COMPUTER BASED EDUCATION AND PROGRESS ALTERNATIVE FOR ELECTRO-MECHANICS LESSON

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Abstract: The rapid developments in technology make it costly to educate the work force for the sectors. In modern technology and in today's world in which the education system is more modern and the need for modern stuff is increasingly high, Computer-Based Education (CBE) techniques and software are no more a luxury but a necessity. Because these softwares become the basic component and means of easy and comprehensible manner of telling in modern education system due to the visuality that they concern. This study presents the examples of material to make the content and the subject of electromechanics more effective and comprehensible.

1. INTRODUCTION

1.1. Mechatronics and education

Mechatronics, the popular science of our century, is an interdisciplinary perception which grows out of the combination of machine, electric-electronic and software technology in the process of planning to production. Mechatronics which is in fact shortly expressed as 'interdisciplinary' is a synergism which is formed by technical and physical sciences. Mechatronics: It is the field of implementation which is realized in an interdisciplinary and equal-aimed structure of computer technology. Mechatronics products aim to produce smart machines, devices and systems that make human life easier (Toprakkiran and Ersoy, 2006).

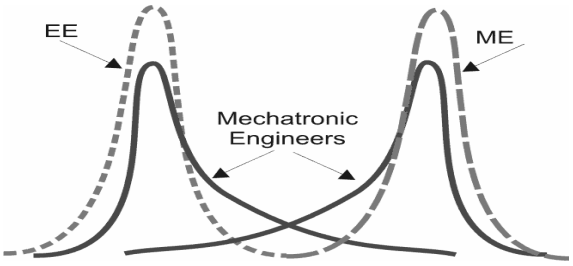

Fig. 1. Mechatronic engineers versus conventional mono-disciplinary EE's and ME's (Van Amerongen, 2006)

The human profile that the society of our present-day needs is different from the human profile that the society of the past-times needs. The globalization occurred due to the improvements in science and technology and the basic components that identify the human force profile which is required by info-based society. The discussions about the quality and quantity of education began to take place and the re-construction in education is put on the agenda. In the period of 2000s, the students' and the teachers' being able to gain new skills depends highly on their being able to use the technology. Because technology is a means of reaching, using, producing and sharing data. The most important means to enable us to reach the data is computers. The use of computers is becoming increasingly important in today's societies.

By considering these things, the educational institutions began work and implementation in order to make the students gain computer skills.

1.2. Web-based education

Within the developments in communication technology, the demand for the informal education has increased. As the instruments which are used in e-learning vary and get stronger, the interest in that type of learning has increased more.

Education and teaching aimed data's transference to the required place electronically by means of communication instruments such as radio, television, computer, internet and similar items is called 'e-learning'. Even the instructor and the student are in different places, the transference of information and teaching function is fulfilled by means of communication technology. Shortly, e-learning eliminates the difficulties of distance and participation. (University of Cukurova, 2007)

The Internet and web offer a number of advantages over other computer-based approaches to distance learning that do not use wide area networks. Here are some of them (Collaboratory for High Performance Computing and Communications, 2008):

1. Resource management;
2. Student/user management;
3. Time/place flexibility;
4. Currency;
5. Ease of use;
6. Cross platform compatibility;

7. Accessibility;
8. Customization;
9. Resource leveraging/enrichment;
10. Resource integration;
11. Collaboration;
12. Dual use;
13. Duplication and other distribution costs;
14. Productivity.

1.3. E-learning and the improvement of e-learning materials

For the teachers' being able to gain the skills to prepare effective teaching materials, they need to know very well the functions of these materials in teaching environment, the principles that they need to consider at the stage of preparation, the benefits and limits of commonly used materials and the features that needs to be considered when they choose and use these materials. When they know these things not in only information level but also in implementation and evaluation level, it will be helpful for these teachers to develop materials in their future lives.

It's shown below the way followed in combining technology and lessons for the education of teacher candidates (Gunduz and Odabasi, 2004).

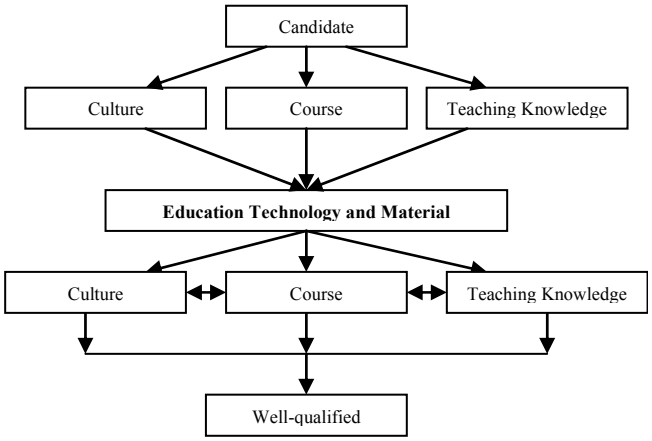

Fig. 2. Process of "education technology and material developing" course in Education Faculty

