

THE POSSIBILITIES FOR PROVIDING INTERACTIVE CONTENT IN NEW VERSIONS OF MOODLE (FROM 3.X +)

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Abstract

LMS Moodle is (in the last 15 years) a standard part of the learning process worldwide. Its advantage is the availability, relatively easy administration and configuration and the possibility of creating so-called modules of third parties. These modules allow us to program any part of this system according to the needs and requirements of users. In this paper, we focus on modules that are not a standard part of the system, but in the last 10 years of its existence have contributed significantly to the development of intellectual, psychomotor skills and abilities of students. Some of these modules were developed by various university departments for the needs of their students, or with through bidders and enthusiasts. In this paper we point to the possibilities and results that can be achieved using such modules in the educational process.

Keywords

LMS Moodle, interactivity, modules of third parties, interactive task.

Introduction

Currently, technological and information progress extends into all areas of life, otherwise it is not in education process. Impacts of development ICT began to create new, far more progressive methods of study. Although classical full-time study has indisputable qualities and is based on direct contact with students and teachers, over time it has proved more favorable to combine this approach with new forms of education that are now presented mainly through e-learning. Aim is to provide information most effectively and therefore is necessary to take particular attention to the students. Excellent example can be a learning process when the teacher takes full advantage provided of ICT. Where teacher used in the interpretation the animations, images, or videos we can also watch the difference in activities of students and compare these results with the results of classical form of education process. Just interactivity that is provided in the environment of e-learning can motivate students and help them better understand the given issue.

The notion that learning is not simply a process of information transmission, but that students have to become actively engaged for deep learning to occur, is certainly not new (e.g., Mayer, 2001; Renkl & Atkinson, 2007). Interactive learning environments are viewed as a promising option not merely for presenting information but for allowing the learner to engage actively in the learning process (Renkl & Atkinson, 2007). Interactivity in learning is a necessary and fundamental mechanism for knowledge acquisition and the development of both cognitive and physical skills (Barker, 1994 as cited in Sims, 1996).

Since the introduction of computers as educational tools, interactivity has been heralded by many as the one feature of this technology that holds the strongest promise for educational use. (Hannafin and Peck, 1998). Interactivity makes it easy for students to revisit specific parts of the environments to explore them more fully, to test ideas, and to receive feedback.

Noninteractive environments, like linear videotapes, are much less effective for creating contexts that students can explore and re-examine both individually and collaboratively (Bransford, Brown, & Cocking, 1999, p. 209). In these and many similar claims, interactivity is presented as an attribute of learning environments that enhances the quality of educational materials and that can facilitate learning.

It is highly likely that the education in the form of e-learning will continue to lead to the increasing of interactivity. Considering that the important part of education is also a test of student's knowledge, we think that is right decision ensure the highest interactivity in this area.

Methodology

Professionals in pedagogy and psychology have been dealing with the issue of employing interactive media elements within the framework of educational process for the development of students' cognitive and intellectual capacities for a rather long time.

The importance of interactivity increased mainly after the implementation of an e-learning support of education, as its standard complement designed not only for the development of knowledge, but also students' skills.

Interactive learning environments are viewed as a promising option not merely for presenting information but for allowing the learner to engage actively in the learning process (Renkl, Atkinson, 2007).

Among the benefits of virtual environment belongs first of all an opportunity to:

- employ elements of interactivity based on implemented interactive media elements (interactive animations, video, etc.), eventually interactive tests representing conceptual task designed for the development of psychomotor skills and abilities,
- manage his/her own course of study from the point of view of the student,
- increase motivation within the study and influence the results of learning using suitably selected methods and procedures,
- simulate conditions of the real world thus inducing situations allowing for deeper comprehension of the given problem,
- create an instant feedback,
- provide autonomy in decision making,
- verify, from the point of view of the student, various variants of solution to the given problem without a sense of threat.

Interactivity, which may dispose animations implementing in the virtual educations system, is not a characteristic the system itself, but is a result of the interaction with didactics target (Figure 1).

