

## **VIRTUAL WORLDS AND COURSE DIALOGUE**

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### **Abstract**

This research examines the effect on course dialogue of the Learning Environment. An experimental design within groups was applied. Nineteen graduate students followed lesson's activities in the LMS (BlackBoard Vista) and 18 in the 3D Virtual World (Second Life) for three weeks. Results revealed significant differences in the co-presence of the two groups. The findings support the use of 3D Virtual Environments for instruction and teamwork in distance education in a blended mode setting.

### **Introduction**

Keegan (2005) distinguished the individual-based systems from the group-based systems in distance education. The asynchronous e-learning platforms, known as Learning Management Systems (LMS), are usually based on the model of individual learning and therefore they belong to the first category, while systems that integrate social networks (e.g., virtual worlds) are based on the collaborative learning model and belong to the second category.

From the view of distance education theories, the Transactional Distance Theory considers that dialogue is essential component of the course and for the needs of interaction we need several kinds of media. One medium is not enough if we want to have all the three types of interaction in a distance education program. Some media are better than the others for each kind of interaction and this has to do with their richness:

The main weakness of many distance education programs is their commitment to only one type of medium. When there is only one medium it is probable that only one kind of interaction is permitted or done well. (Moore, 1989, p. 3)

The development of the sense of community within the members of the class has a high priority at the synchronous e-learning systems (also known as Live e-learning or as Virtual Classroom systems). This sense can be achieved by creating a virtual classroom:

the virtual classroom has the potential of building and sustaining sense of community at levels that are comparable to the traditional classroom. (Rovai, 2002, p. 1)

These environments facilitate remote collaboration of participants. For example Burton (2008) found that “collaboration occurred within 3D virtual learning environments.”

In this research we try to find how the 3D virtual learning environments manage to increase the dialogue of the course.

## **Theoretical Framework**

According to Transactional Distance Theory, dialogue is defined as “the extent to which, in any educational program, learner and educator are able to respond to each other” (Moore, 1991). Dialogue is also associated with the medium of communication:

... distance education relies on mediated subject-matter presentation, mediated student-tutor interaction and mediated student-student interaction. (Holmberg, 2003, p. 60)

The “distance” at a distance learning course is bridged by manipulating the amount of the dialogue of the course.

The Media Richness Theory (Daft & Lengel, 1986) supports that media differ in richness, due to their potential to transform information. The richness of a medium is determined from its ability to support immediate feedback, message personalization, available language variety, and communication and social cues. The richest the tool, the most information of verbal and nonverbal communication (e.g., body movement, facial expressions, voice color, etc.) it can carry. This, in turn, affects the interaction among people communicating (Mehrabian, 1971) and finally the degree of cooperation:

... the more information cues that can be transmitted with a computer medium, the higher is the impact on behavior. From this line of research researchers can assume that technical richness of the communication medium corresponds with higher degrees of cooperation. (Fiedler, 2009)

Jensen et al. (1999) found that “voice communications result in the highest levels of cooperation.” Newberry (2001) put several kinds of media in a hierarchy according their richness. He sets as richest medium the Face-to-Face, then the Video Conferencing, the Synchronous Audio, the Text-Based Chat, the E-mail/Asynchronous Audio and finally the Threaded Discussion. It is obvious that he considers the synchronous media richer than the asynchronous.

Garrison and Kanuka (2004) spoke about the different contribution of synchronous and asynchronous media in an educational program, noting that “the asynchronous aspects of a course allow for reflective and thoughtful discourse and the synchronous aspects encourage students to think ‘on their feet’ and to be assertive in contributing to the conversation.”

The Theory of Social Presence, developed by Short et al. (1976), argues that social presence is a medium’s property and it has three dimensions: Co-presence (Zhao (2003) explains the modes and dimensions of co-presence), Psychological Involvement, and Behavioral Interaction. The richest medium allows the user to achieve higher levels in each of the three dimensions of social presence.

Student’s social presence is positively correlated with their satisfaction from the lesson (Gunawardena & Zittle, 1997; Lowenthal, 2010; Richardson & Swan, 2003; Russo & Benson, 2005).

In our days a lot of educational institutions use the 3D Virtual Worlds as 3D Virtual Learning Environments (3DVE), due to their abilities for social networking, synchronous communication, modeling, simulations, virtual laboratories, etc.

