

## **Social presence and motivation in a three-dimensional virtual world: An explanatory study**

**Rabia M. Yılmaz, F. Burcu Topu, Yuksel Goktas**  
Ataturk Univesity

**Murat Coban**  
Agri İbrahim Cecen University

Three-dimensional (3-D) virtual worlds differ from other learning environments in their similarity to real life, providing opportunities for more effective communication and interaction. With these features, 3-D virtual worlds possess considerable potential to enhance learning opportunities. For effective learning, the users' motivation levels and social presence are important. In this study, the motivation and social presence levels of 42 prospective teachers were measured as they engaged in an Open Simulator 3-D virtual world. Related factors affecting motivation and social presence levels were also examined. An explanatory mixed method design was used in this study. Interviews and three different questionnaires were employed. The quantitative results show that the motivation and social presence levels of the participants were high. The qualitative results also revealed several pertinent factors that are related to motivation and social presence. These factors, which include the particular environment and participant satisfaction, clearly affected motivation while the participants were learning new information. Other factors, such as being relaxed, effective communications, and not feeling lonely in the environment affected the social presence measures. Lastly, the participants perceived the environment as warm and sociable. The results suggest that these factors should be taken into account when 3-D virtual learning environments are being designed.

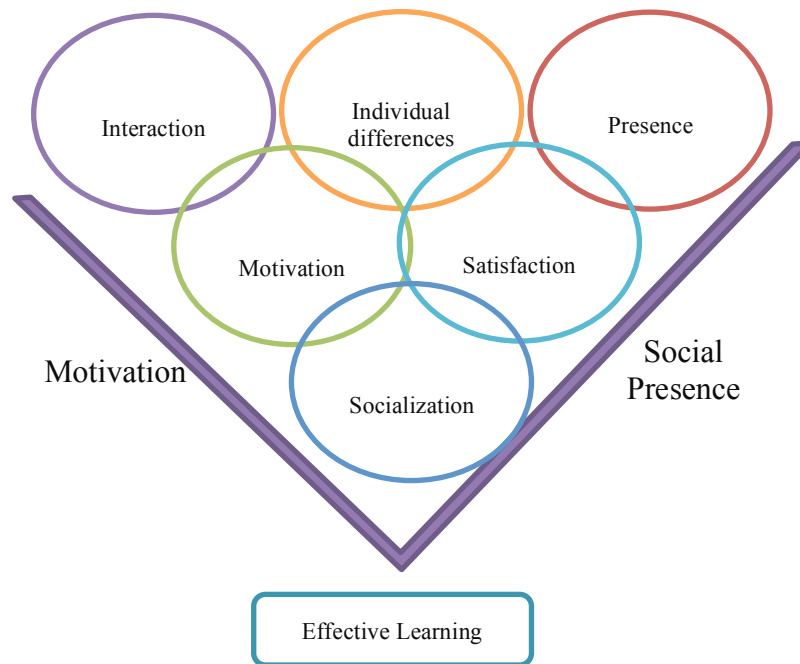
### **Introduction**

Today's students have recently been called digital natives (Prensky, 2001). Their learning environments have been changing rapidly. New learning environments now facilitate the sharing of information as much as the accessing of it, and emphasize collaboration and three-dimensional (3-D) learning (Bulu, 2011; Kapp & Driscoll, 2010). One particularly attractive innovation is 3-D virtual worlds, such as Active Worlds, Second Life, On Live!, Open-Sim, Traveler, Croquet, and Adobe Atmosphere. These are widely used, and the number of 3-D environments has been increasing steadily (Hew & Cheung, 2010). With the increase of interest in 3-D virtual worlds, academic institutions and training organizations have also begun to investigate features of these environments which support the learning process (Li, D'Souza, & Du, 2011). Three-dimensional virtual worlds are environments in which the real world is simulated. Users can move around using virtual representatives called avatars, and they can interact synchronously with other users (Dede, Ketelhut, & Ruess, 2002; Dickey, 2005; Kapp & Driscoll, 2010; Messinger et al., 2009). These environments include some features that do not exist in the real world, but also offer situations that are similar to real life. For example, some 3-D environments provide opportunities for individuals to teleport (via teleports), or to pass between areas by flying, or to turn into various characters (these can be beasts, warriors, other sorts of characters, etc.). In addition, individuals can participate in various activities just as in real life, but without physical limitations (e.g., founding social clubs, discovering interesting environments, or collaborating in a business; Fetscherin & Lattemann, 2008).

Several advantages are offered by these environments, such as providing opportunities for experiential education, increasing motivation and contextual learning, and providing richer and more efficient cooperative learning. These environments are also simpler to use than 2-D environment alternatives (Dalgarno & Lee, 2010). With such features, 3-D virtual worlds can be used as educational tools (Dalgarno & Lee, 2010; Dickey, 2005).

For educational purposes, 3-D virtual worlds make accessing information easier, and they increase the motivation of users by engaging them actively in a learning process (Holmberg, 1997; Mishra, 2009). They also create social presence by recognizing individuals' lifelong learning attainments and cooperative study skills, and thus permit users to utilize their own information and skills (Harris & Rea, 2009; Heid &

Kretschmer, 2009; Ozdinc, 2010). Holmberg (1983, 1997, 2003) stressed in his communication and interaction theory that socialization and feeling as if one is a part of the environment are important factors that make the learning process more entertaining. Increasing participant motivation may enhance effective learning. As 3-D virtual worlds are a type of e-learning environment, they make it easier to access information resources, and they can effectively be used to increase motivation while including the users actively in the learning process (Mishra, 2009). Moreover, by encouraging user interactions with other users and with the environment, these 3-D environments affect the level of presence at an important degree (Ketelhut, Nelson, Clarke, & Dede, 2010; Lee, 2004; Mirkopoulos & Strouboulis, 2004). Figure 1 displays the necessary features of an effective learning environment, according to Holmberg's theory (1983, 1997, 2003):



*Figure 1.* The relationship between motivation and social presence in the communication and interaction theory.

Concepts such as socialization, the feeling of presence in the environment, individualism, and interaction are emphasized as enhancers of effective learning in Holmberg's communication and interaction theory (1983, 1997, 2003). These affect both social presence and motivation, along with certain additional factors. This has been discussed and demonstrated in the literature. Also based on Holmberg's theory, motivation and social presence are critical to the effectiveness of a learning environment. Thus, in the present study, a 3-D virtual world was evaluated within the framework of this theory to examine its effects on motivation and social presence.