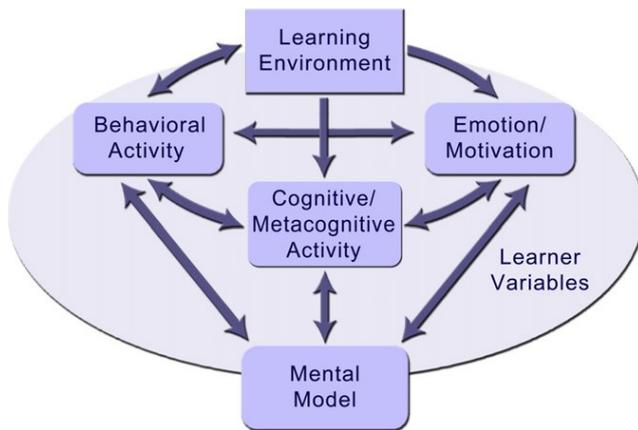


Fig. 1: Interactivity in multimedia learning – An integrated model (Domagk, 2010)

First Module - FlashQuestion

Since the end of 2009 in the Department of Informatics, Faculty of Natural Sciences (Constantine the Philosopher University in Nitra) been created or partially modified modules, which are designed to develop intellectual and cognitive abilities of students. One of the first module was modified module FlashQuestion. This module was introduced 09.07.2009 in the community that is associated to moodle.org. This module introduced russian teacher, moodle expert and chief programmer of Novosibirsk State Pedagogical University of Russia - Dmitry Pupinin. The module allows you to create interactive tests (basis is a simple flash application). The module extends the standard types of tasks implemented in a test of a completely new type of task called Flash-Movie. From the year 2015 we modified this module so, that can be embedded also HTML5 or PHP file. These files can be created as an interactive and subsequently implemented in Moodle using this module. When using the module results are automatically displayed in the final report.

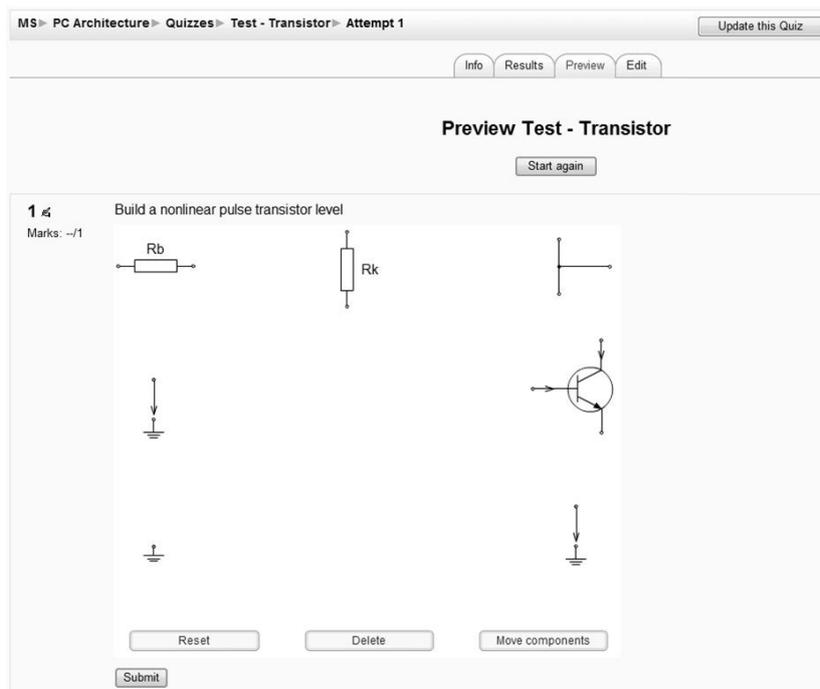


Fig. 2: The example of interactive task

Created test tasks do not include only one specific type of activity. It may contain a number of smaller tasks. If the student solves the task, the system shall assign a specific point gain. The extents, form, design and functionality created test tasks essentially depends on the imagination of the designer and his programming skills. With this type of test tasks is possible in LMS Moodle operate just as with any other type of task in LMS Moodle. Evaluation of the accuracy of the tasks, whether partial or total, takes place directly in the actual test tasks. With using module FlashQuestion is value transmitted and recorded it to the database LMS Moodle.

The module was by us gradually modified (from the version LMS Moodle 1.9 and higher) for the purpose of studying and now for Moodle version 3.XX (and higher) allows you not only to create interactive tests, but also adaptively adjust course material for conditions of students currently under evaluation obtained from tests developed. A detailed description of how the module was modified is described in the following conference papers (Magdin and Turčáni - Implementation of Interactive Animations in E-learning Courses and Their Possible Use as an Interactive Type of Question in LMS Moodle; Magdin, Turčáni and Balogh - Modelling the Transition of a Student Through an E-Learning Course Based on His Previous Activities; Cápaj, Magdin and Mesárošová - Enhancement of e-Testing Possibilities With the Elements of Interactivity Reflecting the Students' Attitude to Electronic Testing).