In a 3DVE the communication tools are the text chat and voice chat (VoIP). Moreover each user is represented in the virtual environment by a virtual representative (avatar). The user observes the environment through a camera which is connected with his/her avatar. So at any time the user can see his/her avatar in relation with the environment (other avatars or objects). The 3DVE functions as a framework for a lot of applications which can be used in the environment (in world). The 3D sound and the projection of images or other graphics make the communication richer in information relatively to other environments without graphics metaphors. In any case a virtual world is not a video conference, as it is not possible to project in world a real time video (as for example in Skype). So according the Newberry’s hierarchy, a virtual world can be put higher than the synchronous audio and lower than the face to face.

## **Research Objectives**

The main question of this study is whether the use of a virtual world as a learning environment may increase the interaction between students and thereby increase the dialogue of the course.

Firstly we have to consider whether the technical environment creates the conditions for contact among the members of the class, in order to set up a learning community. Basic requirement of communication/collaboration is the mutual awareness of the members of the classroom. So the question is:

RQ1. Do the students sense higher co-presence in the virtual world Second Life vs. the LMS BB Vista?

The next step is the development of constructive dialogue and collaboration. So the question is:

RQ2. Do the students have higher mutual assistance in the virtual world Second Life vs. the LMS BB Vista?

A successful collaboration may lead to learner's satisfaction from the procedure and it can be a motivation for feedback in the learning process. So the question is:

RQ3. Are the students more satisfied from the interaction in the virtual world Second Life vs. the LMS BB Vista?

## **Methodology**

Our research was carried out in a graduate e-learning program, which uses blended learning, combining the daily use of an LMS (BlackBoard Vista) with face-to-face meetings every two months. The research was carried out for 3 weeks at the end of the semester (January 2011) and the sample population was 37 students out of the 40 enrolled during this academic year. For the purpose of acquainting our students with virtual worlds and the functions they service we constructed the "island" named RhodesGenderPostgrad for our graduate program in Second Life VW. We introduced and familiarized the students with VW through a two hour seminar in its basic functions, and we gave them open access to it for activities of their preference.

It should be noticed that we chose to train the students in the use of the VW environment at the beginning of the semester, in order to give them enough time to familiarize with the environment. We also tried to ensure that our students will not be disturbed from people who didn't participate in the course. So we gave access to the island only to the students and teachers of the program. Especially we asked the students to become members of the group Gender Student 2010 and we gave access to the island to the members of this group. However, no learning activities were planned or carried out within the SL environment as they were carried out exclusively in the LMS platform.

These two environments have been used in our study in accordance with the two different approaches to e-learning: synchronous (VW) and asynchronous (LMS). The tools available by the LMS environment provide mainly for asynchronous text-based communication, such as "e-mail" and "discussion forum," although this environment also supports synchronous but text-based communication through "Chat" and "Who's on line." On the other hand, Second Life's communication tools, which are "public text chat," "IM" (private text chat),

“public voice chat,” and “private call” (private voice chat), are all synchronous tools of communication — although IM users can also send text messages asynchronously (like e-mail) if the targeted recipient is offline.

After three months, an experimental research design was applied and the course students were divided randomly in two independent groups of students (18 students for SL and 19 students for Vista). All the students followed the same educational program with exceptions only in the Learning Environment where they had to do the course activities (that is lectures, communication with teachers, peers, and groups and teamwork). The students of each environment asked to form four groups of their preference for their teamwork. At the LMS they used the sign-up sheet function and at the VW they just had to sit on a colored chair (there were four colours).

For the activities at BB Vista environment, they had to use as communication tools the discussion forum, the chat and whiteboard and the e-mail. So we constructed a chat room for the discussion among all the members of the classroom about the content of the lecture; and a discussion forum and a chat room for the collaboration of each team.

For the activities at SL they had to use the voice chat and text chat on predefined hours and days. Moreover instead of whiteboard we provided screens with Google shared documents in order the students to keep notes during their collaboration for the teamwork.

After three weeks of student participation in both virtual environments, the research was conducted by using both quantitative and qualitative methods: 1.) an adapted questionnaire (Biocca et al., 2001) measuring variables needed for answering RQ1 (mutual awareness), RQ2 (mutual assistance); 2.) an adapted questionnaire (Stein & Wheaton, 2002) measuring the variable needed for answering RQ3 (satisfaction with interaction); and 3.) observation of students' participation and diary keeping for SL activities, in order to interpret the above-mentioned quantitative results.