### **Motivation in 3-D virtual worlds**

New media articles used in learning environments have the potential to motivate individuals; they can thereby increase the effectiveness of these environments (Keller, 2006; Mills, 2010). The positive effects on user motivation of entertaining and interactive environments which feature eye-catching objects has been amply demonstrated (Allison, Miller, Sturgeon, Nicoll, & Perera, 2010; Horton, 2000; Sancho, Torrente, & Fernández-Manjón, 2009). Because 3-D virtual worlds possess such objects, those environments are thought to stimulate motivation levels (Falloon, 2010; Iqbal, Kankaanranta, & Neittaanmaki, 2010; Sierra, Gutiérrez, Garzón-Castro, 2012; Zhou, Jin, Vogel, Fang, & Chen, 2011). In the literature, it has also been demonstrated that other features of 3-D environments, such as interactions between users and between individual users and the environment, participation in the provided activities, and the feeling of being truly in the environment (Kapp & Driscoll, 2010) all increase the users' learning capacities (Mishra, 2009). Students with special needs also can be motivated with the help of avatar properties, 3-D animations, voice effects, and chat rooms within these environments (Cheng & Ye, 2010).

Users who have fun, are interactive, and cooperate within 3-D virtual worlds tend to be more motivated (Arya, Hartwick, Graham, & Nowlan, 2011), pay attention for longer durations of time (Bouta, Retalis, & Paraskeva, 2012), and evaluate the environment as entertaining and fruitful for learning (Verhagen, Feldberg, van den Hooff, Meents, & Merikivi, 2012). Being granted opportunities to show their talents in these environments (Xu, Park, & Baek, 2011) and enjoying interesting experiences while processing the applications additionally enhance motivation (Cheng & Wang, 2011). Zhou et al. (2011) explained that stimulating motivation in 3-D virtual worlds requires the inclusion of various applications in the design, which take individual user differences into consideration, permit entertaining and relaxing experiences, and allow opportunities for users to socialize in the environment.

According to the literature, socialization, the sense of presence, recognition of user differences, satisfaction, and interaction are all related to Holmberg's communication and interaction theory. It is therefore important to evaluate how much these factors really affect users' motivation levels in 3-D virtual worlds.

### **Social presence in 3-D virtual worlds**

Social presence, defined as a sense of feeling togetherness with others (Thie & Wijk, 1998), has recently been described as a factor that contributes to the effectiveness of new technologies (Biocca, Harms, & Burgoon, 2003). The reason for providing a sense of social presence in an education environment is to encourage qualitative interactions and user questioning of encountered circumstances, which enhance the aims of education (Garrison, 2007). Social presence helps to generate a social identity rather than merely an individual identity (Garrison, Anderson, & Archer, 2010). Social presence also reflects the development of interactions in an environment (Akyol & Garrison, 2011); this activity requires users to explain their emotions and thoughts in communications with other users (Rourke, Anderson, Garrison, & Archer, 2001), and to maintain focus on supporting cooperation and group choices (Burgess, Slate, Rojas-LeBouef, & LaPrairie, 2010).

Dickey (2005) revealed that social presence increases when the users' individual skills and ways of thinking are displayed by their avatars in a 3-D virtual world. Whiteman (2002) concluded that social presence enhances interaction in an environment, encourages users to demonstrate their skills, promotes leadership in interactions, and facilitates socialization and communication. Leh (2001) studied the positive effects of social presence in the process of creating a friendly learning environment, and stressed that participants did not feel confident in environments without a sense of social presence. Without it, there was a decrease in interaction. Tu and McIssac (2002) stated that social presence has a highly positive influence on learning. The relationships between the factors which are mentioned in the communication and interaction theory, such as socialization, presence, individual differences, effective learning, interaction, and social presence, are discussed in these studies. Accordingly, it is important to analyse the participants' sense of social presence in 3-D virtual environments.

In order to increase the number of participants who will use these 3-D environments, motivation levels must be carefully considered (Zhou et al., 2011). The relationships between motivation and socialization, individual differences (Zhou et al., 2011), satisfaction (Bulu & Isler, 2011), interaction, and presence (Kapp & Driscoll, 2010) have been considered. But social presence has not yet been fully examined in the context of education. Social presence has been used to explain the effectiveness of new technologies (Biocca et al., 2003), and it is related to presence (Leh, 2001; Whiteman, 2002), individual differences (Dickey, 2005), interaction (Arya et al., 2011), socialization, and learning (Tu & McIssac, 2002). If all of the factors mentioned above are taken into consideration, 3-D virtual worlds may considerably affect both motivation and social presence. Few studies currently exist on motivation in 3-D virtual worlds used as learning environments (Zhou et al., 2011), and it remains difficult to explain the educational effects of social presence (Messinger, et al., 2009; Ozdinc, 2010). It is also important to analyse whether the other factors that affect motivation and social presence have the same degree of impact within 3-D virtual worlds. This study will therefore contribute new information to the literature and will be a useful resource for future studies.

In this study, our first goal was to determine the participants' degrees of motivation and social presence in the 3-D virtual world. The second goal was to discover which factors affected motivation and social

presence. Lastly, the third goal was to analyse the users' perceptions of their own social presence in the virtual environment. The study is divided into categories related to three main research questions:

1. What are the motivation levels of the participants in the 3-D virtual world?
  - 1.1. What are the factors affecting the participants' motivation levels?
2. What degrees of social presence are exhibited by the participants in the 3-D virtual world?
  - 2.1. What are the factors affecting the participants' social presence levels?
3. What are the participants' perceptions of their social presence in the virtual environment?

## **Method**

### **Overview**

This study is based upon the explanatory method. This is one of the mixed research designs, in which quantitative and qualitative methods are used together. The method facilitates the acquisition of more comprehensive data, which strengthens the results (Burke & Christensen, 2004; McMillan & Schumacher, 2010). In other words, the explanatory method permits deeper explanations of the results of quantitative data analysis. Results from qualitative methods alone permit only more limited interpretations, but the explanatory method supplements the data and so reduces these limits. The motivation and social presence levels of the participants were determined by quantitative methods. Then, in order to analyse the data in detail and to interpret that information with regard to the factors which affect motivation and social presence, qualitative methods were used.

### **Participants**

The sample consisted of 42 teacher candidates, of whom 19 were females and 23 were males. All were undergraduate students. The participants firstly designed the environment within their Project Development and Management course, during the second term of the 2011-2012 academic year. One purpose of this stage was to get the attention of project supporting institutions in Turkey. All of the students had prior knowledge and experience with 3-D virtual worlds, and all were then attending a senior class in Atatürk University's Department of Computer and Instructional Technologies. A purposeful sampling method was used to determine the participants. This permits the examination of facts, events, and information-rich situations.

