

# THE LEARNING PROCESS MANAGEMENT IN THE E-LEARNING ENVIRONMENT IN THE TECHNOLOGY SCHOOL “ELECTRONIC SYSTEMS” ASSOCIATED WITH THE TECHNICAL UNIVERSITY OF SOFIA

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*The goal of this paper is to analyze the possibilities for learning process management in the e-learning environment of the Technology School "Electronic Systems"(TUES) associated with the Technical University of Sofia. The e-learning environment in the TUES has been used for several years. One of the basic modules of the recently used information system of TUES is the, e-learning system. In the paper interaction taking place between student, lecturer and content are described. The test results received from the system are proposed to be analyzed in two ways in order to help the lecturer taking management decisions for his own and for the students further learning activities. The planning of students' activities could be done for a student individually or for a whole group of students on base of their test results.*

**Keywords:** e-learning system, interactions, test results

## 1. INTRODUCTION

The goal of this paper is to analyze the possibilities for learning process management in the e-learning environment of the Technology School "Electronic Systems" associated with the Technical University of Sofia.

The modern education requires the usage of an e-learning system on a Web platform. The implementation of such system has a wide range of advantages for the educational process for the students and for the lecturers. The e-learning environment in the Technology School "Electronic Systems" has been used for several years and during this period of time the platform and the functionality as well have changed.

The recently used information system of TUES has the following basic modules – official part, categories of users- students, teachers and administrators, e-learning system and software and hardware resources [1].

The e-learning system is not being used to perform distance education in the Technology School "Electronic Systems". Its purpose is to support the face to face educational process and to improve its management. It has two sub modules – the student's module and the teacher's module.

The student's and the teacher's modules realize faculty and students communication, sending messages, information and curricula exchange, discussions forum, subject matter and course work. The student's module has been designed to assure the ability of the students to reach to the lecturers' information and use the e-learning system module.

The communication between students and lecturers in the face to face learning process are influenced from the implementation of the e-learning system.

## 2. INTERACTIONS IN THE E-LEARNING SYSTEM

The usage of the e-learning system gives the possibilities for interactions between student, teacher and content as shown on fig.1.

