Exploring the Ancient, Virtual World: Engagement and Enrichment Within a Virtual Historical Learning Environment

Abstract

Virtual Learning Environments are being employed in the field of education with increasing frequency as the available technology improves. Studies have shown high potential for improving learner performance as well as significant challenges if not created and facilitated in the proper manner. This article reviews current literature on the emerging usage of VLEs in the educational environment, and summarizes a case study in which the program MinecraftEdu was adopted for use in a middle school setting.

Keywords

Virtual Learning Environment, virtual world, education technology, Minecraft, MinecraftEdu, history, humanities, simulation, active learning, social media

Introduction

Due to the technological advancements in personal computing within the past two decades, virtual worlds have been imagined, created, and designed with increasing detail and complexity, and are now explorable using commonly-available home technologies.

Twining (2010) defines virtual worlds as “environments within which users are represented by and operate through an avatar and can interact with others over the internet or local area network” (p. 117). Shen and Eder (2009) define them as:

a computer-based simulated environment created with two- and three-dimensional graphical representations of a physical space. People interact with one another via avatars, which are graphical, 2- or 3-D representations of a user. The virtual world environment is an immersive, virtual reality space (p. 225).

Virtual worlds have been mainly confined to entertainment uses, such as video games. The growing video game industry has been the main impetus for technology advancements that have
allowed increasingly complex and realistic worlds to be created. It is only recently that educators and educational researchers have begun to explore their potential as enhanced learning environments.

This study will explore the introduction and use of a virtual learning environment in a middle school setting. It will follow the implementation of a supplemental, historically-themed “3D” world multiple students are able to enter from their own home computers, or from within a classroom or technology laboratory within the school. It will seek to quantify educational gains specifically afforded by the technology and its usage, and will assess both qualitative and quantitative data regarding student participation, engagement within the virtual environment, and increased engagement with coursework resulting from participation in the virtual world.

The limitations intrinsic to this study should be noted from the outset. This study is conducted on a relatively small scale, and should not be interpreted as final justification of the usage of virtual learning environments as a whole. The study follows the “action research” model as delineated by Craig Mertler (2012), and as such is teacher-run and involves a small test base of participants (n=150). Though the study is limited in its general pedagogical applicability, it is unique in its specific use of virtual world creation (MinecraftEdu), and could be useful for any educators wishing to follow in its particular footsteps.

**Rationale**

Virtual worlds are at the forefront of personal computing technology, and hold great potential in the field of education. According to Coffman and Klinger (2007):

> Virtual environments have the potential to fully engage students and enhance teaching and learning. They also have the potential to enhance a constructivist learning approach by providing learning opportunities for students that challenge them to learn by experiencing and through applied activities, rather than by direct instruction and passive involvement (p. 30).

Virtual environments that are entertaining for participants provide further educational benefits. Depending on the particular design of the virtual learning environment (henceforth referred to simply as “VLE”), there can be a strict emphasis on relating and exploring subject content, an emphasis on entertainment and content review, or any number of mixtures of the two. VLEs that at least take “fun” into consideration could be considered more educational video games, or “Edutainment”. Neurologist Judy Willis (2011) notes that educational games provide incremental feedback via a series of increasingly-challenging tasks, and thus offer academic, neurological, and social rewards as a result.

> Classroom instruction that provides opportunities for incremental progress feedback at students’ achievable challenge levels pays off with increased focus, resilience, and
willingness to revise and persevere toward achievement of goals. The development of students’ awareness of their potentials to achieve success, through effort and response to feedback, extends far beyond the classroom walls … application of the video game model to instruction encourages the habits of mind through which … students can achieve their highest academic, social, and emotional potentials (p. 3).

Some VLEs have been used as a substitute or a replacement of the classroom environment. This study did not; the VLE in this case is purely supplemental in nature, with participants engaging with and within the VLE mainly outside of school, from a home personal computer. The VLE is designed to increase engagement with the course content (history, geography, and social studies, within the “humanities” subject specification), give previews of upcoming course content, allow for enrichment activities, and help participants review material already learned in the classroom. In addition, the VLE will hopefully improve (and create new) student social relationships and improve classroom climate as a result.

So, then, the rationale for this study is twofold; (1) the majority of existing literature points to great success in the majority of specified criteria through the usage of VLEs, and (2), the relative newness of the technology, especially in the field of education, has brought with it a lack of substantive, empirical studies into the effects and possibilities of using such technology in middle school education.

Virtual Worlds in Education

This section will first present the VLE as designed for this study, and give examples of typical student participation within it. This will then be compared and contrasted with existing studies and the VLEs employed in those cases, and the existing literature on VLEs will be further explored.

