

## Scoring Rewards in Nursing Education With Games

Pamela Sealover, MS, RN  
Deborah Henderson, PhD, RN

*Create a spark in teaching and learning with an educational game. Try borrowing from a well-recognized game for use in class. The authors discuss advantages and disadvantages of games and questions to ask when selecting a game. A game laboratory that included 4 popular game show formats is described. Pretest to posttest scores and surveys show that students found the game laboratory educational, fun, and refreshing.*

Gaming is an appealing learning strategy for faculty and students due to the element of fun, active participation of students, and the challenge of competition in a nonstressful, collaborative environment. A “Game Lab” at our nursing school uses 4 popular game show formats as a method of reviewing course content.

### Types of Games

To select a game as an instructional strategy, the instructor must know the basics of gaming and how to use games to achieve learning outcomes. A learning game involves competition, rules, and collaboration among team members and competition across teams.<sup>1</sup> If designed correctly, the losers as well as the winners of the game should feel that the experience was worthwhile and fun. Authors have described “serious play” as a form of active learning that includes cognitive and physical components.<sup>2-4</sup> Serious play is purposeful (goal-oriented), satisfying, and rewarding. The experience of playing is as important as the outcomes of playing the game. Games when used as an instructional strategy match the characteristics common to all intrinsically motivating learning environments. These characteristics, such as challenge, curiosity, fantasy, and control, internally motivate the learner by heightening learner interest and caring.

### Elements of an Educational Game

A game needs to incorporate the right amount of *challenge, curiosity, fan-*

**Authors’ Affiliation:** Assistant Professor of Nursing (Ms Sealover); Professor of Nursing (Dr Henderson), School of Nursing, Ohio University, Zanesville, Ohio.

**Corresponding Author:** Dr Henderson, Ohio University, 1425 Newark Road, Zanesville, OH 43701 (hendrsd@ohio.edu).

*tasy*, and *control*.<sup>5,6</sup> First, game goals need to be clear and personally meaningful. Then learners need to receive feedback on whether or not they are achieving them. This requires faculty to develop clear, meaningful goals and a plan for feedback well in advance of the game playing. Second, there must be an uncertain outcome in game for the learner to be motivational: the student must believe winning is possible. Faculty must allocate adequate time in advance of the class to prepare the game and control aspects of how the game will develop. Hiding selective information from the learner until prearranged points in the game maintains the uncertain outcome and heightens continuing interest as the game progresses toward the end point. Third, consideration should be given to the use of props. Toys and tools can serve as props. They need to relate directly to the game’s purpose if used. An example would be the wheel used to play the game, Wheel of Fortune. Fourth, the learner’s self-esteem is enhanced by providing opportunities to be successful. The nursing educator must plan the game to avoid or minimize embarrassment for learners and include opportunities for everyone to be successful. To be successful does not always require winning.

### Advantages and Disadvantages of Educational Games

Games provide a structure for reinforcing facts and acquiring knowledge and skills. Games can help nursing students develop social and professional skills such as communication, problem solving, leadership, and decision making. The educational literature claims that educational games reduce stress and anxiety.<sup>7</sup> A relaxed atmosphere that incorporates humor is part of the design. Active involvement and engagement of all learners is planned. Boredom is decreased because of the varied learning strategy and teamwork is promoted through team efforts to score and win. As a result, an atmosphere which fosters learning and retention is created.<sup>5,6</sup> Games promote assimilation of content and can strengthen the link between theory and practice for nursing students.<sup>7</sup> Games provide a supportive environment in which nursing students can experiment without risk and prepare for possible situations they may encounter in practice.<sup>7</sup>

The disadvantages of educational games<sup>7</sup> include possible stress and embarrassment for students when wrong answers are given. Competition can become threatening to learners.

Other disadvantages include prohibitive costs to develop and sustain games, time-intensive preparation and set-up, and inability to evaluate actual learning by individual students.<sup>7</sup>

## Selection of a Game for Nursing Education

When selecting a game, consider the following questions:

- Does the game contain roles easily recognized by nursing students in nursing practice (real-world relevance)?
- Is the game appropriate for the predetermined learning objectives, learners, and intended goal of instruction (appropriate frame)?
- Does the game allow easy modification to nursing, the number of learners, and the physical site (flexible format)?
- Does the game engage all participants during the entire game (participant involvement)?
- Does the game have “parts” and are they reusable (effective packaging)?
- Does the game have clear, simple instructions and rules (effective instructions)?
- Does the game cause learners to be involved in challenging tasks, not trivial activities (intellectual stimulation)?
- Does (or could) the scoring system for the game reward achievement of the nursing objectives and will the learning be obvious to the nursing students (criterion reference)?
- Is the game easy to use to facilitate learning and does the preparation take a reasonable amount of instructor time (user-friendly)?
- Is the game reasonable to use in nursing education (cost-effective)?<sup>8</sup>