After completing an analysis in the first two weeks of their schedule, the student participants took the role of designers in the following four weeks. They were not developing the environment while they were receiving instruction in the classroom phase, but instead completed the environment interactively via remote access. They worked on applications after completing the design phase. Some participants interacted within the environment that they had already designed, and they also obtained information about the institutions in 3-D virtual world. In the last two weeks, interviews were conducted and the evaluation phase was completed. Thus, the participants took part in the project as both designers and learners.

### **The role of the researchers**

Four researchers working in the Department of Computer and Education Technologies in Atatürk University, Turkey conducted the study. One had experience in the field of 3-D virtual worlds, and acted as a consultant and coordinator. The other researchers were assistants and investigators.

### **The process**

One aim of the environment was to attract the attention of project supporting organizations in Turkey. The research process included the stages of analysis-design, development, implementation, and evaluation. In the analysis-design stage, the participants were notified about the 3-D virtual world, and the general 3-D environment was chosen. An Open Simulator environment (Open Sim) was selected for the study, as it is a powerful independent module (Zhou, Sun, Wu, & Hu, 2010) and one that utilizes open sources (Open Simulator, [http://opensimulator.org/wiki/Main\\_Page](http://opensimulator.org/wiki/Main_Page)). In the development stage, the interactive platform was designed by the participants. This platform facilitated practice and was enriched with presentations, videos, and exhibitions. Moreover, the environment allowed the participants to

conduct their own research and had various features for socialization. The participants were able to interact with other group members with audio communications and in writing. Each of the supporting organizations in Turkey utilized a portion of the environment. Their respective portions each had a presentation room that provided information about the institution, a conference room, a donated exhibition room with sample applications, a research room, and also important historical structures for the organization. The participants had the opportunity to visit any area that they wished to investigate. Moreover, a social room was designed, wherein the participants could easily interact. In the implementation stage, all the participants interacted with each other, and each group promoted and presented their subject of research in their own area of the environment. Then, measuring scales were implemented. Lastly, in the evaluation stage, the process and results were analysed and evaluated. The study's duration was 14 weeks. Screenshots of the virtual world are presented in Figure 2, and more information about all of the stages is presented in Table 1.

Table 1  
*The research process*

Stages	
Analysis-Design	<ul style="list-style-type: none"> <li>• The students were notified about the 3-D virtual world.</li> <li>• An Open Sim platform, a type of 3-D virtual world, was chosen and introduced to the students.</li> <li>• Teams (groups) were formed.</li> <li>• The students were informed about the installation and use of Open Sim.</li> <li>• As a tool for effective communication and interaction, a Facebook group was created; the Facebook website was used as a communication tool.</li> </ul>
Development	<ul style="list-style-type: none"> <li>• A server for Open Sim was installed, and a platform was formed.</li> <li>• Pilot tests were conducted with the Open Sim platform.</li> <li>• The participant groups designed the environment to attract the interest of project supporting organizations in Turkey.</li> <li>• Problems faced during the process and recommended solutions were shared on the Facebook site.</li> <li>• Screenshots of the designed environment were shared on the Facebook site.</li> <li>• Feedback was given to the students about deficiencies in the designed environment.</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>• Each section of the environment designed by the different groups was introduced to the rest.</li> <li>• All of the participants interacted with each other.</li> <li>• Each group promoted and presented their subject of research in their own part of the environment.</li> <li>• Measuring scales, previously selected, were applied to the participant data to reveal the effects of the designed environment on motivation and social presence.</li> <li>• To supplement the quantitative findings, focus group interviews were conducted with nine students, chosen randomly.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>• The findings were analysed statistically.</li> <li>• The focus group interview findings were analysed.</li> <li>• The quantitative results were presented statistically and in graphic form.</li> <li>• Codes were assigned to the qualitative data.</li> <li>• All of the qualitative and quantitative findings were interpreted.</li> </ul>



*Figure 2.* Screenshots of the 3-D virtual environment in this study.

## **Instruments**

Four different instruments were used. For the quantitative analysis, an instrument prepared by Keller (1987) in a Turkish translation (Kutu & Sozbilir, 2011) was used to gather data to answer the first research question. This was the Instructional Materials Motivation Survey. The Cronbach alpha reliability score was 0.88 for this dual-factor, 5-point Likert scale survey, which consisted of 24 items. This instrument is widely used for evaluating motivation levels.

The instrument used to gather data for the second research question was the Turkish version (Bardakci, 2010) of the Social Presence Scale for Measuring Online Learners' Involvement developed by Kreijns, Kirschner, Jochems, and Buuren (2007). The Cronbach alpha reliability score was 0.80 for this single-factor, 5-point Likert scale survey, which is composed of 10 items. This instrument was selected in order to determine the levels of the participants' social presence in the online environment. It was prepared by field experts and has been translated into Turkish.

For the third research question, six items (Hills, 2005) were selected from the scale of Social Presence developed by Short, Williams, and Christie (1976). This set asked the participants to describe the environment. The items in the seven-point semantic differential scale survey were *cold-warm*, *personal-impersonal*, *passive-active*, *unsociable-sociable*, *closed-open*, and *boring-interesting*.

For the qualitative part of the study, focus group interviews (around 60 minutes each) were conducted with nine students, chosen randomly. This was done to strengthen the data from the scales, to more fully understand the reasons for the results, and to inquire about the experiences of the users in the 3-D environment. All of the instruments were employed immediately after the implementation of the 3-D virtual world at the end of the fall semester in 2011-2012.

### **Data analysis**

The collected quantitative data were analysed using SPSS 18.0. Firstly, negative items in the scales were replaced before the analysis (Colton & Covert, 2007). Then, the Cronbach alpha reliability ( $\alpha$ ) score was measured, and the result was high ( $\alpha > 0.8$ ). Standard deviations and means were also determined for the items in each scale. For the qualitative data, the focus group interviews were transcribed by two experts. Then, content analysis was conducted, and the scale results were used to create categories and codes.

### **Results**

The findings of the study are provided in relation to the research questions. The quantitative findings were the initial focus. Then, to strengthen and analyse them more deeply, the qualitative findings were coordinated with them. For the quantitative findings, tables and graphs are used to present the statistical data. For the qualitative findings, each participant was assigned a separate code. These codes are "S\_X."