“The Wonderful World of Humanities”

*Minecraft* (2010) is a popular “3D” video game that has 6.8 million users worldwide (Minecraft.net 2012). It emphasizes exploration and user creation of content, including structures and towns. Seeing its educational potential, Teacher Gaming, L.L.C. was formed by Joel Levin, Santeri Koivisto, and Aleksi Postari. In partnership with the game’s original creators, Mojang, Teacher Gaming created a separate modification of Minecraft that seeks to establish a unique variance of the game that is more conducive to classroom use, *MinecraftEdu* (2012). The author of this study created an historically-themed VLE using the program MinecraftEdu for students of the sixth, seventh, and eighth grades (ages eleven through fourteen).
Designated “The Wonderful World of Humanities”, this is an open, “3D” world (it should here be noted that while this form of VLE is commonly referred to as “3D”, it is not technically viewed in three dimensions using special glasses – 3D simply refers to the first-person perspective through which a participant views their virtual surroundings in the world) through which students can explore at their leisure. Students can connect to the world from their home computers, or in the school computer lab (or on laptops during some class time given during the course), and can see other connected students via in-game graphical avatars. They can chat and work together with other connected players, and leave messages for players that are not connected at that time.

In the world are a number of simulated historical monuments and artifacts (the Parthenon, Chinese gardens, the city of Babylon, an explorer’s galleon, etc.) that students can explore and find.
short snippets of information contained within. At various points around the VLE, there are student project sites. Here, students are given collaborative building or writing tasks in which they must apply information gathered from within the world or from the classroom or course textbooks. These include building a Greek school in the style and educational philosophy of Athens or Sparta; defending the city of Babylon by creating defense systems; planning and creating an irrigation system for the residents of Ancient Mesopotamia; carving a residence from a cliffside similar to Petra, Jordan; exploring secret rooms and traps within the Great Pyramid; collaboratively writing a modern myth following the common stages of Greek mythology, and more. Student work is fully viewable to all other students in the VLE.

There are other challenges presented that the students can choose to accomplish on their own, or with groups of any size. One involves a “scavenger hunt” for items that can only be collected with knowledge of the content and prior exploration of the world; another includes the various challenges faced in reaching a new or restricted area, such as climbing to the top of a clock tower, navigating a Spartan obstacle course, following fairy tale clues through a forest, answering quiz questions, or others. Virtual rewards for completing tasks and assisting other players include materials for building personal houses and projects, permanent monuments commemorating an achievement, and increased avatar customization. Physical rewards include points towards the school’s “House” system, student names in all-school announcements, chances to attend a monthly pizza party, and using a special “teacher” chair for one class period.

Some aspects of the VLE are included purely for entertainment, engagement, and community-building. These include spaces for student personal housing and free-building, areas that feature
fun and interesting historical facts not strictly related to the curriculum, and secret hidden areas that can give rewards similar to those mentioned previously.

Some progress in interdisciplinary inclusion within the VLE was made, and more is planned. A few areas relating to science and literature curricula were included in the world, after consultation with teachers of those subjects.

**Comparative to Studies and Literature**

The majority of VLE educational studies conducted have used the Second Life program, with a secondary or undergraduate audience (Warburton 2009; Coffman and Klinger 2007; Shen and Eder 2009; Eschenbrenner, Nah, and Siau 2008). Second Life lends itself to curricular replacement more so than MinecraftEdu; it is a popular choice for distance learning programs. Thus the majority of studies conducted so far have centered on assessing the validity of learning tasks in the virtual world compared to their counterpart learning tasks in the physical world. This study aims not to replace curriculum or classroom learning, but to supplement it, and as such will be assessing a separate set of objectives.

Second Life features web tie-ins and links that are not, as yet, included in MinecraftEdu. Also, MinecraftEdu is aimed towards a generally younger audience than Second Life. Providing students access to Second Life also gives access to the program’s non-educational content, much of it created by other users, that could be inappropriate for younger audiences. Eschenbrenner, Nah, and Siau (2008) describe these challenges when using Second Life: “Safety measures may be needed, such as acquiring one’s own island so usage is restricted, so that behaviors can be properly monitored” (p. 9). For these reasons, MinecraftEdu is superior to the commonly-used Second Life in the case of elementary and middle-school programs.

Fabrizia Mantovani, in her article “VR Learning: Potential and Challenges for the Use of 3D Environments in Education and Training” (Riva and Galimberti 2003), provides an excellent, in-depth analysis of the potential and challenges of using VLEs in education. She summarizes the benefits of virtual education as follows (pp. 212-213):

1. Experiential and active learning: Students are engaged in active learning rather than passive reception of content. MinecraftEdu’s interactive and creative nature (students can gather resources and build their own structures of any type) are conducive to this.

