

## NEW POSSIBILITIES OF EDUCATION – THE ADAPTIVE ELEARNING ENVIRONMENT

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**Abstract:** The basic idea of the adaptive eLearning development is to respect and support different learning styles of students who can be thus offered a more effective, more-user friendly teaching environment of better quality. This contribution outlines existing situation in the area of the Learning Management System – LMS) and its potential future implementation with regards to the system adaptability in terms of students and the author of the course.

**Key words:** eLearning, LMS, learning styles, study materials, multimedia

### 1. Introduction

Those who currently look for the eLearning word understand for sure that they search for information about the new form of education recently experiencing its boom. The reason is time, quick changes and the necessity of long-life education.

eLearning in a broad sense means the process. It describes and solves the development, distribution and management of teaching including feed-back on the basis of electronic courses (e-courses). Those applications cover simulations, multi-media lessons (combination of text interpretation with animation graphics, charts, audio files, video sequences and electronic texts). It is said that each student can select a form of education which suit them best. At the moment, usually the selection between full-time and combined form of study is meant by that. Let us raise that idea and aim at the method and form by which content of study is presented to students. Are today's courses adaptable for various types of students?

Frequently conducted evaluations and investigations show that the defined passage through the course as such does not need to be suitable for each individual. It would be easy to object – let the student choose a different form of study

We will dive into a routine e-course in detail. Many conferences, seminars and workshops focused on the e-learning area offer a large quantity of courses in various quality. They differ in terms of the level of application of multi-media features, processing of the teaching text and the way of feed-back including the forms of keeping communication. They have one common feature – the courses are offered to students in a single compact form of precisely passage through the course. Frequently conducted evaluations and investigations show that the defined passage through the course as such

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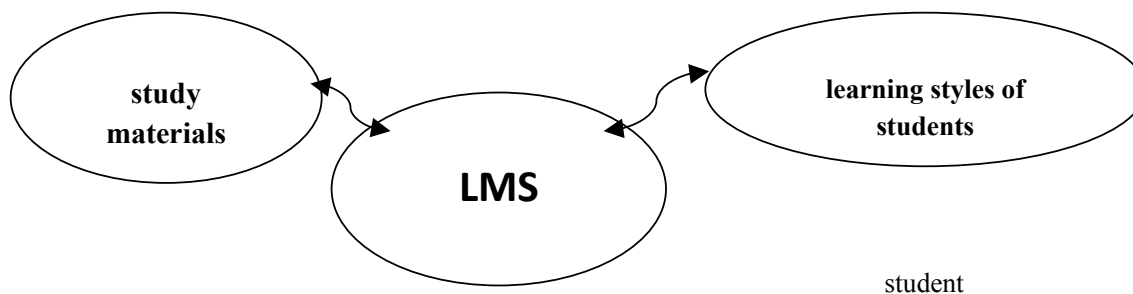
## 2. LMS environment insight

The e-learning course development is closely linked with the use of environment for management of administrative and organizational aspect of running courses, with so called Learning Management System (LMS). The following LMS functions are considered to be the common ones:

- register and administration of students
- register and administration of teaching courses
- catalogue of teaching objects and courses
- register of student evaluation
- testing and re-testing of students
- database of teaching content
- author tools
- communication tools, etc.

In future, the newly developed LMS should consider besides stated functions learning styles of students while modeling the passage through the course for students to respect the learning style of a particular student. The adaptive LMS system developed as such will further consider influence of various psychological and pedagogical aspects (described by characteristics) and on their basis the passage through the course can be later controlled.

The chart below illustrates the situation – we will gradually describe the area of students and study materials:



Picture 1.

The adaptive system will be the one monitoring behaviour and characteristics of the specific user. For the system to be able to respect diversity of users, it cannot be anonymous. Data about students will be collected in several phases. The most important parts involve self-assessment of students, i.e. testing prior joining the course (test results are included to statistically determined parameters), followed by testing the student during the study of the course (testing will be included to dynamically determined

parameters – characteristics which change and are decisive for modification of the proposed passage through the course).

### 3. Student and their learning styles

Static characteristics of a particular student are most frequently obtained at input testing using various tests and self-testing. Based on determined characteristics the learning style is specified to which the student inclines. The topic of learning styles has been elaborated by many authors and described of various aspects. In our country the issue of learning styles has been developed by Mareš (1994), who defines learning as ... „a peculiar procedure of learning by its structure, sequence, quality and flexibility of application) having a nature of meta-strategy of learning. That issue was continued by Solárová (2000), who investigated learning styles of students at grammar schools. According to her research the grammar school students can be allocated to some of the following styles based on certain predominant characteristics: in depth, inter-style and superficial style. The style which predominates in the student is usually preferred and the student inclines to it in the course of study.

The optimum method of teaching requires complementing the static characteristics obtained from students at the beginning of study with dynamic characteristics which can be divided according to several areas. Information obtained regularly in the course of study is the one closest to the characteristics of the student, e.g. obtained via testing. Frequency of testing can vary – following completion of a chapter, studied topic, regular time period, etc. Such testing will provide us with a set of information about passing/failure of the content of study, information about popularity of the proposed method of study by users, etc. Those complementing information are used for modification of the proposed method of passage through the particular course so that the study path is optimum for the student. For example, students will be offered explanation or practicing the topic via different method than proposed originally. Next extending criteria which can influence the learning style and thus the optimum method of study involve various psychological aspects. We will focus on them, later.

### 4. Study materials

Study materials are on the opposite side of the management system. Where does the philosophy of study materials for the proposed adaptive system originate from? Study topics (for a particular subject) are described via so called terms. By such identification we can imagine a topic, or chapter. Each term is described with so called metadata, involving name, teaching area, to which it belongs, the level of difficulty (according to complexity and detailed explanation), to which multimedia type of processing it belongs, and so on. Moreover, it suggests that each term will occur in the databank of study materials in several options (it describes the same topic, but with various means)). The basic levels of the term encounter:

- level of sensual perception (audio, video, animation, text, ...)
- level of complexity, detailed presentation of the content of study
- method of presentation (teaching style).

The work of the originator of study materials is quite demanding in terms of time, as each term must be developed in several indicated options, described by metadata and stored in a database. The database will include individual teaching objects available following selection of the optimum method of passage through the course.

## 5. Interlink of both sides

On the „student“ side the categorization of most frequently occurring learning styles is established including their description according to obtained characteristics. On the opposite side of „study materials“ database of terms and the modeled option of the passage through the course exist for the tipped learning styles (for those occurring most frequently).

Based on the characteristics of the student the first step involves static characteristics which suggest their dominant learning style. At this stage, their initial knowledge, skills and abilities are known. Then, the student is offered a modeled passage through the course. The student starts to study according to the plan being tested as required – their dynamic characteristics are added and compared with the initial condition. In ideal case the student will complete the course with primarily proposed method. In real situation the proposed method must be modified in the course of study and adapted to the actual condition.

## 6. Conclusion

Next step in the development of the adaptive management system will require the establishment of the algorithm of searching for the optimum passage through the course while taking into consideration initial information about the student, dynamically changing conditions in the course of study and finally, involvement of psychological aspects, as well.

In future, quality of offered courses and study programs will depend not only on adherence to formal issues and standards, but mainly on the system adaptability and student requirements. The aim will be to consider the student requirements so that they can select the method of study which will be user-friendly and optimum in terms of individual needs of learning.

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