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A pedagogical model to develop teaching skills. The collaborative learning experience in the Immersive Virtual World TYMMI

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ABSTRACT

The initial training of quality teachers is seen as a key to improving the learning outcomes of students in Chile. The TYMMI project is one of the initiatives being developed to provide a space for simulation for teaching practices in immersive virtual environments in Second Life and Open Sim. Initial Teachers Training belong to the School of Education at the Universidad Católica de la Santísima Concepción, participated during 2014 in the implementation of challenges, based on a pedagogical model and teaching strategies such as role play and problem-based learning. Through direct observation and blogs, the results show that participants have an important domain in the pedagogical and technological interaction. Despite the perception of the technical difficulties of using platforms, students emphasize that the experience has been supportive along their teaching practices, and it has allowed them to reinforce subject content, which poses a very motivating intellectual and technological challenge.

1. Introduction

Despite the efforts of the Chilean Government to strengthen the teaching profession (MINEDUC, 2011), and thus the quality of initial training as a key to improve the results of students' learning , the assessment knowledge and skills graduates of teacher education programs have not been successful. There is a consensus about the strategic importance of the initial training of teachers under the assumption that this could have an effect on the academic achievement of students in the scholar system (Sotomayor, Parodi, Coloma, Ibañez, & Cavada, 2011). In this context we must add the great heterogeneity and diversity of students, a challenge that to which teachers must respond appropriately. Several countries are aware of this situation, and thus they have been reforming their educational systems. Tedesco (2011) suggests that awareness has been raised about the enormous complexity and difficulty of changing the patterns in the functioning of educational systems.

The Information and Communication Technologies (ICT) are powerful tools that facilitate the teaching and learning processes in the new digital era. Monterroso and Escutia (2014) indicate that higher education in the twenty-first century cannot be conceived without the use of such technologies. It is a challenge for teachers to implement educational innovations, the use of the advantages they offer to optimize learning, promoting collaborative and cooperative learning, and the development of new skills and cognitive skills of students who are going to face their professional future.

The emergence and characteristics of new technologies such as virtual worlds offer the prospect of promoting student learning and commitment, if they are properly applied in educational contexts (Warburton, 2009). Jerónimo, Andrade, and Robles (2011) indicate that 3D world scenarios favor the inclusion of teaching strategies such as role play, problem-based learning and case studies.

The main research question guiding this research focuses on respond "Which is the contribution of Immersive Virtual Worlds in developing pedagogical and technological skills from the perspective of students in Initial Teacher Training?" This research involves the implementation of activities to simulate pedagogical practices in Immersive Virtual Worlds (IVW), specifically in *Second Life* and *Open Sim* through an island called TYMMI, where students exert an active role in generating different teaching strategies and activities that recreate those common scenarios in everyday classrooms. These spaces are designed thanks to the contributions of the project *Fondecyt 11121532: Technology and Pedagogical Models in Immersive Worlds*, funded by the *National Commission for Scientific and Technological Research, CONICYT* –

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Chile, in order to complement classroom teaching and strengthen vocational training of Initial Teacher Training students at the Universidad Católica de la Santísima Concepción.

2. Immersive Virtual Worlds

Higher education in the twenty-first century cannot be conceived without ICT. It poses a challenge for teachers to implement pedagogical innovations and use of the advantages they offer to optimize learning, promotion of collaborative and cooperative learning, and the development of new skills and cognitive skills of students throughout their academic careers toward their professional future.

Through the use of software developed to implement Immersive Virtual Worlds, ICT have contributed to education by finding new ways to deliver content to students in an engaging, playful and dynamic manner. One of the main features of the IVW is the possibility of social interaction in real time and manipulation of objects in the virtual world, allowing the feeling of being in a space of freedom and creativity in a controlled environment, with real changes.

Over the last years, Second Life and Open Sim have been used for professionals as a virtual environment in order to see their utility in different fields (Chena, Wardenb, Tai, Chen, & Chao, 2011). The educational field has been tested too. It has shown how the classroom can be transformed into a digital space and how students can take different appearances when they become an avatar.

