Virtual worlds: Not the final frontier for games-based nursing education

Grant Meredith
University of Ballarat

Leigh Achterbosch
University of Ballarat

Kylie Turville
University of Ballarat

Sita Venkatraman
University of Ballarat

Virtual worlds present frontiers of promise for the ever evolving venture of pedagogical development, trial and embracement. Of late there have been large pushes into these worlds in terms of health-based education for students and early practitioners. Virtual worlds seem to be the next logical jump into nursing education and can offer a range of simulation benefits. But these worlds do not appeal to all students, can be complex and expensive to develop and interact within. Other game-like avenues exist though and have not been explored thoroughly enough to date. Such genres like puzzles games, management style games and surprisingly first person shooters already have titles and game mechanics which have been somewhat adapted to nursing education but could easily be more thought out and developed to suit. This paper outlines the two major gaming audience types to be considered and then explores a range of options for nursing education beyond virtual worlds.

Keywords: nursing education, serious gaming, computer-based learning; virtual worlds.

Introduction & purpose

Virtual worlds like Second Life and OpenSim have recently generated a lot of interest and developments concerning simulation and education across many disciplines. Their three dimensional environments, modern games-related interfaces and controls make them intuitive avenues of educational approaches for sections of the growing gamer student demographics. Universities just like ours, the University of Ballarat, have invested resources, time and effort into developing and evaluating virtual nursing education platforms with success and proving the educational viability of such approaches to both the student and lecturer (Miller, Lee, Rodger, Meredith & Peck, 2010; Meredith, Miller & Simmons, 2012). But virtual worlds themselves are somewhat expensive to develop from scratch and at times are daunting for both the developer to create and participate within (Eno, Stafford, Gauch & Thompson, 2011). Lost amongst all the hype of these newly embraced virtual platforms is the fact that other gaming genre platforms have existed for many years prior to the virtual genre. These existing genres could be equally beneficial and perhaps even more simply embraced by many student nurses in future educational games. Socially, culturally and technologically computer games have significantly impacted modern society, including education, and long established genres continue to influence this trend (Kapp, 2012). We wished to explore these existing and somewhat older formats because some of these genres already have marketed health and nursing related games that could be used as inspiration to build more developed, enjoyable and educational games and simulations for student nurses. The purpose of this paper is to outline a range of different player types to be considered when conceiving and designing educational games for learning in the future. This paper will also outline different gaming genres with existing nursing/health related games and to offer some related educational options beyond virtual worlds.

Catering to different audiences

Developers of nursing educational games, actually any games in general, have to consider the variety, skills and expectations of their audiences. Perhaps some nursing students rarely play video games, while others may own multiple video game consoles or operate a personal computer with varied game genre interests. By nature of preferred genre not all students are used to the standard controls and mechanics of a virtual 3D environment. Perhaps some enjoy quick bouts of Tetris on their mobile phone, while others enjoy huge immersive worlds with expansive narratives to explore on their high definition monitors. Perhaps some put in many hours a day

gaming and others maybe little to no time per week at all. To help distinguish these two audiences, they can be classified under two very broad categories, the casual gamers and the core gamers. It is important to know the differences in broad gamer types in order to appreciate the common related genres and games styles preferred. It is also important to understand these gamer types in order to develop, trial and market related games.

Casual gamers tend to enjoy games that can be played in short bursts, on a wide variety of devices, such as the personal computer, notebook, tablets, pads, and mobile devices. Casual gamers often do not invest large amounts of time into a single title and often stop playing once bored or frustrated (Adams, 2010). These games are usually just a small download to the user's device ready to play in minutes, or can be played directly in the web browser using the Java application or Adobe Flash player (Kultima, 2009). These games involve less complicated controls and typically less complex game mechanics (Kuittinen, Kultima, Niemelä Johannes, & Paavilainen, 2007). A distinctive example would be Firemint's Fruit Ninja or Zynga's extremely popular FarmVille available as a Facebook application (Andersen, Liu, Snider, Szeto, & Popovi'c Zoran, 2011).

