Teaching Tip

Learning Experience with Virtual Worlds

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ABSTRACT

Virtual worlds create a new opportunity to enrich the educational experience through media-rich immersive learning. Virtual worlds have gained notoriety in games such as World of Warcraft (WoW), which has become the most successful online game ever , and in 'general purpose' worlds, such as Second Life (SL), whose participation levels (more than 10 million users) and economic opportunities (creating millionaires), have attracted considerable news media attention (e.g., *Forbes*, *Newsweek*, *Wired*, *Businessweek*). This article offers a description of the opportunity in general, and of a specific application case that illustrates the value, as well as implementation challenges.

Keywords: Virtual worlds, learning, tacit knowledge, Second Life, e-business

1. VIRTUAL WORLDS

Virtual worlds within the scope of this article are understood as immersive, three-dimensional, multi-media, multi-person simulation environments, where each participant adopts an alter ego and interacts with other participants in real time. World activity persists even if a player is off-line. This makes extended participation more compelling, possibly even 'addictive'.

2. LEARNING WITH VIRTUAL WORLDS

Virtual worlds have several characteristics that facilitate learning, as defined by Rotter (1954). Users can exercise new behaviors, repeat them to gain experience, observe the outcome (e.g., based on virtual world pay-offs or feedback from other participants), and adjust based on the outcomes. All this is enabled by a stimulating multi-media environment that potentially leads to significant, lasting behavior changes, if desired (Brown and Thomas, 2006). Users thus create their own experiences and construct their own knowledge. Different from much of classroom learning, the experience is immersive and learning-by-doing. Participants can furthermore acquire tacit knowledge (Polanyi, 1967), demonstrated by the ability to complete tasks without being able to describe how to do so (Ju and Wagner, 1997). In addition, participants can explore extreme situations in simulated environments. The simulated catastrophic consequences of potential failures intensify the learning experience (Brown and Thomas, 2006).

3. PURPOSEFUL VERSUS GENERAL PURPOSE WORLDS

There are well over a hundred widely used virtual world applications available today, operating on platforms from mobile phones to desktop PCs and larger computers. This article focuses on applications for broadband networked PCs. Among them, we can differentiate two distinct groups, purposeful and general purpose virtual worlds. Purposeful worlds, represented mostly by games such as the world's most successful online game (Gamerworld, 2007) World of Warcraft (WoW), require the user (player), to fulfill a set of objectives, usually rising in difficulty and complexity (Wagner, 1997). Although these objectives can be quite abstracted from real life (e.g., slaying of monsters), the learning experiences can be very practical, such as the impact of altruistic behavior or the benefits of separation of duties and team work. Nevertheless, *general purpose* virtual worlds are in many ways more suitable for the classroom environment, in that the instructor does not have to overlay his or her own objective system over one implemented within a game, nor has to compete with game objectives that might prove to be distractive.

4. IN THE CLASSROOM

Instructors using virtual worlds to enrich the learning experience can use them to move class meetings into the virtual space, or may require students to complete assignments in the virtual world. While it may seem natural to invite students into a virtual seminar room to let them look at virtual presentation slides, real innovation comes from using the medium to simulate. Hence, unless students are physically distributed, and thus face-to-face teaching is unavailable, letting students create

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virtual world experiences is likely the more attractive one to pursue, e.g., building e-businesses.

Virtual worlds can also be used to coordinate distributed group work. In fact, system developers at Lindenlabs, the company that created SL conduct their meetings within SL. Student teams can also meaningfully interact with overseas groups to internationalize their experience and learn more about collaboration within far-flung, distributed teams.

5. TEACHING AND LEARNING EXPERIENCE

The course "Virtual organizations and global teamwork" is an information systems course that prepares students for virtual work environments, developing their skills in technical and non-technical areas. In September 2007, students were tasked to use Second Life as part of their learning experience in this course.