The “mutual awareness” is the only factor of the co-presence dimension of Social Presence consisting of six items on a 5-point Likert scale. The mutual assistance is a factor of the Psychological Involvement dimension of Social Presence consisting of four items on a 5-point Likert scale. The “Satisfaction with Interaction” is sub-scale consisting of six items on a 5-point Likert scale.

## Results

The major descriptive characteristics of our student population are: 23 to 52 years of age, with an average of 10.21 years of experience in using computer ( $SD = 4.89$ ) and 8.22 years experience in using Internet ( $SD = 3.74$ ).

Firstly we checked the reliability of the tools we used. The values of Cronbach Alpha for the variables measured for our research comparatively with previous researches are as follows:

Table 1: Cronbach Alpha for each Research Factor

Variable	Previous researchers	Our result
Co-Presence	0.74 (Biocca et al., 2001)	0.84
	0.83 (Hauber et al., 2005)	
Mutual Assistance	0.69 (Biocca et al., 2001)	0.77
	0.74 (Hauber et al., 2005)	
Satisfaction with Interaction	0.91 (Stein & Wheaton, 2002)	0.94

According the values measured, it seems that the tools used in our case have the reliability reported by manufacturers.

The quantitative results summarily answering the research questions are presented in Table 2, where it is shown that during that three-week period of exposure, the students of the experimental group (SL) had difference from the students of the control group (Vista) at: 1.) the feeling of co-presence (RQ1); 2.) the mutual assistance (RQ2); and 3.) the satisfaction with interaction (RQ3). These results are consistent with the findings of other researchers (Biocca et al., 2001; Hauber et al., 2005), although they used a different research design and environments.

Table 2: Total Scores Measured

	Environment	N	Mean	S. D.	Std. Error Mean	t-test
Co-presence	Second Life	18	26.89	3.08	0.73	t(35) = 4.04, p = 0
	Vista	19	22.35	3.71	0.85	
Mutual Assistance	Second Life	18	17.11	2.97	0.70	t(35) = 1.88, p = 0.068
	Vista	19	15.35	2.72	0.62	
Satisfaction with Interaction	Second Life	18	22.83	2.36	0.56	t(35) = 1.71, p = 0.097
	Vista	19	21.00	3.94	0.90	

Above we observe that there are statistical significant differences only for the RQ1 (co-presence).

