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Toward an Engaging Learning Experience for Students

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Toward an Engaging Learning Experience for Students

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ABSTRACT

Our research program explores the opportunities and challenges for *engaging learning* raised by emerging multi-user virtual environments such as Second Life and There. Students need an engaging learning environment that stimulates their self-efficacy and their outcome expectations. This paper focuses on exploratory research regarding students' preference to learn in a virtual world environment vs. classic text-based learning management systems. Three in-depth interviews were conducted with undergraduate students after using the virtual world called "There." Our preliminary findings indicate that there is some preference for using virtual worlds over the learning management systems. However, there were some issues encountered that could hamper the use of virtual worlds for teaching college courses. This research contributes to the design and use of computer-support learning environments.

Keywords: Virtual Worlds, Learning Management Systems, Technology Acceptance Model, Qualitative Research

INTRODUCTION

Today students need an engaging learning environment that can complement the online learning management systems such as Blackboard or Moodle in order to motivate them to pursue a career in science, technology, engineering and mathematics. One type of engaging learning environment is a virtual world, which can make science classes more practical and exciting. For instance, a 3D modeling class can have students create and inspect 3D objects at the virtual world in real-time. A physics class can test different types of object collision and free fall behaviors. Such experience goes beyond the current capabilities of classic learning management systems. In addition, as Kemp and Livingstone (2006) pointed out, a virtual world such as Second Life has the advantage over learning management systems in terms of enhancing the learning experience. We propose that augmenting the learning environment with a virtual world provides a better learning experience and it can be used in face-to-face, online, and blended learning. This research furthers our goal of creating a set of design principles for a constructivist learning environment (Muñoz Rosario and Widmeyer, 2007); whereas we previously proposed using a quantitative survey, this research uses a qualitative research interview protocol (Trauth and Jessup, 2000).

Our research program explores the opportunities and challenges for *engaging learning* raised by emerging multi-user virtual environments such as Second Life and There. New models of collaborative working will emerge from the millennial generation's childhood and college experiences with technology. Gaming perhaps offers the most interesting potential for changing educational and workplace practices, since many popular games require global, team-based collaboration to achieve goals. We will be conducting field studies using classes of students who spend considerable time in these worlds as part of the course. However, prior to these field studies, we have conducted smaller scale pilot studies using a limited period of exposure to virtual worlds, followed by semi-structured interviews to explore the reactions of the students. (See Schultze, Hiltz, Nardi, Renneker, and Stucky, 2008, for a description of the first pilot study). This paper describes our second pilot study. The research questions we had are, is this environment potentially useful for teaching and learning; and, is it reasonably easy to use?

There are several reasons why massively multi-player online games (MMOGs) are an appropriate vehicle for studying learning. "The networked learning communities that emerge around game play exhibit many of the

features originally sought after by research communities such as Computer Support for Collaborative Learning” (Steinkuehler 2006, page 100). While many online games may offer opportunities for learning by motivated individuals very few of these games are *designed* to provide learning opportunities. The chess or bridge playing communities do engage in actions that provide support for learning and these communities do take advantage of information and communication technologies for active, critical and reflective thinking about their game playing, but neither chess nor bridge was designed as learning environments. Several popular MMOGs such as World of Warcraft, RuneScape, Ragnarok and Guildwars also provide opportunities for learning for the better players (Steinkuehler and Chmiel 2006), but again they were not designed as learning environments. The goals of this research are to develop a set of design principles and architecture for an online environment that supports learning

Many courses are now offered completely or partially through course management or “discussion board” systems such as Blackboard and Moodle. Potentially, virtual worlds can enable richer learning experiences beyond what is offered by course management systems, but there are some people who experience difficulty in navigating and interacting in virtual worlds. In addition, there may be new features in the systems that lead to new concerns, likes or dislikes (such as privacy and security). Our goal in this study was to obtain some insight into whether students would be more motivated to learn in this environment as compared to a classic course management system, and also into any user problems that should be resolved or taken into account before trying to conduct all or a substantial part of a course in such an environment. Therefore, we adopted an exploratory approach to this research using a series of qualitative questions based on the constructs of the Technology Acceptance Model (Davis, 1989).

The next section gives the background theories for this research. This is followed by a description of the qualitative research methodology. Section four is the findings and section five is conclusions and future research.

