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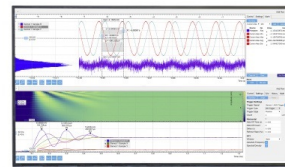
Social Aspects of Synchronous Virtual Learning Environments

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Abstract. In recent years, synchronous virtual learning environments have been rapidly evolving and have the potential to overcome social isolation in distance learning, as well as make it more interactive and personalized. This paper presents the results of a study on the social aspects of synchronous virtual teaching. Sixty-four tutors from online and blended settings, who had experience with VEDAMO Virtual Classroom[1], completed a survey and shared opinions based on their experience and teaching practices. The main findings summarize the key benefits of synchronous virtual learning, such as enhanced learning opportunities, flexibility, interactivity, student-centered instruction, options for timely and constructive feedback, collaborative learning, etc.

INTRODUCTION

The use of digital technologies has dynamically changed educational theory and practice. This has led to the emergence of diverse distance learning solutions. Moreover, it has required the adoption of new methods and approaches to teaching and learning. It has also required developing new attitudes in both teachers and learners regarding e-learning, understanding its benefits, and acquiring relevant skills to adopt and make the best use of its immense opportunities.

Distance learning is still associated with the lack of physical contact, social isolation, and a high level of self-regulation. Research on asynchronous virtual learning, which is the prevalent e-learning option, shows the predominant focus to be on cognitive processes and the exclusion of the learners' needs for affiliation, support, and affirmation. [1] In recent years, synchronous virtual learning environments have been rapidly evolving and have the potential to overcome these limitations, as well as provide significant added value to the learning process.

WHAT IS SYNCHRONOUS VIRTUAL LEARNING?

Synchronous virtual learning allows for live interaction between the tutor and the learners while they are participating in learning activities. It is done in real-time with a live instructor facilitating the training. Everyone logs in at a set time and can communicate directly with the instructor and with each other. Course length is usually fixed for a specific amount of time - from a single session to several weeks, months, or even years. [2] Synchronous virtual learning is, in many ways, similar to a physical classroom. For example, both physical and virtual classrooms allow

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[1] A web-based synchronous virtual learning environment

for immediate feedback, interactions with instructor and peers, and guided exercises to motivate and increase student learning. [3]
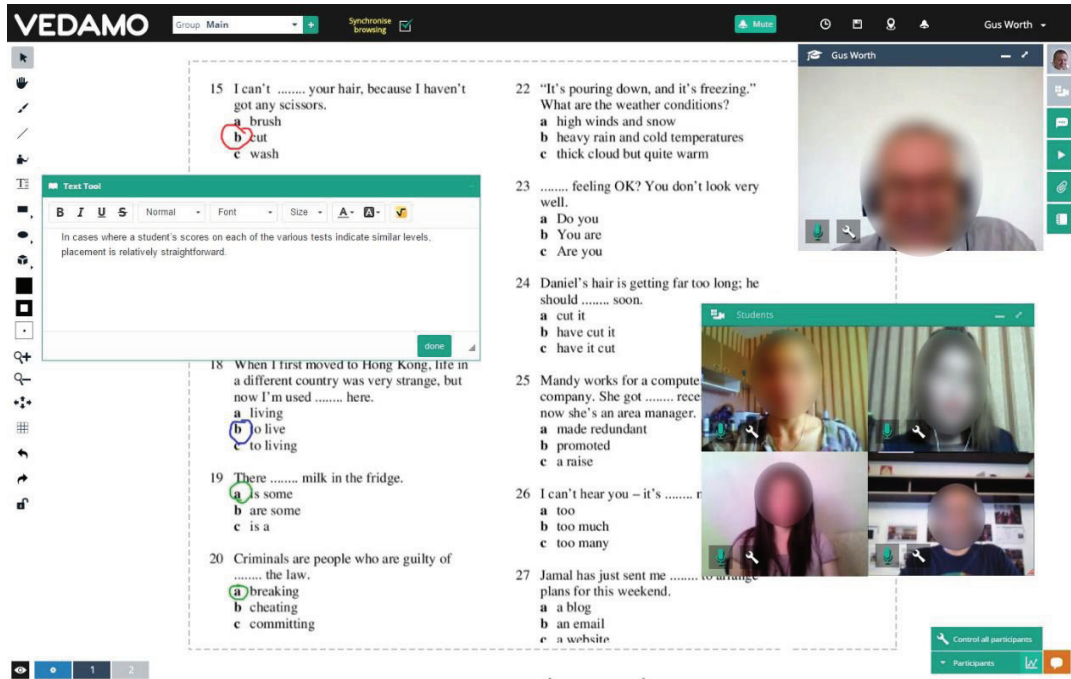