Figure 1: Frequency and Total score of Co-presence in Each Environment

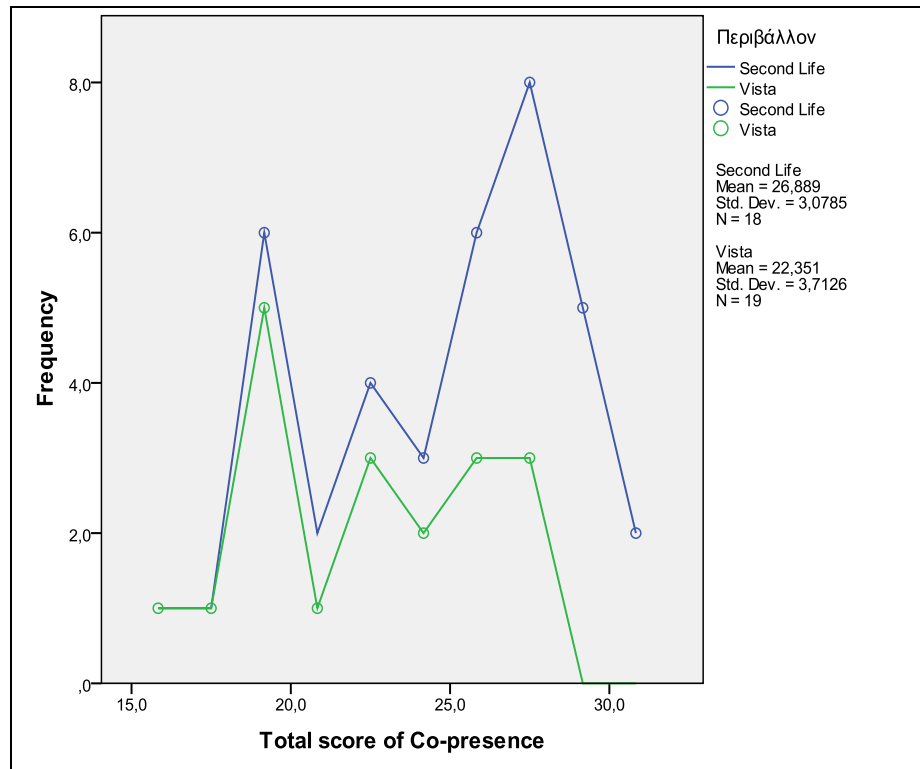


Figure 2: Frequency and Total score of Mutual Assistance in Each Environment

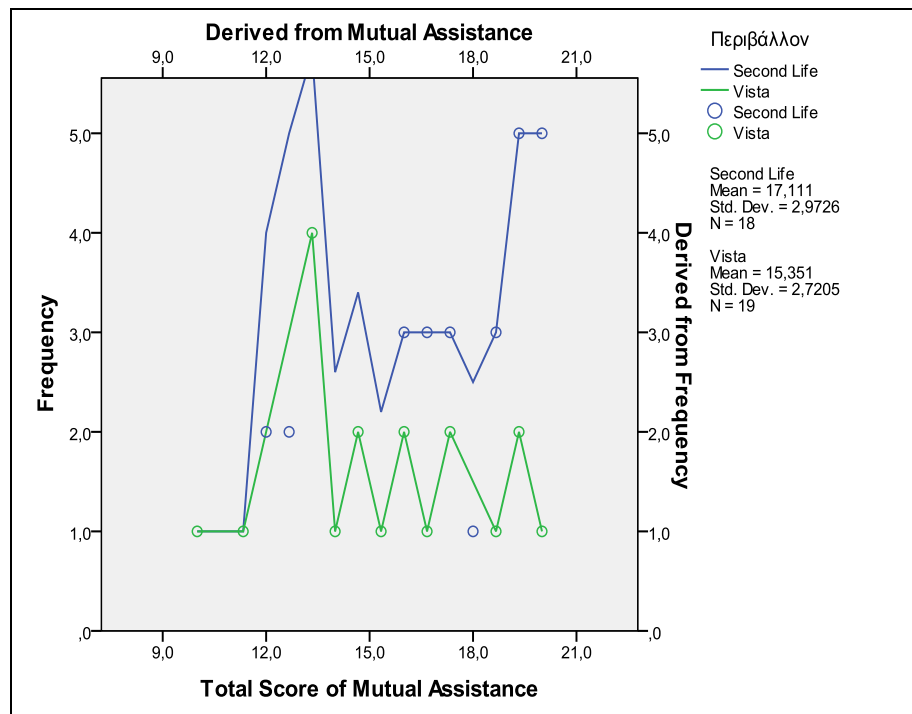
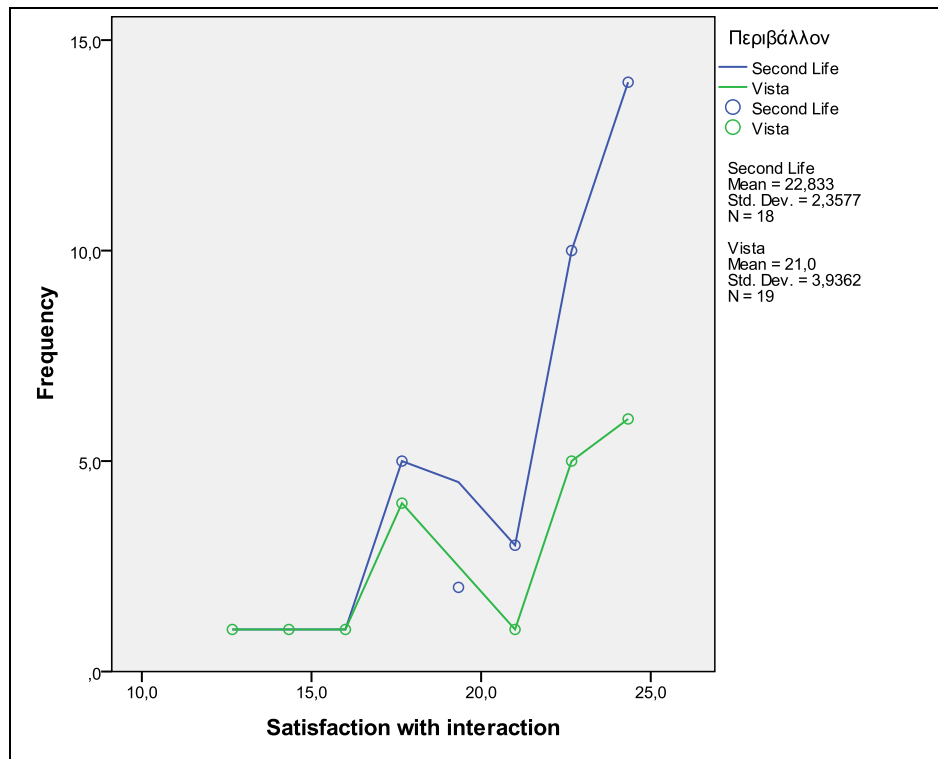