THEORETICAL FOUNDATION

Perceived usefulness and perceived ease of use are the two major constructs of the technology acceptance model (Davis, 1989; Venkatesh, Morris, Davis and Davis 2003). Both of these constructs relate to the intention to use the technology that enables the learning environment.

We adapted the definitions of these two constructs to our learning context. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her learning performance. Perceived ease of use is defined as the degree to which a person believes that using the learning system would require effort. Both of these variables relate to the technology and are treated as reflective measures of the learning environment. There is a significant literature using this model and its extensions (Venkatesh, Morris, Davis and Davis 2003). We did not use the validated quantitative scales from this prior research but used the two constructs to structure a series of semi-structured interviews as explained in the next section.

RESEARCH METHODOLOGY

Semi-structured interviews were conducted to explore college students’ reactions to navigating and interacting in a virtual world and to capture any concerns, likes or dislikes. Furthermore, it was hoped to obtain some insight into whether students would be motivated to learn in this environment more than from a classic Learning Management System.

Subjects

A preliminary investigation was conducted with three college students as subjects, referred to in this paper as RM1, RM2 and RM3. The three subjects came from two different USA Northeast universities. RM1 is a female graduate student between 34-41 years old with a major in Information Systems. She had a prior experience in LMS that she rated 4 on a 1-5 scale. She had prior knowledge and experience in virtual worlds, though it was only rated 2, but no prior experience with 3D gaming environments. RM2 is a male senior undergraduate student between 18-25 years old with a major in Computer Science. He had a prior experience in LMS that he rated 3 on a 1-5 scale. He had prior knowledge and experience in virtual worlds, and he rated it 4. In addition, he had previous experience with 3D gaming environments. Lastly, RM3 is a male junior undergraduate student between 18-25 years old with a major in Criminal Justice. He had a prior experience in LMS that he rated 3 on a 1-5 scale. He had prior knowledge of virtual worlds, but no prior experience with them, and no previous experience with 3D gaming environments.

Environment

“There” <www.there.com>, the virtual world chosen for this study, became available to the public in 2003, and is similar to but a bit simpler than Second Life. It is a 3D world in which use of an avatar allows users to communicate with each other and, interact with in-world objects. Public conversations are displayed in chat “balloons” word by word, rather than displaying entire sentences in an instant messaging window. However, private conversations can be held through the private chat feature window. In addition, “There” allows users to design, build, and sell their own custom products for use within the environment. One feature of interest is its ability of expressing non-verbal communication (nodding, shaking the head, smiling, etc.) through the avatar’s gestures.

Procedure

First, we created an interview guide with open-ended questions as suggested by Rubin and Rubin (2005). Next, a task guide was created for the students to follow while in the virtual world. In addition to the instructions, the task guide contained pictures to help the user determine if they were at the correct locations in “There”. Third, the consent form was created to give to any students that would participate in the formal study. Lastly, a demographics questionnaire was created to capture background information and prior experience from the subjects.

Once the preliminary material was prepared, the next step was to conduct the interviews. From prior experience in qualitative research, conducting semi-structured interviews recorded in audio is very time consuming to transcribe for further analysis. Therefore, for this study it was decided to conduct the interview from within the environment itself. This strategy has several advantages. First, it saved the time of creating a transcript, since the both the interviewer and the subjects typed the questions and answers respectively. This in turn would allow the interviewer to copy and paste all the text from the instant messaging window to a MS Word document. Second, the transcript’s accuracy is also better, since most times, text is easier to understand than audio recordings.

There are some disadvantages of written “in-world” interviews using avatars as compared to recorded face-to-face interviews, though. As with face-to-face interviews, virtual world interviews require a private or secluded location to conduct the interview without any distractions. It is easier said than done, especially for basic account members that don’t have the luxury of owning their own place. Another possible disadvantage is the relative paucity of non-verbal cues, which may make it difficult to determine emotions from the interviewees.

After conducting the interviews, the transcripts were combined into a single Rich Text file (RTF) and then transferred to NVIVO for coding. The coding scheme was pre-planned, in which there were some categories in mind based on the interview guide, and from prior experience. Nevertheless, it was refined throughout the coding of the interviews. The final step was to analyze these transcripts.

FINDINGS

This section presents the results of an initial qualitative analysis of the semi-structured interviews in terms of the two TAM constructs and other additional concerns.