In order to increase the quality of education and teaching, the effective use of modern teaching technology in teaching of concepts is becoming more important day by day. In that case, one of the most important advantages of the use of computers in teaching environments is its increasing the degree of learning by appealing to a lot of sense organs at the same time and make what's learnt more permanent. Because of that reason, it is pointed out that the use of animations, pictures and sound at the same time eliminates the conventionalism of teaching environment and increases the degree of learning (Saka and Yilmaz, 2005; Clark and Craik,1992). On the other hand, technology-based teaching materials are extremely needed in order to construct teaching environment for the students who come from different social environments and who are physically, biologically and cognitively different from each other. However, the students' having different cognitive, perceptional qualities and physcomotor skills makes it more difficult for teaching technologies to improve by considering individual differences. Because of that, it is emphasized that there is no technology to make it possible that a topic is learnt by all the students at the same degree and at the same speed (Saka and Yilmaz, 2005; Akpinar, 1999).

2. THE STAGES OF DEVELOPMENT OF TEACHING MATERIAL

In order to be used in the software design of research content, "Macromedia Flash5" software is preferred due to its well-known file structure, rapid running, its files' taking little space, its interaction functions and its being user-friendly. In material's development process, the stages below have been fulfilled:

1. Available researches and developed teaching materials were examined by leading the research of computer-based education, experiment notes and related literature.
2. Some examinations were done about the experiments and the qualities of Electro Mechanic Laboratory.
3. The topics that the students have difficulty in the lessons that are done by traditional methods were considered.
4. The identified topics were examined by using the various lesson books which suits to the teaching program. As the result of interviews that are made with instructors, it's decided to develop a study sheet for teaching of these three concepts below.
5. Some experiments about the identified subjects and concepts were done in laboratories and were recorded.
6. A literature scan about visual design was done and the qualifications of an effective and a suitable interface were decided.
7. The necessary animations, texts and shapes were designed for to be prepared packet program by identifying the most suitable animations and design programs for the goal of the research (Fig. 3-5).
8. In Macromedia Flash5 program, an interface is prepared and all animations and texts were inserted into that preface (Fig. 6).
9. The suggestions about the visual design of the education expert were considered.
10. Some visual buttons were inserted in order to enable the interacting use of activity's implementation process.
11. The pilot implementation process will be implemented at the spring term of 2008-2009 education term (Fig. 7).

There are 30 students in the class. These students will be divided into 2 groups as the experiment group and the control group. The control group will have education with traditional methods and the experiment group will take the courses by E-learning Method. The length of time of the implementation of the Experiment group will be as much as the length of time of the implementation of Traditional group which will be exactly one day.

Lesson ELK232 Electromec. Sys. Theoric – 3 / The implementation will be implemented as 2 hours long, totally as 4 credits within 12weeks of academic term. The total

implementation time will last for 3 days which will be totally 24 hours.

There needs to be an implementation at the laboratory workshop for the comprehension of topics of this lesson. The connection schemas of controlling unit circuits needs to be drawn at technical lessons in accordance with Turkish standards and the way how it Works needs to be told. During the implementation, some little voltage (lower that 50 V) needs to be used at the weak rheo controlling unit circuits for the security of life.

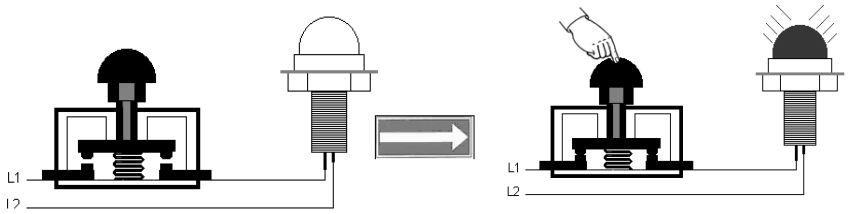

Fig. 3. Schematic shown of open switch in circuit

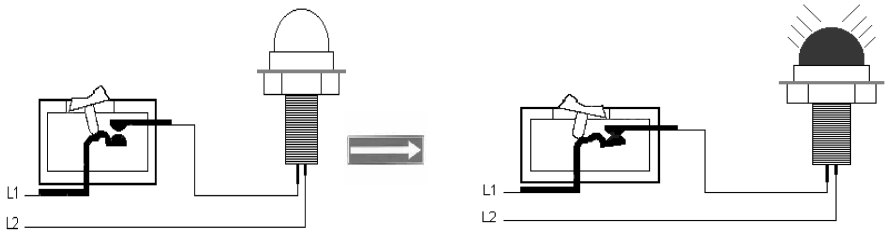

Fig. 4. Schematic shown of wrench in circuit

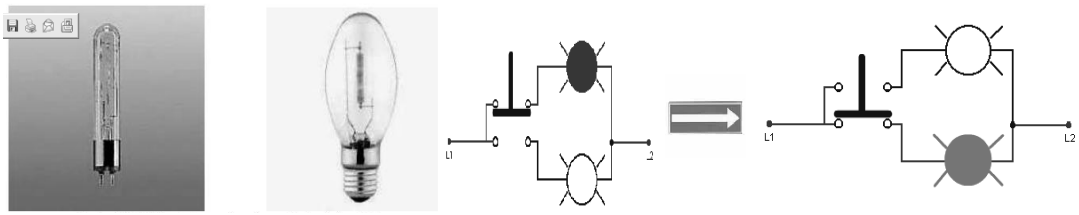

Fig. 5. Lamps and shown in circuit

3. THE CREATION OF THE MATERIALS

We can explain simulation in different ways:

