SciMedCentral

Annals of Nursing and Practice

Research Article

Teaching Nursing Students in a Multi-User Virtual Environment (MUVE): A Pilot Study

Estelle Codier*, Abbie Neves and Penny Morrison

Replace- Associate Professor, School of Nursing, University of Hawaii, USA

***Corresponding author**

Estelle Codier, 2528 McCarthy Mall, Webster Hall, Honolulu, Hi 96822, Tel: 808-783-1583, Email: codier@hawaii.edu

Submitted: 04 November 2014

Accepted: 26 November 2014

Published: 28 November 2014

Copyright

© 2014 Codier

OPEN ACCESS

Keywords

- MUVE
- Nursing education
- Virtual learning
- Simulation

Abstract

Multi-user virtual environments (MUVE), considered by some to be the 'next wave' of educational technology, have been effectively used across a wide range of learners and subjects. A meta analysis published in 2012 reviewed 107 articles, including 52 empirical MUVE learning research studies, summarizing its benefits and advantages over traditional teaching methods. Of the 52 research studies, only one focused on health care education [1]. This exploratory, mixed method pilot study was undertaken to evaluate learning activity and course outcomes for nursing students using MUVE learning. Ninety percent of students reported that learning objectives were met using MUVE learning activities, and 80% reported that course objectives were met as well if not better in MUVE learning activities as compared with traditional learning activities. Instructor evaluation validated the student assessments.

Qualitative themes in student evaluations included "positive learning outcomes and processes",

"Learning in virtual reality", and "technology obstacles".

BACKGROUND AND DESCRIPTION

Clinical simulation is widely used as an adjunct to traditional methods of teaching clinical nursing assessment, diagnosis, and intervention, as well as professional skills such as teamwork, interdisciplinary practice and professional communication. Computer simulation in particular is used extensively in health care education and is widely regarded as effective and cost efficient mixed method. This exploratory, descriptive pilot study, funded by seed grant funds from the Robert Wood Johnson Foundation, was undertaken to explore the use of a new form of computer simulation, multi-user-virtual environments (MUVE), in nursing graduate education. Specific study questions included the following: 1. Are students who utilize MUVE learning able to meet learning activity and course objectives? 2. How do student learning in MUVE learning activities compare with traditional learning activities? 3. How do instructor evaluations of MUVE learning compare with student assessments?

What is a multiuser virtual environment?

Imagine a three dimensional cartoon world. In this world, each cartoon person (avatar) represents a real person. In a MUVE learning activity, teachers and students engage in virtual world activities in their avatar form. The participant, via computer keyboard controls, moves their avatar around the three dimensional world, walking, talking, and interacting with others. By typing in a chat box that appears as a running dialogue, students communicate with each other, the instructor, and avatar/patients. This running dialogue can be copied and pasted into a word file for a transcript of the learning activity.

Numerous universities have virtual campuses in MUVE, and a wide range of disciplines; physics, medicine, psychology, public health, nursing, business schools and EMS trainers use the virtual environment to teach a wide range of professional practice skills, from advanced resuscitation and disaster preparedness to leader effectiveness and skills for running a business [2-11]. Several large, multimillion dollar MUVE's were created specifically for learning, such as Harvard University's "Riverwalk". Second Life® was one of the first MUVEs available to the public. It is free of charge, and available for a wide range of learning activities across a variety of learning environments. For this reason the MUVE learning activities in this study engaged in took place in Second Life®. Learning in a MUVE can target particular skill sets and facilitates feedback, reiteration of key principles, and the ability for learners to practice where the consequences of error do not harm patients. Pilot research evidence suggests that the translation of skill performance from the MUVE environment into 'real time' application of complex skills is, in some cases, superior to traditional teaching methods [12, 13. Advantages

of MUVE learning include greater engagement with processes, interpersonal engagement and learning partnerships, as well as on line availability. These results in highly engrossed, contextualized learning. MUVE learning is particularly effective for addressing complex scenarios in which a wide range of skills are simultaneously engaged. The MUVE environment enables feedback which is context specific and immediate [5, 11, 14-17].