Perceived Ease of Use

Subjects were asked about their perceived ease of use with respect to four aspects of the virtual world environment: navigation, communication, object interaction, and student learning. Navigation refers to moving and jumping around the virtual world. Communication deals with “talking” with others and making oneself understood. Object interaction refers to the interaction of the user with objects in the environment (chairs, signs, etc.). Lastly, student learning deals with learning in a virtual world versus learning using a Learning Management System (LMS).

Regarding navigation, two out of three learners thought the navigation around the virtual world was very simple. RM2 commented: *“It was very easy to walk around and jump onto things... running was not complicated either”*. However, RM1 found some difficulty when she had to change directions: *“turning around to find a location gives me an uncomfortable feeling”*. After probing, she remarked that this [turning around] made her a bit dizzy. Nevertheless, she commented on other aspects of the navigation that she found easy and she compared it to her prior experience with Second Life. She thought that “There” was less *intimidating* than SL: *“Intimidating meaning, I did*

not think I would have to invest a lot of time in learning how to get around". The difference in perceived ease of navigating might be explained by looking at the demographic information from the subjects. RM2 and RM3, the two subjects that found it simple, were males in their twenties as opposed to RM1 who was an older female. Perhaps gender and age can influence tolerance for certain kinds of movements within a virtual world.

Concerning communication, two out three subjects found it very easy. For instance, RM1 said: *"I like the fact that what you said appeared above your head and not in some corner of the screen like in SL [Second Life]"*. It seemed that she didn't have a previous good experience with virtual worlds and she might have found this aspect of There "refreshing". RM2 seemed very positive about this environment and his experience: *"I was able to just type at any time using the keyboard to communicate... aside from a few spelling mistakes it was almost like talking with someone in person"*. This might indicate that the subject enjoys face-to-face classes and that he might enjoy virtual world classes as well. The one exception was RM3 who said: *"it was a little difficult and confusing...because it has IM [Instant Messaging] and the balloon talk"*. RM3 at this point was having two different conversations with two different people at the time of discussing the communication aspect. Consequently, having two active ways of communicating simultaneously might have been the source of some of his perceived difficulty. One way of mitigating this inconvenience is the obvious one: do not carry more conversations that you can handle. Computer monitor space will always be limited and there will be a point at which the screen will look too cluttered. "There" in particular has addressed somewhat this issue with the balloon talk. After typing a word and pressing Enter, the balloon shows on top of the user's avatar. However, about every 5 seconds, the balloon will elevate (as a real balloon) just a bit higher on the screen, until eventually, it disappears altogether.

Pertaining to object interaction, all of the subjects found that it was easy. RM2 described his experience of this type of interaction: *"It is fairly straightforward by simply clicking on a blue circle I was given a list of options and could select an action"*. RM3 even compared this experience to *"watching someone play the SIMS"*, a life simulation computer game under the Electronic Arts brand. RM1 and RM2 had prior experience with virtual worlds which may explain the lack of difficulties. Even though RM3 did not have previous experience in this type of environment, just by observing some games, he might have had a general idea of how interactions would be possible. It might also be possible that this aspect of the interface is intuitive enough that it is easily picked up by newcomers.

Finally, concerning student learning, there were mixed impressions. RM2 was highly optimistic about its potential for learning when compared to WebCT:

[It would be easier to learn] in an environment like this [than using WebCT]. WebCT as of now is mostly notes from the teacher and them giving assignments with a blog or message board for communication.... with here ["There"] it [be]comes more of a simulated class room environment.

Thus, this student may think that a virtual world gives a more realistic classroom setting feel than a learning management system. On the other hand, RM1 brought some issues that could hamper student learning: *"...The setting for the class in the virtual world have to have very little objects, as too many would be distracting. Also, what if a member of the class come[s] with a distracting outfit?"* Both of these are valid concerns. Regarding the first item, an extreme number of objects can make people lose focus on what is being taught, and focus instead on the environment. Instructors that are interested in designing online classes in virtual worlds must consider this. It would be possible to have nice decorations (in addition to rooms with chairs, desks, etc.) without being too intrusive or distracting. Concerning the second item, people that dress their avatars with too exotic designs (or have them walk around without any clothing) can greatly disrupt the learning environment. This issue might be addressed by establishing protocols and rules of conduct for virtual world classes that can address issues similar to what we would have in a face-to-face class.