FIGURE 1. Screenshot from synchronous virtual session with one instructor and four participants in VEDAMO's virtual classroom

The development and application of synchronous virtual learning environments is justified by a variety of advantages such as advanced collaboration and communication, convenience, efficiency, user control, personalization, ubiquity, task orientation, and timeliness of learning and teaching. [4] Students and instructors are able to interact synchronously using features such as audio, video, text chat, interactive whiteboard, application sharing, instant polling, emoticons, and breakout rooms. [5] Students can participate in various individual or group activities while having the feeling that they can still interact as if they were meeting face to face. Usually, these interactions take place through videoconferencing. The participants have tools to present learning content in different formats, as well as to implement collaborative and individual activities. In this type of interaction, the teacher has the particularly important role of moderator who guides the learning process and supports group activities and discussions. These interactive elements are unavailable in an asynchronous course. [6]

PEDAGOGICAL SPECIFICS OF SYNCHRONOUS VIRTUAL LEARNING

There is a perception that distance-learning students suffer from inadequate collaboration and supervision with their course lecturer since the interaction between them is not in real time. [2] This is true to some extent for asynchronous virtual learning, which is related to self-paced progress and requires high levels of self-control, self-regulation and self-efficacy. Meanwhile, synchronous e-learners, as suggested in some studies, tend to enjoy more consistent communication, greater focus on tasks, increased participation, and more frequent completion of their work and courses than their asynchronous counterparts. [7] Synchronous interaction is more socioemotional and enhances interpersonal connections and student satisfaction.

Gedera's research on how students experience learning in a synchronous online environment shows that the two-way video and audio communication among the students created a sense of belonging to a learning community. The students who participated in the study acknowledged the value of being able to have a lot of physical cues, which led to more human interactions in the virtual classroom compared with asynchronous interactions. According to the

participants, the synchronous virtual learning environment was extremely useful in encouraging participation to express views, ask questions, and listen to others. [8]

These findings show the potential of synchronous virtual learning to make social aspects a part of the online education. In their study, Muilenburga et. al. found that the most significant student barriers to asynchronous online learning was the lack of social interaction. The authors concluded that improving social interaction would lead to a more effective and enjoyable educational experience. [9]

Martin et. al. stated that the high level of interaction enhanced the effectiveness of any distance education course. While asynchronous courses provide interaction primarily through discussion forums, synchronous courses provide real-time interactions. Adding synchronous components to online courses can create meaningful interactions [6] as they promote social presence and a sense of community. According to Tu and McIsaac, social presence has a positive correlation with communicative interactions as a means of constructing online learning. [10]

Chen et. al. identified the key advantages of online synchronous learning: immediate feedback, an increased level of motivation and responsibility, more in-depth learning, and richer interactions. In addition, their study found that questioning, greeting, and help, as well as cognitive, social, and teaching presence are significantly higher in synchronous online learning than in face-to-face mode. [11] Park and Bonk, who listed the major benefits of using a synchronous virtual classroom, had similar findings. They mentioned the following advantages: providing immediate feedback, encouraging the exchange of multiple perspectives, enhancing dynamic interactions among participants, strengthening social presence, and fostering the exchange of emotional support and supplying verbal elements [12]. All of these social aspects of synchronous virtual learning increase the e-learner's motivation and foster the development of group cohesion and a sense of community.

