DolceVita Institute of Technology and 3D virtual worlds: a case study

Giuseppe Macario

November 27, 2014

This research paper is licensed under the Creative Commons Attribution Share-Alike 3.0 Unported License: http://creativecommons.org/licenses/by-sa/3.0/

Abstract

Many business organizations, also recognized internationally for their relevant scientific research, are turning their attention towards the virtual worlds, which prove to be great platforms that support collaboration and training. This article describes the experience of using Second Life at the base of training activities carried out by the DolceVita Institute of Technology,¹ which is a higher education institution located in Vatican City (Rome, Italy), as part of a course on the methods and tools to support collaborative work having as recipients representatives of companies, public administration officers and graduates. The results obtained are on the whole encouraging.

Introduction

The use of 3D virtual worlds in education has recently become more and more frequent [Duncan et al. 2012, Warburton 2009]. The main reason is the perception of belonging to a community, which eliminates the sense of isolation that may cause a loss of effectiveness in the distance learning activity. Furthermore, many corporate organizations are moving in this direction because of the support offered by virtual environments for collaborative activities carried out globally [Linden Lab 2009].

Business organizations consider these environments very significant because of their similarity to virtual enterprises, i.e. temporal alliances of heterogeneous businesses that adapt your business to market demands. The aim is to bring together the respective competencies to create a new company that is aimed at

¹Also known as DolceVitaTech: http://www.dolcevitatech.education
a specific business target. This highly competitive global environment requires special skills. Virtual worlds reflect the characteristics of a virtual enterprise because they are distributed and, on the one hand, can be very competitive due to some of the elements common to role playing games, while on the other hand they encourage collaboration because they induce a strong sense of community belonging. They have a special importance in regard to the development of leadership [Linden Lab 2009] and identifying people who have this particular attitude, which is essential to manage virtual enterprises in constant change and require considerable decision making ability.

It is important to underline that, when talking about e-learning, emphasize must be placed on 'learning', although in many uses of Second Life distance teaching focus is placed on ‘teaching’, that is to say the platform is simply used to hold synchronous distance classes, i.e. by projecting preloaded slides etc. In fact, Second Life offers much more effectiveness in collaborative work and learning support, since it was created as a massive multiplayer online game (MMOG) with social networking features [Edwards 2006] and, by its very nature, allows the structuring of activities that have as their goal the pursuit of a common objective.

This article presents the experience of using Second Life carried out under a project of technology transfer to companies. In particular, the goal of the intervention was the construction and the start of a project for the qualification or requalification of the supply and demand for solutions that employ technologies in the ICT sector. One aspect of the project involved the delivery of online training activities concerning support to collaborative work in ICT to businesses and to the public administration staff.

The virtual campus

In recent years, various activities have been undertaken aimed at the use of buildings constructed in Second Life as a tool to support distance learning. The virtual spaces organized by some universities are completely different from reality, while others faithfully reflect real buildings. In the case of the DolceVita Institute of Technology, the latter choice has been made, based on the assumption that finding themselves in familiar locations instilled within learners a sense of belonging to the community of students.

Controlled experiments have produced good results in both the performance and the satisfaction of the students, who have found it easier to communicate in this environment with the teachers—during classes—and with their colleagues—during collaborative activities. This positive perception may be attributed to the widespread feeling of belonging to the community of the students of the course attended, as demonstrated by the access outside of the educational activities. Indeed, in order to promote extracurricular activities, the environment has been
equipped with leisure areas, group games and tools for the use of audiovisual material.

The whole environment makes use of the programming language offered by Second Life—the Linden Scripting Language (LSL)—which allows equipping the objects with an active behavior. In this respect, several devices have been created, such as a slide projector, a video screen connected to a streaming server and, more importantly, a complex environment for synchronous virtual meetings, to name but a few. In order to support the provision of organizational activities and the exchange of information and educational material, the virtual environment has been integrated with Moodle, so that the synchronous collaborative activities could be supported by this popular open source learning management system that encourages collaboration among people and offers several features including chats, forums, wikis and workshops for brainstorming, discussions and debates.

### Training activities

The education that was provided during this project in Second Life comprised several advanced topics. Specifically, a unit was about the methodologies and the technologies that support collaborative work. In addition to theoretical aspects, described through face-to-face synchronous classes (‘teaching’ modality), Second Life has been used as a platform supporting learning and collaborative work. The goal is to help students study together in a fast and effective manner, by providing them with tools for working as a team. This kind of collaborative process allows them to strengthen and validate their knowledge by interacting with each other and focusing on the social dimension. Indeed, discussing and exchanging views can make a major contribution to building knowledge [Harrer et al. 2008] and can be facilitated by adopting ad hoc tools to stimulate certain group dynamics and cooperation processes that are not always associated with traditional face-to-face teaching methods.

