Interactive environments for training in the higher education

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Abstract: The introduction of the today's information and communications technology in the education is one of the possible solutions of the problem with digital generation's decreasing affinity to education. The main reason is that the new generation is so close attached to the new technology. The purpose of this paper is to present the possibilities of web-based system for the sharing of content and collaboration in the Higher education, as well as to present a best practice in the using of this system in the Trakia University of Stara Zagora, Faculty of Technics and Technologies of Yambol.

Key words: interactive environments for sharing and collaboration, interactive presentation system, digital generation, higher education.

INTRODUCTION

We, all the lecturers of universities, are witnessing the reduced affinity for knowledge acquisition and education among the young generation. To take back the pupils in classrooms as well as the student audiences, and encourage them to learn, we need to adapt the educational system to the digital generation. For this purpose, we need to introduce and employ innovative ICT-based educational technologies. In this regard, universities must be excluded from the "timid" innovators group and join the "moderate" ones, or even the "bold" innovators by integrating these technologies and modern teaching methods into the learning process.

In particular, we should switch from Blackboard to Smartboard as soon as possible. Would this help to attract students' attention? Yes! Why? Because the students are accustomed to the touchscreen technology and interactive presentation system (IPS) allows an ordinary whiteboard, even a white wall, to become a large touchscreen, that students recognize and focus on. The use of ICT allows a lecture to be made much more informative and attractive. Lecturers, who use this technology, are much more likely to be recognized by the students as a people from their social group, not immigrants, but natives in their digital world [2].

IPS opportunities in education, including universities are discussed in other author's works [4, 5, 6]. But their attractiveness, informativeness and dynamics may increase multiple times if they work along with an appropriate content sharing software for cooperation on common work surface, this of virtual or real interactive whiteboard. There are many software solutions that have the listed options and use virtual spaces (including 3D).

The report examines in detail one of the interactive environments for collaboration, integrated into the IPS in which students can also use their mobile devices for connection. Indicated possibilities for application in the higher education as well as concrete examples of the use of web-based environment eBeam Connect disciplines studied by students in the Trakia University of Stara Zagora, Faculty of Technics and Technologies of Yambol (FTT) Application possibilities as well as concrete examples of using the web-based environment eBeam Connect in the studied subjects at FTT are indicated.

INTERACTIVE ENVIRONMENTS FOR COLLABORATION

The lecturer will surely attract more learners attention if there is interactive whiteboard (IWB) employed in class, using it not with the mouse sitting at the computer but in front of the board, using the stylus or finger on the analogy of its student's addiction to the touch-screen technology. If they can see their own screens on the IWB, their own solutions to the tasks as well as to hear and see the comments of their colleagues and lecturers, they will definitely be more active and motivated. We do not expect the digital generation students to raise their hands and get on (appear on) the whiteboard to

represent their decisions. Certainly, they would rather want to present it from their place by their Smartphones, tablets or laptops. The Smartphones are in their hands anyway so we better find a way for their application in the learning process. They can be used as remote-control devices may for operational control (Classroom Performance System, CPS) [6] or devices through which the student is working on the shared virtual or real IWB surface. The topic of mobile learning and its relevance and opportunities is examined by many authors [1, 3, 9, 13], but undoubtedly the integration of this training IPS opens up new opportunities.

As a part of its software, IPS provides tools for meetings (eg. eBeam Meeting Sharing), in which on the whiteboard the surfaces of other remote user's IWBs or the screens of classmates and lecturers are shared. Lecturer and students can inflict notes, comments, corrections on the presented content, for example decision on a specific task. In some cases, the device in the lecturer or student's hands can be a specialized device (Interwrite Mobi View, Interwrite Mobi Learner, eBeam Inscribe 200e) or desktop PC/laptop, that works under the control of the additional installed software to the IWB. Another solution are the web-based environments provided by some IWB manufacturers (Luidia, eBeam Connect), which do not put limitations on the hardware and software devices or users.

