

## VIDEO CONFERENCE AS A TOOL FOR ENHANCING STUDENT COLLABORATION

### KORIŠTENJE VIDEO KONFERENCIJE ZA POBOLJŠANJE STUDENTSKE KOLABORACIJE

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#### Abstract

Video conferencing has been present on software markets for decades. Yet, due to various technical and pedagogical restrictions, it has been relatively rarely used in online education. Following the advent of reliable and high-bandwidth internet protocol connectivity, as well as development of new videoconferencing system, potentials of synchronous computer supported collaborative learning through video conferencing have increased [1] [2].

In ancient Greece, those who weren't interested to participate in public affairs were called "idiot", so it may be said that there are a lot of idiots in a world today and the only one who can change things are educational institutions. By supporting synchronous collaborative learning, contemporary education has better chance to develop public citizen and not private individual or "idiot". To facilitate such synchronous communication between students and teachers, not as a tool for teacher domination but as a tool for authentic education [3], this study looks into recent applications of the BigBlueButton (BBB) videoconferencing system integrated in open-source virtual learning environment, Moodle.

In the capacity of learning technologist, author of this paper has been involved in various aspects of this application from software development, through support to teachers and students, to pedagogy. The paper analyse the main motivators for the implementing synchronous computer supported collaborative learning at the University of Applied Sciences. It briefly introduces the main technical issues in the application of Moodle/BigBlueButton, and explores its pedagogical applications in providing a suitable online environment for democratic education and

encouragement of students to become "critical agents who actively question and negotiate the relationships between theory and practice, critical analysis and common sense and learning and social change" [4].

**Keywords:** *Videoconference, Moodle, BigBlueButton, Computer supported collaborative learning, democratic education*

#### Sažetak

Videokonferencijski sustavi već su desetljećima prisutni na tržištu. Međutim, zbog različitih tehničkih i pedagoških ograničenja, relativno su se rijetko koristili u online obrazovanju. Pojavom pouzdanog i širokopojsnog pristupa internetu, kao i razvojem novih videokonferencijskih sustava, potencijali sinkronog računalno potpomognutog kolaborativnog učenja (eng. Computer Supported Collaborative Learning - CSCL) su značajno porasli [1] [2].

U staroj Grčkoj, one koji su imali pravo, a nisu bili zainteresirani za sudjelovanje u javnim poslovima, nazivali su "idiotima", tako da se može reći da danas na svijetu ima puno "idiota", a obrazovne institucije su jedine koje mogu promijeniti stvari. Podržavajući sinkrono kolaborativno učenje, suvremeno obrazovanje ima veće šanse da razvije javne građane, a ne privatne osobe ili "idiote". Da bi se olakšala takva vrsta komunikacije između učenika i nastavnika, ne kao sredstvo za dominaciju nastavnika, već kao alat za autentično obrazovanje [3], u radu se gleda na primjenu BigBlueButton (BBB) videokonferencijskog sustava integriranog u open-source virtualno okruženje Moodle.

U radu se analiziraju glavni poticatelji za provedbom sinkronog CSCL, te se ukratko uvodi u tehničke probleme u primjeni Moodle/BigBlueButton i istražuje njegove pedagoške primjene za pružanje odgovarajućeg mrežnog okruženja za demokratsko obrazovanje i poticanje studenata da promiču dijalog, raspravu i argumente potkrijepljene dokazima, te aktivno pregovaraju odnose između teorije i prakse [4].

**Ključne riječi:** Videokonferencija, Moodle, BigBlueButton, računalom podržano kolaborativno učenje, demokratsko obrazovanje

## 1. Introduction

### 1. Uvod

Education, not only plays an important role in student learning, but also in fostering the ability to research and gather information, their understanding and application of collected information to prepare students for the upcoming challenges [5]. However, education also plays an important role in the democratization of society because only people who respect each other and their diversity [4], who realize that everything is built through collaboration can create a society with genuine democratic values.

To create conditions, for students to develop in such way, there is a need to shift the educational approach by changing the focus from the teacher to the students. There was always the idea of students learning together in small groups and that idea was mostly accepted as a positive learning shift from lectures in large auditoriums overcrowded with students [6]. The collaboration that takes place in such groups is a continuum and it happens at every step, from content research, discussion, creation of shared knowledge and co-editing content. Unlike competitive and individualistic learning, students can work together in collaboration to achieve common goals of learning [7].