## The Game Lab

Four games were created for the game lab day to provide an overall course review in medical surgical nursing prior to the comprehensive final exam. Each game incorporated team participation to allow students to feel more comfortable and provide a level of excitement. Questions in each

game were designed to draw out knowledge, comprehension, or application of content included in the course. The games developed were Nursing Jeopardy, So You Want to Be a Millionaire Nurse, Wheel of Nursing Fortune, and Nursing Feud. Faculty served as the game show hosts. Each gaming station lasted approximately 20 minutes.

In the Nursing Jeopardy game, 4 broad categories of course content were developed. In each category, questions with values of \$100, \$200, \$300, \$400, and \$500 were developed. The team chose a category and dollar value question to answer. If the team gave an incorrect answer, the other team attempted to answer the question. The team with the most money won the game.

In the So You Want to Be a Millionaire Nurse game, a team of 4 or 5 students acted as the contestants and selected multiple-choice questions for increasing amounts of money. Each team had 3 life lines they could use if they were unsure of the correct answer: ask the audience, call a friend, or 50/50 (eliminating 2 of the 4 answers). The team with the most money was designated the winning team.

The Wheel of Nursing Fortune game incorporated a homemade spinning wheel with cards that were placed at each slot with questions behind them. A team consisted of 4 or 5 students and the team answered the question where the wheel stopped. The team was awarded points for correct answers and the team with the most points was designated the winning team.

In the Nursing Feud game, 1 student from each team competed by being first to ring a bell to gain the right to answer an open-ended question. The students choose the correct answer which was verified by the faculty member. If they were correct, the team could decide to play and attempt to get all the possible correct answers for that question for points or pass the question to the other team. All members of the team took turns identifying correct answers. Each correct answer had a number of points attached. If the student gave an answer not identified by the faculty member, a strike was awarded to the team. If a team received a total of 3

strikes, the other team could steal all the competing team’s accumulated points for that question by giving a correct answer. The team with the most points at the end of the game was designated the winning team.

## Methodology For Evaluation of the “Game Lab”

Two research questions were developed. Research question 1: Will there be improvement in individual student scores from time 1 (pretest) to time 2 (posttest)? Research question 2: Will the use of a gaming strategy be perceived as beneficial by students? A 1-group pretest and posttest design was used to evaluate research question 1. The pretest was developed to include a sampling of 10 multiple-choice questions covering the course-assigned topics of orthopedic and neurological emergencies. The posttest included the exact same questions. Pretest to posttest scores were entered into SPSS (statistical software) for each individual student and by quarter.

This method was used in 5 sequential quarters the course was offered for a total convenience sample of 107 students. Frequencies were run comparing correct responses on the pretest to posttest for each student and paired *t* tests were run question by question pairing the answers for each question on the pretest and posttest. Nine of 10 multiple-choice questions showed improved scores from pretest to posttest with significance. Each quarter the course was taught, a pretest was completed in a classroom setting prior to the game lab. Answers to the pretest questions were not discussed.

To answer research question 2, an evaluation survey was administered to the students in 3 of the 5 quarters (*n* = 74). The survey asked students to use a Likert scale ranging from 0 to 4 (0 = strongly disagree, 1 = disagree, 2 = unsure, 3 = agree, and 4 = strongly agree). The 7 evaluation questions included: was the game lab useful, was learning retention facilitated, was it fun, was it intellectually stimulating, was team cohesiveness promoted, were areas for review identified, and what their overall rating of the lab was. In addition, students were asked

**Table 1. Pretest to Posttest Results of Learning from Game Lab over 5 Quarters**

Question Topic	n	Pretest % Correct	Posttest % Correct	% Change	P
1. CPR	106	47	83	+36	<.001
2. Bucks traction	106	86	98	+15	<.001
3. Closed reduction	105	65	96	+31	<.001
4. Assessment fracture	106	99	97	-2	<.001
5. Cystic fibrosis	24	42	100	+58	<.001
6. Skeletal traction	107	40	88	+48	<.001
7. Seizure precautions	107	83	92	+9	.012
8. ↑ Intracranial pressure	106	80	94	+14	<.001
9. Nephrotic syndrome	24	100	100	0	1.000
10. Care during seizure	107	55	91	+36	<.001
11. Assessment cast	107	86	99	+13	<.001
12. Inflammatory response	107	86	97	+11	<.001

what they liked the most, what they liked the least, and were allowed other comments or suggestions. Students were then divided into groups of 4 or 5 by dividing each clinical group into 2 smaller groups.