The 4-week group assignment required 5-student teams to build a virtual organization inside SL for the purpose of economic gain. Given a limited amount of resources (Linden$ 3,000 = US$12 per team), they were asked to generate revenue through the in-world economy. The experiential portion of the assignment required them to rent real estate, develop a service, build a product, or trade, attract customers in order to generate revenue. Students also had to report on the experience, both as a business project and a systems development project. On the development side, they had to create artifacts (either to sell or to furnish their store) and had to program using a scripting language which would give the created artifacts properties with which to respond to events.

The project offered opportunities for a broad range of learning experiences. Students demonstrated many of these in their project reports and presentations. Four types of learning experiences emerged: e-business insights, systems development insights, virtual work insights, and IT planning insights. As e-business proprietors, students had to make decisions on locations, products, and such. Insightful teams used in-world business intelligence, such as visitor frequency (reported in SL) to facilitate such decisions. Three teams coordinated and co-located their businesses, a jewelry store, a theme park (for honeymoon travel), and a bridal store ("Second Wife"), demonstrating additional insight. As systems developers, students had to learn a 3D modeling language and learn basic scripting concepts. Most student groups focused on modeling, but usually copied or purchased object scripts instead of scripting themselves. As virtual workers, students had to learn to operate in the virtual world, build relationships and carry out tasks. They had to meet the instructor at regular intervals, had to receive cash through the in-world cash transfer system, and had to form SL registered groups. Furthermore, they had to self-learn about the environment using online resources such as YouTube videos. One team had its members even place themselves at strategic places within SL, so as to drive traffic to their business. With respect to IT planning, students had to make choices related to technology use (e.g., how to capture video of their site) or make "make vs. buy" decisions concerning artifacts and scripts. While students were not necessarily aware on an abstract level that they

made these decisions and created these insights, their project reports and presentations clearly demonstrated them.

All groups succeeded in the 4-week exercise, successfully creating a revenue-oriented business, attracting customers, generating Linden$, and documenting their findings. Students were able to do so with only a few hours of formal instruction in SL. They demonstrated SL capabilities that were significantly beyond those shown in the formal instruction. Not surprisingly, students criticized the high workload level of this assignment and were initially doubtful in their ability to complete it. In an anonymous, online post-event survey, 29 (28) students indicated that the assignment was demanding, but were somewhat favorably inclined towards the assignment learning value, and recommended that it should be used again in future (see Table 1).

Question	Range	Result	Responses
"The Second Life assignment was …"	1 - highly demanding, 3 - reasonably challenging, 5 - not demanding at all	2.39	28
"My learning value of the Second Life assignment was …"	1 – very high, 3 - average, 5 - very low	2.45	29
"The Second Life assignment has given me an opportunity to practice business ideas (Examples: effective advertisement, location selection, etc.)"	1 - strongly disagree, 3 - neutral, 5 - strongly agree.	3.72	29
"The Second Life assignment helped me learn from experiences and feedback from my partners, customers, and other collaborators."	1 - strongly disagree, 3 - neutral, 5 - strongly agree.	3.48	29
"This assignment should be repeated next year."	1 - strongly agree, 3 - neutral, 5 - strongly disagree	2.21	29

Table 1: Student Feedback

6. CHALLENGES

In addition to the challenges for the students, there were other issues to overcome. The department's computer lab PC configuration was barely adequate (especially with respect to graphics), leading to repeated system crashes during lab hours.

Bandwidth also appeared to be a problem when 50+ students were accessing SL in the lab at the same time. However, these problems were manageable. Other challenges arose from the fact that SL, although free to use, is not free for those who wish to build. Students building on rented real estate had their businesses disappear as soon as their rent money ran out (they were asked to budget 4 weeks beyond assignment completion), thus leaving no trace of their assets. Also, holding class meetings in a virtual world with large student groups is difficult, as many students enjoy their 3D freedom to buzz around the classroom, chat, or even speak via microphone, thus creating significant back-channel noise. Coordination skills, methods, and discipline become even more important than in other synchronous communication environments.