#### **The motivation levels of the participants in the 3-D virtual world**

When the quantitative data on the motivation levels of the participants were analysed, the Attention-Relevance and Confidence-Satisfaction sub-sections of the questionnaire were the focus. As may be seen in Table 2, the mean score of the Attention- Relevance section was ( $M = 4.14$ ); the mean score of the Confidence-Satisfaction section was ( $M = 4.08$ ); and the general mean was ( $M = 4.10$ ). This coincided with the "I agree" level of the scale. The means of certain other items coincided with the "I totally agree" level of the scale. These results show that the participants' motivation levels in the environment were high. The Attention- Relevance and Confidence-Satisfaction sub-dimensions of motivation are also close to each other. That indicates the stability of the motivation levels. In other words, strong motivation was observed in dimensions of attention, interest, confidence, and satisfaction.

The most important factors for promoting motivation were the items with the highest means ( $4.20 < M < 4.58$ ), such as the environment's particular features, the feeling of being happy and satisfied while using the environment, the users' awareness of learning new information, their increasing self-confidence, and their sense of being satisfied by the positive feedback about the environment.

Table 2  
*Motivation level results*

Dimensions	<i>M</i>	<i>SD</i>
Attention- Relevance	4.14	.46
Confidence-Satisfaction	4.08	.56
Total	4.10	.44

Regarding the qualitative data, ( $F=9$ ) the participant groups' opinions were examined, and factors affecting motivation were derived from their responses. All of the coded findings are presented in Figure 3, under the subtitles Attention- Relevance and Confidence-Satisfaction. The items which have a high average were determined. The data supported by the interviews are shown below, to help explain why these averages are high and how they support motivation.

Two items in the questionnaire used for the quantitative data had high mean scores. These were in the Attention-Relevance section. The environment's particular features had a score of ( $M = 4.57$ ), and the environment's perceived value for learning had a score of ( $M = 4.21$ ). Supplementing the quantitative data, some of the participants' statements supported these findings:



It is exciting to conduct many daily life routines with avatars in this environment. That got my attention. It is like real life... S\_2

I think this environment should be [experienced], because in the environment, one can feel as if he was really in there. Once the interaction starts, it becomes very entertaining. While fulfilling some of the missions with friends, we feel that we are in real life. You can go any place, sit together, and there are friends all around ... like reality... S\_3

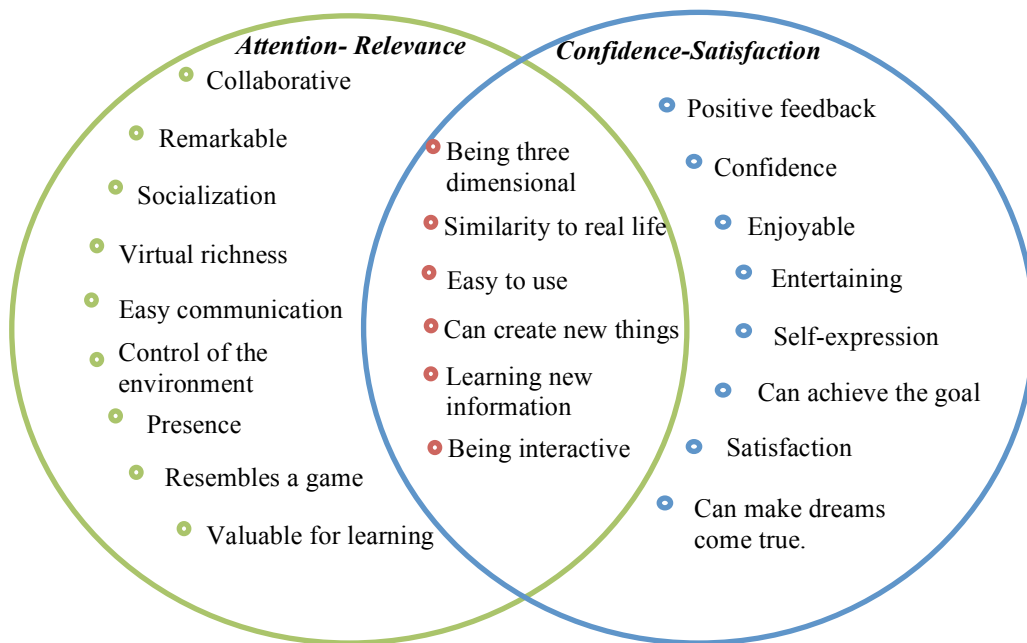


Figure 3. Factors affecting motivation in the 3-D virtual world, according to the qualitative data.

In the Confidence-Satisfaction section, enjoying the environment had a mean score of ( $M = 4.29$ ); the score for feeling happy while using environment was ( $M = 4.57$ ). Getting positive feedback scored ( $M = 4.26$ ); and having self-confidence had a mean score of ( $M = 4.36$ ). These were the most remarkable items. Relating to these data, the participants stated:

I enjoy using this environment, and it is great fun, because I can express myself and create what I dream about. S\_3

In other environments, much work is done, but less can be acquired. But in 3-D virtual worlds, you can get much more performance. The 3-D feature is also effective. I am so happy to be in this environment. S\_1

I was very satisfied after I got positive comments from others. Getting the attention of others for the work that I do in this environment and positive feedback from my tutors makes me feel very good about this implementation. S\_2

At first I was horrified in the environment. But then, you gain confidence in the ongoing process. The results of your hard work are accepted and liked by everyone. This makes one feel confident. S\_4

The 3-D feature, the environment's ease of use, the ability to learn new information, the environment's similarity to real life, the ability to create new things, and the interactive aspect were features positively commented upon in both categories of the data (Figure 3). Some of the participants' supportive opinions were:



You can be close to each other in the environment. You always think about it while having dinner or sleeping. In addition, you have the opportunity to learn new things while using the environment. So time is passing fast, and you are enjoying it. S\_5

Each participant's work was nice and got attention. We increased our performance in order to do better, as we had the opportunity to see others' work. So, I think that we did a great job together. S\_1

As it is 3-D and interactive, it turned out to be entertaining. I enjoyed being there, interacting with other avatars, and doing something easily. S\_4

Effective communication and feeling as if it was real life were possible in the 3-D environment. I have friends in MSN, but it is not the same. You feel that you are [actually] in that place, as there are individuals at the same time walking or flying from place to place... S\_9

### **The social presence levels of the participants in the 3-D virtual world**

The social presence levels of the participants in the 3-D virtual world, collected from the quantitative data, are shown in Table 3. The general mean corresponded to the "I agree" level ( $M = 3.88$ ) of the questionnaire. The highest mean score items ( $4.00 < M < 4.24$ ) were feeling comfortable, easy communication, not feeling lonely, easy daily life chatting, and developing working relationships.

Table 3  
*Social presence level results*

	<i>M</i>	<i>SD</i>
Social Presence	3.88	.56

In the qualitative data, the factors affecting social presence were identified from the participants' statements. All of the codes related to the findings are shown in Figure 4.

