LEARNING OBJECT-ORIENTED PROGRAMMING SUPPORTED WITH E-LEARNING

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Abstract
The modern age requires a modern school and modern teaching methods and forms. The implementation of information-communication technologies is also reflected in the change of ways and strategies of education, e-learning represents one of them. This article provide a view of teaching object-oriented programming with support for e-learning

Key words: *E-learning, object-oriented programming*

1   INTRODUCTION

E-learning (supported by internet-based computer technologies) has already been massively introduced in education institutions. However, it is necessary to say that this learning tool is not always used suitably or properly. But is still considered to be the most up-to-date way of learning. Distance learning form is said to be the key element in the learning process (e.g. in external studies, in language courses, etc.). In places where presence based learning form (full time study) is preferred e-learning is mostly used as a supporting learning tool.

2   E-LEARNING CHARACTERISTICS

In literature the term e-learning is used broadly but its content often differs in meaning. It has numerous definitions, some more detailed and some more brief. Based on *learningcircuits.org* e-learning includes learning processes such as web education, computer based learning, virtual classrooms and cooperation with digital information and communication technologies used. Learning is done with the use of internet (mostly), intranet / extranet or even conferences, etc. E-learning is however mostly used in distance learning form where presence form is cut to the minimum. Other names and expressions mostly used for E-learning before were:

- open distance learning,
- web based training,
- computer based training,
- technology based learning,
- on-line learning. (Nedeljaková 2006).

Learning Management software systems may significantly enhance quality of a teaching process in various educational institutions. Like many other modern applications and platforms serving larger groups of people, most analyzed systems use access via web. Thanks to this they can simply be set in various environments. At the same time with use of architecture of a client – a server (as in all web applications) students' tasks are separated from   the administration system and evaluation of students' work which teachers can do on server globally. For these tasks most LMS (Learning Management System) contain various supported tools for authentifications, confirmation, time   schedules and saving files on the server. Using unified system for the whole class or school means that many students may at the same time create a system in which both students and teachers may advise each other, share information and experience and thus create common content. Moreover, thanks to the accessibility to the educational system via internet students can be given their homework, too. (Nedeljaková 2006)

E-learning is carried out in the form of managed study of individual subjects (modules / courses) with on-line communication between a student and a teacher as well as among students themselves within one community. In this system each user has his own user's profile and own set up working environment. It only depends on the system administrator (e-learning applications) what extent of rights in categories he grants to the "student / verified user". Most Learning Management Systems contain in-built electronic communication tools (synchrone, asynchronous). Among the synchronne tools "chat" is perhaps the most worth mentioning because it runs in real time. The speed of response can be considered its biggest advantage when a student receives answers for questions practically immediately. Among the asynchronous communication the electronic mail (email) and discussion groups belong to the most frequently used tools. Further, the communication process can be used in improving course materials. It must be said that as in the classical communication users keep certain rules and polices which both sides must follow. Moreover, the main nature of these applications is to provide with possibility of sharing text, visual and audio information (knowledge) practically in real time. Thanks to this the room for use of various forms of teaching materials, from texts through animation and audio records to video records and multimedia interactive applications or wiki is made.

Use of tools and methods of e-learning enables teachers to integrate their lectures, seminars, preparation of study literature and testing into one interconnected complex unit. Knowledge in one subject may be provided to a significantly larger group of students and a teacher may immediately react to the need of innovation and changes within the subject. Teaching preparation as well as a part of own teaching, students' assessment, etc. is not bound to a specific time, the teacher may create preparation materials for e-learning and check advance and results of students whenever he wants. E-learning also brings a change of teacher's position which now may get closer to a role of an advisor or a tutor who manages and orientates the student in acquiring and selecting accessible information.

Use of internet in education brings many advantages. First of all it is an extremely fast and effective form of communication which gives room for use of other forms of learning materials such as:

- text files,
- cartoon pictures,
- photographs,
- animations,
- audio files (accompanying text, music),
- video sequences.

All materials must be prepared in regard of the way of work with education modules. Use of tools and e-learning methods enables students:

- individually choose time and extent of their learning,
- access to broad sources of information,
- students may choose such source that is close to them in regard of methods, forms, language, levels and so on,
- to understand a topic in wider context with connection to related areas, practical applications, wide consultation opportunities and exchange of experience in groups among students and teachers, etc. (Kopecký & Nedeljaková &Václavková 2011)

In wider sense the study materials mean all study and information sources which are specifically prepared and used in the electronic form of education. Main study material (or study material in narrower sense of the word) are distance texts whose creation is one of the most important stages of the subject preparation. (Nedeljaková 2006)

## 3   EXPERIENCE WITH E-LEARNING IN TEACHING OBJECT-ORIENTED PROGRAMMING

E-education is applied not only in teaching humanities but in teaching programming and programming techniques, as well.