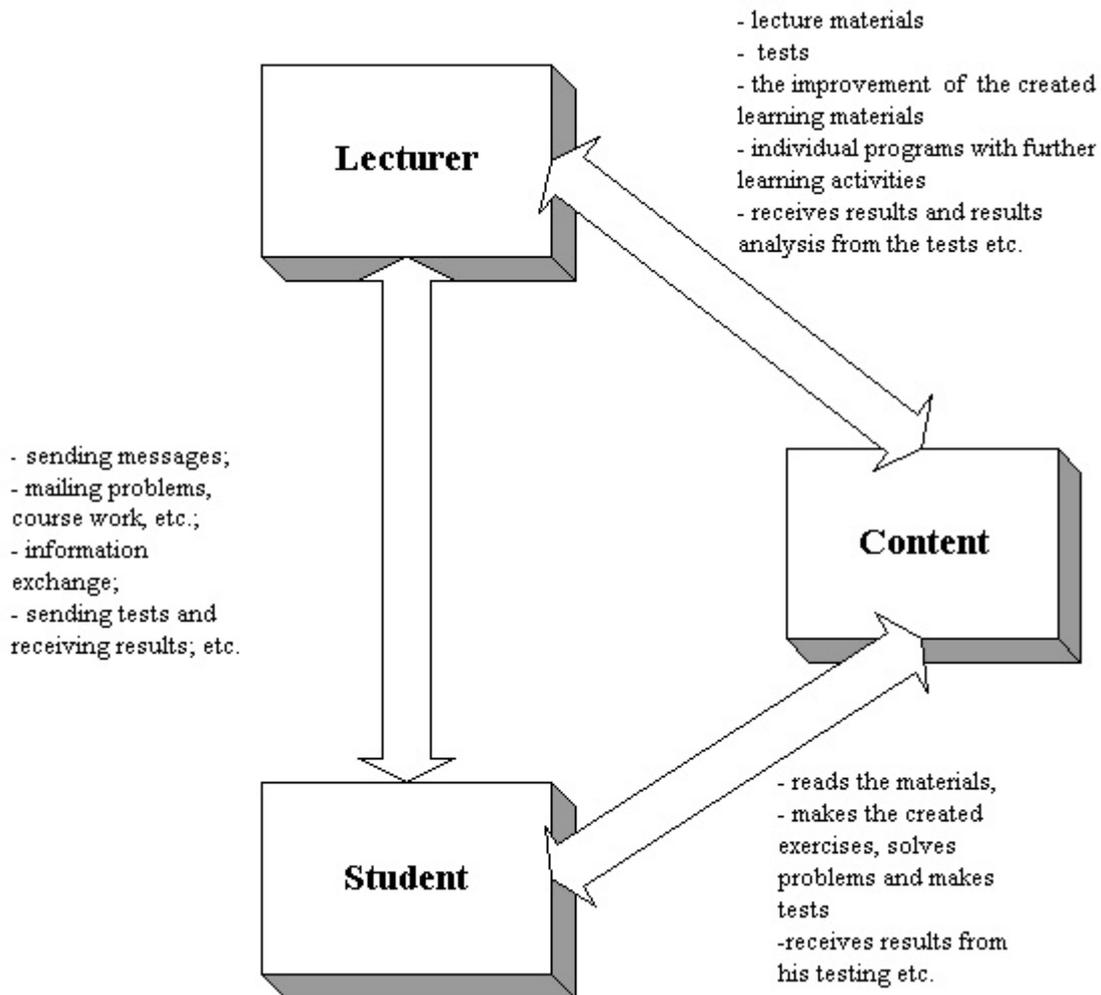


Fig. 1. Interactions in the e-learning

The teacher's part has been developed for the lecturers in order to give them ability to upload information - lectures, tests and other materials. They are also able to create, modify and publish multimedia educational materials in the e-learning module of the information system.

The e-learning system contains tools for creation of multimedia educational materials for different disciplines in the Technology School "Electronic System". It maintains tools for self-education and test system for knowledge and skills assessment.

The lecturer plans, designs and creates the educational content in the e-learning environment:

- lecture materials, exercises, problems and different kinds of test etc., creating the hierarchical structure of the learning content ;
- the type of tests evaluation and the time of test fulfillment;

- the improvement or change in a definite way of the created learning materials on the base of his control and evaluation results of the students;
- individual programs with further learning activities for each student or for a group of students.

The student works individually realizing independent study or collaborating with the others in groups in the e-learning environment – he reads the materials, makes the created exercises, solves problems and makes tests. He can see his results and fulfill additional self education and self control testing. The usage of the created from the lecturer content in the e-learning system is very popular in TUES.

On the base of lecturer's work in the e-learning environment he improves his interactions with the students. The communication between the lecturer and the student is realized:

- in the e-learning environment (messages, discussions forums, mails). This possibility is rarely used in TUES;
- in the face to face learning process in the class room.

The lecture materials in the classroom are presented for a whole group of students while in the e-learning environment the material could be individually intended. The consultation for the students could be realized using the different possibilities of the information system (listed above) individually or for a group of students. The work in the classroom could be widely affected by the results achieved in the e-learning environment and can give result in individual tasks for the student.

The communication between student and lecturer can be realized by:

- sending messages;
- mailing problems, course work, etc.;
- information exchange;
- sending tests and receiving results;
- discussions forum;
- face to face instructional education in the classroom.

The student consults the lecturer about his problems or difficulties in the education mainly in the classroom education. The proposed in the information system possibilities to communicate the teacher are used mainly in the last year of the education at the school.

The lecturer communication with the student is face to face in the classroom and over the e-learning environment and has the purpose to help the student in his learning process.

