Measuring and understanding the learning experience in video games

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Abstract

Using commercial video games to learn is a potentially exciting concept. The engaging and motivating features of a commercial video game make them a potentially powerful educational tool. Although there has been considerable speculation that commercial video games can assist the educational process, there is a lack of studies to support this. In this proposed research a series of studies is planned to see what and if any learning takes place within a commercial video game.

Author Keywords

Video games, play, learning

ACM Classification Keywords

H.1.2 User/Machine Systems - Human factors; I.2.6 Learning - Knowledge acquisition

General Terms

Human Factors, Measurement, Learning

Introduction

There has been an increased interest in the use of video games in education to engage students in the learning process [1, 2, 3]. The concept is not new but the ready availability of rich digital environments has become more accessible for educational institutions in the last decade.

Gee [1] suggests that commercial video games can be used for:

- Empowering learners
- Enhancing problem solving skills
- Helping users in solving well-ordered problems
- Improving understanding
- Developing systems thinking

Moreover there is the potential of video games to enhance strategic thinking and leadership skills [6].

To test these assertions three studies will be established. The first study will focus on individual game play and problem solving. Volunteers (N=50) of various backgrounds and prior exposure to playing video games will play a specific level of a game in a play-test laboratory. The game will include a specific problem that needs to be solved before the user can proceed to the next stage in the level. The same problem will be included at a later (variable) stage in the game. The data collected (time to solve, number of attempts, and any improvements in solving the problem when encountered the second time) will be compared with the amount of prior game play experience each user has.

Participants will be asked to think aloud as well as have periods of uninterrupted play. All game play and user actions (and reactions) will be video recorded and the combined videos will be shown to the participant and they will be asked a series of open-ended questions.

The second study will focus on group game play and the leadership, cooperation, communications skills within the different teams and what learning takes place within these worlds. Volunteers (N=50) of various backgrounds and prior exposure to playing video games will play a specific level or map of a Role Playing Game (RPG) in a play-test laboratory. Pre and post test surveys will be conducted to get an understanding of; previous leadership development, previous game play experience, how the leader was chosen, get feedback on decisions made and find what (if any) learning took place. Comparisons will be made between different levels of play experience and their leadership and decision making capabilities.

The second phase is a twelve month ethnographic study which will involve the researcher playing two online RPGs. In this study the researcher will observe his own learning experience and observe and interview other players.

The third phase entails surveying clan (or guild) leaders (N=40) of well-established massively multiplayer online role-playing games (MMORPG). The surveys will be used to measure self-perceived leadership and decision making skills. The extent of leadership experience (time) and the size of the clan (quantity) will be considered as the moderating variables.

Rationale
Learning is a difficult abstract to qualify, especially if we focus on the individual [7] and therefore to try to understand what learning has taken place a mixed methods approach [8] was chosen using multiple learners.

In the first study (play testing) a combination of thinking aloud [4] and playing the game in a 'normal' or 'natural' state will be used. The concern with the use of thinking aloud is that it may interrupt the normal gameplay or learning experience. In this phase a specific problem will be included in the game and the player will need to solve this puzzle to be able to progress to the next stage in the level. Measures of the time taken, the number of attempts and the use of external resources (online cheats, chat logs and so on) to solve the problem will be calculated. The same problem will be included at a later stage of the game and the same measurements will be calculated and these results will be compared to measure if the player has learnt how to solve the problem from the first attempt. Furthermore, a varying number of different events will be included between the two problems to potentially measure retention. The decision on the sample size (N=50) will consist of ten groups of five users is based on the work of by Microsoft Game User Research [14, 15].

The rationale of the ethnographic study is based on the work of Nardi and Harris [9] who suggest that players (of the MMORPG World of Warcraft) learn explicit and tacit knowledge [10] through playing a video game.

The final study uses a standard research instrument (reflective survey). The rationale for this choice was that as the clan or guild leaders held positions of leadership and made tactical and strategic decisions on a regular basis they made for ideal candidates to test the assertions of Beck and Wade [6].

Conclusion

This research will result in establishing the effectiveness of specific commercial video games as tools for learning. Additional research is to follow which will consider the use of video games in an educational context and evaluate the novelty factor.

Biography

Allan Fowler is a doctoral candidate at AUT University, in Auckland, New Zealand. Allan is also a Lecturer Game Design at Waiariki Institute of Technology. He has been using games as educational tools since 2002 in primary, secondary and tertiary environments. His current research interests include the use of commercial video games in an educational context and applied experiential learning opportunities for students.

References

[1] Gee, J. P. 2003. *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.

[2] Prensky, M. 2001. *Digital Game-Based learning*, New York, NY: McGraw-Hill.

[3] Squire, K. 2003. Video games in education. *International Journal of Intelligent Simulations and Gaming*, 2(1), 49-62.

[4] Drucker, K. 1945. On problem-solving, in Dashiell, J. F. *Psychological Monographs*. The American Psychological Association, Inc. Washington, DC, *58*, 1-114.

[6] Beck, J., and Wade, M. 2004. *Got Game*. Boston, MA: Harvard Business School Press.

[7] Simon, H. A. 1969. *Sciences of the artificial*. Cambridge, MA: M.I.T. Press.

[8] Johnson, R. B., & Onwuegbuzie, A. J. 2004. Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33 (7), 14-26.

[9] Nardi, B., & Harris, J. 2006. Strangers and Friends: Collaborative Play in World of Warcraft. In: *Proceedings of 20th Conference on Computer-Supported Cooperative Work*. Banff, Canada: 149-158.

[10] Reber, A. S. 1993. *Implicit learning and tacit knowledge: An essay on the cognitive unconscious*. Oxford: Oxford University Press.

[14] Kim, J. H., Gunn, D. V., Schuh, E., Phillips, B., Pagulayan, R. J. and Wixon, D. Tracking real-time user experience (TRUE): a comprehensive instrumentation solution for complex systems. In Proc. SIGCHI 2008, ACM (2008), 443-452.

[15] Pagulayan, R., Keeker, K., Wixon, D., Romero, R. L. and Fuller, T. User-centered design in games. In The Human-Computer Interaction Handbook. L. Erlbaum Associates Inc. (2003), 883-906.