Core gamers, on the other hand, are a game audience that expect and require depth and hours of evolving game content (Bosser & Nakatsu, 2006). These gamers tend to take game playing seriously and spend large amounts of time and at times money dedicated to each game they play (Fritsch, Voigt, & Schiller, 2006). The games catering to this audience usually cannot be played in short bursts and often involve complex mechanics and rich branching narrative designs. Core gamers feel the need to spend time mastering the game's challenges and accomplishing set goals (Bosser & Nakatsu, 2006).

Instinctively each broad gamer type presents the developer and educator with a unique set of challenges and demands to consider. It cannot be assumed that all your students, in this case nursing, will be satisfied and intuitively understand a detailed virtual world environment to contend with. Next we will explore some different game genres that these two particular audiences enjoy playing, outline health related games within each and discuss how nursing education could be adapted to these alternative genres.

Alternative genres

Puzzle games

This video gaming genre emphasises the solving of puzzles and tends to focus on testing the player's puzzle solving skills such as logic, strategy, pattern recognition, sequence solving and word completion (E. Adams & Rollings, 2006,). Common puzzle games include Solitaire, Tetris and Mahjong (Thompson, Berbank-Green, & Cusworth, 2007). More recently Angry Birds has become a well-known commercially successful physics based puzzle game, available on a large variety of platforms and mobile devices (Cramer, 2011; Middleton, 2011). Many puzzle games with their short bursts of challenge and interest are very appealing to casual gamers.

The puzzle game genre lends itself to a variety of different styles of games that could be adapted for nurses as training tools. Tablets and mobile devices would pose interesting and convenient platforms for taking the blood pressure and monitoring the signs of a virtual patient. This could also be true for visualizing medical equipment monitors, and for the player/nursing student to assess what is going on. In a sense piecing together the feedback, signs and signals of a virtual patient and being then able to assess the scenario. Surgical nursing games would make great candidates for the puzzle genre, such as assisting surgeons, using the correct tools and keeping up with aseptic technique practices. An example of an existing game that could be adapted for surgical nursing is Pet Pals: Animal Doctor, developed by Legacy Games for PC and Mac (Legacy Games, 2012). In this game players must diagnose and treat animals in a realistic simulation using many medical instruments.

The puzzle genre would also be ideal for a nursing assessment game where the nurse has to do a full body assessment (cardiovascular, respiratory and reproductive as a few examples) to collect enough data for a diagnosis to be made, or to perhaps even work out drug requirements and calculations. Perhaps a player would be given the ability to ask questions of the patient to form a medical history. This game could focus on medical patients with different symptoms, or could be more specific such as the psychiatric patients for the mental health nurse.

Time management games

Time management games usually focus on time as a critical resource to be aware of and control other resources within. The player must spend their time wisely performing the tasks involved to complete each level, stage, or assignment for example. The player could be given a critical task that needs to be done immediately and also

tasks that may be set aside for a more appropriate time. It is all up to the player to manage the time spent efficiently. Big Fish Games and GameHouse Games have a large variety of time management games. This would pose perfect scenarios for a student nurse learning how to manage multiple patients and critical tasks. These games could be crafted to suit either casual or core gamers depending on length and complexity of the task at hand.

More specific to nursing, Alawar Entertainment developed a game called "Hospital Haste" which is available on PC and in the iTunes store. In Hospital Haste the player must direct a nurse in diagnosis, treatment, and curing her patients. Time management is used to direct the nurse which patients require priority, in order to send all patients home healthy (Alawar Entertainment, 2012). Merscom, the developer of "Hospital Hustle", went a little further in that the player must manage the ward as well as a nurse. Placement of treatment devices and beds is as much a priority as directing the nurse to diagnose and treat patients. Adaptation of such a game could be made to suit specific and modelled needs of a real life hospital and style of ward.

Real-time strategy games

The typical real-time strategy game focuses on manoeuvring warfare units around a battlefield and engaging in combat with hostile opponents. They include building and defending structures which are capable of producing additional units, and using those units to destroy the opponent's structures and units (Adams, 2006; Metoyer et al., 2010). This genre is where we move away from the casual gamer and start focusing on the core gamers. Rather than played in short bursts, the real-time strategy genre usually involves skill and dedication in order to master its many mechanics (D. Adams, 2006). The strategy involves managing resources to build structures and units, while playing both defensively and offensively to win the level.