At Faculty of Management Science and Informatics, University of Žilina in Žilina we teach students OOP (Object-Oriented Programming) basics in Java in the first year of the full time bachelor study programme of Informatics and in the full time and external bachelor study programme of Management. In most cases students of Management study programme (full time and external study done through presence based learning form) have great difficulties in understanding principles of object-oriented theory and principles of Java programming right at the very beginning of the semester. Based on students' feedback and several year teaching experience it can be said that the students need a different approach to learning. (Drozdová & Grondžák 2005)
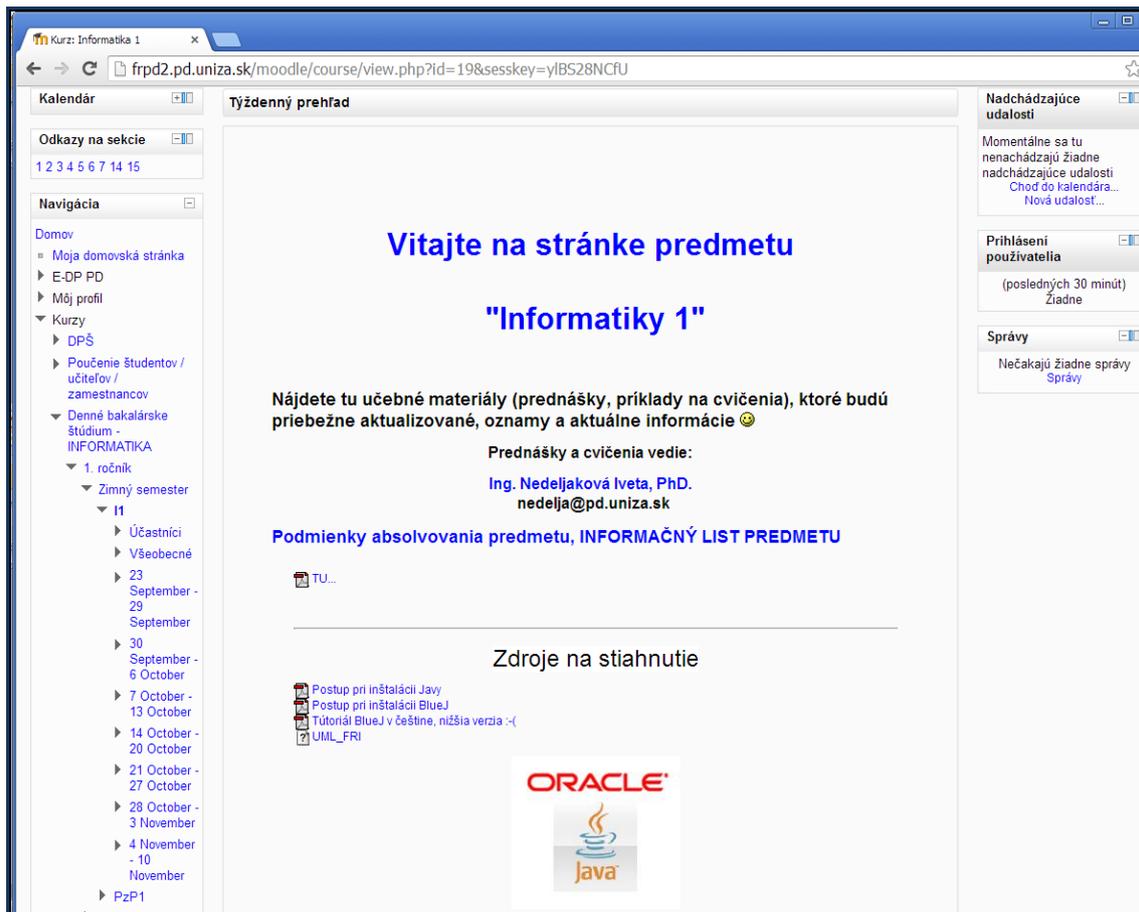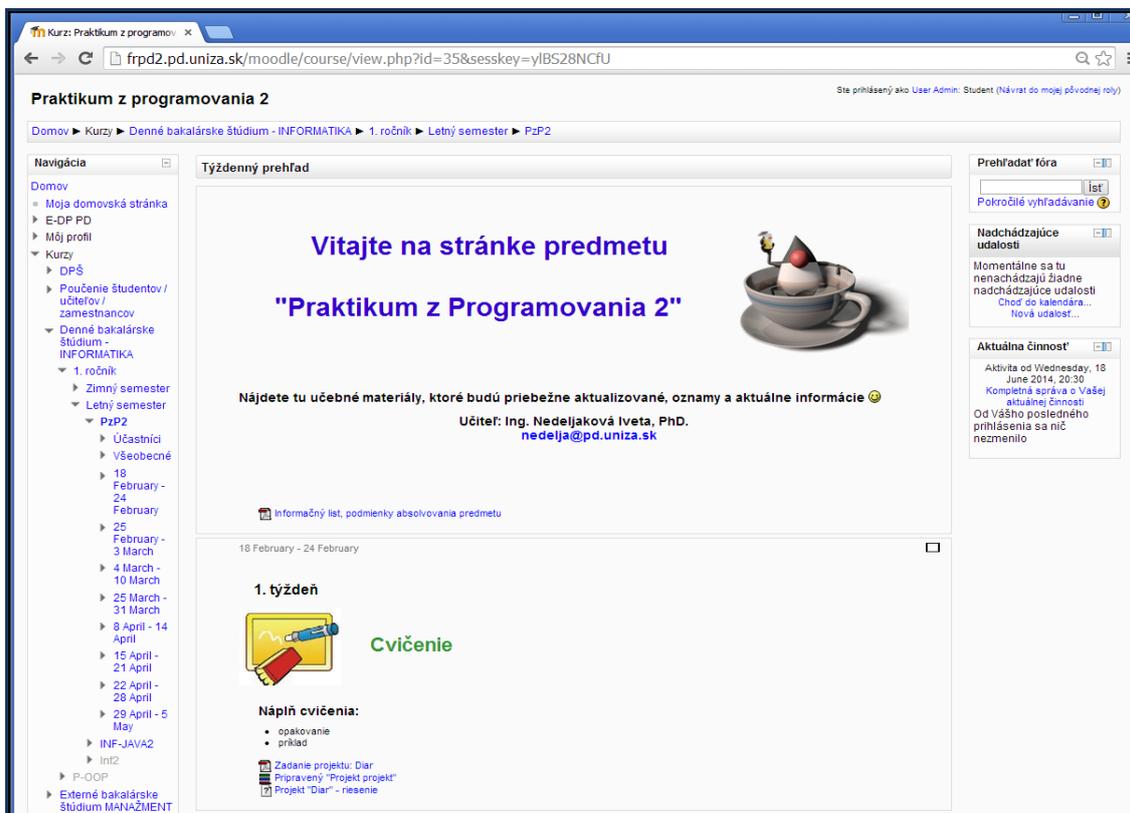