Synchronous virtual learning has the potential to provide learners with a more personalized experience. Schullo et.al. stated that with synchronous systems, the tutor can assess the students' levels of knowledge and customize the course material appropriately. [13] The inclusion of a scheduled time creates the perception (or reality) that the instructor and students are providing external motivation and are encouraging student participation, which can result in higher retention and completion rates.

SOCIAL ASPECTS OF SYNCHRONOUS VIRTUAL LEARNING

The synchronous virtual learning environment provides an abundance of opportunities, especially when combined with self-study platforms (learning management systems) or when used in addition to traditional classroom learning activities. As mentioned above, unlike asynchronous learning environments, the synchronous one allows for instant feedback, direct teacher-student interaction, and engaging activities to increase motivation and active participation.

In this paper we will investigate the following characteristics that promote the social aspects of synchronous virtual learning:

- Interactivity
- Collaborative learning
- Student-centered instruction
- Multimodal content representation and a variety of learning activities
- Psychologically safe environment
- Timely and constructive feedback
- Teacher control over group interaction

Interactivity

Training in a synchronous virtual classroom can only be successful with the active participation and engagement of the learners. Social interaction is a vital factor in cognitive development. It creates a positive learning environment and helps the participants achieve the expected outcomes.

During a synchronous virtual session there should be opportunities for frequent interaction between learner and tutor, learner and other learners, and learner and content. [3] Interaction between student and instructor supports knowledge construction, motivation, and the establishment of a social relationship. The exchange of information

regarding educational content as well as socio-emotional information is important for learning. Paechter et.al. found that students benefit from the interactions with their peers in the following ways: working in small groups to construct understanding, receiving and providing socio-emotional support, and learning within a cohesive and positive environment. Mutual support and the feeling of group cohesion are related to level of student engagement in teamwork, their motivation to participate in a learning environment, and course satisfaction. [14] According to Moore, learner-content interaction is the process of intellectually interacting with the content, which changes the understanding, perspectives, and cognitive structures of a learner's mind. [15]

Collaborative Learning

Collaborative learning includes the mutual engagement of learners in a joint effort to construct knowledge and solve problems together. The learners work together to achieve a common goal, exchange views, clarify the meaning of concepts, or solve problems together. It creates opportunities for cooperation in skills development.

The socio-emotional aspect of interaction is essential in successful collaborative learning. The emphasis is placed on interactions in which common understandings are subject to discussion and are developed precisely through exploring the differences in the participants' levels of knowledge, skills, and positions.

When applied to the synchronous virtual environment, this approach is associated with an active process of the collective construction of knowledge using the group as a source of information, a motivational agent, and a means of mutual support. Successful collaborative learning requires both task and group-related interaction. [16] Students need time and space for the planning and coordination of group activities, and such discussions need to be supported by a teacher.

Student-Centered Instruction

The lecture, which is a classic teaching format, often makes students more passive as the focus is on the content and the students must work independently with little opportunity for collaboration. This approach is more applicable to asynchronous virtual teaching – the tutor creates video lectures and self-directed activities, which the learners cover at their own pace.

Reushle and Loch's research supported synchronous virtual learning as a student-centered approach that offered more flexibility for student participation. [17] The learners and the tutor interact equally and active participation, collaborative work, and communication are encouraged. The tutor creates opportunities for both independent learning and learning from one another, and guides the learners in developing and practicing the skills they need. This increases the motivation level of the learners, as well as their interest in the learning activities.

Multimodal Content Representation and a Variety of Learning Activities

A variety of content presentation and learning activities is related to differentiated instruction, which takes into consideration the differences in the needs, levels, and learning styles of the learners. It favors the creation of a more personalized learning experience and individual success. When a teacher uses various sources to present the content (text, images, diagrams, audio, video, etc.), this can greatly improve the learning process by providing a flexible learning experience that is tailored to the various needs and preferences of the students. Presenting the content through various types of media retains the attention and interest of the learners [1].