Gradually, as the module has been modified, from the academic year 2009-2011 we conducted a series of experiments. Use these experiments we assessed the quality and method of teaching of innovative learning materials.

The aim of the first experiment was to find out the assessment of our method of teaching using innovated study materials, into which interactive animations were implemented, by the students using the e-learning course Architecture of Computers. We also tried to identify the problem items in the evaluation of the method of instruction and innovated study material. In order to assess the quality and method of teaching using the questionnaire correctly, we had to expressly define the activity of the students from the point of view of implementation and utilization of interactive animations in the e-learning course Architecture of Computers. Using this procedure we reached elimination of those items, which were irrelevant for the assessment, i.e. those, which were evaluated by the students in spite of the fact that they did not work with the given interactive animation in the course.

Experiment was carried out always in the summer term of the academic year 2009/2010 (reference group) and 2010/2011 (experimental group). At the end of the accomplished experiment students were asked to fill in the questionnaire and add some comments on what was missing or what was redundant in it.

Individual items in the questionnaire characterizing the method of instruction and interactive animations implemented into the e-learning course Architecture of Computers should have been assessed by the scale ranging from 1 to 9, where 1 meant "I fully disagree" and 9 "I fully agree". The item 5 meant "I neither agree, nor disagree". Totally, 146 students aged 18 to 50 participated (73 in academic year 2009/2010 and 73 in 2010/2011. The original number of valid questionnaires was 78, however, 5 of them were filled in spite of the fact that the students did not use the interactive animations in their course.

Our intention was to find out based on the questionnaire, whether there were significant differences in the assessment of the implemented interactive animations and the method of instruction between the reference and experimental group in individual academic years. For the evaluation of answers (item P1-P11) from the respondents the methods of descriptive statistics as well as the analysis of variance for multiple measurements with more than two levels were used.

As to the scale value means, the largest differences were found between item 9 (wording: „To comprehend the contents of education solely this e-learning course would be sufficient“) and the remaining items.

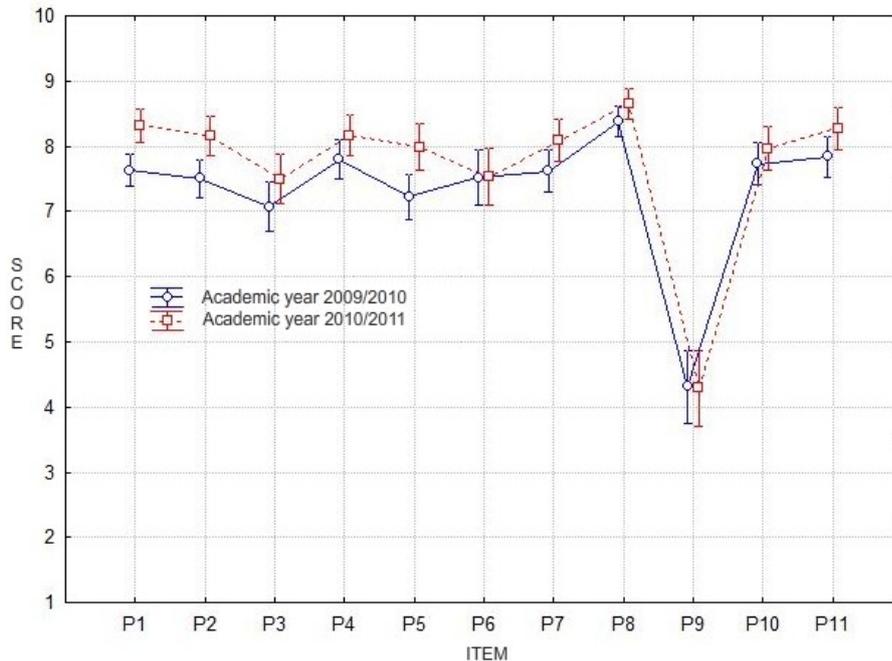


Fig. 3: Results of the experiment carried out in academic years 2009/2010 and 2010/2011

The results show that interactivity is an important and integral part of the learning system. Interactivity increases intellectual and cognitive abilities of students, but students also need feedback from the teacher. Teacher for them is certainty in communication and allows them explanations for irregularities occurring during the reading and understanding of the study material.