#### **Social Presence**

- |                                    |  |
|------------------------------------|--|
| • Being 3D                         | • Sense of presence                            |
| • Being interactive                | • Communication variety                        |
| • Collaboration                    | • Ability to share information with each other |
| • Having the feeling of possession | • Developing close cooperation                 |
| • Feeling close to each other      | • Similarity to real life                      |
| • Presence of avatar               | • Not feeling alone                            |
| • Having good working relations    | • Create new things                            |
| • Easy communication               | • Feeling comfortable                          |
| • Control to the environment       | • Daily life chatting                          |

*Figure 4.* Factors affecting social presence in the 3-D virtual world.

The highest mean score items were feeling comfortable ( $M = 4.24$ ) and not feeling alone in the environment ( $M = 4.05$ ). Some of the supportive opinions were:

Sometimes people can write what they cannot say, and can show what they cannot write using mimicking and gestures. 3-D virtual worlds provide opportunities to individuals to feel comfortable accordingly. S\_1

We were always together and interactive in the environment. We didn't have a chance to be alone there. We were in such an interaction... S\_2

According to the data, easily communicating with each other ( $M = 4.10$ ), the daily chatting ( $M = 4.05$ ), and having good working relationships ( $M = 4.00$ ) were other important factors that affected social presence.

We had the feeling that we had been chatting in real life. We could chat about daily routines in the environment. Communicating with friends while doing something else and having a chance to quit what we were doing with just one Stop sound made us feel like we were in real life. S\_6

In 3-D environments, online chatting, voice chatting, and avatars have a great impact on communication. You can easily communicate with each other, just like writing, talking, or using mimicking and gestures to each other. You feel that others are nearby... S\_9

Cooperative work made it easier to communicate with each other in the group. Also, it increased our sharing outside of the group... S\_4

**The participants' perceptions of social presence in the 3-D virtual world environment**

The results of the questionnaire used to elicit the participants' perceptions of their own social presence in the 3-D virtual world environment are shown in Figure 5. The users stated that the virtual world was warm, interesting, and open. Also, they had the chance to be active and sociable in the environment, and it was not personal but impersonal. There were no data relating to whether the environment was insincere, passive, or boring apart from this. And there was no stability in the data on the environment's characteristics of being impersonal and open.

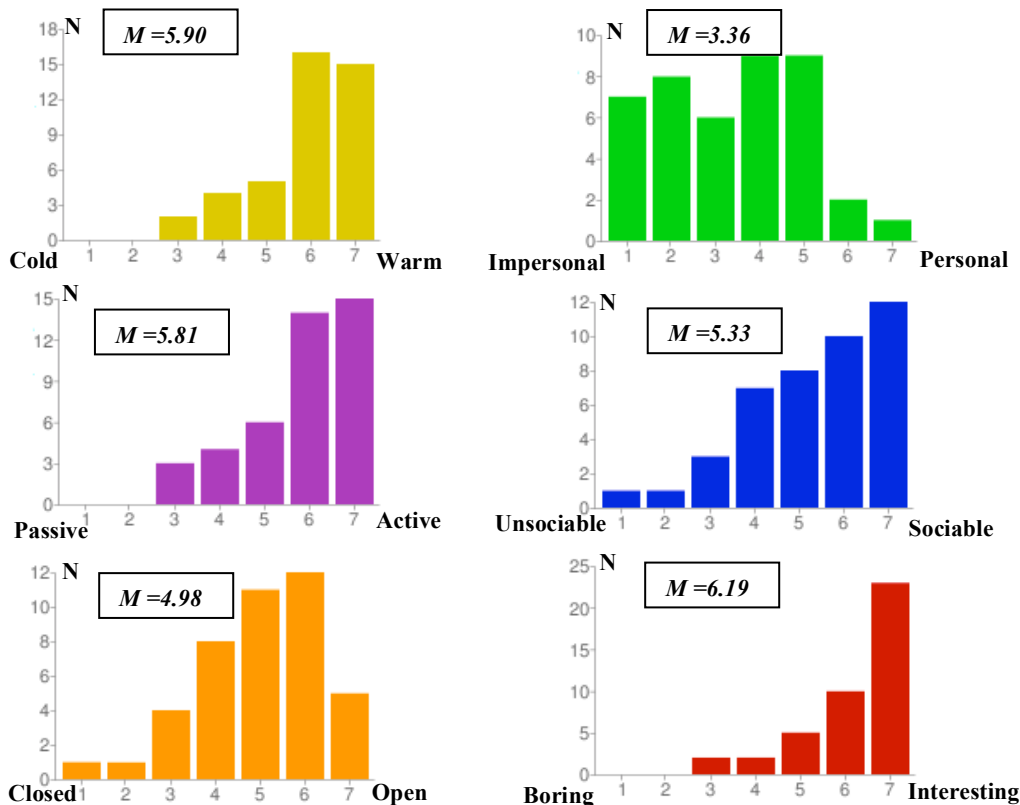


Figure 5. The participants' perceptions of social presence, and the top features of the environment.

In the qualitative data, the social presence perceptions of the users were expressed in detail. Some of the users said the following:

Doing something and sharing it makes the environment warm. S\_5

The environment turns out to be either personal or general related to the communications with others in there. As we were always together, our environment was impersonal. S\_1

We were active. You cannot stand still in that environment; at least you walk there. You can be busy doing something anytime there. S\_3

We had never been together as a group before the Open Sim. It gave us a chance to socialize more, and relationships developed in these kinds of activities are continuing in real life. Ok, the environment is virtual, but similar to real life, not totally fake... S\_6

There are some challenges in the environment. There was no option to withdraw from the actions. We negotiated on this issue and thought: There are limitations in the environment, because in real life you also do not have a chance to withdraw an action that was already done. As far as I know, our environment was not as limited as real life. S\_4

As the environment is 3-D, it attracts one's attention easily and makes the environment entertaining. Also, communicating with others got my attention. S\_7

## **Discussion**

### **The motivation levels of the participants in the 3-D virtual world**

The motivation levels of the participants in the 3-D virtual world were clearly high. Several factors played an important role in that result.

Two of the more remarkable aspects of the 3-D environment that affected motivation were the environment's own particular features and the participants' sense of being happy in the environment. The properties of the environment, such as its eye-catching visuals and entertaining situations (Allison et al., 2010; Horton, 2000; Sancho et al., 2009) make the learning process interesting (Bulu & Isler, 2011), increase motivation, and help the participants to feel happy. In addition, the realistic features of the environment and the avatars are both significant factors. This can be the result of the ability to freely choose a personal avatar's physical appearance in a more realistic way (Cheng & Ye, 2010).