Advances in technology that occurred over the past few decades allow this theory to be finally put into practice. However, the ability to combine these two ideas (ICT and collaborative learning, or technology and education) and

to effectively enhance learning remains a challenge for teachers.

## 2. Theoretical Background

### 2. Teoretska pozadina

#### 2.1 Computer supported collaborative learning (CSCL)

#### 2.1 Računalom podržano kolaborativno učenje (CSCL)

CSCL is a diverse field in which teachers work in different ways, but the main focus is on collaborative groups of students. Unlike previous educational and pedagogical theory that looks almost exclusively at individual students, CSCL uses networked computers to move focus away from individual student and focus it on a small group of students (4-5 students) [8]. Therefore, it rejects the foundations of traditional educational and places learning in meaningful negotiations to be carried out in the social world, rather than in the minds of individuals [6]. Learning begins to take place as group discourse, where communication is not random, secondary factor, but the primary interaction through which everything else happens. Such an environment allows students to take ownership of the learning process, to engage in social interaction and dialogue, to develop more ways of presenting and become more self aware [9].

Small groups are the most suitable places for observing intersubjective learning as they release a wide range of social interactions and still they are small enough to keep track of what is going on [8]. The very nature of collaborative learning is such that a group that works together, will probably develop a solution that is more complex and sophisticated than it would be if each member has worked by himself. Through participation in group process, students do not only learn the theory developed by the group, but can also learn to think about the theory from multiple perspectives, and learn how to work together with others. CSCL gives hope that networked computer technology can bring together students in new ways to take advantage of the power of collaborative learning [10].

CSCL has been deeply influenced by the theories of Lev Vygotsky [8][10], and it emphasizes the importance of dialogue and social mediation in the development of guidelines of the learning process [11]. In particular, it can be said that the CSCL is inspired by his visionary understanding that learning takes place originally on a social level, and later, on the individual level of learning [8][10][12]. For Vygotsky, educators serve as facilitator who teach and are encouraging students to form their own level of understanding. Social interaction between students and students with teacher boosts the growth of knowledge [13]. In the process of completion of collaborative process, students are exposed to new ideas and information from a variety of perspectives and approaches through discussions and questioning, which at the end makes easy for students to understand and internalize critical concepts [9].

CSCL provides a convenient online environment for democratic education in which students are encouraged to become “critical agents who actively question and negotiate the relationships between theory and practice, critical analysis and common sense and learning and social change” [4]. This is an area which will the most challenge traditional pedagogy, concepts of teaching and learning, and institutional policies and practices [13].

## 2.2 Virtual learning environments (Moodle)

### 2.2 *Virtualno edukacijsko okruženje (Moodle)*

While there are many platforms that are appropriate for creating VLE, Moodle is one of the most popular. One of the reasons Moodle is so popular among teachers is that it is designed in open dialogue between teachers and developers, where they met various models for learning design and pedagogy [14]. Moodle platform satisfy most of the necessary conditions for the provision of high-quality virtual environment for student collaboration. Some of the tools that are available in Moodle, and are easily applicable in each class are wiki, database, forum, glossary... What is important to note that, since the Moodle

is an open source platform, there is a wide community of teachers and developers, who are constantly working to create new tools and improve existing ones.

In terms of collaboration and creating dialog between students, the biggest drawback of the Moodle platform is that it is mainly based on asynchronous communication, however, that can be compensated with a large plugin database that is available for teachers, and one of such plugin is BBB.

## 2.3 Extending Moodle with synchronous bbb platform

### 2.3 *Proširenje Moodle platforme sa sinkronom BBB platformom*

Moodle includes a number of tools that enable high-quality support for asynchronous collaboration, but it lacks quality synchronous component. In addition, Moodle can be enriched with a web conference tool, BigBlueButton.

BigBlueButton is an open source web conferencing system that enables educational institutions to deliver a high-quality learning experience to remote students. BBB supports sharing of slides (PDF and office documents), video, chat, voice, whiteboard and desktops, and it runs on Mac, Unix, and PC computers. Also, it allows recording of web conference sessions and presentations for later playback by students, complete with full audio and video.