Picture 1: Sample of introduction page for the course Informatics 1 made in LMS Moodle environment.

In making new teaching materials the less complicated explanations supported with examples, pictures or possibly some instructions for exercises must be used. It is important not to forget to motivate and activate students throughout the whole semester.
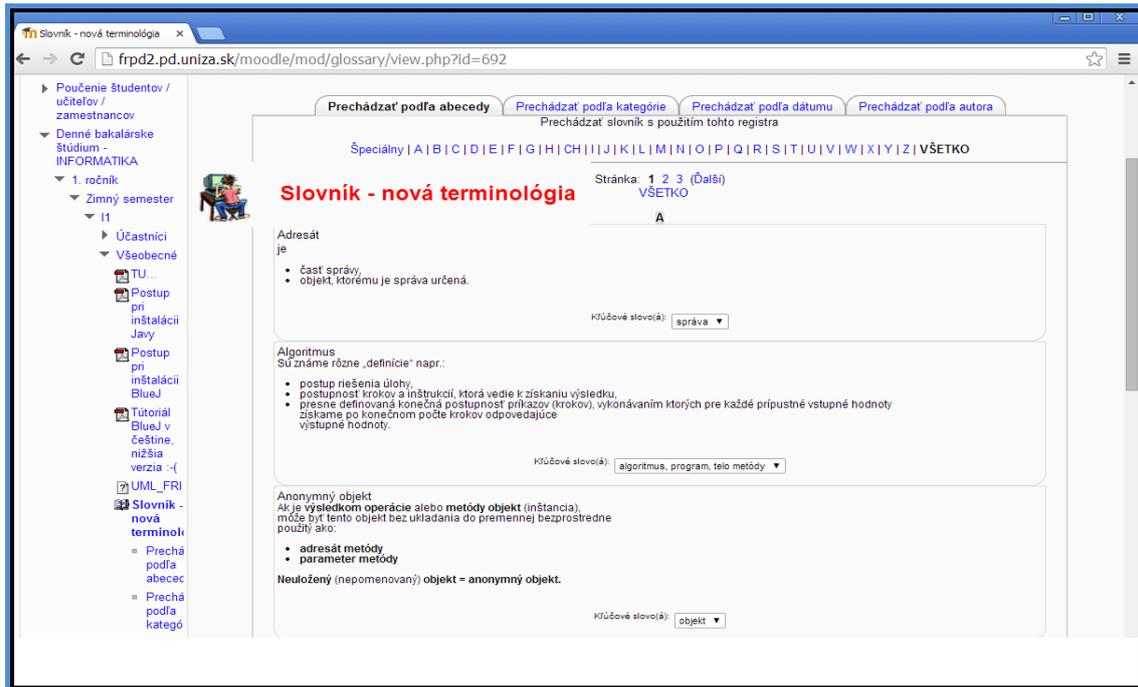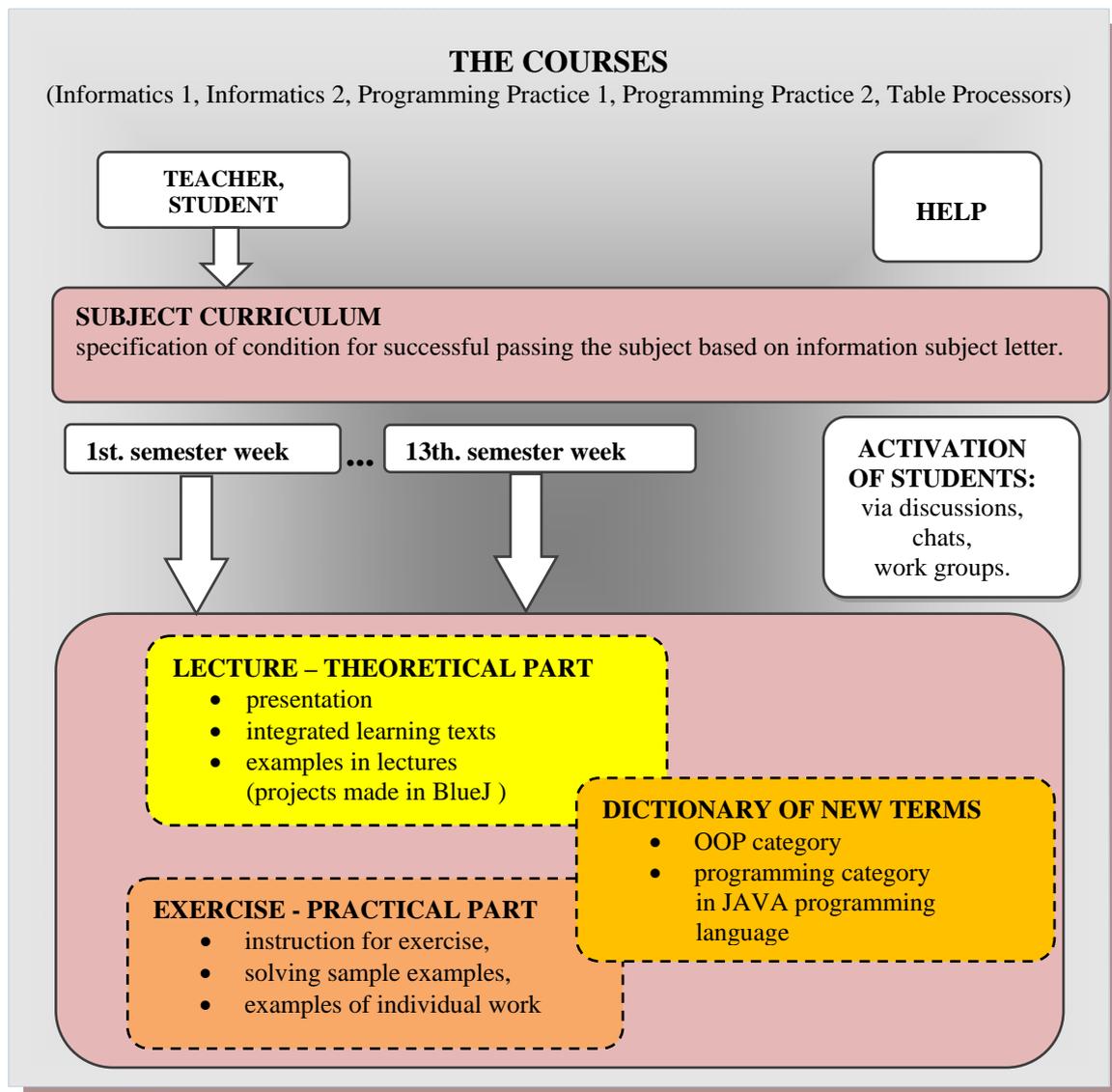
Picture 2: Sample of introduction page for the course Informatics 1 made in LMS Moodle environment.