Secondly, the recognition by the participants that the environment was a valuable tool for learning, which was proven by their discovered ability to learn new information easily, was another factor that affected their motivation levels. Based upon the qualitative data, the sense of realism and the interaction features were both important contributing factors that affected the environment's perceived value as a learning tool. In the literature, there is a strong relationship between interaction features and presence (Hendrix & Barfield, 1995). This seemed to help the users to feel that they were part of the environment (Bulu, 2011), which also motivated them (Allison et al., 2010). Learning new things helped them to enjoy the environment. This created positive perceptions of the environment (Horton, 2000).

Lastly, it is clear that self-confidence and acceptance by the others were among the motivational factors. When the users received positive feedback during the study, they gained self-confidence. Connolly, Stansfield, and Boyle (2009) have stated that success and satisfaction affect self-confidence. In particular, receiving a reward is highly important for satisfaction. Schunk (2009) has emphasized that positive feedback from others provides necessary motivation for the continuation of learning. Contrary to all of the studies mentioned above, Shelton (2010) stressed that users had different motivation levels and behaviours, even though the 3-D virtual environment contained all of the popular media activities. This is because different users have differing characteristics and learning styles (Gunawardena & McIsaac, 2003). For this reason, the users' motivations should be nurtured with specific attention given to these variances (Zhou et al., 2011).

### **The social presence levels of the participants in the 3-D virtual world**

In this study, the data revealed that the participants had a high degree of awareness of their social presence. The most important factor that contributed to social presence was the users' sense of comfort in the environment. This result might be related to the users' sense of feeling free to express themselves. Leh (2001) supported this explanation, and stressed that social presence allowed individuals to feel comfortable in the environment.

Secondly, the users' social presence levels were bolstered by their sense of not feeling lonely in the environment. The qualitative findings indicate that the participants did not feel lonely, because cooperation and interaction with others effectively diminished that feeling. In the literature, social presence is defined as "being together with others, feeling them nearby, and being interactive" (Leh, 2001; Tu & McIsaac, 2002). That includes interaction and cooperation. So, this was an expected result. It also contributed to the formation of a warm learning environment (Rourke, Anderson, Archer, & Garrison, 1999).

Finally, good communication and cooperative working relations were among the significant factors that supported social presence. The qualitative data indicated that the variety of communication methods, online chatting, and collaborative learning were important features. The literature also suggests that the chat feature, voice mail, the ability to make eye contact, and the ability to display emotions all contribute to warmth in the environment, and to social presence (Gunawardena & McIsaac, 2003; Gunawardena & Zittle, 1997). Cooperative work (Dickey, 2005) is also an important factor for improving the working relationships of individuals. In addition, social presence helps individuals to prove their talents and to improve their communication skills (Whiteman, 2002). In this study, the participants felt a sense of presence, which in turn supported their sense of social presence. Without social presence, users cannot feel that they belong in an environment, and that decreases their sharing with others (Leh, 2001).

### **Features of the 3-D virtual world which are related to social presence**

Lombard and Ditton (1997) stated that the environment's social role could be determined by assigning it an identity. Accordingly, it can be inferred that the social presence of the environment was high, because there was no evidence of insincerity in the environment. The perceived warmth of the environment also indicates a high sense of social presence among the users (Rourke et al, 1999). Even though there was no certain data regarding whether the environment was personal or impersonal, the results could infer that the environment was impersonal. The qualitative data indicates that the environment could be perceived as personal only if the participants were not interactive. As the high social presence is related to the interaction levels of the participants, this suggests an impersonal characteristic for the environment (Gunawardena & McIsaac, 2003; Minocha & Roberts, 2008).

The participants perceived the environment to be active, social, and interesting. Gunawardena (1995) stated that as long as users perceive the environment as a social platform, they can regard it as active and interesting. A positive relationship exists between being in a social environment, interactivity, and social presence (Liu, Magjuka, Bonk, & Lee, 2007; Mennecke, Triplett, Hassall, Conde, & Heer, 2011). The qualitative data supports the view that feeling presence promotes close cooperation between the participants. The environment was also clearly distinguishable from other environments, in that it was realistic and three-dimensional, which made it more interesting (Dalgarno & Lee, 2010). This finding suggests that a 3-D virtual world can be more interesting to users, if it captures their attention. However, the effect of the Facebook platform, which was used as a communication tool, on social presence has been neglected, as it has been evaluated as a limitation of this study.

Regarding whether the environment was seen as closed or open, it appeared open and flexible. But according to the qualitative findings, there were some limitations in the Open Sim platform. This can be explained by the environment's design and lack of program features. Flexibility is directly related to the users' sense of feeling free in an environment and to their ability to do whatever they wish (Gunawardena & McIsaac, 2003). In a 3-D virtual world, the users' confidence and freedom to move increases their social presence level.

## **Conclusion and recommendations**

This study was limited by some technical problems, as this was the first time an Open Sim platform was used with 42 prospective teachers. Another limitation was the use of the participants as both designers and users/learners. Moreover, the students were engaged in regular coursework at the time of the study, thus, limits on their time may have led to fewer opportunities to contact one another. This could be another limitation regarding social presence. The most important limitation regarding the motivation levels was that the users' motivation was not measured before they started the project. Lastly, motivation and social presence in 3-D virtual worlds are related to the design of the environment. If we compare socialization and motivation levels to the users' interactions and their integration in the environment, the environment that was designed by the students was highly effective. However, results can change in accordance with different environment designs.

In spite of these limitations, the participants in this 3-D virtual world had high motivation levels. The environment's attractiveness, the participants' sense of pleasure and being happy while using the environment, their learning of new information, the increase in their levels of self-confidence, their satisfaction upon receiving positive feedback from others, and their perception that the environment was a valuable learning tool were all important factors in their motivation. Secondly, these users had high social presence levels. Their feeling of comfort in the environment, ability to communicate easily, lack of loneliness, ability to chat about daily life routines, sense of presence, and good working relationships were all important factors that contributed to their social presence. Lastly, the participants' perceptions of the 3-D virtual world were that it was warm, interesting, open, sociable, active, and unique. We therefore conclude that 3-D virtual learning environments should be designed according to these findings.

