

E-EDUCATION IN ACADEMIC ENVIRONMENT

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Abstract

This paper discusses major features of e-learning systems used by higher education institutions. Short historical overview provides the necessary perspectives and introduces the subjects of distance learning and e-learning. Major system features are further analyzed and concepts of content personalization and system standardization are given as technical constructs. Elements of further possibilities are displayed at the conclusion of this paper.

Keywords: *e-learning; educational process; learning objects.*

JEL Classification: A2

Introduction

The main difference between the classical educational process and any method of distance learning is that in classical education, usually the teacher and the student share a close space, and the totality of pedagogical and supportive educational



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activities occur synchronously. Therefore, distance education has two basic problems: overcoming student and teacher physical distances, as well as solving process synchronicity issues.

Academic practice has long known the concept of distance education. Practically from antiquity we witness different models of overcoming the physical distance between students and teachers, as well as finding different models of solving the problem of synchronicity of the educational process. Since 1960, the telecommunication systems in education have been developing rapidly and have been used as an absolute advantage over the communication links of the learning participants so far. Particularly important is the fact that, in 1960, the Open University in the United Kingdom was founded; today it is the largest institution of higher education providing distance education [Dedic *et al.*, 2011]. The term e-education, nowadays established, therefore represents a more detailed definition of the term distance education, in terms of the clear technological basis used.

Basic Features of E-Education Systems in an Academic Environment

The development of information and communication technology (ICT) has enabled the development of global e-learning systems. Such systems meet the requirements of all anticipated participants and actors in the educational process and provide access from anywhere in the world (using the Internet). Advantages are ease of use, unlimited possibility of repeated use of individual teaching aids, as well as the choice of time and dynamics of learning [Dedic, 2012].

A significant number of distance education institutions appear in Balkans countries [Dedic *et al.*, 2011], almost exclusively through the Internet, and this paper can therefore be considered as a significant potential contribution to the development of technology-supported education in our countries.

One of the goals of education is to provide adequate and applicable knowledge useful for each individual, but also for society and the community as a whole. Education is everyone's right and should not neglect and preclude the inclusion of any specific potentially handicapped group or individuals, be it a physical or health restriction or regular work and other obstacles that make it impossible to attend a traditional school in an average case [Phipps & Mersotis, 1999].

Despite all the technical and methodological constraints that information technologies (IT) place before the realization of the teaching process using the Internet, the choice of adequate teaching aids and prepared quality learning materials



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cannot only replace traditional teaching methods but also overcome them in some elements.

IT is increasingly influencing the way in which new generations are educated and brings with it, every day, new, bigger and bigger challenges to the traditional education system. At the same time, the use of IT in education is becoming a source of competitive advantage for the institution itself [Dedic *et al.*, 2011].

There are a number of challenges in the process of the immediate implementation of IT in education. They must be resolved in order to establish a systemic solution that fully implements IT in the educational process. Challenges may be different, more or less influential, but normally we meet the following: legislation, existing innovation habits and attitudes, teachers' prior knowledge, effective management decision-making, resistance to innovation, integration with the existing system, technology constraints, technical preconditions, security internal and external technical support, teacher training, internal and external promotional activities, motivation of all participants in the educational process for full contribution, security. [Dedic *et al.*, 2011; Allen *et al.*, 2002]

Electronic distance learning enables education to be delivered directly from home or from work through the Internet. Also, teaching and non-teaching staff participating in the educational process may perform activities when they are not present at the institution's headquarters. Some automated systems can be used for repetitive processes; they can be automated without, at the same time, requiring the presence or activity of a teacher.

Each distance learning system implemented in a university environment typically integrates the following building blocks:

- content creator module;
- learning management system;
- student testing module;
- systems administration.

Each of these modules is designed according to specific requirements and rules, and the modules communicate with each other according to defined protocols. It is noted that a large number of modules also represent a potential danger, since there is a problem of standardization of contents and associated technologies. The problem of standardizing the design of the mentioned modules and standardizing the ways of interaction between them is defined in two ways: first, as a classical problem of software engineering (application of some standard method of designing an



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information system); and second, as a problem of standardizing communication between the projected system and other similar systems in the environment.

Potential benefits of e-education in the context of higher education are understood from numerous research endeavours [Phipps & Mersotis, 1999; Dedic *et al.*, 2011; Allen *et al.*, 2002] and the very nature of the system as such.

This type of education has many potential advantages over classical education. Generally, the benefits can be viewed from the perspective of an educational institution and a student.