Group learning often involves a small group of people working together as a team to complete a problem-solving task, specifically designed to promote learning by means of collaboration [Alavi et al. 1995]. Therefore, the collaborative learning concept is based on the three premises of effective learning: (i) active learning and construction of knowledge, (ii) cooperation and teamwork, (iii) learning via problem solving. The participants of a collaborative activity should be able to express their ideas and make decisions. They should dispose of the needed material, such as documents, meeting minutes, and presentations. Moreover, additional features that support coordination and awareness services are required to coordinate and solve possible conflicts between the collaborative entities involved in the session [Carroll at al. 2003]. The participants of a collaborative session can have different roles and each role is entitled to perform a specific task. The system ensures that each user interacts only with the established UI
for the user’s role. Thus, in order to facilitate the collaboration, the following roles are assigned to the selected participants:

- the **organizer**, responsible for supervising all the collaborative sessions.
- the **leader**, belonging to the group of participants of the collaborative activity and responsible for guiding its execution. When the discussion turns out to be ineffective or chaotic, it is the leader’s responsibility to moderate the discussion with her interventions. This role is required because it is very difficult for the organizer to supervise all the meetings at the same time. The leader’s role can also be assigned, in turn, to each participant so as to enable them to develop moderation skills.
- the **participants**, taking part in the collaborative session.
- the **speaker**, a participant who speaks after receiving permission from the leader.

For the purposes of meeting management, ad hoc tools have been developed, including a Moodle module which provides information on the event in progress and allows users to act as moderators in turn.

According to Peter Senge, a learning organization is a group of people who continually enhance their capabilities in order to create the results they truly desire [Senge 1990]. Senge argues that, when people learn together, they can learn faster than could have happened otherwise [Smith 2001]. In this experiment, the proposed task was to reach a conclusion by deduction or inference from a set of circumstances. The solution was the result of a group discussion, because each group was allowed to give only one answer. One of the tasks was the so-called ‘zebra puzzle’ [Wikipedia 2014], also known as Einstein’s puzzle (or Einstein’s riddle) because it is said to have been invented by Einstein. It is often claimed that only 2% of the population can solve it [Antonick 2012]. The remaining tasks were equally difficult. Every group managed to carry out each task successfully and within a reasonable time frame.

During a workshop about collaborative work, several agile software development methods were discussed, with particular emphasis on extreme programming (XP), a software development methodology which aims at improving software quality, productivity and responsiveness to changing customer requirements by favoring teamwork and collaboration between programmers and users. XP makes use of pair programming (or peer programming), a software development technique in which two programmers work together at one workstation. One, the driver, writes code while the other, the observer, reviews each line as it is typed in. It is an effective form of collaborative programming [Nosek 1998] that is being used more and more often in industry. After understanding important aspects of XP, such as rapid feedback, incremental change and embracing change, and after learning how to write simple programs in LSL, the students participated in remote pair programming activities in teams of two, where a student, by assuming the role of driver, wrote the code, and the other one, as an observer, revised the code and helped the driver to make decisions. The two programmers switched roles frequently. The ultimate objective was to build objects in-world
(i.e. within Second Life) and provide them with an active behavior through LSL scripts.

**Evaluation**

In order to assess the proposed Second Life collaborative learning approach, an experiment has been performed in accord with the paired comparison design suggested by [Wohlin et al. 2012]. Specific questionnaires measured the factors perceived by the users within the 3D virtual environment, such as presence, immersion and involvement, while an objective assessment was obtained through a comparison between the teams’ performances in each task. The questionnaire was made up of the following questions about pair programming:

1. The material and the information I received were clear.
2. I was able to experiment freely and confidently with LSL programming in Second Life.
3. Communicating with my colleague and understanding her in-world actions was easy.
4. The task I had to carry out was easy.
5. The programming language was easy to learn.
6. The same environment, or a similar one, can also be used for pair programming sessions with different languages.
7. All in all, the remote pair programming experience was productive.

The results are summarized in this box plot:

The seven answers have been evaluated on the five-point Likert scale from 1 (low) to 5 (high) [Oppenheim 1992]. On the whole, the values obtained in the questionnaires tend to be high. The lowest values (question 2 and question 5) are probably due to the newness of the environment and the programming language. The environment is perceived to be productive (question 7) and an effective way to make use of pair programming (question 3 and question 4). A sense of confidence and trust in pair programming applied to different languages can be detected (question 6).
Conclusion

This article presented the experience of using Second Life carried out under a project of technology transfer to companies, aimed at using technologies and methodologies of interaction in computer support for collaborative work. The final questionnaire asked the subjects to report their level of performance on the task and their perceptions of benefit. It showed that, on the whole, the participants were satisfied and found the tasks stimulating. They also said that they would welcome the adoption of the same methodologies in their work environment, or of similar tools for remote collaboration. Remote pair programming made work easier and gave the opportunity to socialize.

References