Blending different types of learning activities within one virtual session also creates opportunities to meet a wider range of the needs of the students. Switching between individual work, small group collaboration, and class discussions addresses the specific learning preferences of all of the students – either to work alone, to interact with the others, or to express themselves in front of a larger group.

Psychologically Safe Environment

The interactions in a synchronous virtual environment create the sense of a more informal and safer emotional environment as the learners usually participate from the comfort of their own homes. The learning process is much more focused because of the absence of the usual physical distractions that are found in the conventional classroom. Furthermore, Bello et. al emphasized that the physical distance, which is often seen by many as a disadvantage, can have positive effects by making learners and instructors more objective, less fearful of comments or criticism, and less prone to cultural barriers. [2]

Psychological safety leads to better learning outcomes. It also fosters creativity, confidence, and a willingness to experiment on the part of the learners. The participants in the study of Woodcock et. al. demonstrated an increased level of self-efficacy in a synchronous virtual learning environment because they were in a psychologically safe environment. [7] Specifically, participants stated that they were able to learn from home and felt more confident asking questions for understanding, and, thus, were more comfortable sharing their ideas in a judgment-free environment. Most participants reported that they were more competent online compared to their participation in the classroom.

The virtual teacher also has a crucial role here – they need to encourage safe discussions, mutual respect, equal opportunities to participate, and the free sharing of different viewpoints. The teacher can enhance the psychological safety of the learners and make things more personalized by adding options for self-directed learning, as well as by communicating more frequently with each student.

Positive and Constructive Feedback

From the student's perspective, synchronous virtual learning allows for immediate feedback in the form of "just-in-time clarification and information." The participants are able to immediately correct themselves and strengthen their learning. [6] This feedback is particularly helpful when dealing with abstract concepts. The ability to talk with other class participants and instructors in real time can enhance the interaction in ways that other forms of communication cannot. [3]

The key role of the tutor here is to create an atmosphere of positive feedback by guiding the group's interaction. The need for feedback, which acknowledges the positive aspects of the learners' performance and provides valuable comments and recommendations for improvement, benefits the education and progress of the students. It also builds the habit in the group of trying to maintain a positive and constructive tone. All of these factors are vital in assisting the learners to overcome their mistakes without feelings of negativity, as well as by fostering confidence and inspiring them to achieve their full potential.

Teacher's Control over the Group Interaction

In synchronous virtual teaching, the instructor's expertise and role of a counselor and facilitator in learning is of great importance for the acquisition of knowledge, skills, and competences and in terms of student satisfaction. Over the course of the virtual session, the tutor should encourage the students to participate every 3-5 minutes. This can be achieved by a variety of activities such as brainstorming, small group discussion, collaborative and individual tasks, Q&A sessions, hands-on experience, etc. Discussion between students and tutors is a necessary part of a class, is crucial for supporting the negotiation of meaning that leads to knowledge construction, and is essentially a social cognitive process. [11]

PURPOSE OF THE PRESENT STUDY

The purpose of the study was to identify the key social aspects of synchronous virtual learning according to tutors from virtual and blended settings. The research questions were:
1. What are the key benefits of synchronous virtual learning?
2. What are the most important social aspects of synchronous virtual teaching that lead to efficient learning?

The results of this study will be of interest to online tutors and administrators who would like to promote synchronous virtual learning to their organizations.

METHOD

A standardized online survey was used to conduct the study. It consisted of 14 questions that explored the personal attitudes and experiences of respondents who use synchronous virtual learning environments.

The following types of questions were used in the survey: five close-ended, three open-ended, two Likert-type scales and four rating-scale questions. Five of the questions were used to identify the respondents' professional profile; two to investigate their experience and confidence in synchronous virtual teaching; four questions were related to rating the features of a synchronous virtual learning environment, its social aspects that are important for efficient teaching and learning, and its social aspects in comparison to traditional and asynchronous settings; there were two questions about assessing the application of synchronous virtual learning environments, as well as the respondents' overall teaching experience with synchronous tools; there was one open-ended question for comments on the implementation of synchronous virtual classrooms in the educational practice.