Perceived Usefulness

Subjects expressed their perception of usefulness with respect to four aspects: communication, collaboration, teaching, and preferred learning environment. Communication refers to the importance of gestures and non-verbal cues (smiling, laughing, nodding, etc.) when talking with others. Collaboration deals with how students work with each other for assignments and projects. Teaching pertains to how students perceive the environment's

effectiveness for teaching, meeting with the professor, receiving instructional materials, etc. Lastly, preferred learning environment deals with usefulness comparisons between learning in a virtual world vs. learning from a LMS such as BlackBoard or WebBoard. An analysis of the subjects' impressions as well as the implications of these impressions is presented below.

Regarding communication, there were mixed feelings among the subjects. One of the subjects, RM2, was enthusiastic about it: “[*Gestures*] add an extra emotional element to the game play experience...maybe gestures add a more realistic feel to the experience...”. Nevertheless, the other subjects saw both positive and negative aspects about this form of communication. For instance, RM1 thought that since it conveyed emotion it was very important. However, she also thought that for people in her age group (late 30s) they might not be too excited about this feature. RM3 was more eloquent in his opinion about why it was a good feature: “*I suppose it is important for the fact the prof[essor] would be able to see judging from his students’ facial expressions he would be able to see if there would be any confusion in what he was teaching*”. On the other hand, he felt that it was “weird” to get to know other students in the virtual world. It is possible that certain people with a higher degree of introversion will find this type of expression unsettling, since it might resemble face-to-face communication.

Concerning collaboration, only one of the three subjects, RM2, did not have any doubts about its usefulness:

They [virtual worlds] could be as useful as any other way students collaborate already such as instant messenger, phone, or even meeting in person. I think it would excel though at a commuter school where students may be more spread out and not always be able to meet up to work together or need more capabilities than an instant messenger services offers.

As can be seen, RM2 caught onto the fact that virtual worlds can also help for distance learning, which is also an advantage of more conventional LMS. However, the other two interviewees saw possible setbacks; e.g., as was remarked by RM3:

“It depends on the projects and the assignments...well not all assignments and projects can be done online... let’s say a student was given an assignment to look up material of their family ancestors or a project where they would have to build a chart without the use of [a] computer”

Although somewhat limited in his thinking about current computer capabilities, this is an important point. Not all courses can be effectively adapted for virtual worlds. For instance, engineering courses that require use of equipment would be expensive to set up, if the instructor wanted lab machines to be remotely operated. Conversely, a freshman composition course could only require PowerPoint slides with class concepts and assignments, with no additional hardware configuration. Nonetheless, some of these obstacles have been overcome, and others will be after new technologies are developed. It might be difficult for people outside IT (as RM3) to know of the current or future capabilities of computers and the Internet. Therefore, this makes it an excellent opportunity to create public awareness in schools and universities of future trends of education using IT. Another point was brought out by RM1 concerning joint work: “*We did not explore this in the tour, but it would be good if it would allow joint editing of a document.*” This technology already exists, and it would be a nice add-on for virtual world environments to support this feature.

Pertaining to teaching, all interviewees agreed that it was a good environment for instructing a college course. However, two subjects had some initial concerns regarding this. For instance, RM1 thought about prior orientation and learning as important aspects: “... [*they*] are absolutely necessary.... how to use all of the features, what protocol will be adopted. Earlier, we mentioned the dress code, etc.” As was mentioned above, establishing a code of conduct may be the first measure that could guarantee the success of the virtual world as a learning environment. On the other hand, RM2’s issue was that he couldn’t figure out how the teaching would take place. His comment describes it: “...*how would the teacher teach, I just don’t see a way for them to lecture, how would that be handled*”. After doing some probing, RM2 explained further: “*from a typing standpoint would it all have to type in, if you could copy and paste into...*”. It appeared that this concern was about how to take notes on everything that the professor would say synchronously in a virtual world. He himself suggested copying and pasting, but he was

unsure whether this capability exists in the virtual world. The interviewer remarked that it was possible, since this was how he was noting what was being said in their interview.