The reason why BBB is chosen, instead of some similar platform, is because it can be fully integrated with Moodle (simply adds a new activity), no software to download, single sign on (authenticated via Moodle), and ease of use. Same as Moodle, BBB is open source, and as such no manufacturer support is available, although it is available through the online community.

The combination of Moodle and BBB in education is extremely useful, especially when it comes to collaboration within small groups of students. In Moodle, BBB is displayed as activity and therefore as well as any other activity can give access only to specific group. In this way, each group of students has its own virtual classroom in which they can have both synchronous and asynchronous collaboration. As already mentioned BBB has several tools that can

be used in synchronous collaboration, but this paper is focused on the importance of just one of them and that is the role of video conferencing in the student collaboration.

### **3. Improved potential for video communications**

#### ***3. Poboljšanje potencijala za video komunikacijom***

Video conferencing has great potential for use for teaching in higher education. The potential lies in the possibility of creating a dialogue in student collaboration, which contributes to the quality of education instead of learning in isolation. The dialogue can be between teachers and students or only between students. However, the success of a video conference may depend on factors that are not necessarily related to the technology, but with an institutional support, student and teacher access to the technology, and their methods [2].

Although the technology has been available for several decades, there was always some reason that restricted its wider introduction to student education. Some of these reasons were the availability of broadband Internet, the high cost of technology, lack of flexibility and widespread use of information technology among the students themselves. However, due to the rapid development of the technology itself, as well as the availability of broadband internet, video communications are more accessible, more mobile and have greater impact on student education.

Synchronous video communication technology shows a high potential for education, it is suitable for small and large groups, offers a variety of tools for meaningful interaction and has applications in a wide range of values. They allow a combination of several technologies that enable simultaneous communication and interaction, and the possibility of using multiple media in different ways. Video communication provides an opportunity for authentic online collaborative learning (formal and informal), which is also its greatest potential because the way that affects the online learning environment is that it moves it closer to face-to-face communication [13]. New video communication technologies have the potential to give students

the freedom to interact with each other and their teacher in accordance with their learning needs and agreed plans for achieving the learning objectives and outcomes. Video media can empower successful learning because mutual face-to-face communication encourages the development of trust within the learning community, allowing students to support each other in various ways on their way.

The intention of the videoconference is not only to create space for new communication, but also encourage critical dialogue instead of a regular discussion, dialogue that supports thinking and reflection in real-time which promote deeper more powerful learning in a more positive and relaxed environment. Acceptance of new technologies and their potential for the development of critical education, does not mean at the same time diminishing the importance of teachers in the educational process, but on the contrary, teacher role is even more important and more active than ever before [10] [15] [16].

### **4. Importance of dialog in synchronous video communication**

#### ***4. Važnost dijaloga u sinkronoj video komunikaciji***

The asynchronous component, that Moodle has to offer, has great value in the collaboration (wiki, sharing documents, forums, databases ...) and it is to a certain extent irreplaceable, but what tools for synchronous collaboration has to offer, asynchronous cannot match. This primarily refers to the dialogue that takes place among students or between students and the teacher in real time. Although synchronous communication includes chat rooms and discussion boards, when it comes to the dialogue, video conferencing is much natural because it uses both verbal and non-verbal signs, so there is less chance for misunderstandings [17].

The use of video communication in CSCL, encourage students to create knowledge through dialogue and sharing of different perspectives. Conditions for such dialogue should be based on ethical and moral values, and thus fosters thoughtfulness and holistic thinking [13]. All this leads to the creation of new opportunities that

students can explore. Unlike traditional forms of teaching that represent a one-way transfer of knowledge from teacher to student, „dialogue represents a give and take, a creation and re-creation, a process of risk and reward“ [18]. This approach moves towards the ideals of Paulo Freire, whose philosophy encourages emancipatory learning. In his ideals, teachers should leave behind the traditional learning process of memorizing facts and start encouraging students to engage, dialoging and problem solving with other students [3] [19], as opposed to banking concept, where knowledge is owned by the teacher and its transfer to students is direct and one-sided. By shifting teaching practice to his ideals, students are being treated as responsible human beings who are ready to enter the world with the ability to think, and not manipulable objects .

Simply said, dialogue implies a sincere exchange of words and ideas, between students who enjoy the same role in the process. Dialog „is the encounter between men, mediated by the world, in order to name the world. Hence, dialogue cannot occur between those who want to name the world and those who do not want this naming—between those who deny other men the right to speak their word and those whose right to speak has been denied them.” [3].