PARTICIPANTS

Sixty-four respondents, who had experience with VEDAMO Virtual Classroom, completed the online survey – 26 freelance tutors, 12 respondents working at a small teaching organization, 12 working at schools,10 working at a university, 2 corporate training providers, and 2 working in online academies. The survey was completed by 52 teachers/lecturers, 10 principals/managers, and 2 researchers.

The respondents reported that they taught the following subjects: foreign languages (38), Mathematics (4), ICT in education (4);,Humanities (4), Soft Skills (2), Medical Studies (2), and Public Administration (2). Their learners can be summarized in the following categories: adult learners (14), K-12 students (30), university students (12), and corporate clients (8). Thirty-two of the respondents taught traditional classes, 38 - synchronous virtual sessions, 6 - asynchronous online courses, and 26 - blended learning activities.

RESULTS

Almost 85% of the respondents had experience with synchronous virtual teaching: 12.5% had more than 10 years of experience, 9.4% between 6 and 10 years, 21.9% between 3 and 5 years, and 40.6% between 1 and 2 years. Only 15.6% of the respondents reported that they had no experience in a synchronous virtual learning environment as tutors. These results show that the majority of the respondents can share relevant opinions based on their experience and online teaching practice.

With the next question, the survey participants assessed their confidence to teach in a synchronous virtual learning environment. 53.1% stated that they felt confident to a very great extent 21.9% to a great extent, 18.8% to a moderate extent, and 6.3% were not at all confident. This means that almost 75% of the respondents felt confident to deliver synchronous virtual training and could contribute to the study with valuable feedback based on their experience.

In the eighth question the respondents rated the features of the synchronous virtual learning environments according to their importance for efficient teaching and learning on a scale of 0 to 5 (0 being the lowest rating and 5 the highest). The most important features according to the survey participants were accessibility (4.41), tools for easy content creation (4.13), tools for various types of content presentation (4.13), and tools for teacher control over the group interaction (4.09). The less important features for the respondents were instant messaging (3.56) and the tools for small group work (3.03). The features with the highest rating are related to the options for differentiated instruction in an online environment, which means that the participants foresee the potential of synchronous virtual teaching to provide more personalized learning that is tailored to individual needs.

With the next question, the respondents assessed the importance of the social aspects of synchronous virtual teaching for efficient teaching and learning on a scale of 0 to 5 (0 being the lowest rating and 5 the highest). The participants gave the highest ratings to the options for active participation of each learner (4.38), high interactivity (4.34), and the possibilities for giving constructive and timely feedback (4.23). Communication between fellow

learners (3.81) received a lower rating, even though it had a relatively high average score. These results show that the respondents find all social aspects of synchronous virtual teaching to be of great significance for achieving better learning outcomes.

In the tenth question the participants rated the benefits of a synchronous virtual learning environment in comparison to the traditional classroom. The respondents highlighted the following benefits as the most significant: learning is more personalized (4.06), the students feel freer to share their opinions (4.03), and the students receive more focused, personalized, and immediate feedback (4.03). The statement that the students have more efficient communication in a synchronous online environment had the lowest rating (3.47). The results show that respondents see the potential of the synchronous virtual learning environments to provide a more personalized and psychologically safe space for learning in comparison to the traditional setting.

The respondents were also asked to rate the benefits of the synchronous virtual environment compared to the asynchronous one. They reported the following benefits as being the most important: the training is more interactive (4.23), the teacher has better control over the group interaction (3.91), the students have more efficient communication (3.91), and students receive more focused, personalized, and immediate feedback (3.91). Meanwhile, the idea that learning in a synchronous virtual setting is more personalized (3.56) was perceived as less important. The results show that the respondents consider the interactivity that synchronous virtual teaching brings to online learning as a key benefit. The role of the teacher as a group facilitator is also crucial.

