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# Experiences of Collaborating and Learning through Collab3DWorld

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**Abstract.** Collaboration is an activity that is considered important during the learning process. Good communication between group members is essential to achieve quality output. Recently, virtual worlds gained excessive popularity in educational settings and more and more lecturers are incorporating live activity or lecturing sessions in environments like Second Life (SL). In this work we are investigating how students of a conventional university perceive collaboration, communication and attending lectures in a 3D virtual environment. Initial results show high perception and students' openness to the 3D world's experiences.

**Keywords.** Second Life, Collab3DWorld, collaboration

## 1. Introduction

Virtual worlds (VW) are " *synchronous, persistent network of people, represented as avatars, facilitated by networked computers"* Bell [1: 1]. These environments provide shared multi-dimensional spaces that support synchronous interaction and communication, enhancing the socialisation between users [2]. VWs support real time interaction between users and objects, providing the immersive feeling to its users of actually '*being there*' [3]. Using their avatars, users can navigate and synchronously interact with other users and the environment and can also create, manipulate, manage and interact with virtual objects [4]. VWs are mainly used for socialising and recreational purposes, however, the use of such environments have also been adopted for educational purposes.

VWs provide a range of multimedia presentation tools such as video, materials presentation, 3D graphics, synchronous audio and chat communication etc. which are richer than the standardised email, chat and forum based techniques used as part of the traditional E-Learning environments [5]. These environments allow to develop constructive and engaging activities that promote involvement in learning [6]. The ability to bring students and teachers together in the same shared space, facilitates collaboration which is essential in the learning progress [5]. Through these attributes, students immerse in the environment, are aware of the existence and actions of others and develop the feeling of belonging to a learning community [7].

In this paper we describe an experience report of how students of a conventional university in Cyprus perceive communication, collaboration and learning through Collab3DWorld - a virtual campus built in SL for the purpose of this and future studies.

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Specifically, in this study we aimed to answer the following research questions: *How the students who attend a conventional university perceive the: i) lecturing experience, and ii) the collaborative work through a 3D world environment?* and also: *iii) How written communication influences student perception for lecturing and collaboration.*

## 2. Collab3DWorld

Collab3DWorld campus (Fig. 1) is developed in SL, and its layout mainly represents a real campus with recognisable facilities and surroundings. We designed the appropriate educational structures to offer the possibility of managing educational resources and support collaborative activities using Moodle[1] and Sloodle[2] components.
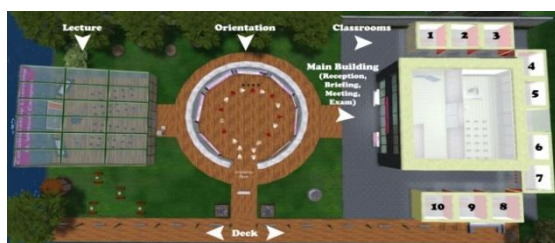


**Figure 2.** Collab3DWorld Campus



**Figure 3:** Students while working on designing their digital paper prototypes

When users visit Collab3DWorld, they are virtually transferred (teleported) to the Orientation Room where they can read signs with basic instructions for using SL Viewer. On the ground floor of the main building there is a reception area where users can find information and guidance for the activities and use of the Registration Enrolment Booth to connect their avatar to their Moodle account. The virtual environment also contains a transparent Lecture Room which provides functionalities such as Presentation Boards (Sloodle Presenter) and chat recordings (Sloodle Chat Logger). Finally we developed 10 rooms to support collaborative group activities simultaneously. They included an interactive multipurpose web wall for collaborative tasks, and a Chat Logger to record the written communication for further investigation. These rooms have been used for the study we are describing in the next section.

## 3. Pilot Evaluation Study

The purpose of this study was to investigate the three main questions addressed at the beginning.

**Procedure**: We recruited students of a conventional university in Cyprus to attend a lecture and perform a collaborative activity in groups through Collab3DWorld that was part of their overall assessment. Two sessions took place in different days and a total of 22 undergraduate Computer Science students were recruited, of whom 13 males and 9 females, between 20 and 25 years old. The students enrolled in the Human Computer Interaction (HCI) module and called to participate in this study as part of

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[1] www.moodle.org - Moodle is an open source learning management system.
[2] www.sloodle.org - Sloodle is a tool that links the educational activities of Moodle with SL through 3D virtual objects managed through the virtual environment.

their course attendance. Clear instructions were given to the students for the purpose of this study and the steps they had to follow to register and familiarise themselves with SL and the Collab3DWorld environment. In addition a demonstration of the environment was given in class.