Picture 3: Sample of introduction page for the course Programming Practice 2 made in LMS Moodle environment.

Solving theses problems from the teacher's and student's point of view was provided by LMS (Learning Management System) Moodle (Modular Object-Oriented Dynamic Learning Environment, source Moodle.sk) which has been available at our university for several years now (at our detached department of Faculty of Management Science and Informatics in Prievidza as a support to teaching the external bachelor study programme of Management, the full time bachelor study programme of Informatics, life-long education at the branch of University of the Third Age, see the Picture 1, Picture 2, Picture 3).

THE COURSES
(Informatics 1, Informatics 2, Programming Practice 1, Programming Practice 2, Table Processors)

TEACHER, STUDENT

HELP

SUBJECT CURRICULUM
specification of condition for successful passing the subject based on information subject letter.

1st. semester week ... **13th. semester week**

ACTIVATION OF STUDENTS:
via discussions, chats, work groups.

LECTURE – THEORETICAL PART
- presentation
- integrated learning texts
- examples in lectures (projects made in BlueJ)

DICTIONARY OF NEW TERMS
- OOP category
- programming category in JAVA programming language

EXERCISE - PRACTICAL PART
- instruction for exercise,
- solving sample examples,
- examples of individual work

Picture 4: Graphic image of proposed subject pattern prepared in LMS Moodle environment.

After analysis of already mentioned needs and expectations it was necessary to propose such subject structure in Moodle system which would enable to logically split up the publicized study materials, propose motivation tools for students, propose a form of communication between a student and a teacher and get their feedback (Picture 4.). The feedback in the system provides:

- possibility of monitoring students' knowledge by a teacher (preliminary checking of students e.g. how they work with study materials, saving work history in the system for each student who has signed up for the subject),

- checking knowledge (via tests, tasks, and assignments),

- display of results to students (e.g. set up feedback after testing a student informs of not only points acquired but of mistakes in test and correct answers, as well).

Currently we use the LMS Moodle 2.2.2+. Based on several years' experience with the use of e-learning in the daily form learning courses focused on teaching programming courses, we can say that this support of teaching has not benefits only but also some limitations, simply "nothing is perfect". Both teachers and students are to decide which form of learning (self-study) to prefer. The understanding that continuous education is necessary is essential for success; and it applies for e-learning even more

4   CONCLUSION

E-learning provides many opportunities to improve teaching and communication among a teacher and a student or among students themselves. After simple installation, the Moodle system directly offers creation of courses which may be used widely in elementary schools where thanks to this such system of electronic education may be applied. Use of week timetable with individual topics is advantageous for most schools. Sources are made inside them in which you also can place, apart from classical texts and pictures, various multimedia elements or links to them. This way the current level of teaching may be improved and more difficult topics may be explained more clearly. Using one of the evaluation method such as a questionnaire, forum or survey it can be found out what students think of the subject and what they would do to improve it and their answers could adjust education closer to their expectations.

Properly proposed teaching materials make the whole process of teaching more efficient. These materials should be clear, brief, with easily comprehensive content and should motivate. Consultation between a teacher and a student can be done electronically. There may be a time lag between asking a question and receiving a response. It is necessary to stress out that written communication may sometimes cause wrong understanding of the topic being discussed. Therefore, it is necessary that a course teacher or a lecturer think of all these facts when proposing a distance text already in the stage of its preparation.

Based on acquired information on use of e-learning in real life and based on assessment of own experience we may say that this form of learning has, along with indisputable advantages, some restrictions, too. Just like in presence based learning quality depends on a level of lectures and exercises, the quality of e-learning depends mainly on study materials the student is using. If we want to offer a student quality education we must pay close and enough attention to processing distances texts. Form of writing a text is also important aspect influencing quality of study material. Size and thickness of letters, changing various fonts, suitable spacing between lines, placing tables and graphs, various icons, features, and so on   play significant role in it.

A computer did not remove books from our lives and so e-learning cannot replace schools commonly based on direct interaction of a teacher ↔ a student, either. Prepared combination of contact education and electronic education however may make studying easier, more attractive and adjust it to the time we currently live in.

5   REFERENCES

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