True dialogue is possible only in conditions in which no one imposes their ideas to others, in which one person does not act on another, but work together with each other. The dialogue allows the exchange of opinions, spreading the difference, consensus building and reflective practice. And such dynamic conditions that occur through dialogue, can lead to the creation of new knowledge.

## 5. Teacher's Role

### 5. *Uloga nastavnika*

A shift from the traditional teacher-oriented education, to teaching that focuses on student and interaction among students, also changes the role of teacher. The teacher dismisses traditional role, and assumes the role of facilitator. Although the more control over learning is given to the students, learning still needs to be planned in order to achieve planned outcomes. However, there are several

different ways, in which students can come to outcomes, than it was in traditional learning where the emphasis was on teaching instead of learning [13].

The teacher's role is even more important than in traditional teaching because the teacher must create a environment in which students will become aware of their possibilities as critically engaged citizens. The teacher has to design and organize all the cultural elements that are involved in the educational context, and same as the architect, he needs to organize the content in which student experience will take place [19].

Such a dialogue that takes place between the students must not be empty, must not be reduced to mere talk, but it must be constructive and concentrate around the real problem. This means that it must be the problem for which they care, and must include the problems which make sense to them. In terms of Vygotsky, in the zone of proximal development, it should be a problem that challenges their current understanding, but is in the reach of their understanding if they have the support of students who are working with them. In other words, if they work collaboratively on the problem which each member individually would not know to solve [8] [10]. Students should know and understand that their interactions in the group are connected with others in such a way that success can only be achieved if they all contribute and work together. The teacher must create such positive interdependence among students, because knowing that someones participation is essential for the entire group, can be a powerful motivating factor. By this means students, by themselves, are gathering the knowledge and solutions to problems that was set up by a teacher, and so they are able to pass on their knowledge in another context [20].

The work of students is also affected by their perception, so the negative perception leads to a negative effect, while positive perception leads to positive results [21]. Based on that, it is of great importance that teacher prepares students for video collaboration through the technical and educational aspects. In other words, they need to receive training before taking a course, so they can understand what the technology can achieve, and what its limitation are, and also they must know what is expected of them. Pedagogy

itself should not be a method or technique that is imposing to students, but a political and moral practice that provides knowledge, skills and social relations, which enable students to expand their opportunities and become more aware of the critical importance of being a citizen in a democratic society [3] [4]. Such an approach, which shifts the learning focus to students and their interactions, creates uncertainty that did not exist before. The teacher is no longer the safe zone in which he has complete control, but is faced with a variety of unpredictable obstacles. The teacher, as a facilitator, especially should pay attention to potential obstacles (student in the group can not or does not want to participate in the work, technical problems ...), and in such cases to make alternative plans.

## 6. Conclusion

### 6. Zaključak

This paper showed some of the potential of videoconferencing as a rich media that is able to enhance CSCL using Moodle upgraded with BBB. In order to fulfill the purpose of higher education institutions for critical education of citizens, including the revitalization of democracy itself [4], it is extremely important to provide students with the opportunity to develop a dialogue. Since most institutions have limited physical space in which students are able to find and keep a dialogue, VLE (virtual learning environment) is the appropriate solution. Because

of the open source and interoperability Moodle and BBB proved to be more than suitable for the creation of a virtual environment in which student collaboration can take place.

Model of using video conferencing, presented in this paper, puts the difference between content oriented learning and learning with a focus on student interaction through videoconferencing collaboration. While it is proposed that the control of the learning process is placed fully into the hands of the student, it does not mean that learning is unplanned, but that the role of the teacher is to create conditions for such collaboration and student motivation [13]. The emphasis is on empowerment of mutual student interaction as the foundation of learning. Enabling students to participate in the construction of the learning process, encourages them to embrace education as its own project, something they themselves can create. In other words, they no longer have to wait passively to be told what to do [19].

Educational institutions that plan to use video conferencing in teaching, must be aware that such courses require more time for organizing and structuring than the traditional one. Teachers need to be familiar with the technology, must be aware of different teaching conditions and make changes in the organization and management of the course. But also they must keep in mind that education should help us fight the ideological delusion, and that the main goal of education is not only preparing for the "career", but preparing for self-manages life [22].