Interactive collaborative environment can be classified under different signs. As mentioned above, there are IWBs which require installation of specialized hardware and / or software, and IWBs that can work with non-specific devices (including Smartphones) and wide-spread web-based software. There are environments that do not use the web and can work without an internet connection, using only LAN to share computer screens with the other users within the audience or university. All have their advantages and disadvantages and the educational institutions have to choose the appropriate one, considering their digital student's preferences, requirements and last but not least, their financial capabilities.

Fig. 1. Solving a task in eBeam Connect environment with
Web-compatible devices

eBeam Connect is web-based software that allows lecturers and students to interact in the learning process by using a web-compatible devices such as tablets, laptops and smartphones (Fig. 1).

It is an indisputable fact that today the number of young people is constantly growing, including students using portable internet devices (laptops, tablets, smartphones).The web-based eBeam Connect environment allows users of these devices to collaborate in cyberspace, whether they are in the same physical audience or different geographical locations [12, 15].

eBeam Connect gives a possibility for cooperation types like browser-browser and browser-interactive whiteboard. The lecturers can monitor the work of students, solving a specific task in real time on the IWB or their computers (including from home), thus they can inflict notes, comments, adjustments on the students decisions. In the session,

initiated by a lecturer or student, more than one participant can take part, i.e. team work is possible. On fig. 1 a document-task window is presented in the eBeam "cloud" on the IWB with devices connected to the active session of the students. Students may submit their problem solutions by opening their .jpg, .docx, xlsx, .ppt files.

When there is interaction of type browser-browser eBeam Connect provides a type of sharing, in which a large number of students and lecturers, can start or join interactive sessions without special hardware or software only by using a web browser. The aim is to create, capture and share content in real time. On mobile devices, like Android or Windows tablets as well as smartphones, lecturers and students can use the touch screen or stylus for taking notes, drawing diagrams and more.

eBeam Connect can be integrated with Luidia eBeam Edge IWBs or eBeam Engage IWBs, as well as other models or other manufacturer's IWBs, providing sharing between the IWB and the browser. Students and lecturers are not limited to traditional communications and they can take advantage of the new mobile learning and collaboration opportunities, including using IWBs.

