strickland & Kaylor, 2016). Additional research is needed to assess if gaming or traditional lectures are more beneficial (Gibson & Bear, 2013).
Gaming has benefits and disadvantages. Gaming allows active student learning, engages the student in the learning process, motivates the student to learn, and allows the student and faculty to assess content weakness and strengths (Strickland & Kaylor, 2016). However, gaming has disadvantages that are the game could get out of control; the process could be time-consuming and stressful, unpredicted technology problems, and lack of resources; and therefore, the gaming activity should be well planned, meets the course and clinical objectives; expectations and rules are provided, and answers are provided to the faculty. If gaming, which includes debriefing and the checklist (Figure 1), is used appropriately, the outcomes should be positive for student learning. Figure 1 is a checklist for games (logistics) in the classrooms or preclinical setting and includes review of policy, review of classroom syllabus, collaboration with nursing department head, team teaching collaboration, collaboration with technology unit/s, coordination of game-based teaching activity from start to finish, student communication and buy-in, and evaluation.

- ☑ Review Policy and Standards of the University/Agency for use of technology/Simulation: Become familiar with the policy, so that you refer to it as you develop your simulation game or simulation activity; If you wish to conduct research using simulation check with your university's Institutional Review Board on use of student/faculty data.
- ☑ Review your classroom syllabus: Be sure that your simulation game/ simulation activity links to the course syllabus. There needs to be a statement(s) in the syllabus that speaks to use of games/simulation as teaching and/or evaluation.
- ☑ Collaborate with University/Department Administration: Works in your favor to understand the expectations of faculty in and out of classroom; and obtaining administrative support for resources
- ☑ Team Teaching- Collaboration with Faculty: Your supportive colleagues are essential to the simulation game/simulation activity.
- ☑ Collaborate with IT: Be sure to include IT in the formulation of games, resources, and funding
- ☑ Coordination of Activity: Step By Step: Be sure to write out step by step guide for you as the teacher of the activity. Be sure it is clear what your role is in the game and others. If scripts are needed, write them out.
- ☑ Guidelines for Game: From Start to Finish, write out every detail of game and communicate this with all teachers and students involved.
- ☑ Communication with Student: At the beginning of each semester or with new hire, be sure to communicate with students and new nurses regarding the game and the expectations. Provide an overview (Pre-Game Show) during orientation to the course content and point out in the syllabus.
- ☑ Be flexible during the activity: All learners are different consider diverse learning styles.
- ☑ If you are wishing to conduct or publish the results of your game/simulation activity, work as a team with colleagues and ascertain that your university/hospital IRB and other essential departmental administrators are aware and accessible for support.

Fig. 1: Checklist for Games in Classroom/Pre-Clinical Setting.

Figure 2 is the game-based activity checklist developed based on lessons learned from use of the game in classroom setting, including feedback gathered from student and faculty. More importantly, this checklist is for the teacher who is considering using the game. It may be used as a guide for teaching considering using this approach to teaching content in health assessment with undergraduate nursing students.

- ☑ Develop game meeting course objectives/ competencies
- ☑ Encourage student participation r/t learning incentives
- ☑ Encourage student & faculty preparation prior to game.
- ☑ Collaboration with faculty for success and buy-in
- ☑ Incorporate game technology to eliminate bias
- ☑ Develop an evaluation tool for game effectiveness
- ☑ Research: student & perceptions of games in classroom
- ☑ Link course objectives to Theory of Adult Learning
- ☑ Link objectives, learning objectives to game content
- ☑ Include Pre-Game as Study Prep as Guidance
- ☑ Include Media/Technology Personnel for feasibility
- ☑ Pre-test Technology prior to game
- ☑ Devise a checklist for game logistics

Fig. 2: Game-Based Activity Checklist.

Simulation continues to be a hot commodity in nursing education and practice. As we prepare the future nurses for diverse health care practices, game-based has become an innovative method to effective didactic and clinical teaching in a safe and simulated environment that prepares them for clinical settings. This strategy was used to engage students in learning the abdomen assessment content in a beginning nursing health assessment course prior to clinical site rotations. The game-based activity checklist may be used as a strategy to develop a game-approach to teaching basic assessment skills to undergraduate nursing students.

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