## 7. References

### 7. Reference

- [1] Comber C.; Lawson T.; Sustaining technological innovation: The example of videoconferencing in English schools. In *Education and Information Technologies* 18(4), 641-659, 2013.
- [2] Coventry L.; Video Conferencing in Higher Education <http://www.agocg.ac.uk/reports/mmedia/video3/video3.pdf>. Accessed 22 May 2016.
- [3] Freire P.; *Pedagogy of the oppressed*. New York: Continuum, 1970.
- [4] Giroux H.A.; *On critical pedagogy*. New York: Continuum International Publishing, 2011.
- [5] Kuo F.R.; Hwang G.J.; Chen S.C.; Chen S.Y.; A Cognitive Apprenticeship Approach to Facilitating Web-based Collaborative Problem Solving. in *Educational Technology & Society*, 15 (4), pp.319-331, 2012.

- [6] Stahl G.; Koschmann T.; Suthers D.; Computer-supported collaborative learning: An historical perspective. In Sawyer RK (Ed) Cambridge handbook of the learning sciences. Cambridge, UK: Cambridge University Press, pp.409-426, 2006.
- [7] Vanni I.; Collaborative Learning: Resources for International Studies, 2014.
- [8] Stahl G.; Theories of cognition in collaborative learning In Hmelo-Silver C.; O'Donnell A.; Chan C.; Chinn C. (Eds.), International handbook of collaborative learning. New York, NY: Taylor & Francis, pp. 74-90, 2012, Web: <http://GerryStahl.net/pub/clhandbook.pdf>.
- [9] Lin L.; Investigating Chinese HE EFL Classrooms - Using Collaborative Learning to Enhance Learning, Springer-Verlag Berlin Heidelberg, 2015.
- [10] Lipponen L.; Exploring foundations for computer-supported collaborative learning. In Proceedings of the Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community. International Society of the Learning Sciences, pp.72-81, 2002.
- [11] López D.; Alvarez I.; Socio-cognitive regulation strategies in cooperative learning tasks in virtual contexts. In Multiple Perspectives on Problem Solving and Learning in the Digital Age, Springer New York, pp.111-126, 2010.
- [12] Dillenbourg P.; What do you mean by collaborative learning?. In Dillenbourg P (Ed) Collaborative-learning: Cognitive and Computational Approaches, Oxford: Elsevier, pp.1-19, 1999.
- [13] Smith R.; Enhancing learner-learner interaction using video communications in higher education: Implications from theorising about a new model Vol 42 No 1 pp.113-127, 2011.
- [14] Berggren A.; Burgos D.; Fontana J.M.; Hinkelman D.; Hung V.; Hursh A.; Tielmans G.; Practical and Pedagogical Issues for Teacher Adoption of IMS Learning Design Standards in Moodle LMS in Journal of Interactive Media in Education. 2005(1), p.Art. 3. doi: <http://doi.org/10.5334/2005-2.2005>.
- [15] Jandrić P.; Boras D.; Kritičko e-obrazovanje - Borba za moć i značenje u umreženom društvu. Zagreb: Tehničko veleučilište u Zagrebu, 2011.
- [16] Roberts T.S.; Online Collaborative Learning: Theory and Practice. Hershey: Information Science Publishing, 2005.
- [17] Ashcraft D.; Treadwell T.; The Social Psychology of Online Collaborative Learning: The Good, the Bad, and the Awkward in Computer-Supported Collaborative Learning: Best Practices and Principles for Instructors, IGI Global, 2008.
- [18] Monchinski T.; Critical Pedagogy And The Everyday Classroom. Springer Netherlands, 2008.
- [19] Luis S. Villacañas de Castro.; Critical Pedagogy and Marx, Vygotsky and Freire. Palgrave Macmillan UK, 2016.
- [20] Dooly M.; Telecollaborative Language Learning. A guidebook to moderating intercultural collaboration online. in Constructing Knowledge Together. Bern:Peter Lang, pp.21-45, 2008.
- [21] Altmer C.; Perceptions of undergraduate students about synchronous video conference-based English courses. in Procedia - Social and Behavioral Sciences 199, pp.627 - 633, 2015.
- [22] Giroux H.A.; Rethinking Education as the Practice of Freedom: Paulo Freire and the promise of critical pedagogy. in Policy Futures in Education Volume 8 Number 6, 2010.

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