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Social Norms In MathLife 3D Virtual Learning Environment[1]

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Abstract
The present study aims to reveal the social norms that emerge in a 3D virtual learning environment (MathLife) through real-life scenarios requiring mathematical skills. The research was conducted by mean of case study method at a lower secondary school in Trabzon in 2015-2016 academic year. The study group consisted of 10 students attending grade 7th. Field notes, semi structured interviews and records of computer screen images were used as data collection tools. The study lasted for 6 weeks. NVivo 9.0 qualitative data analysis software was used to analyse the data, and content analysis was conducted. According to the research results, 12 social norms such as communication through writing, expressing answers freely and avoidance of exposing the answers through private communication were determined in MathLife 3D virtual learning environment.

Key words: 3D virtual learning environment, social norm, MathLife.

Introduction

With current development in technology, the design and use of different learning environments for teaching is becoming more and more widespread. Among these learning settings designed considering the technological advances for more effective teaching are the interactive, three-dimensional (3D) virtual learning environments. The 3D virtual learning environments are those including avatars that visually represent the users, and communication tools that allow them to interact with one another (Dickey, 2005). In this way, these virtual learning environments not only present learning opportunities as far as the lessons are concerned, but also enable their users to communicate and interact online (Pulford, 2011). MathLife is one such virtual learning setting designed within the scope of TÜBİTAK project no. 113R008 which aims to transfer the mathematics in daily life to virtual reality, thereby allowing the learners to discover for themselves the link between mathematics and real life (Arslan et al. 2015; Atalay et al. 2015). As part of this project, MathLife was designed to include a farm and a three-storey shopping centre with an ice rink, a supermarket, several department stores, and a food hall, with real-life scenarios developed and applied in line with the technicalities of virtual reality.

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Each learning environment has a subculture (micro-culture) shaped through its own distinctive features around the communication and interaction between the teacher and the pupils (Lopez &Allal, 2007). This micro-culture involves certain regulatory social behaviours reflecting the teacher's and the pupils' mutual expectations. Social norms are unwritten rules orally set down by teachers, or initially formed or complemented by them through the use of their body language (Yackel& Cobb, 1996). From this perspective, social norms can be said to be all-encompassing, without specific reference to a particular course or a knowledge construction process.

Confining to the classroom the social norms commonly negotiated by teachers and pupils in their meaning formation process would be tantamount to restricting the very nature of these norms. As Yackel, Ramussen, and King (2000) point out, every learning environment, without exception, has its own norms. Naturally, it follows that the 3D MathLife virtual learning environment, designed to highlight the link between mathematics and real life, also has its own social norms. In this context, the research problem could be stated as follows:

'What are the social norms emerging through real-life scenarios requiring mathematical skills in a 3D virtual learning environment (MathLife)?'

This study is expected to contribute to the literature and provide guidance for future research in terms of determining social norms that effect individual's knowledge gathering and building in virtual learning settings.

Method

Case study was used in a qualitative approach to the research which lasted 6 weeks. The study group was composed of 10 seventh-grade pupils at a state secondary school in central Trabzon.

The data collection instruments were field notes, recordings of screen pictures of the pupils in real-life scenarios requiring mathematical skills, and semi-structured interviews. Six real-life scenarios requiring mathematical skills were used in the data collection process. The researcher was always present during the process, both taking field notes and providing academic and technical support to the pupils when necessary.

The NVivo 9.0 qualitative data analysis program was used for content analysis of the interviews and the recordings of the pupils' screen pictures. In this process, first the potential norms were determined and then the social norms were uncovered taking into account the norm criteria.

Findings

The analysis consists of two phases. Potential norms were determined during the first stage of the analysis. These norms represent expectations of the one of the parties (students or teachers) which are expected to be performed by the other party in the learning environment. Since these expectations are not mature enough to be valid as norms, they do not enter force in the learning environment. Social norms are shaped based on classroom microculture. Thus, it requires a process that takes place in the context of joint negotiations between teacher and

their students. As Akyüz (2014) point out, a behaviour, expectation or rule must be adopted by most of the class members in order to be considered as a social norm. In this context, the potential norms determined in the first phase of the study were interpreted again with a holistic approach, and the regulatory contexts valid in the setting through the consideration of the teacher's and pupils' mutual expectations by one or both sides were determined as the social norms. Thus, in our study, a total of 12 social norms were formulated as

- Communication through writing,
- Teachers use upper case and students use lower case letters during written communication,
- Using the chat screen only for communication and exchange of ideas,
- Waiting for everyone to come to the field of duty,
- Waiting till every student express an opinion or response,
- Asking freely in order to clarify things,
- Expressing answers freely,
- Avoidance of exposing the answers through private communication,
- Cooperation / solidarity,
- Teacher guidance from academic and technical backgrounds,
- Using time effectively,
- Interaction in a democratic environment.

Discussion / Conclusion

Since the norms are formed through common negotiations, only some of the behaviours determined as potential norms evolved into social norms. While some of these social norms found to be valid in MathLife were specific to the technicalities of the virtual setting, others could be valid in the classroom as well. For example, the 'communication through writing' norm is specific to MathLife virtual learning environment. The chat screen and private message feature designed to communicate between the teacher-students and among students have led to the communication of everyone in the environment in the process of doing the requirements of the tasks. This social norm has made it possible for some social norms to be formed and implemented in the learning environment, such as 'teachers use upper case and students use lower case letters during written communication', 'using the chat screen only for communication and exchange of ideas', 'waiting for everyone to come to the field of duty', and 'avoiding of exposing the answers through private communication'.

Other emerging social norms are norms that can be valid in other learning environments. Two of them, 'Waiting till every student express an opinion or response', and 'expressing answers freely', are associated with the social norm that 'even ineffective undertakings may contain important ideas' determined by Sekiguchi (2005) in a classroom learning environment in which the problem-solving approach is dominant.

The social norm of 'cooperation / solidarity' emerging in the MathLife virtual learning environment can be a reflection of the collaborative work of students in fulfilling their mission requirements. Edwards (2007) noted that, in the norm-study classes students often work in small groups when problem solving. Through the interaction between students in the process of cooperation, both individual beliefs and values as well as the general values prevailing in the learning environment can be determined by bringing them together.

Teachers in the MathLife virtual environment have helped students as a mediator and mentor in the process of making sense of the information rather than as an authority. Regardless of the learning environment, teachers should help students in all aspects of their knowledge building process (Pesen, 2008). Therefore, students have been helped by their teacher because they are not familiar with some of the technical features of MathLife virtual environment and they need academic help in the process of meeting the requirements of the script content. In addition, we can say that the teachers' mediator approach helps the interaction to take place in a democratic environment. The opportunity to express each student's thoughts offers an opportunity to learn by experiencing the democratic value and thinking approach (Hotaman, 2010).

Mathlife virtual environment is a learning environment designed for specific purposes. The social norms in other learning environments designed for different purposes can be determined, and the differences between the norms set out in this study can be criticized. Besides, norms set both in a virtual learning environment and in the classroom environment can be examined for the same study group.

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