### **3. LEARNING PROCESS MANAGEMENT**

The learning process management is realized on the base of the goals and the achieved results from the students. The testing of students in groups gives many advantages for a lecturer. Usage of test results analysis for this group would help the lecturer in his further activities in class or in e-learning system.

The e-learning system supports the lecturer with additional information about the achieved results from the students for his further management decisions concerning

the learning process. The saved data from the fulfilled tests and exams is shown on fig. 2.

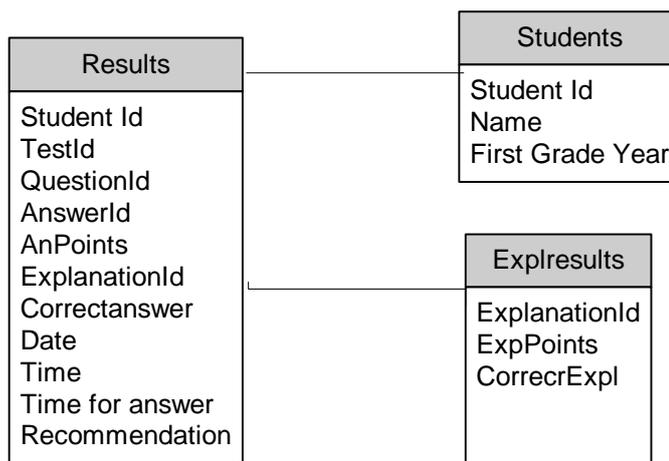


Fig. 2 Test results accumulation in the database structure

In the Students table is the data for student's identification. In the Results table (fig. 2) the identification of the test, question, answer, points etc. are kept. The table Explresults has been used for précising the answer points of the student [2].

<b>Knowledge Skills</b>	<b>0 - 50%</b>	<b>50 - 70%</b>	<b>70 - 80%</b>	<b>80 - 90%</b>	<b>90 - 100%</b>
<b>Students results</b>	<b>N1</b>	<b>N2</b>	<b>N3</b>	<b>N4</b>	<b>N5</b>

Table 1. Distribution of shown knowledge and skills in a definite test

After the fulfillment of a definite test it would be useful to know the distribution of percentage of shown knowledge and skills. The percentage of shown knowledge and skills are grouped in the well known official groups for defining the marks of the students. In table 1 is presented the table for such analysis. The numbers N1, N2, ..., N5 represent the calculated percentage of shown knowledge and skills. They are calculated as follows:

$$N_x = M_x / M \cdot 100 \%$$

where  $M_x$  is the number of students with test result within the appropriate range of shown knowledge and skills,  $M$  is the number of all tested students and  $x$  is the number of the range which usually is from 1 up to 5.

This analysis helps the teacher to take the decision for additional training of a definite student or of a group of students and the type of training – in the e-learning system or in the classroom.

This could be followed by a deeper analysis – for the lecturer would be useful to know the distribution of given answers for every question in the test for the whole group of students. In table 2 is presented the distribution of given answers for a definite test.

QuestionId	Correct Answer (%)	WrongAnswer1 (%)	...	Wrong Answer n (%)
1	50	10		10
2	0	20		80
3	98	0		0
.	.	.		.
.	.	.		.
.	.	.		.

Table 2 Distribution of given answers in a definite test

The high percentage of wrong answers to a group of questions is a condition for taking decision for additional explanations and training of the group of students in the lecture material represented by these questions.

#### 4. CONCLUSION

The e-learning environment allows the lecturer to plan for each student or for a group of students individually the access to a definite kind and type of learning resources. This could be realized on the base of analysis of test results.

The test results should be analyzed from the distribution of the percentage of shown knowledge and skills point of view. This distribution allows the teacher to decide how to continue his further activities – proceed with the learning materials, fulfill additional training for a definite student or for a group of students in the e-learning system or face to face in the classroom. The deeper analysis of the test results - the distribution of given answers – correct and wrong answers, allows the lecturer to define the difficulties in the learning of a student or of a group of students.

These analyses help the lecturer with his further planning of his own activities and of the activities of the students as well.

#### 5. REFERENCES

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