7. CONCLUSIONS

The experience exceeded the instructor's expectation. Students produced work products that were interesting and insightful, and demonstrated considerable learning, both explicit and tacit. Students were enthusiastic about operating in the virtual world, although critical of the workload. Students were able to generate business transactions, but generated little revenue. While it appears useful to require revenue generation, the key emphasis should be on generating transactions (even if they earn only few Linden$).

There are many opportunities to extend the experience. For example, courses might offer more sophisticated training in modeling or scripting for better systems development, or might stress opportunities for multi-university collaboration. Virtual worlds also offer great potential for multi-disciplinary courses and partnering between IS educators and those in other subjects. For instructors, teaching with this new medium requires some learning and familiarization (likely several tens of hours for sufficient familiarity, but considerably more so to master the development/programming capabilities of the medium). Creating one's own virtual world presence and experimenting with the concepts to be learnt by students is highly recommended.

The virtual world medium also offers a vast array of learning-related research opportunities, such as an analysis of tacit knowledge creation, learning effectiveness, and learner satisfaction.

9. REFERENCES

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AUTHOR BIOGRAPHY

Christian Wagner is a professor at the City University of Hong Kong's Department of Information Systems. He investigates the use of social software to harness collective intelligence and improve learning. He incorporates the use of social software in research, practice, and teaching. Wagner holds a PhD from the University of British Columbia. He has published over 70 articles on topics related to improving performance through information technology, including articles on using wikis, weblogs, and computer games to facilitate knowledge sharing. Wagner has won teaching excellence awards from the City University of Hong Kong and from the University of Toronto's Rotman School.

APPENDIX 1

Assignment Instructions

IS3000 ASSIGNMENT 2: ORGANIZATIONAL USE OF SECOND LIFE

Task

Your task will be to invent and prototype a use of Second Life to help an organization (invented by you) to perform better. The organization can be commercial, government, or a non-profit. You will need to think of the competitive advantage of SL, such as use in training, virtual application development, or similar. Thereafter, you should build a prototype for the application and describe your design ideas for the application, as well as your assessment of its usefulness. You can best demonstrate the usefulness by earning money with your SL organization. You are expected to complete this task in groups of about 5 people (+/- 1).

Deliverable

You will write a document of about 2,000 words explaining your idea, its implementation, and its benefits. In doing so, make use of outside resources that can explain the potential success of your application. You will also create an interactive application, e.g., a **video** that demonstrates how your idea is implemented. Your team will also have the opportunity to present its assignment deliverable in the classroom.

Evaluation

Your assignment will be evaluated as follows:

Executive summary / statement of purpose	10%
The "business case" – explanation of the leverage point, where your idea can help the organization perform better	15%
Design concept	15%
Implementation	30%
Assessment of usefulness	10%
Overall impression	20%

The best assignments will be those with a high level of application value, e.g., those where the business or organizational benefit is clear. If you can demonstrate that you have made money from your idea, it will help you demonstrate usefulness.

Resources

Recognizing that you need a place to operate your business, you will be given limited financial resources. Each team will receive L$3,000 from the instructor. This will be enough money to rent 512 sqm of land for 2 months if you look carefully, e.g., at Jewel (132,77,21). Your property must be rented by you until 2 weeks after the assignment due date. If you spend wisely on rental cost, you should have resources left over for other purchases, as needed.

Due Dates

You will need to provide an idea for the 'project' you wish to undertake by [T + 2 weeks], providing also a list of your group members (changes at a later date will require instructor approval). *Once you identify your group members and project idea, your team will be allocated L$3,000.*

The assignment will be due on [T + 4 weeks]. Presentations will be held on the same day.

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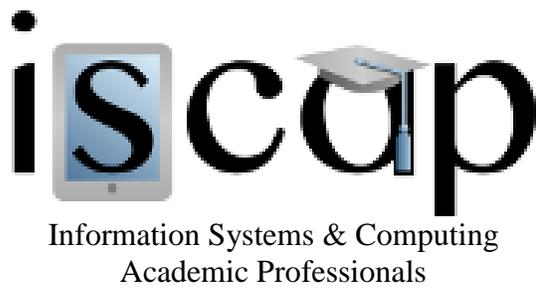
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