Concerning the preferred learning environment, there are also mixed impressions. On a positive note, RM2 explained why he preferred virtual worlds: *“Personally I would prefer a more interactive student learning environment, I don't like to take classes online after taking two. I much rather have a classroom environment over just reading post on a bulletin board”*. It seems that an incentive of virtual worlds could be the simulation of being in a class environment without having to be physically present in class. On the other hand, RM1 mentioned that it is preferable for synchronous communication. Nevertheless, she felt more comfortable with asynchronous communication and even face-to-face interactions. She previously indicated that people of her age group might not be too interested in this environment. It is a conceivable statement for the present, but in years to come, the next wave of graduate students would be the ones that enjoyed virtual worlds as undergraduate students. Lastly, RM3 mentioned a different issue that casts doubt on virtual worlds as a preferred environment:

Let's say that two students use this program and were trying to get assignment done and another user decides to play games while the other two where trying to get work done what would stop him? Blackboard doesn't have that problem because it's not that complex and it doesn't allow other people to interfere.

This is true to an extent, although it can be argued that Blackboard can be used for irrelevant posts, while others do post actual work. Fortunately, Learning Management Systems have features that would prevent situations like that, such as disabling anonymous postings. This works very well for asynchronous communications, but how can this work for a virtual world environment? How would an instructor know who is working and who is playing around? Possible solutions could be an auto-save feature for chat and a log file that keeps recorded activities that occur in the virtual world area designated for the course. These IT dependent possibilities might deter some users from behaving improperly. Regardless of the technology measures taken, if an instructor can develop swift trust with his or her students, these kinds of problems will be greatly reduced.

Concerns

The concerns expressed by the subjects pertained mainly to privacy and security. Other concerns were also voiced.

Regarding privacy and security, all three subjects mentioned concerns. RM1 had some unease that was more Internet-related than virtual world specific: *“The only thing I might be concerned about is one of my class mates who knows me personally might inadvertently disclose personal information about me”*. However, she doesn't know how to address this issue specifically. It is difficult indeed, because it may depend, among other things, on others' good will, which may or may not be present. There is not much that can be done beyond having a clause dealing with privacy as part of a code of conduct for the virtual world class.

RM2 had a different take on this matter: *“I don't see any need for [privacy] then depending on how much personal information we would be required to prove, but viruses wouldn't be a concern if it's run on NJIT server...”* This issue could bring to the fore a debate on whether it is better to have the virtual world hosted on the college's own servers or to have it remotely hosted. Hosting it in a university may minimize malware risks, but at an additional expense of getting all the necessary software, and hardware for properly running this environment. On the other hand, having it hosted at the virtual world's company might reduce these costs, but the risk of acquiring malware might increase, since thousands, if not millions, of users are members. This might be alleviated in part by designating areas as private, in order to prevent people who are not registered in a class from gaining access to the class location. These options would have to be carefully evaluated before the university commits to a decision.

RM3 brought up an issue which was the result of the obnoxious person that had disrupted the interview: *“...[We need] blocking programs that would deny annoying users from interfering”*. Currently, “There” has the ability to block users from contacting a user. It is likely that other virtual worlds have (or will have soon) that same capability. Regardless, the interviewer is not certain at this time whether there is a feature that prevents the avatar of a blocked user from being seen. If that feature does not exist, then it should be implemented.

Finally, all other concerns are mostly related to performance issues. RM1 mentioned that the mini browser from “There” took long to appear. RM2 was worrying about the type of Internet connection required for this environment. This means that specific hardware and software requirements play a critical role in determining who can and cannot use the virtual world. Thus, it is very important to choose a virtual world that supports the most platforms.

CONCLUSIONS

We interviewed three subjects to determine if students would choose a virtual world as a learning environment instead of traditional learning management systems for a college course. A major limitation of the study is of course the very small number of subjects. Nevertheless, the responses provide some preliminary answers to our research questions, and the answers are a conditional “yes.” Our college student subjects indicated that there is some preference for using virtual worlds over traditional text-based learning management systems. However, there were some usability issues encountered that could hamper the use of virtual worlds for teaching college courses; even though the students all found the system they tried to be reasonably easy to use. Some issues are user dependent such as carrying on many conversations at the same time, misbehaving and disrupting the class environment. Other issues are related to course design using virtual worlds, such as creating an effective non-distracting environment. There were some suggestions offered to deal with these issues. The suggestions’ effectiveness will be determined in time as these environments are used more, new IT innovations and virtual worlds’ features are created, and additional research is undertaken.

The goals of this research are to develop a set of design principles and architecture for an online environment that supports learning. This research contributes to the design and use of computer-support learning environments. Our premise is that students need an *engaging* learning environment that stimulates their self-efficacy and their outcome expectations. This is the path to effective learning.

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