28.1% of the respondents deemed the application of synchronous virtual learning environments in the educational practice as necessary. Most of these were tutors with more than 10 years of experience in synchronous virtual teaching. 62.5% thought it gives new opportunities to both teachers and learners, 6.3% responded that it requires a lot of extra work, and only 3.1% found it difficult to apply (these answers came from participants who reported that they have no experience with synchronous virtual teaching). The results show that the more familiar tutors are with synchronous virtual teaching, the more explicit they are about the benefits of its application.

Almost 84% of the respondents assessed their overall teaching experience in a synchronous virtual environment compared to the traditional classroom as very good or good. 6.3% considered it acceptable and 9.4% - very poor. The participants who assessed their overall experience with the lowest scores reported that they had no experience as tutors in synchronous virtual learning environments. This shows that the participants who work with synchronous virtual teaching tools are satisfied with their overall experience compared to traditional training.

The last question was open-ended and aimed to collect comments on the implementation of synchronous virtual learning environments. The answers can be summarized in the following categories:

- Flexibility – the possibility to learn from anywhere at a convenient time; both the instructors and the students reported saving time and expenses because there is no need to travel.
- A positive effect on learning – Synchronous teaching was defined by some respondents as "important" and "necessary." It has the potential to bring "new and modern trends to education," "diversify the learning process,," and "provide schools with new opportunities." Some said that "those who try it are really satisfied and happy" and that "my students love it."
- Pedagogical benefits – Some responses included: "I think it helps students to concentrate on their own practice, thus allowing for better results"; "The learner can learn better and improve their method of communication"; "Excellent opportunity for student collaboration."
- Recommendations – Some stated that "training is required" and that "students need to be more mature learners.".

CONCLUSIONS

Based on the data, we can draw the following conclusions on the research questions:
Research question 1: What are the key benefits of synchronous virtual learning?
- Enhanced learning opportunities – Respondents emphasized the options for differentiated instruction and collaborative learning as key benefits of synchronous virtual learning.
- Flexibility – The survey participants outlined the potential of synchronous virtual learning to overcome many of the limitations imposed by the traditional pedagogical reality, such as time, location, and costs.
- More focused learning – The respondents reported that in a synchronous virtual learning environment the students show higher levels of concentration and better communication with their peers.

Research question 2: What are the most important social aspects of synchronous virtual teaching that lead to efficient learning?

- Interactivity – The higher level of interactivity, especially when compared to traditional and asynchronous settings, was one of the most commonly mentioned benefits of synchronous virtual learning. The synchronous virtual learning environment creates a favorable space for the active participation and engagement of the learners.

- Timely and constructive feedback – This social aspect was reported as one of the key benefits of synchronous virtual learning compared to the traditional and asynchronous settings. Immediate feedback is crucial for building learners' confidence and strengthening their learning.

- Student-centered instruction – According to the respondents, synchronous virtual learning environments could foster more personalized learning, especially in comparison to traditional classroom instruction. This social aspect is closely related to the greater flexibility that synchronous virtual teaching can offer.

- Psychologically safe environment – The survey participants reported that the synchronous virtual learning environment created a more informal and safer emotional space than the traditional classroom. Therefore, the learners feel more confident to share opinions, ask questions, and actively participate in the learning activities.

- Better teacher control over group interaction – This social aspect was reported as a key strength in comparison to asynchronous virtual learning environments. In synchronous virtual teaching, the tutor's presence and skills are critical for efficient classroom management due to the real-time interaction. That is why the tutor should have the tools available to facilitate the group dynamics and engage the students in various learning activities.

- Collaborative learning – This is one of the key advantages of synchronous virtual learning environments compared to asynchronous ones where students do not have direct, real-time communication. Collaborative learning is not only crucial for building the feeling of group cohesion and a sense of a learning community, but also for the collective construction of knowledge and cooperation in skills development.

The findings of this study do not claim to be representative as they present the experience of a limited number of respondents. Moreover, they provide ideas for further research. An examination of the instructor's competence to foster the social aspects of synchronous virtual teaching, as well as an exploration of the specifics of the different age groups of the learners, could help trainers of virtual teachers develop more robust professional development programs.