At first students had to complete a questionnaire that was designed to provide us with information on their computer skills and most importantly their previous experience with 3D worlds. Then the students registered in SL and teleported in the main orientation area where they could found instructions on basic functions they could use. This was done separately for each student at their own time and without the researchers' supervision. Then the students were asked to perform a collaborative activity in Collab3DWorld.

Students formed groups of 3 - 4 and developed digital paper prototype[1]. For this activity they had to book a 90 minutes slot at one of the 10 rooms constructed especially for this purpose. The rooms were equipped with an interactive wall, where the Google Drawing[2] tool incorporated and used by the students for designing their digital paper prototype (Fig.1). In addition the chat logger tool was used to record the chat communication between the students for further analysis.

The second part of this study was the lecture session that took place synchronously through the lecture room of the VW (see Fig. 2), and students were remotely located. Students were asked to log in the Collab3DWorld and attend a lecture that was given by the lecturer presenting a new learning material.

At the end of the study the students were asked to respond to a questionnaire that aimed at assessing their perception regarding the collaborative activity they performed, their lecturing experience in the 3D environment and also to examine the importance of communication as part of their activities. The questions were extracted from [8-10] and focused on the students' ease of navigation and use of the environment, the importance of nonverbal communication, the perception of collaboration and lecturing through SL and Collab3DWorld. Likert scale of one to five has been used, with five being the most positive option.

**Results and Discussion:** Before conducting any data analysis, the data were tested and passed a Kolmogorov–Smirnov test thus, parametric approaches were employed. The scales have also been tested and passed the Cronbach's alpha reliability test, denoting high internal consistency between the items comprising the scales.

*The importance of communication in VW settings:* Firstly, we analysed the data concerning the nonverbal communication within Collab3DWorld. We acknowledge the importance of communication within such environments, thus communication was explicitly measured through the questionnaire. Students' replies show that they communicated very well with others (M=4.23, SD=.75), and the nonverbal communication tools available were sufficient to support their collaborative activity (M=4.00, SD=1.00). Although, we acknowledge the limitation of not allowing verbal communication between students, the results show that this was not an obstacle to their collaboration and participation.

*How the students who attend a conventional university perceive the: i) lecturing experience, and ii) the collaborative work through VW:* Similarly, we were interested to investigate the extent to which their previous experience with VW environments like

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[1] Paper prototyping is used widely in user centered design by usability professionals. Recently, it has been advocated by companies like Pidoco due to advantages in terms of collaboration, flexibility and cost.

[2] https://docs.google.com/drawings/

OpenSim and SL influences their perception of collaboration and lecturing experiences. We thus run a Pearson correlation between the data collected about students' previous experience in such environments, their collaborative activity session and lecturing session through SL. The results show no correlation (r=.12, p=.61) and (r=.173, p=.44) respectively, implying that previous experience with VW does not influences how students perceived collaboration and lecturing through Collab3DWorld.

The next step in our data analysis is to gather the information about how students perceived their collaboration through Collab3DWorld. The students were satisfied with the collaboration in their teams (M=4.18, SD=.85) and thought that being able to collaborate with their fellow students at any time of the day was very important (M=4.14, SD=.89). Similar results obtained for the lecturing session. The students perceived the lecturing experience very positively, reporting that they following the lecture given through SL was very easy (M=4.18, SD=.79), and that asking questions about the material taught was also straight forward (M=4.14, SD=.834).

## 4. Conclusion

The study presented in this short paper, is an initial experience report of how students perceive collaboration and learning through 3D environments. The results show that these environments are very promising in supporting collaborative online activities, and can make learning more interesting. We are planning to extend this initial study in a longer evaluation the 3D campus built and also other learning management tools that are available through SL. The purpose is not to create completely new online university but to be able to assist in-class learning and teaching with what technology has to offer.

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