In the examples, task solutions of students from "Cad-systems" and "Programming languages and systems automation" disciplines, are examined. Fig. 2-1, 2-2 is an image showing a student (from the first subject) task solution saved as a .jpg file and fig. 2-3, 2-4 – shows a student solution from the second subject (error correction or C++ program editing). The lecturer works on an interactive whiteboard in the audience, and students participate actively using eBeam Connect, to manipulate data and objects directly from their mobile devices or desktop computers, and to record their actions in a file (.jpg, .pdf, .ppt). Furthermore, remote student can be added into the classroom for distance learning and collaboration in eBeam cloud. The lecturer has the option to disable or enable annotation placements on presented material, from the students participating in the session , as well as to record the presented solutions to the students in an appropriate format (.jpg, .pdf , .ppt), for review and evolution later.
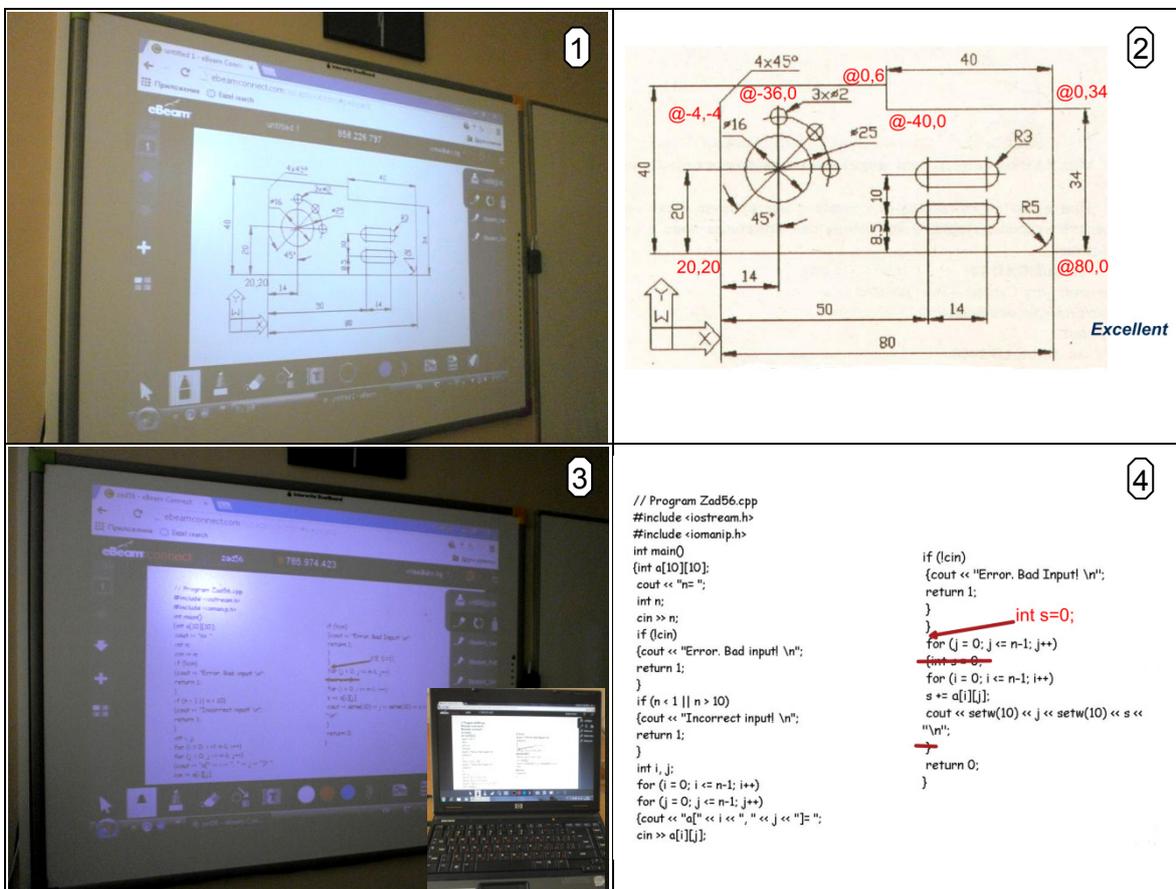

Fig. 3. Problem solving by eBeam Connect environment

Access to web-based software "eBeam Connect", students can acquire by taking the relevant courses at e-learning systems, by tools for instant message sending or through social networks where they are 24/7. A message, containing the session hour and IWB, and published in the course or in the social group, can be used from the students to join them in the session and do their assignments individually or together with the group under a real time supervision and control of the lecturer. The lecturer and students don't need to be in the university audiences. Initiators of the session can also be the students themselves upon registration at the eBeam Connect site.

Working with the eBeam Connect and its tools is comfortable and after its creation in 2012 it's evolving in a positive direction. The relatively slow synchronization between the devices and the screen refresh, could be indicated as disadvantage of the eBeam Connect, but in this case the issue can depend your Internet connection speed. In some cases it is much more convenient to use stylus when working with tablet or smartphone. It would also be useful adding a tool like button magnifier (zoom) to the environment. It is difficult and uncomfortable to use the built-in Windows application for this purpose. When .docx .xlsx files are added by the lecturer or students (e.g. their decisions), the pages are transferred 1:1 on the eBeam Connect pages and the audience visibility of IWB's image is unsatisfactory.