The advantages in terms of educational institutions:

- excursion of the University beyond national borders;
- accept a larger number of students, if allowed by regulations;
- expansion of the population of potential students;
- saving space, cost reductions, investment opportunities;
- reusage of the learning material;
- reducing the cost of execution, a large number of business processes;
- market differentiation from similar educational institutions;
- following the trends of developed countries – establishing high standards and criteria in education that classify the institution as a competitive partner in Europe and the world;
 - ease of use;
 - ease of conducting analyzes of educational success and efficiency;
 - role in connecting people, knowledge and information;
 - establishing and maintaining a unified knowledge base;
 - facilitating the advancement of a centralized knowledge base;
 - past records, data mining and analytics;
 - simplified evaluation processes of all elements of the system;
 - establishing better communication with students;
 - connecting and increased collaboration between all factors of the educational process;
 - saving and better organization of teaching staff time due to the opportunities that the principle of asynchronous communication brings with it;
 - more objective assessment and continuous insight into degree of progression and activity of students.

The advantages from the perspective of a student:



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- reduction of costs due to costs related to the stay in the place of study;
- the ability to choose schools outside the physical boundaries of the home country;
- possibility of working during the study regardless of the venue of the study;
- overcoming the impossibility of attending the traditional teaching because of some form of permanent or temporary physical problems, impairments or illnesses;
- independence from the teaching schedule and the ability to self-organize learning time (high motivation, time planning and ability to analyze and synthesize the learning content), etc.;
- easier scheduling of commitments and activities;
- insight into progress and activities throughout the learning process.

The actual exploitation of these benefits depends on the concrete realization of the e-education system as well as on the quality of interaction between the system and the educational institution.

The Problem of Standardization and Personalization of Content

A significant breakthrough in standardizing the design of building modules of distance learning systems, as well as standardizing ways of creating instructional content, testing and communication between modules, are the internationally accepted SCORM standard and the defined properties of teaching instruction through the learning object paradigm.

A *learning object* is a realization of an object-oriented teaching instruction paradigm. A learning object is a package of instructional instructions defined by its content, methods that can be applied to the object, and interfaces to the external environment. The learning object is different from the generic information object in its meaning in the context of learning.

In reality, during the implementation of a particular distance learning program, we face a twofold limitation:

- first, there is an infrastructure constraint that emerges from the quality of the telecommunications network in the environment of the distance learning system. This limitation is of a technical and technological nature and is only surpassed by significant financial investment in infrastructure. In other words, the infrastructural constraint is an exogenous influence on the distance learning process;
- second, educational content has its own hierarchy of complexity, which, again, stems from the educational goals set. The degree of complexity of educational



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content does exert an endogenous influence on the distance learning process, but it is not separable from the infrastructure constraint, which will inevitably eliminate some educational content from the process due to technological incompatibility. In this sense, one can also talk about limiting educational content [Dedic *et al.*, 2011].

The overall effect of these limitations is always embedded in a specific distance learning system and the system itself, therefore, is inseparable from its technological environment and the educational content on offer.

One of the well-known ideas of overcoming system-generated problems is known as the model of personalizing distance learning [Kuleto *et al.*, 2011]. Not without small pretensions, it can be said that the idea is in the wake of the ancient pedagogical doctrine of mastery learning, later transformed into the concept of mentoring, and the well-known ideal of fruitful interaction of a highly motivated student and the best possible teacher.

In the literature [Dedic *et al.*, 2011] we find that a student's personal characteristics that determine his / her learning preferences are defined as "learning styles". Numerous studies have righted the proponents of learning style theories, but not many studies have called into question such findings. In particular, voices of dissent and even resistance are heard from the community of neuroscientists and cognitive psychologists, who reject the idea of learning styles. The ambition of much contemporary research is to seek to define and theoretically shape a new set of student traits that can speak about his or her preferences in the field of learning, accepting the scientific knowledge in this area. Such a system that uses a set of student traits, with its ability to accurately measure traits for any particular student individual, also defines ways of preparing and presenting educational material. Such a system is called an adaptable personalized model of the distance learning system.

Checking the plausibility of similar models is often realized by checking the connection between personal traits found and preferences and how to prepare and present learning materials. This test is done in two ways: by checking the attitudes and grades of students towards an adapted personalized model, and by checking the objective achievement of students when actual teaching is performed on an adapted personalized model, and the results of which are tested by achievement tests.

Conclusions

Numerous specific e-learning system solutions are certainly desirable, from the perspective of increasing competition in the market for such solutions, and also from



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the perspective of the possibility of choosing an adequate solution in a particular institution. However, the problem of standardization, both content and the system itself, with the new problem of interoperability of multiple systems and integration into the information system of an educational institution, increase the already clearly emphasized importance of standardization at the institution level.

Content personalization, now very popular, has failed to answer some essential questions, first and foremost the question of the meaning of finding a set of relatively immutable student-individual traits, commonly known as learning styles. These questions remain open.

Efforts to design e-learning systems should also address some issues of broader societal importance, of which we highlight the cost-effectiveness of distance learning systems as a current issue of accreditation, especially of such innovative solutions.

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