2. Visualization and reification: The graphics and visuals inherent to VLEs offer new ways to visually present material that may further engage visual learners. The “World of Humanities” (which can be referred to simply as “WoH”) offers students the opportunity to explore visual recreations of locations and events in ancient history and presents them in a more engaging method than traditional textbook illustrations or teacher PowerPoint presentations, for example.
3. Learning in contexts impossible or difficult to experience in real life: VLEs can simulate learning experiences that are prohibited by finance, distance, time, or danger in the physical world.

4. Motivation enhancement: Mantovani suggests structuring VLEs in a game format can engage students with otherwise uninteresting material, or can help students with attention disorders. Because of its roots as a popular video game, MinecraftEdu places an emphasis on fun and engagement that few other educational software programs have offered before.

5. Collaboration fostering: Social structures and norms can be studied and even re-created in a VLE, allowing for an increase in teamwork or for deeper understanding of social trends and movements by participating in them. This study aims to quantify the increased collaboration achieved by using MinecraftEdu as a VLE.

6. Adaptability: VLEs can be tailored to learner profiles and needs. WoH is adaptable and can be updated by the instructor at any time, allowing the possibility of adding new content or tailoring existing content. This is in addition to the constant modification and creation allowed by students as a focus of the program.

7. Evaluation and assessment: VLEs lend themselves to easy assessment practices, as most all student activity within them is recorded and the resulting data sets can be analyzed. Through the study of “chat logs” and records of student activities within WoH, qualitative data can be produced and analyzed throughout the course of the study.

Yet most researchers, when assessing the educational potential of VLEs, make sure to note the additional risks and challenges they may bring. Mantovani later states the open-ended nature inherent to VLEs can in itself be a risk when assuming educational activities will necessarily take place.

The basic assumption that the learning process will take place naturally through the simple exploration and discovery of the Virtual Environment should be reviewed. Despite the undoubtful value of the exploratory learning provided by VR [virtual reality], when the knowledge context is too unstructured, the learning process can become very difficult. This is especially true for younger students (p. 220).

Other researchers point to the social issues that may arise between participants in a VLE. The assumed anonymity of online and virtual interactions can encourage anti-social behaviors in some participants, and behavior monitoring, as with all school-sanctioned programs, should be appropriately monitored.

Twining (2010) points to the rather surprising amount of attachment that participants can form to their work within a VLE. In particular, he refers to an occurrence in which students had to vote on which creations needed to be removed from a virtual environment due to space limitations; “there was nothing ‘pretend’ about removing a building that might have taken someone many
hours to create, nor in the reactions to such building removals” (p. 119). He goes on to suggest that because of the amount of time and effort poured into these “virtual” goods, there is really no distinct separation between a virtual and a “real” product. He proposes the replacement of the phrasing ‘real world’ with ‘physical world’, and that this “would help overcome a major source of confusion within the literature on virtual worlds” (p. 119).

Many researchers point to the role of the educator, both in designing and constructing the particular VLE, and with facilitating activities within it, as key to the success or failure of the project. Coffman and Klinger (2007) write:

> the instructor must provide learners with compelling problems that engage students not only in the adventure of the virtual world itself but additionally into a deep inquiry and analysis of a meaningful and authentic problem that students can relate to and that meets the lesson objectives (p. 30).

Twining points to two main components of a framework that seems to predict the engagement and thus, the learning, that is possible with participants in a virtual learning program; “the extent to which they feel they belong (‘co-presence’) and the extent to which they are engaged in communal activity (‘eventedness’)” (p. 120). In short, participants in a virtual world must be included in collaborative activities that drive their desire to rejoin the world on their own time, or within sanctioned school scheduling.

**Methods**

*to be updated and modified at beginning of 2012-2013 school year*

This study followed 150 participants in the sixth, seventh, and eighth grades (ages eleven through fourteen) in the MinecraftEdu-supported “World of Humanities” virtual learning environment. It tracked their participation according to three separate criteria:

- Willingness to participate, including number of students who joined the VLE from home and amount of hours logged during the length of the study, and the number of activities students participated in, as well as qualitative survey responses related to engagement and participation
- Supplementary delivery of course content, including grade tracking of participants vs. non-participants and the self-perceived value of the VLE content and activities in increasing or decreasing course achievement
- Collaboration and community building, including friendships/collaborative groups formed in the VLE that translated into “real-world” friendships and collaborative groups; the nature of in-game communication as recorded in
program chat logs; and the effects on classroom participation of those substantially involved in the VLE as compared with those who were not.

Quantitative data was tracked throughout the timeframe of the study, and qualitative surveys were conducted at various points throughout the school year.

Results

to be continued in 2012-2013 school year

Analysis

to be continued in 2012-2013 school year

Conclusion

to be continued in 2012-2013 school year

References