A virtual world is known as a digital multimedia online environment inspired in reality, where users can interact with each other through avatars, understood a feature of Second Life is to be a cross-platform software with three-dimensional features, with unique settings, easy to remember, it can run on Linux, Macintosh and Windows. It was developed by Linden Lab, a U.S. private corporation, in 2003 (www.secondlife.com). The following benefits of Second Life can be remarked by Hundsberger (2009, p. 8):

- *Three-dimensional format.* This makes the user experience more immersive and comprehensive than traditional textual scenarios based on interrelation and static images.
- *Active student role through manipulating their avatar roles.* The role of the teacher and the student is redefined. Students are responsible of exploring and immersing themselves in the process.
- *Collaborative relationship* among students by means of the training environment itself.
- *Learning as a game.* Students move through different three-dimensional (3D) places, explore and learn while enjoying their experiences.

In 3D environments, the visual and kinesthetic aspects are present continuously, because individual differences are evident in the ways of learning and user participation (Iribas, 2008).

The Open Simulator project, dating back to 2007, was conceived as an open source program, which means that everyone can use it freely. It is a 3D application server that can be used to create a virtual environment (virtual world) that can be accessed through a variety of clients, on multiple protocols (viewers). Each developer can create their own world according to their needs, as the basic software can be extended or adapted in a modular fashion to accommodate custom configurations.

2.1. The potential of virtual worlds in education

Virtual environments, especially those with multiple simultaneous users, have become known for their usefulness: promoting constructive learning (De Lucia, Francese, Passero, & Tortora, 2009; Jamaludin, Chee, & Ho, 2009), collaborative learning (Jarmon, Traphagan, Mayrath, & Trivedi, 2009), improving critical thinking (Herold, 2010), allowing developing technological skills (González & Blanco, 2011), and they are considered as a didactic resource for teaching as well (Rodríguez & Bañados, 2011).

The potential of virtual worlds today are that learning processes do not take care of the demands that the work environment are requested to education professionals, so the creation of three-dimensional educational settings could generate an additional advantage to the traditional methodologies, allowing users to interact in simulated work environments. Checa (2011) states that teachers become a facilitator in the metaverse, abandoning their traditional role as mere transmitters of concepts or content. Outside the virtual world classroom teachers act as a guide providing clues to solve encountered problems, and they are the companions of student, thus guiding processes within the metaverse. According to Pellas (2014) instructors and monitors should be encouraged to discern the students' engagement with artifacts in this environment, learning materials, and study through collaborative – interactive workflow.

Some of the advantages of using virtual worlds for education are the multiple possibilities for distance education in a way which can help the feelings of isolation, loneliness and isolation students may experience during the distance-learning process (Poveda & Thous, 2013). According to Cheng (2014) active learners mostly valued the ease of use and usefulness of SL whereas verbal students were mostly satisfied with the communication and identity features in SL. Besides, the study also identified some practical problems with the use of SL in education including insufficient teaching and learning time, limited mode of communication with instructor and inadequate equipment for running SL.

2.2. Empirical findings about simulating classroom behavior

Numerous sites exist about immersive educational projects for example N.I.C.E: Narrative-based Immersive Constructionists/ Collaborative Environments, University of Illinois at Chicago; Dryad, Stanford University; MASSIVE: Model, Architecture and System for Spatial Interaction in Virtual Environments; The University of Nottingham; DIVE: Distributed Interactive Virtual Environment, at the Swedish Institute of Computer Science; VirtUAM, Opensim and virtual reality as network training system in education at Universidad Autónoma de Madrid; and SimAULA, focused on teacher training for primary education based on practices in 3D virtual world, led by the Open University of Catalunya, Coventry University, the University of Salerno, University of Sofia and the Greek school Ellinogermaniki Agogi. More than a 90 educational institutions offer college courses with support in three-dimensional environments: Laurea University of Applied Sciences, Finland; Indiana University, University of Denver, The University of Akron, Montclair State University, University of South Florida; all of USA; The University of Nottingham, United Kingdom; Chihlee Institute of Technology, Taiwan; Dongguk University, Republic of Korea; Madrid Open University, Spain; University of Silvaner, Panama; University of Western Australia, Monash University, University of New England, all of Australia; University of Wales, Wales; Tecnológico of Monterrey, México; The Abyss Observatory, Japan, between others. Despite this empirical research on the use of virtual worlds within teacher education seems limited.

Social networks and the virtual world offer a wide range of educational opportunities which make them conductive for learning scenarios in which students can further explore, meet other residents, socialize, participate in individual and group activities, as