Unlike learning activities in which a learner can remain passive, in a MUVE, a learner is in a situation about which they must make a decision, and be promptly confronted with its consequences [7]. The MUVE environment offers the opportunity for a 'dense' learning experience where multiple skills, cognitive, perceptual/motor, interpersonal, leadership and team may be simultaneously exercised. A wide range of skills such as psychomotor skills, critical thinking, interpersonal communication, problem solving, leadership and team management can all be included in a single MUVE learning activity [3]. Assessment of abilities can be accomplished quickly in MUVE, an environment that more closely approximates a real practice environment than is possible in the traditional classroom. A MUVE learning methodology is particularly useful with highly complex training, where the consequences of errors are expensive and/or dangerous [12]. A meta analysis of 52 empirical research studies on MUVE learning concluded that advantages of MUVE learning included its ability to develop collaborative learning, situated cognition, and problem solving [1]. Disadvantages include the requirements for computer access and skills, the necessity of internet access and the ability to engage internet resources, as well as the learning curve required to adapt to both the on line and virtual format for learning. Additionally, although voice communication is possible in MUVE learning, most MUVE learning activities are carried out using a chat function, which limits even 'verbal' interaction to written text. Although avatars can gesture and perform other 'nonverbal' communication, for the most part facial and typical nonverbal communication and other critical elements of 'presence' are not possible. Course instructors can design learning activities in MUVE to meet a wide range of student learning objectives. Participants in this study were engaged in course work that involved the following general types of MUVE learning activities: 1. MUVE learning in content rich environments, 2. Interviewing, 3. Clinical rounds in a virtual hospital and 4. Discussion groups

Students could explore genetics content in a MUVE location designed by geneticists to teach genetics flying through a three dimensional cell to explore cell function or walking through a chromosome forest to explore chromosomal structure and function. Students who did interviews in MUVE received comprehensive feedback when the interview transcripts were evaluated by themselves, peers, and the instructors. Students who did clinical rounds in a virtual hospital with the instructor reported "this is where it all comes together". Student run discussion groups on a wide variety of subjects were described as lively and engaging, and facilitate instructor evaluation via transcript analysis revealed a high degree of collaboration and discussion depth in a shorter length of time than would have been typical in a classroom or small group discussion.

Purpose

The purpose of this mixed methodology pilot study was to evaluate the use of MUVE learning activities for nurses in a graduate nursing education program. The following research questions were addressed: 1. Did MUVE learning facilitate students meeting course and learning activity objectives? 2. How did students compare MUVE learning with "traditional learning" methods, and 3. How did the instructor's evaluation of student learning in MUVE compare with the students'? Additional subjects explored included students' assessment of their orientation to Second Life® and possible correlations between students' level of computer skill and their evaluation of MUVE learning.

METHODOLOGY

Setting and Sample: The "Virtual Setting"

"Second Life®" was the first widely available public MUVE, and because of its stature as such, its ease of availability and the fact that it is free, was the MUVE environment of choice for University of Hawaii, Manoa (UHM). The Second Life® "Virtual University of Hawaii campus" was first constructed in 2008. Numerous departments at University of Hawaii, Manoa now are involved in Second Life® education activities, including the Information Technology Department, Library science, Oceanography, Psychology, Language and Information Science. Several courses at UHM focus on Second Life® specifically, and others use it for specific learning activities within courses taught with traditional methods. This study reflected the first use of Second Life® within the University of Hawaii, Manoa department of nursing curriculum.

Academic Setting

The setting for the study included 3 graduate entry nursing courses at the University Of Hawaii School Of Nursing. After IRB approval was received, volunteer participants were solicited and offered informed consent. A total of 72 surveys were collected from student participants who volunteered to participate in the MUVE learning activities and then agreed to provide feedback on the MUVE learning experience. Because of demographic characteristics of the state of Hawaii and the graduate entry nursing program students, the sample was an older, more ethnically diverse population with a higher percentage of males than is typical of mainland US nursing graduate students.

Data Collection and Analysis

Students completed post course surveys that included 12 Likert Scale questions and one ended question. Both types of questions aimed to explore student perceptions of the MUVE learning experience, focusing on the achievement of learning activity and course objectives. Three questions related to the student's self evaluation of their computer skills, 6 focused on assessment of specific MUVE learning activities and course objectives, two explored the course orientation to SECOND LIFE® and one referred to comparison with traditional learning

activities. For the purposes of this study, traditional learning activities included class lecture, small group projects and discussion, tests, quizzes, and written assignments. Quantitative data from Likert scale questions was analyzed using descriptive statistics. Correlation analysis was planned for degree of computer skill and student evaluations of MUVE learning outcomes. Qualitative data was analyzed by aggregating it in a matrix form under numbered rows assigned to document line numbers. Columns of positive, negative, line occurrences and meaning units were assessed and categorized.

FINDINGS

Quantitative Data

Question #1 (Survey Questions 1-4, 11-12): The vast majority (80%) of surveys reflected that the MUVE activities had a positive effect on their overall course learning experience (rating of 3, 4 or 5 on the Likert scale). Ninety percent of surveys reported that learning objectives had been met in MUVE learning activities. Question #2: Comparison with traditional learning activities. Of the student responses, 80% reported that course objectives were met as well if not better with MUVE learning activities as compared with traditional learning activities. Question #3: Instructor analysis of learning activity transcripts demonstrated that MUVE learning activity objectives were met 90% of the time, validating the student data. There was no correlation between perceived level of computer dexterity and any of the survey questions. Most students were satisfied with the class orientation to Second Life®, which was entirely accomplished via a self instructional orientation packet over a period of 1-2 hours.