Finally, we present a list of recommendations for future researchers on this topic:

- In this study, differences among the users were not taken into consideration; a future study might be designed to fill this gap.
- The Open Sim platform, one type of 3-D virtual world, was used in this study. Similar studies could be conducted using different 3-D environments.
- A greater variety in the types of subjects/users could be selected when determining motivation and social presence levels in a 3-D virtual world.
- A bigger sample might be used to analyse the factors affecting motivation and social presence.
- An implementation of the same research could be coordinated with distance training by using a different sample.
- New studies could focus on different institutions that have an interest in 3-D virtual worlds and/or distant learning.
- Future studies could focus more on the relationship between the codes that were derived from the motivation and social presence data.
- In this study, it has been observed that motivation and social presence increased in accordance with the degree of interaction that was permitted between the users and with the items featured in the environment. This should be carefully considered when designing 3-D virtual worlds. Also, providing communication features that allow oral or written communication between users and presenting an environment that is similar to real life increase the users' sense of social presence.

## **Acknowledgments**

This research is supported in part by the Turkish Scientific and Technical Research Council (TUBITAK) under the project number 111K516.

## **References**

- Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233–250.

- Allison, C., Miller, A., Sturgeon, T., Nicoll, J. R., & Perera, I. (2010, October). *Educationally enhanced virtual worlds*. Paper presented at the meeting of the ASEE/IEEE Frontiers in Education Conference, Washington D.C.
- Arya, A., Hartwick, P., Graham, S., & Nowlan, N. (2011, May). *Virtual space as a learning environment: Two case studies*. Paper presented at the meeting of the International Education Technology Conference, Istanbul.
- Bardakci, S. (2010). The validity and reliability study of the scale of the perceived sociability of online learning environments. *Ankara University of Journal Faculty of Educational Sciences (JFES)*, 43(1), 17-39.
- Biocca, F., Harms, C., & Burgoon, J. K. (2003). Criteria for a theory and measure of social presence. *Presence: Teleoperators & Virtual Environments*, 12(5), 456-480.
- Bouta, H., Retalis, S., & Paraskeva, F. (2012). Utilising a collaborative macro-script to enhance student engagement: A mixed method study in a 3D virtual environment. *Computers & Education*, 58, 501–517.
- Bulu, S. T. (2011). Place presence, social presence, co-presence, and satisfaction in virtual worlds. *Computers & Education*, 58(1), 154–161.
- Bulu, S. T., & Isler, V. (2011, February). *METU Campus in Second Life*. Paper presented at the meeting of the Academic IT Conference, Malatya. Retrieved from <http://ab.org.tr/ab11/bildiriler/248.pdf>
- Burgess, M. L., Slate, J. R., Rojas-LeBouef, A., & LaPrairie, K. (2010). Teaching and learning in Second Life: Using the Community of Inquiry (CoI) model to support online instruction with graduate students in instructional technology. *Internet and Higher Education*, 13(1-2), 84–88.
- Burke, J., & Christensen, L. (2004). *Educational research: Quantitative, qualitative and mixed approaches* (2nd ed.). London: Pearson.
- Cheng, Y., & Wang, S. H. (2011). Applying a 3D virtual learning environment to facilitate student's application ability – The case of marketing. *Computers in Human Behavior*, 27, 576–584.
- Cheng, Y., & Ye, J. (2010). Exploring the social competence of students with autism spectrum conditions in a collaborative virtual learning environment: The pilot study. *Computers & Education*, 54, 1068–1077.
- Colton, D., & Covert, R. W. (2007). *Designing and constructing instruments for social research and evaluation*. San Francisco, CA: Jossey-Bass Publishing.
- Connolly, T. M., Stansfield, M. H., & Boyle, L. (Eds.) (2009). *Games-based learning advancements for multi-sensory human computer interfaces: Techniques and effective practices*. IGI Global Publishing: Hershey.
- Dalgarno, B., & Lee, M. J. W. (2010). What are the learning affordances of 3-D virtual environments? *British Journal of Educational Technology*, 41(1), 10–32.
- Dede, C., Ketelhut, D. J., & Ruess, K. (2002). Motivation, usability, and learning outcomes in a prototype museum-based multi-user virtual environment. In P. Bell, R. Stevens, & T. Satwiciz (Eds.), *Keeping learning complex: The proceedings of the Fifth International Conference of the Learning Sciences*. Mahwah, NJ: Erlbaum. Retrieved from <http://muve.gse.harvard.edu/rivercityproject/documents/AELppr.pdf>
- Dickey, M. D. (2005). Three-dimensional virtual worlds and distance learning: two case studies of ActiveWorlds as a medium for distance education. *British Journal of Educational Technology* 36(3), 439-451.

- Falloon, G. (2010). Using avatars and virtual environments in learning: What do they have to offer? *British Journal of Educational Technology*, 41(1), 108–122.
- Fetscherin, M., & Lattemann, C. (2008). User acceptance of virtual worlds. *Journal of Electronic Commerce Research*, 9(3), 231-242.
- Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*, 11(1), 61-72.
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *Internet and Higher Education*, 13(1-2), 5-9.
- Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications*, 1(2-3), 147–166.
- Gunawardena, C. N., & McIsaac, M. S. (2003). Distance education. In D. H. Jonassen (Ed.), *Handbook of research in educational communications and technology* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8-26.
- Harris, A. L., & Rea, A. (2009). Web 2.0 and virtual world technologies: A growing impact on IS education. *Journal of Information System Education*, 20(2), 137-144.
- Heid, S., & Kretschmer, T. (2009). LLL3D's contribution to teaching and learning with 3-D MUVES in higher education. *British Journal of Educational Technology*, 40(3), 568-571.
- Hendrix, C., & Barfield, W. (1995, March). *Presence in virtual environments as a function of visual and auditory cues*. Paper presented at the meeting of the Virtual Reality Annual International Symposium. Retrieved from <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=512482>
- Hew, K. F., & Cheung, W. S. (2010). Use of three-dimensional (3-D) immersive virtual worlds in K-12 and higher education settings: A review of the research. *British Journal of Educational Technology*, 41(1), 33–55.
- Hills, A. L. (2005). *Social presence and communication quality in videoconferencing*. (Unpublished bachelor's dissertation). University of Otago, New Zealand.
- Holmberg, B. (1983). Guided didactic conversation in distance education. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), *Distance education: International perspectives* (pp. 114-122). London: Croom Helm.
- Holmberg, B. (1997). Distance-education theory again. *Open Learning: The Journal of Open, Distance and e-Learning*, 12(1), 31-39.
- Holmberg, B. (2003). *Distance education in essence: An overview of theory and practice in the early twenty-first century*, (2nd ed.). Germany: Oldenburg.
- Horton, W. (2000). *Designing web-based training*. John Wiley & Sons, New York.
- Iqbal, A., Kankaanranta, M., & Neittaanmaki, P. (2010). Experiences and motivations of the young for participation in virtual worlds. *Procedia - Social and Behavioral Sciences* 2(2), 3190-3197.
- Kapp, K. M., & Driscoll, T. (2010). *Learning in 3D: Adding a new dimension to enterprise learning and collaboration*. San Francisco, CA: Pfeiffer.