REFERENCES

1. K. Kreijnsa, P. A. Kirschnerb and W. Jochemsb, *Identifying the Pitfalls for Social Interaction in Computer-Supported Collaborative Learning Environments: A Review of the Research*, Computers in Human Behavior, 2003, no. 19, p. 335–353.
2. O. W. Bello, D. N. Ehira, J. K. Ayeni, N. Faruk and N. A. Balogun, *Towards the Design of a Synchronous Virtual Learning System*, Covenant Journal of Informatics and Communication Technology (CJICT), 2014, vol. 2, no. 2, pp. 59-74.
3. Ö. Yılmaz, *The Effects of 'Live Virtual Classroom' on student Achievement and Student Opinions about 'Live Virtual Classroom' at a Distance...,* TOJET: Turkish Online Journal of Educational Technology, 2015, vol. 14, no. 1, pp. 108-115
4. D. Mueller and S. Strohmeier, *Design Characteristics of Virtual Learning Environments: State of Research*, Computers & Education, 2011, vol. 57, p. 2505–2516.
5. F. Martin and M. A. Parker, *Use of Synchronous Virtual Classrooms: Why, Who, and How?,* MERLOT Journal of Online Learning and Teaching, 2014, vol. 10, no. 2, pp. 192-210.
6. F. Martin, M. A. Parker and D. F. Deale, *Examining Interactivity in Synchronous Virtual Classrooms*, The International Review of Research in Open and Distance Learning, 2012, vol. 3, no. 13, pp. 227-260.
7. S. Woodcock, A. Sisco and M. J. Eady, *The Learning Experience: Training Teachers Using Online Synchronous Environments*, Journal of Educational Research and Practice, 2015, vol. 5, no. 1, pp. 21-34.
8. [D. S. P. Gedera, *Students' Experiences of Learning in a Virtual Classroom*, International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 2014, vol. 10, no. 4, pp. 93-101.
9. L. Y. Muilenburga and Z. L. Berge, *Student Barriers to Online Learning: A Factor Analytic Study*, Distance Education, 2005, vol. 26, no. 1, p. 29–48.

10. C. H. Tu and M. McIsaac, *The Relationship of Social Presence and Interaction in Online Classes*, The American Journal of Distance Education, 2002, no. 16, p. 131–150.

11. P. Chen, J. Xiang, Y. Sun, Y. Ban, G. Chen and R. Huang, *Exploring Students' Discussion in Face to Face and Online Synchronous Learning*, in Emerging Issues in Smart Learning, Berlin, Springer-Verlag Berlin Heidelberg, 2015, pp. 183-191.

12. Y. J. Park and C. J. Bonk, *Is Life A Breeze?: A Case Study for Promoting Synchronous Learning in a Blended Graduate Course*, Journal of Online Learning and Teaching, 2007, vol. 3, no. 3, p. 307–323.

13. S. Schullo, A. Hilbelink, M. Venable and A. E. Barron, *Selecting a Virtual Classroom System: Elluminate Live vs. Macromedia Breeze*, MERLOT Journal of Online Learning and Teaching, 2007, vol. 4, no. 3, pp. 331-345.

14. M. Paechter, B. Maier and D. Macher, *Students' Expectations of, and Experiences in E-learning: Their Relation to Learning Achievements and Course Satisfaction*, Computers & Education, 2010, no. 54, p. 222–229.

15. M. J. Moore, *Three Types of Interaction*, Distance Education Theory, New York, Routledge, 1993, pp. 19-24.

16. E. Vuopala, P. Hyvönen and S. Järvelä, *Interaction Forms in Successful Collaborative Learning in Virtual Learning Environments*, Active Learning in Higher Education, 2015, pp. 1-14.

17. B. Loch and S. Reushle, "*The Practice of Web Conferencing: Where are We Now?*, Hello! Where are You in the Landscape of Educational Technology?, Melbourne, 2008.

18. A. Ali, *Instructional design and online instruction: Practices and perception*, TechTrends, 2003, vol. 47, no. 5, pp. 42-45.