Paper, Rock, Shotgun? Moving immersive online games from *DE*structive to *CON*structive

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This poster looks at the taxonomy of game development tools mapped against games-based learning theories in order to suggest the most promising directions to take in online educational software design

Keywords: games-based learning, discovery learning, game theory, constructivism.

Introduction

The genesis and development of online games has brought about an interesting transition in what motivates children and adults to invest their time in immersive environments over the last 20 years. As ever, the key ingredients are mastery of a skill of some kind, and curiosity about the narrative suggested by the setting and contents and where it will all lead; arguably the preferable ingredients for e-learning development where discovery and games-based learning approaches are used.

When online immersive 3D games are re-purposed for educational use, ideally they bring with them most of the elements of the original game that made it engaging for users in the first place. There is increasing evidence that learning based on games is having a major influence on educational delivery. EDUCAUSE's 2009 Horizon report states that "Experience with and affinity for games as learning tools is an increasingly universal characteristic among those entering higher education and the workforce" (Johnson et al. 2009).

In this poster a taxonomy of game development tools is mapped against games-based learning theory in the context of four game development environments. What emerges can suggest promising directions to take in online educational software design.

Changing the motivation

Graphic games that give users a first person POV have been around since the early 1990s, providing them with an immersive visual experience that is frequently designed with the object of shooting anything that moves in the 3D landscape. The first-person-shooter (FPS) genre produced titles such as *Castle Wolfenstein*, *Doom* and *Quake* - all highly popular examples of the online interactive game approach. Narratives in these FPS games tend to be basic and repetitive as the gameplay itself is the main determinant of engagement. Conflict is built into the interaction from the very first frame and the obligatory back-story usually adds little to the player's basic motivation as surviving attacks from programmed opponents quickly becomes the main issue. Ironically, the 3D graphic user interface (GUI) that these games employ was initially an add-on feature of text-based "Adventure"-style games that relied solely on text descriptors and branched-decision narrative structures to further the story-line. GUIs merely replaced typed navigation instructions such as "enter room" with mouse movements or clicks. With the development of game platforms such as the FPS tiles described above, mastery of levels supplanted the narrative aspects of such games, previously inherent in the text. For many users an animated graphic exposition of violence will always trump a text description in a setting where the main motivation is to destroy opponents, mainly because there are only so many ways you can use text to describe the act of shooting a monster before it becomes a little too repetitive. On another level, the speed of interaction between characters in a graphics-driven virtual world usually generates an emotional response that text could never match.

Given the challenge of exploiting the motivational power behind FPS online games some educational game developers have recently begun to tap into the power of these networked games to provide educators with alternative forms of immersive learning environments that don't depend on scripted violence to provide the motivation to explore a virtual world. Platinum Arts Sandbox (PAS) is one such environment that had its genesis in a Quake engine, normally used to create Death Match arenas for online combatants. The PAS development team decided to make the engine used to build virtual environments more suitable for use by children and adolescents by removing weapons, explosives and other violent aspects of combat-based games. Educational game developers have used PAS to build non-violent worlds where the main motivation is the completion of a pre-defined quest. They include reconstructions of archaeology sites, side-scrolling games and quests based on a generic "save the princess" model. The construction environment is simple enough to encourage adolescents to build complex, detailed worlds.

In the Minecraft development environment the main driver is discovery learning. Users need to learn how to use raw materials to construct specific artefacts such as bricks and wooden planks that can then be used for building structures and virtual inhabitants. The emphasis here is on collaborative learning as the game's website supports a large worldwide community, including 10.5 million registered users who exchange advice and resources on a daily basis.

Apart from the proscriptions on tools used for violent interaction, both adolescent learners and educational game developers now have the tools to build learning environments that are motivating, challenging and capable of producing achievable learning goals.

Current developments in immersive 3D games used for educational purposes

This poster will compare four online 3D development environments and how they have been used for various learning tasks, using elements of Game Theory, discovery learning and learning by design approaches:

- Platinum Arts Sandbox
- Minecraft
- OpenSim, and
- Second Life

Figure 1: Screenshots from two archaeological online games developed using PAS

Platinum Arts Sandbox, as described above, offers users all the graphic power of an FPS game with violent artefacts removed. The development of two online archaeological games "The Search for 18 Rabbit" (Kerr 2011) and "The Tomb of Memi" (Leong 2011) using this environment is compared with a collaborative learning environment built using the networked game *Minecraft*. Finally, the potential to motivate learners provided by these online tools is compared with the proprietary world of *Second Life*, and its open-source equivalent *OpenSim*.

References

Johnson, L., Levine, A., & Smith, R. (2009). *The 2009 Horizon Report*. Austin, Texas: The New Media Consortium. Available from: http://www.nmc.org/publications/2009-horizon-report

Kerr, Thomas (2011) "The Search for 18 Rabbit". Online archaeology/mythology game developed at Macquarie University. Website available at: http://virtualarque.wordpress.com

Leong, Nicole (2011) "The Tomb of Memi". Online archaeology game developed at Macquarie University. Website available at: http://virtualarque.wordpress.com

Minecraft: Website available at: http://www.minecraft.net

Platinum Arts Sandbox Ver. 2.6.1. Website available at: http://sandboxgamemaker.com