Qualitative Data

From the visual representation of the qualitative survey data, comments were grouped. From the two general headings of "learning" and "Experience", the following sub themes emerged: "positive learning process", "positive learning outcomes", "technical challenges", and "phenomenology of virtual reality". The general heading of "learning" contained statements like "In Second Life® I got to apply what I had learned in class". The category "experience" included statements about the emotional quality of the learning activity, "It was fun and energizing". "Positive learning process" included statements like "Great to practice and learn in a safe environment". "Positive learning outcomes" included statements such as "The (Second Life®) activities improved my interview skills". Technical challenges were reflected in statements such as "(It) took me a while to get comfortable with my avatar". The "Phenomena of virtual reality" was reflected in statements such as "I am usually really shy. Being in virtual reality made it easier for me to interact". The greatest total number of responses (20) related to positive learning experiences. Additionally, in anecdotal feedback during the learning activities themselves, many students reported the energizing and deepening effect the activities had on their learning.

DISCUSSION

Findings of this pilot study provided evidence that MUVE activities were effective in meeting learning activity and course objectives at least as well as traditional learning activities. Students reported words like 'energizing', "engrossing" 'engaging' to describe MUVE learning. Instructor evaluation validated students' perceptions that learning objectives were met. Technological obstacles to the experience were minimal and very few students expressed a preference of traditional learning activities over the MUVE activities. Individual, one-on-one, and small group activities were most successful. Groups of more than seven students did not work as well, as there was less time for individuals to participate and there was more lag in computer response time.

Limitations and Suggestions for Future Research

Findings from the study are not generalizable to a larger population due to the use of a convenience sample, and demographic characteristics of the population that vary significantly from the average US graduate nursing population. Additionally, some of the learning activities were mandatory and some were optional, and all of the study participants were volunteers, all of which complicated the role of motivation in the student responses. Lastly, there were students who overlapped between the classes, resulting in multiple surveys from individual students in different classes.

None the less, the findings suggest the importance of further research. Partially on the further explore outcomes and student perceptions in a larger sample population. Further research on the use of MUVE in distance education may be of particular interest.

REFERENCES

1. Wang F & Burton JK. Second Life in education: A review of publications from its launch to 2011. British Journal of Educational Technology. 2012; 44: 357-371.
2. Broom M, Lynch M, Preece W. Using online simulation in child health nurse education. Paediatric Nursing. 2009; 21: 32-36.
3. Collins A, Graves B, Gullette D, Edwards R. Developing an interactive micro simulation method in pharmacology. Journal of Nursing Education. 2010; 49: 410-413.
4. Codier E and Holt A. Virtual Clinical Rounds in a Multi-User Virtual Environment (MUVE). Journal of Nursing Education. 2012; 51.
5. Gallagher-Lepak S, Reilly J, & Killion C. Nursing student perceptions of community in online learning. Contemporary Nurse: A Journal for the Australian Nursing profession. 2009; 32: 133-146.
6. Giddens JF, Shuste, G, Roehrig N. Early student outcomes associated with a virtual community for learning. Journal of Nursing Education. 2010; 49, 355-358.
7. Kirriemuir J. Second life in higher education, medicine and health. Health Information on the Internet. 2008; 64, 6-8.
8. Innes G. In a virtual world. Nursing Standard. 2010; 24: 61.
9. Kilmon C, Brown L, Ghosh S, Mikitiuk A. Immersive virtual reality simulations in nursing education. Nursing Education Perspectives. 2010; 31: 314-317.
10. Perera I, Allison C, Ajinomoh O, Miller A. Managing 3D multi user learning environments: A case study on training disaster management.

International Journal of Emerging Technologies in Learning. 2012; 7: pp. 25-34.

11. Phillips B, Shaw R, Sullivan D, Johnson C. Using virtual environments to enhance nursing distance education. Creative Nursing. 2010; 16: 132-135.

12. Rose FD, Attree EA, Brooks BM, Parslow DM, Penn PR, Ambihaipahan N. Training in virtual environments: Transfer to real world tasks and equivalence to real task training. Ergonomics. 2000; 43: 494-511.

13. Salmon G. The future for (second) life and learning. British Journal of Educational Technology. 2009; 40: 526–538.

14. Dorsey D, Campbell G, Russell S. Adopting the instructional science paradigm to encompass training in virtual environments. Theoretical Issues in Ergonomics Science. 2009; 10: 197-215.

Cite this article

Codier E, Neves A, Morrison P (2014) Teaching Nursing Students in a Multi-User Virtual Environment (MUVE): A Pilot Study. Ann Nurs Pract 1(3): 1012.