While usually themed around war and combat, the genre design of real-time strategy could be adapted to fit well within the realms of a hospital or ward. The player would control nurses rather than warfare units, and build different medical rooms and place medical equipment, rather than combat structures. In this sense the patients become the nurse's problem to fix, in the same way the combat units problem is this hostile opposition. There are many possibilities within this scenario, conceivably the player could play as the head nurse and manage a team of nurses on the ward in a real-time scenario. Or perhaps the player could control each nurse individually in a ward, able to change between them at will, on a real-time basis with each level getting progressively more difficult to manage. An example of this would be the early levels managing one nurse with few patients, and later levels managing multiple nurses with a completely full ward of patients. This genre would also suit the education on emergency medical teams quite well.

These suggestions have similarities to an older PC strategy game called "Theme Hospital" developed by Bullfrog Productions. In this game the player manages a hospital - building the layout, managing the doctors, specialists, nurses, and even janitors, in order to run a successful hospital.

First person shooter games

This genre would most likely be overlooked as something that could be redeveloped for nursing education, as at its core the genre involves the shooting of and the killing of people, aliens or monsters for example, through the eyes of the hero character (Cardamone, Yannakakis, Togelius, & Lanzi, 2011). But this genre has been used in the past by government bodies in producing training software, for example the U.S. Army created the promotional game called "America's Army" (da Silva Simoes & Ferreira, 2011). Could this be taken one step further to development of software that trains military medical staff for field-based exercises? Battlefield environments require a lot of medical care, and this game genre may be adaptable to that specific field of nursing, or perhaps a more generalised approach to simple exploring and interacting with a virtual hospital. Once again, this type of genre would cater to a core gamer, as the player usually requires good reactions and reflexes along with a multitude of input devices such as mouse and keyboard simultaneously in use by the player. In other words the learning curve is much more difficult than a casual game.

Moving away from the battlefield, the first person viewpoint could make an excellent immersive tool for a nurse, especially in a busy ward such as the emergency ward. In this the player must perform emergency nursing triage, with the objective of performing data collection and making the decision of the category the patients have to be seen in (1 = Immediate / Life Threatening, 5 = Less Severity). In this ward, the wrong decision can be fatal.

Conclusion

Although virtual worlds are currently highly fashionable to develop and research within at this moment in time in terms of education, in this case nursing education, it is clear that differing games-based avenues exist and have existed for a long time. Yet through all the hype these other existing genres and platforms have been largely overlooked. Overlooked options, yet they are long established mediums through which people have played and interacted with for many years. We conclude that more attention is required for nursing education purposes throughout avenues other than virtual worlds. Genres such as puzzles, strategy and time management lends themselves so cleanly to being adapted and thought out for health-based educational games. In the future, educators, researchers and developers need to spend more focus and attention to these alternate avenues to educate and train health professionals in perhaps ways which are more accessible, more intuitive and even more cost effective forms than what virtual worlds present.

Do not let hype and trendy focus dictate the direction of education, because in reality there have been such rich pedagogical avenues overlooked or at best lightly developed. We cannot expect a varied student audience to be highly effective within such a complex medium such as virtual worlds and this will hamper future directions of development and embracement of methods. We need to carefully understand the audience, their requirements and importantly their pre-existing experiences with gaming environments to be able to shape the future of health-related interactive education. Virtual worlds are an answer, but not the only answer and we should not be blinkered into believing so. We must continue to dream up, develop and explore future educational methods and worlds, but not at the expense of under developed existing ones.

References

Adams, D. (2006). The state of the RTS. Retrieved June 3, 2012, from http://au.pc.ign.com/articles/700/700747p1.html

Adams, E. (2010). *Fundamentals of games design* (2nd ed.). Berkeley, CA: New Riders.

Adams, E., & Rollings, A. (2006,). *Fundamentals of game design*. Upper Saddle River, NJ: Prentice-Hall.