The second module – H5P

It is fact, that in today's digital world we increasingly need more hooks and catches to engage our students (and staff) with digital learning and despite the best efforts of many VLEs, the look, feel and layout of activities is not something most young people come rushing to use. However we can be often very frustrated with interactive content as either it is pre-designed and not quite right for the job and/or is beyond ours rather very limited programming knowledge. Interactive content creation sites are few and far to be found.

Therefore was created new module with a name H5P. This module created Svein-Tore Griff, Pål Jørgensen, Frode Petterson and Thomas Marstrander. H5P makes it easy to create interactive content by providing a range of content types for various needs, for example: games, multimedia, question or social media.

One of the great benefits with using H5P is that it gives you access to lots of different interactive content types.

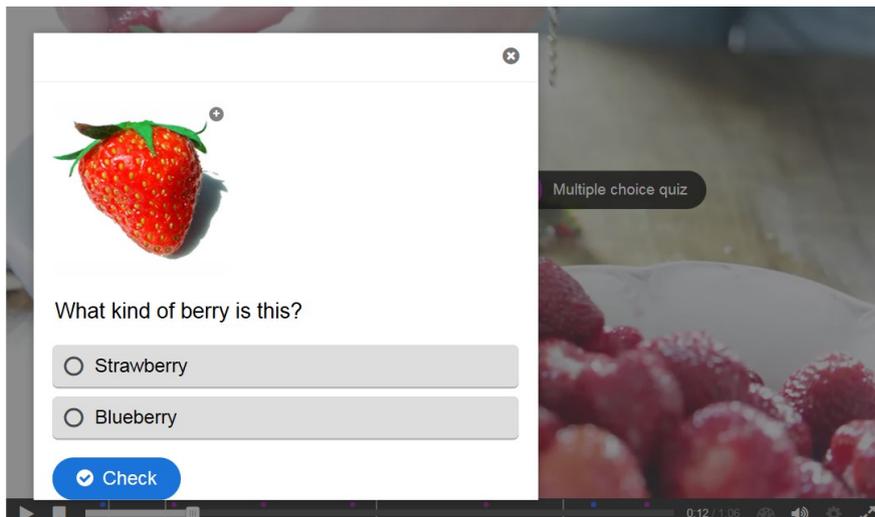


Fig. 4: Example of interactive video that we put in LMS Moodle

Another great benefit with H5P is that it allows you to easily share and reuse content. To reuse content, you just download the H5P you would like to edit and make your changes – e.g. translate to a new language or adjust it to a new situation.

H5P is:

- Open Source,
- Free to Use,
- HTML5,
- Responsive.

The H5P community is actively contributing to improve H5P. Updates and new features are continuously made available on the community portal H5P.org.

This module is perfect for beginners in LMS Moodle, because the Moodle feature is a little misleading only that the site has developed a plugin/integration with Moodle that allows data to be fed directly back to the gradebook.

Conclusion

Information technologies are explicitly or implicitly significant in all processes in our life. The development of ICT and their implementation in the educational process in the last decade, allows learners to acquire not only new knowledge and skills, but also the ability to customize the amount of study material and time to their needs.

We say that we live in a society in which ICT are becoming a driving force for its development. E-learning is obviously a part of this (Kostolányová, Šarmanová and Takács, 2011). E-learning has become an increasingly popular learning approach at universities due to the rapid growth of web-based technologies. E-learning implementation at universities is a long-lasting and complicated process. This process has to overcome a wide range of internal and external factors influencing e-learning effectiveness and content quality of learning (Drlik and Skalka, 2011).

A virtual study environment is a significant contribution to education and its role in the education industry is growing constantly [Milková, Slabý, 2006]. Basic requirements, which are imposed on LMS (Learning Management System) from the point of view of the needs of a teacher, are to present the contents of instruction, manage the instruction, communicate with students, motivate them to study, observe their progress and evaluate them [Balogh, Turcáni, 2011]. Implemented multimedia applications (Java applets) in LMS together with individual approaches within the didactic process substantially influence education. They give us an excellent chance how to support not only demonstrating and visualizing the explained subject matter to be much clearer and comprehensible, but also enable us to prepare such study material for students that optimizes their study habits [Milkova, 2008a]. Multimedia applications as java applets give us an excellent chance how to support not only demonstrating and visualizing the explained subject matter to be much clearer and comprehensible, but also enable us prepare various kinds of test for students. The feedback provided through tests helps students to recognize what they already knew and what they didn't know and need to improve [Milkova, 2008b].

