"Internet Tool for International Biomedical Engineering Education"

Asta Kybartaite (*Neuroscience Institute, Lithuanian University of Health Sciences, Lithuania*),
Jaakko Malmivuo (*Prof. Emeritus, Tampere University of Technology, Department of Biomedical Engineering, Finland*).

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I. INTRODUCTION

The Internet has been widely used as a powerful tool in education [1]. It gives the possibility to deliver teaching and learning material widely all over the world without the need for students or teachers to travel and be present at the same location. For this we have developed a free access e-learning portal European Virtual Campus for Biomedical Engineering (EVICAB) [2].

II. MATERIALS AND METHODS

A. Portal

EVICAB offers high-quality video lectures including associated lecture slides and additional teaching materials, e.g., textbooks, exercises and laboratory works. The video lectures, recorded during on-site lecturing, are provided in various formats: files for a computer screen in a flash format implemented as web pages, downloadable files for iPods, and for mobile phones [3]. Detailed instructions about the courses and introductions of the teachers are also available.

Educational institutes outside the EVICAB community may also propose courses to be included to the portal. Other educational institutions are encouraged to take EVICAB courses to their curriculum. Their students may attend an examination and so earn credits for the studies.

The portal also includes a large number of publications concerning e-learning in general. EVICAB portal may be used free of charge.

B. Internet Examination

The EVICAB has been extended to offer the examination service. By using the EVICAB portal the students may participate in the examination at their home university or anywhere in the world, ensuring that controlled circumstances are provided, Fig.1.

Since the examination is offered via the Internet, the students have all the material available from the Internet. This creates certain requirements for the style of the questions. Typically, the questions shall not ask "What is …" but instead "Why is ..,", "Which one is better and why ..," "Design a system which …".

III. RESULTS

The Internet examination serves the students who made their studies online with the aid of the EVICAB portal and also students who attended on-site lectures. The students seem to appreciate this kind of examination because it better reflects the situation as in the real working environment. Also this form of examination allows better to evaluate the students' ability to understand the issues in the course rather than remembering small details, and it makes it possible for the students to take the examination at their home university so there is no need to travel to the university, which has provided the course.

The teachers and assistants found the advantage that there is no need to be in the exam location during the examination but all the administration of it may be performed from any location in the world where the Internet connection is available. The teacher may store the students' answers from the e-mail attachments and print them out after the examination. All the documentation from the examination may be easily archived to the computer.

In addition to advantages the Internet examination offers several disadvantages, e.g., possibility for plagiarism, copying and pasting, collaboration via digital or mobile devices, incorrect attendance information, and exceeding deadline for submitting the examination forms. These issues should be carefully considered by the teachers, examiners, supervisors and following consequences well explained to the students.
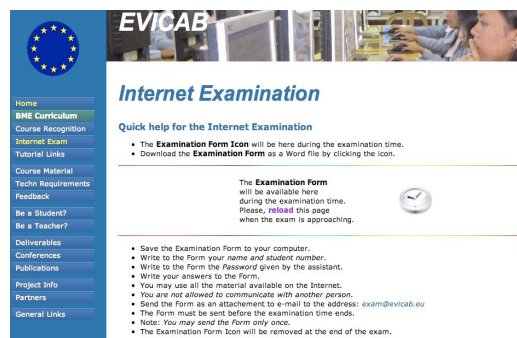

Fig. 1. The screenshot of the Internet examination on the web page.

IV. CONCLUSIONS

The Internet has completely changed the process of knowledge construction. It diminished barriers for knowledge distribution and acquisition. Anyone at any time from any place in the word is able to access the virtual campus.

Thus, implementation and application of education via the Internet requires additional efforts from the students, teachers, educational institutions and virtual education developers, e.g., at least: the students should have confidence in using information communication technologies, the teachers - be able to produce pedagogically sound virtual course materials, the educational institutions - provide computers with the Internet connection and ensure their proper functioning during the learning process, and the developers - understand how these issues are solved in different international environments in order to provide the optimal solutions. Therefore these issues will continuously be analyzed during the implementation and application of EVICAB.

V. REFERENCES

[1] M. Limayem, and C.M.K. Cheung, "Predicting the continued use of Internet-based learning technologies: the role of habit", *Behaviour & Information Technology*, 2010, Vol. 30(1), pp. 91–99.

[2] J. Malmivuo, "European virtual campus for biomedical engineering. *EVICAB*." Available at: www.evicab.eu. Accessed 20 April 2012.

[3] A. Kybartaite, J. Nousiainen, and J. Malmivuo, "Technologies and methods in virtual campus for improving learning process", *Computer Applications in Engineering Education*, 2010. doi:10.1002/cae.20460