Figure 3: Frequency and Total score of Satisfaction with Interaction in Each Environment



The diary data during the experiment are summarized as follows:

- i) Students used the tools which inform them for the presence of another user in the environment as follows: In Vista they used the tool “who is online” from which they could send a chat invitation to another online user. In SL they used two tools: the “nearby people” from whom they could start a private chat conversation and map from which they could locate another user in the environment. There were no differences in the efficiency of tools’ usage, but we observed that at the SL environment, the use of the tool was often followed by an action (e.g., moving toward another user, or beginning a discussion).
- ii) Students of both groups showed a high degree of familiarity with the communication tools with text (synchronous or/and asynchronous). However when they had to work in groups, they were seeking forms of synchronous communication. Moreover they showed a preference to oral communication. So as there was not such a communication tool in Vista, the students of the control group were seeking other forms of oral communication, as telephone, Skype or Second Life.



iii) The students of the control group when they were doing their teamwork, from the suggested tools (e-mail, discussion forum, chat room) they used only e-mail and external communication tools, such as telephone, Skype or Second Life.

## Conclusions

The main hypothesis of our research is that the richest communication medium can increase the dialogue of the course.

Following the approach of Media Richness Theory and Newberry's hierarchy (2001), we considered that Second Life is richer communication medium than Vista because of its technical characteristics (synchronous audio support). In addition we examined whether SL is richer communication medium than Vista according to the approach of the Social Presence Theory, measuring the Co-presence of students in both learning environments. Although the sample was small, it was found statistically significant difference in the co-presence in the two environments, higher in SL. The co-presence is associated with the awareness a user has in the virtual space (spatial presence — Hauber et al., 2006). The spatial presence makes the difference between a virtual world and a sound conference that could be done by phone or Skype or MSN.

We supposed that Vista, as an asynchronous e-learning tool, better serves the educational needs of adult students, compared with a synchronous tool (Second Life). From the quantitative measure of mutual assistance of students in both environments, and the diary data, our hypothesis seems to be rejected. Specifically, the students seemed to collaborate better in the 3D virtual environment (SL) than in the 2D virtual environment (Vista), maybe due to the richness difference of the media (SL vs. Vista). The two environments differ in the conditions they offer for teamwork or other activities from a distance. The use of shared documents and one-to-many communication tools (as the public voice chat in SL) makes the collaboration of the team faster, more direct and more effective.

The Transactional Distance Theory argues that a distance education course should provide the necessary amount of dialogue, in order to reduce the Transactional Distance. We supposed that if the students get the appropriate amount of dialogue, then they will be satisfied with the interaction. From the measurement of satisfaction with interaction, the students seemed to be more satisfied with their interaction in SL than in Vista. As, according Moore, dialogue is a positive interaction, we can say that there was more dialogue in SL compared to Vista.

Our research is limited due to the small sample, which didn't allow statistically significant effect on "mutual assistance" and "satisfaction with interaction." Therefore these results should be verified by subsequent research.

In conclusion we note that the axis “presence — participation — satisfaction from participation” seems to be stronger in a virtual world environment than in an asynchronous e-learning system. Our research confirms Moore’s argument that different types of interaction require different types of communication media. So if in a distance education course are designed any collaborative activities, it is essential to consider the synchronous e-learning environments as a part of a blended learning mode.

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