Students were not randomized to a control or experimental group because all students participated. Each group rotated to each of 4 game stations. To increase the level of excitement and create a festive atmosphere, each of the assigned groups developed a team name, well-known game show music was played in the background, the room was decorated with balloons, faculty were dressed as game show hosts, and candy was given as prizes. At the conclusion of the games, the students turned in game score cards. The winning team was awarded the trophy and individual prizes. "Prizes" included penlights, writing journals, mugs, notepads, name tag holders,

and nursing books donated by nursing faculty. At the conclusion of the game lab, approximately 100 questions had been answered. The posttest, consisting of the same items as the pretest, was given in a classroom setting.

### The Game Lab Outcomes

#### Research Question 1 Results

The students arrived for their class knowing that they would be playing games to review course content but had not known there would be a pretest or posttest. Analysis of the 2 tests revealed significant improvement on the group mean pretest to posttest scores (Table 1). Item scores improved from 9% to 48%.

Although there was noted improvement on posttest means for most questions, alternative explanations for improvement include a practice effect

and a short time interval between pretest and posttest.

#### Research Question 2 Results

Evaluation survey mean scores on the 7 evaluation questions indicated very positive evaluations of the game lab, ranging from a mean of 3.39 to 3.78 out of 4.00 (Table 2). Students provided written feedback that they liked the knowledge-based questions and felt the lab was informative. Students cited that they liked the games, candy, group involvement and interaction, and enthusiastic environment. The written feedback from students stated that they enjoyed working on teams and the group interaction. Comments about what students liked least included: competitiveness, confusion, losing the game, time consuming, and on some questions, the level of difficulty was too high.

**Table 2. Game Lab Evaluation from 3 of 5 Quarters**

Question	n	Mean	% Agree/Strongly Agree
Useful	74	3.68	97
Facilitated learning retention	74	3.65	96
Fun	73	3.78	96
Intellectually stimulating	74	3.73	99
Promoted team cohesiveness	74	3.69	97
Identified areas to focus on for review	73	3.39	84
Overall rating of lab	73	3.73	

## Recommendations

The authors recommend varying the pretest and posttest questions in order to better understand the effect of the game lab on learning and to decrease the practice effect. Suggestions on ways to decrease this could include (1) a 20-item test randomly split into pretests and posttests, (2) some groups of students could complete the posttest only or (3) a second posttest, given a few weeks later, would indicate whether learning that occurred was short or long term. The results could be compared to the current findings to see if varying the technique decreases the possible practice effect.

The development of props, such as the spinning Wheel of Nursing Fortune and cards with questions and answers was inexpensive but time intensive. Subsequent set-up of the game lab and addition of new ques-

tions require little preparation time. The cost of candy and other prizes is minimal, and comes from donations from faculty and associates.

The results of the game lab at our school are sufficient to encourage us to continue this experience in this course. The game can be changed as new game shows become popular, or unique game styles could be invented. Students do not need to be entertained to learn, but wise faculty know that a change of pace and adding fun to learning is good for both students and faculty.

## References

1. Thiagi S. Who is Thiagi? 2002. Available at: <http://www.thiagi.com/about-thiagi.html>. Accessed October 18, 2004.
2. Rieber LP. Designing learning environments that excite serious play. Available at: <http://www.nowhereroad.com/seriousplay/Rieber-ASCLITE-seriousplay.pdf>. Accessed December 29, 2004.
3. Rieber LP, Matzko MJ. Serious design of serious play in physics. *Educ Technol*. 2001;41(1):14-24.
4. Prensky M. Simulations—are they games? 2001. Digital Game-Based Learning. McGraw-Hill. Available at: <http://www.marcprensky.com/writing/Prensky%20-%20Simulations-Are%20They%20Games.pdf>. Accessed October 18, 2004.
5. Malone T. Toward a theory of intrinsically motivating instruction. *Cogn Sci*. 1981; 5(4):333-369.
6. Malone T, Lepper M. Making learning fun: a taxonomy of intrinsic motivations for learning. In: Snow RE, Farr MJ, eds. *Aptitude, Learning, and Instruction, III: Cognitive and Affective Process Analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1987:223-253.
7. Kuhn MA. Gaming: a technique that adds spice to learning? *J Contin Educ Nurs*. 1995; 26(1):35-39.
8. Henderson D. Games: making learning fun. In: Oermann MH, Heinrich KT, eds. *Annual Review of Nursing Education: Vol. 3*. New York, NY: Springer Publishing; January 2005.

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