The implementation and use of interactive media elements in implementing the teaching process with the support of e-learning is currently among the basic methods, to encourage interactivity with the learner's learning materials so that there was a autoactivity, the development of cognitive and intellectual abilities. The foundation of good interactivity is not only well prepared hypermedia structure, but also the content of individual chapters of the e-learning course. Because only if it is possible to exploit the full capabilities of a learner, so that even to his motivation.

Actual expansion of ICT (in many ways much faster than human perception) forces us to adapt to the rate of its development. Mentioned development affects almost all areas of our existence and activities (Koprda et al., 2009). Otherwise, it is not in the educational process. Teachers are all the time looking for different ways of increasing the quality of their teaching. At present, the use of computers and new technologies has become an important aspect of education (Klimová, Poulová, 2011).

In this paper, we pointed to the possibility of providing an interactive study material that was created by means of third party modules. These modules are actively used at our Department of Computer Science from the academic year 2009.

References

- BALOGH, Z. TURČÁNI, M. (2011). Possibilities of Modelling Web-Based Education Using IF THEN Rules and Fuzzy Petri Nets in LMS, *ICIEIS 2011*, Part I, CCIS 251, 2011, pp. 93–106.
- BARKER, P. (1994). *Designing interactive learning*. In T. de Jong, & L. Sarti (Eds.), *Design and production of multimedia and simulation-based learning material*. Dordrecht: Kluwer Academic Publishers.
- BRANSFORD, J. D., BROWN, A. L., & COCKING, R. R. (Eds.). (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- DOMAGK, S., SCHWARTZ, R., & PLASS, J.L. (2010). Interactivity in Multimedia Learning: An Integrated Model. *In Computers in Human Behavior*. Page 1024-1033
- DRLÍK, M., SKALKA, J. (2011). Virtual Faculty Development Using Top-down Implementation Strategy and Adapted EES Model, *Proceedings of the World Conference on Educational Technology Research*. East Univ, Nicosia, Cyprus, Paper presented at the Procedia - Social and Behavioral Sciences, 28, pp. 616-621.

- HANNAFIN, M. J., & PECK, K. L. (1988). *The design, development and evaluation of instructional software*. New York: MacMillan.
- KLIMOVÁ, B. F., POULOVÁ, P. *Tutor as an important E-learning support*. Paper presented at the Procedia Computer Science. 3. 2011. Page 1485-1489.
- KOPRDA, Š., BREČKA, P., MAROŠ, M. Project and realization of WIFI net. In: *Trends in education: Information Technologies and technical education*. Olomouc. Votobia. 2009. Page 301-304.. ISBN 978-80-7220-316-1.
- KOSTOLÁNYOVÁ, K., ŠARMANOVÁ, J. AND TAKÁCS, O. (2011) ‘Classification of Learning styles for Adaptive Education’, *New educational review*, vol. 23, no. 1, pp. 199-212.
- MAYER, R. E. (2001). *Multimedia learning*. Cambridge: Cambridge University Press.
- MILKOVÁ, E. (2008a). Multimedia applications and their benefit for teaching and learning at universities, *WSEAS Transactions on Information Science and Applications*, 2008a, 5(6), pp. 869-879
- MILKOVÁ, E. (2008b). *Optimization of students' study habits using on-line testing*, Paper presented at the WEBIST 2008 - 4th International Conference on Web Information Systems and Technologies, Proceedings, 2008b, 2, pp. 298-303.
- MILKOVÁ, E., SLABÝ, A. (2006). E-learning as a powerful support of education at universities, *Paper presented at the Proceedings of the International Conference on Information Technology Interfaces*, ITI, 2006, pp. 83-88.
- RENKL, A., & ATKINSON, R. K. (2007). *Interactive learning environments: Contemporary issues and trends*. An introduction to the Special Issue. *Educational Psychology Review*, 19, 235–238.
- SIMS, R. C. (1996). *Engagement, control and the learner: a theoretical appraisal of interactivity*. Paper presented at the ASCILITE 1996 conference of the Australasian Society for Computers in Learning in Tertiary Education, Adelaide, Australia,