- Keller, J. M. (2006). *What is motivational design?* Florida State University. Retrieved from <http://www.arcsmodel.com/pdf/motivational-design-rev-060620.pdf#!motivational-design/c2275>
- Ketelhut, D. J., Nelson, B. C., Clarke, J., & Dede, C. (2010). A multi-user virtual environment for building and assessing higher order inquiry skills in science. *British Journal of Educational Technology*, 41(1), 56–68.
- Kreijns, K., Kirschner, P. A., Jochems, W., & VanBuuren, H. (2007). Measuring perceived sociability of computer-supported collaborative learning environments. *Computers & Education* 49, 176–192.
- Kutu, H., & Sozibilir, M. (2011). Adaptation of instructional materials motivation survey to Turkish: A Validity and reliability study. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 5(1), 292-311.
- Lee, K. M. (2004). Presence, explicated. *Communication Theory*, 14(1), 27–50.
- Leh, A. S. (2001). Computer-mediated communication and social presence in a distance learning environment. *International Journal of Educational Telecommunications*, 7(2), 109–128.
- Li, J., D'Souza, D., & Du, Y. (2011). Exploring the contribution of virtual worlds to organizational learning. *Human Resource Development Review* 10(3), 264-285.
- Liu, X., Magjuka, R. J., Bonk, C., & Lee, S. (2007). Does sense of community matter? An examination of participants' perceptions of building learning communities in online courses. *The Quarterly Review of Distance Education*, 8(1), 9-24.
- Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication*, 3(2). Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.1997.tb00072.x/full>
- McMillan, J. H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry* (7th ed.). London: Pearson.
- Mennecke, B. E., Triplett, J. L., Hassall, L. M., Conde, Z. J., & Heer, R. (2011). An examination of a theory of embodied social presence in virtual worlds. *Decision Sciences* 42(2), 413-450.
- Messinger, P. R., Stroulia, E., Lyons, K., Bone, M., Niu, R. H., Smirnov, K., & Perelgut, S. (2009). Virtual worlds - past, present, and future: New directions in social computing. *Decision Support Systems*. 47(3), 204-228.
- Mills, K. A. (2010). A review of the "digital turn" in the new literacy studies. *Review of Educational Research*, 80(2), 246–271.
- Minocha, S., & Roberts, D. (2008). Laying the groundwork for socialisation and knowledge construction within 3D virtual worlds. *ALT-J: Research in Learning Technology*, 16(3), 181–196.
- Mirkopoulos, T. A., & Strouboulis, V. (2004). Factors that influence presence in educational virtual environments. *Cyber Psychology & Behavior*, 7(5), 582–591.
- Mishra, S. (2009). Virtual worlds. In S. Mishra (Ed.), *E-Learning* (pp. 110-113). New Delhi: Indira Gandhi National Open University. Retrieved from [http://webserver.ignou.ac.in/institute/STRIDE\\_Hb8\\_webCD/STRIDE\\_Hb8\\_Full.pdf](http://webserver.ignou.ac.in/institute/STRIDE_Hb8_webCD/STRIDE_Hb8_Full.pdf)
- Ozdinc, F. (2010). *Utilization of three-dimensional multi-user virtual environments for orientation purposes*. (Unpublished doctoral dissertation). Hacettepe University, Ankara.
- Prensky, M. (2001). Digital natives, digital immigrants. *On The Horizon*, 9(5), 1-6.

- Rourke, L., Anderson, T., Archer, W., & Garrison, R. (1999). Assessing social presence in asynchronous computer conferencing transcripts. *Journal of Distance Education*, 14(2), 50-71.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education*, 14(2), 50-71.
- Sancho, P., Torrente, J., & Fernández-Manjón, B. (2009). *Do multi-user virtual environments really enhance student's motivation in engineering education?* Paper presented at the meeting of the 39th Annual Frontiers in Education Conference, San Antonio, TX, USA: IEEE digital library.
- Schunk, D. H. (2009). *Learning theories: An educational perspective*, (M. Sahin trans, 5th ed.). Ankara: Nobel Publishing.
- Shelton, A. K. (2010). Defining the lines between virtual and real world purchases: Second Life sells, but who's buying? *Computers in Human Behavior*, 26, 1223-1227.
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: John Wiley & Sons.
- Sierra, L. M. B., Gutiérrez, R. S., Garzón-Castro, C. L. (2012). Second Life as a support element for learning electronic related subjects: A real case. *Computers & Education*, 58, 291–302.
- Thie, S., & Wijk, J. (1998, June). *A general theory on presence: experimental evaluation of social virtual presence in a decision making task*. Paper presented at the presence in shared Virtual Environments Workshop, University College London, UK.
- Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education* 16(3). 131-150.
- Verhagen, T., Feldberg, F., van den Hooff, B., Meents, S., & Merikivi, J. (2012). Understanding users' motivations to engage in virtual worlds: A multipurpose model and empirical testing. *Computers in Human Behavior*, 28(2), 484-495.
- Whiteman, J. A. M. (2002). Interpersonal communication in computer mediated learning. ERIC Document Reproduction Service, No. ED 465 977. Retrieved from <http://eric.ed.gov/?id=ED465997>
- Xu, Y., Park, H., & Baek, Y. (2011). A new approach toward digital storytelling: An activity focused on writing self-efficacy in a virtual learning environment. *Educational Technology & Society*, 14(4), 181–191.
- Zhou, H., Sun, B., Wu, H., & Hu, X. (2010, November). *Study on building a 3D interactive virtual learning environment based on OpenSim platform*. Paper presented at the International Conference on Audio, Language and Image Processing. Retrieved from [http://ieeexplore.ieee.org/xpl/freeabs\\_all.jsp?arnumber=5684986](http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5684986)
- Zhou, Z., Jin, X.-L., Vogel, D. R., Fang, Y., & Chen, X. (2011). Individual motivations and demographic differences in social virtual world uses: An exploratory investigation in second life. *International Journal of Information Management*, 31(3), 261-271.

---

**Corresponding author:** Yüksel Göktaş, [yukselgoktas@atauni.edu.tr](mailto:yukselgoktas@atauni.edu.tr)

Australasian Journal of Educational Technology © 2013.

**Please cite as:** Yılmaz, R. M., Topu, F. B., Goktas, Y., & Coban, M. (2013). Social presence and motivation in a three-dimensional virtual world: An explanatory study. *Australasian Journal of Educational Technology*, 29(6), 823-839.