Alawar Entertainment. (2012). *Hospital haste*. Retrieved June 2, 2012, from http://www.alawar.com/game/hospital-haste/#.T87VR8U1N0s

Andersen, E., Liu, Y., Snider, R., Szeto, R., & Popovi'c Zoran. (2011). Placing a value on aesthetics in online casual games. In *Proceedings of the 2011 Annual Conference on Human Factors in Computing Systems*, Vancouver, BC, Canada. pp. 1275-1278. https://doi.org/10.1145/1978942.1979131

Bosser, A., & Nakatsu, R. (2006).Hardcore gamers and casual gamers playing online together. In *Proceedings of the 5th International Conference on Entertainment Computing*, Cambridge, UK. pp. 374-377.

Cardamone, L., Yannakakis, G., Togelius, J., & Lanzi, P. (2011). Evolving interesting maps for a first person shooter. In C. Di Chio, et al. (Eds.), *Applications of evolutionary computation* (pp. 63-72) Springer Berlin / Heidelberg. Cramer, T. (2011). The angry birds effect. *EContent*, 34(7), 4-4.

da Silva Simoes, P. D., & Ferreira, C. G. I. (2011). Military war games edutainment. *Serious Games and Applications for Health (SeGAH), 2011 IEEE 1st International Conference* on, pp. 1-7.

Eno, J., Stafford, G., Gauch, S., & Thompson, C. W. (2011). Hybrid User Preference Models for Second Life and Open Simulator Virtual Worlds. *Lecture Notes in Computer Science, 6787*, 87-98.

Fritsch, T., Voigt, B., & Schiller, J. (2006). Distribution of online hardcore player behavior: (how hardcore are you?). In *Proceedings of 5th ACM SIGCOMM Workshop on Network and System Support for Games*, October 30-31, 2006, Singapore. https://doi.org/10.1145/1230040.1230082

Kapp, K. (2012). *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. San Francisco, CA : Pfeiffer. https://doi.org/10.1016/j.learninstruc.2011.12.002

Kuittinen, J., Kultima, A., Niemelä, J., & Paavilainen, J. (2007). Casual games discussion. In *Proceedings of the 2007 Conference on Future Play*, Toronto, Canada. pp. 105-112.

Kultima, A. (2009). Casual game design values. In *Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era*, Tampere, Finland. pp. 58-65.

Legacy Games. (2012). *Pet pals: Animal doctor*. Retrieved June 1, 2012, from http://www.legacygames.com/download_games/154/pet_pals%253a_animal_doctor/

Meredith, G., Miller, C., & Simmons, G. (2012). Stuttering Support & Nursing Education: Two Case Studies in Second Life In C. Wankel & R. Hindrich (Eds.), *3D Virtual World Learning Handbook* (pp. 217-254). Charlotte, North Carolina: IGI Global Publications.

Metoyer, R., Stumpf, S., Neumann, C., Dodge, J., Cao, J., & Schnabel, A. (2010).Explaining how to play real-time strategy games. *Knowledge-Based Systems*, 23(4), 295-301. https://doi.org/10.1016/j.knosys.2009.11.006

Middleton, J. (2011). Be the next app millionaire. *APC*, 31(4), 14-17.

Miller, C., Lee, M. J. W., Rogers, L., Meredith, G., & Peck, B. (2010). Enhancing tertiary healthcare education

through 3D MUVE-based simulations. In G. Vincenti& J. Brama (Eds.), *Teaching through Multi-User Virtual Environments: Applying Dynamic Elements to the Modern Classroom*: IGI Global Publications.

Thompson, J., Berbank-Green, B., & Cusworth, N. (2007). *Game design*. New York, NY, USA: John Wiley & Sons, Inc.

Author contact details:

Grant Meredith, g.meredith@ballarat.edu.au
Leigh Achterbosch, l.achterbosch@ballarat.edu.au
Kylie Turville, k.turville@ballarat.edu.au
Sita Venkatraman, s.venkatraman@ballarat.edu.au

Please cite as: Meredith, G., Achterbosch, L., Turville, K & Venkatraman, S. (2012) Virtual worlds: Not the final frontier for games-based nursing education. In M. Brown, M. Hartnett & T. Stewart (Eds.), Future challenges, sustainable futures. Proceedings ascilite Wellington 2012. (pp.652-656).