The simulation of a system is the procedure of forming a model which can represent that system. Simulation is a process of the designation of the model of the real system, the implementation of experiments in order to understand the conduct of the system and evaluate the different strategies for the goal of running the system with that model.

Simulation is the experimental study which is done for fulfilling the process procedures of the duration which is improved or reorganized, executing experimental studies and estimating the time of the error of these procedures. We can understand the possible reactions that the new process gives against the changes. It is the observation of a qualification or a conduct about an event, a process or a system on the model.

4. THE COST

The rapid developments in information technology have affected the societies and it became possible for everyone to use the computers. Due to the rapidly changing world, it became a necessity to use the computers in teaching-learning process at schools in order to prepare our children who are face to face with a rapidly changing world to the information societies of 21st century.

As the relationship of the human being with information and society changed in our present day, the qualification of it changed too. The case of information explosion changed the function of information in the life of human being and society and the method of being produced and being gained. The modern society became different in the aspects of structure and function. All of these cases affect the basic model of the education and causes fundamental changes in education (Dogu and Eroglu, 2004).

The matter of education has been considered with common sense rather than a scientific approach for a long time. The education concerns the establishment and the assimilation of the ideas rather than the change of ideas. However, this era that we have been in possesses an imbalanced and an inconstant characteristic and it is characterized by the rapid change. In that atmosphere, the skills in mechanization are replaced by skills in information technology (Ozer, 1989).

In that case, the education needs a change to reprepare itself and a new conceptional frame in which the decisions

about the innovation can be taken easily (Dogu and Eroglu, 2004).

The change for output and effectiveness in the process of teaching and learning becomes more and more important. Because the education services constitute one of the biggest costs in the life of the nations.Today none of the societies can endure an education with a high cost and low output (Dogu and Eroglu, 2004).

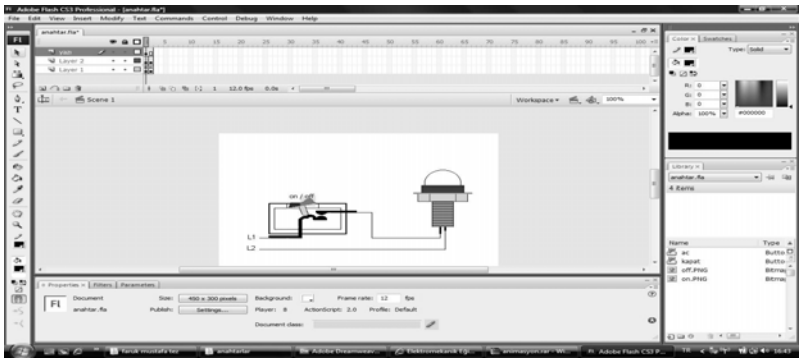

Fig. 6. Generated to materials animations

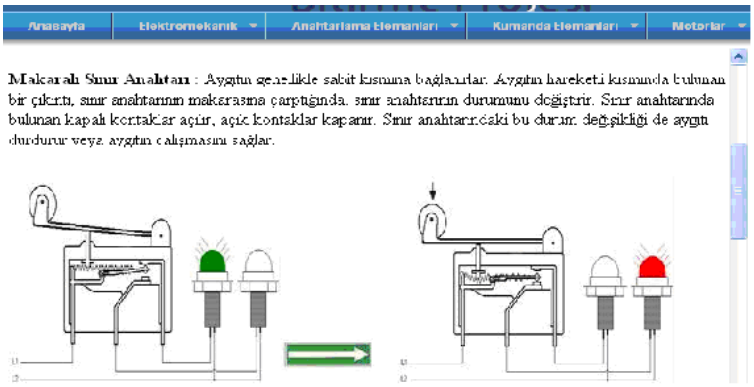

Fig. 7. Web page of using in Electro – mechanics course

5. CONCLUSION

The education which is put into practice during the process of educating workforce in developing disciplines like Mechathronics is costly and difficult. In addition the distribution and the spread of information is highly important at the process of globalization. The implementation and the pursuit of information during its stages of rise and development are possible with e-learning. Digital and online materials can dramatically reduce the cost of education materials, particularly for university students and researchers (Oxfam Briefing Paper, 2008).

The electro-mechanic lesson materials that we submitted during our study take little part in Mechathronic Education. The institutions need to focus on the studies about the e-learning model, spread it everywhere and form a basis for the updates.

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