The IPS, which are combined with collaborative interactive environments, undoubtedly open new possibilities in the educational process according to the modern student's preferences. Positive results in terms of education quality can be achieved only by using interactive tools and teaching methods with interactions of type "lecturer-student", "student-student" of subject-subjective basis [8]. The eBeam Connect environment allows the implementation of interactive teaching methods as lectures, brainstorming, discussions, etc. [8, 16], as learners are located within or outside the auditorium. This environment can be successfully used when collaborating on projects. Working in pairs or small groups can be applied as techniques for collaborative organization in class [17]. The lecturer allocates the learners in one or several groups-sessions with common or different identifiers. The groups can work on different or identical. Each student can participate in its sessions with different (favourite) pen colour in order to be easily identified or just for attractiveness. As it is noted, the lecturer manages sessions giving or withdrawing rights of the learners to participate actively. If a student hasn't demonstrated the required knowledge, the lecturer can take his permission for annotations and make him passive participant - spectator of the session. All actions and their comments, corrections and evaluations, can be presented to the auditorium on IWB by the stylus interacting with IWB-browser or on the screen of computer (laptop, tablet, smartphone) with browser-browser interaction by allowing remote users to participate (students and lecturers).

As it is mentioned before, there are another environments and tools, which give possibility for joined work and collaboration in the classrooms and auditorium. These possibilities have a decisions in the interactive learning sphere, in which are integrated open code web-conference systems to the e-learning systems (for example BigBlueButton [10]), as well as above described tool for joint sessions and content sharing on IWB including and remote users – eBeam Meeting Sharings. Similar instruments possess other IWB and interactive projectors. Especially for the needs of teaching there are exist software decisions for teaching process monitoring and control (for example HP Classroom Manager), which work with thin clients over the Windows platforms (Windows MultiPoint Server), which give possibility for monitor, organization and interaction between the lecturer and students [11, 14]. The last ones give possibility of integration with IWB, but affinity of the new generation to the tablets, laptops and smartphones is a serious reason for the including of the mobile devices as technical means of education, which assure possibility of distant access to resources and collaboration in the classrooms and auditoriums.

The computer screen content students can share with the lecturers and colleagues also by using some widespread programs such as Skype and i.e. or by applications for remote access, although their use in the groups and for needs of the learning isn't very appropriate and widespread variant.

EVALUATION OF THE WEB-BASED SYSTEM FOR COLLABORATION WITH REMOTE USERS

Some environments for sharing and collaboration are mentioned/ examined in the point 2. All of them have advantages and disadvantages that might be removed in the near future.

The web-based environment eBeam Connect is used in some of the courses in FTT. An inquiry about the student's opinion on the use of the web-based environment, allowing simultaneous work on virtual / real IWB of remote users, been conducted. On a multiple answer question the students defined the environment mainly as a convenient for work (60,24 %), interesting (57,83 %) and "motivating and challenging" (39,76 %) [7].

Analysing student's regard to these environments, taking into account the age group, it is found that students born after 1991 do not face difficulty working in a web environment and thus the largest share (35,78 %) of answers is "Convenient and fast." In this case the convenience is associated with the possibility to share IWB's content on their mobile devices (tablets, phones, smartphones) and to work on a specific task under the supervision of the lecturer, even being outside the auditorium. The students born before 1991 have indicated with the greatest frequency the response - "interesting" (41,46 %).

This confirms the positive attitude of students to interactive learning with the eBeam web-based system. The IPS opportunities for sharing content and collaboration on real or virtual whiteboard are evaluated by the students as convenient, interesting and motivating as well as a tool for an easy and quick work on a specific task under the supervision of the lecturer, regardless of the geographical location of the session participants.

CONCLUSIONS

Web-based systems for sharing and collaboration, give possibility for the students to participate in the learning process and to solve problems under a real time supervision and control of the lecturer by their mobile devices (tablets and smartphones). An examined web-based system gives a possibility for participating of remote users, outside the auditorium and makes possibility for team work, using interactive teaching methods for real time interaction and support by the lecturer. The work of these systems in the IWB-browser regime increase their possibility by adding advantages an IWB like a basic element in the classrooms and auditorium of 21-th century, which is visible by all students, and to which could be integrated other digital devices.

The work of the lecturer upon the IWB by stylus or finger, by analogy with student's actions on the touch screen of their phone or the tablet, approach a lecturer to his students, increase his prestige and make lessons more attractive and informative.

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