The Comparative Study between Traditional and Informatized Instruction in Technical Universities Education

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Abstract: - The theme of our paper approaches the particular aspects of the educational, research and production environment, from a multi-dimensional perspective: the contents of the educational process; the modernizing of the didactic technologies by integrating the informational and communication technologies and using the educational potential of mass-media; the universities’ role in research and in forming future researchers; the role of pre-university education in this context. Finally, the paper performs a case study achieved at the Faculty of Materials Engineering, Mechatronics and Robotics from Valahia University from Targoviste. The subjects chosen have been the students from the Faculty of Materials, Equipments, Installations, Mechatronics and Robotics of all study years from major field of study.

Key-Words: - mechatronics, mechatronic education, information technology training, the National Educational Network for Integration (RNEI), SWOT analysis, study case.

1 Introduction
The revolution in informatics (the second industrial revolution) marked the progress from the industrialized society to the informational one, generating a wave of technological and educational renewal. The Japanese have defined the sense of these movements of renewal, forging the term mechatronics, at the beginning of the 8th decade of the last century. The term was used to describe the technological fusion between mechanics-electronics-informatics [1].

Mechatronics is the result of the normal evolution in technological development. Electronic technology stimulated this evolution. The development of micro-electronics allowed the integration of electromechanics. During the next stage, by integrating microprocessors in electromechanical structures, they become intelligent and thus we arrive at mechatronics. Mechatronic education is an efficient solution for promoting inter-disciplinarity and stimulating initiative and creativity. An interdisciplinary education makes it easier to solve the problems of professional adaptation.

The accomplishment of the project’s objectives will help create a friendly environment for an efficient technological transfer in education. Forming trainers in mechatronics for the pre-university education is essential for improving the quality of the educational act as a whole.

The modern means offered by the information and communication technology represent an essential support in this approach. The use of mobile educational laboratories for integration, in the activities of in-service training and professional adaptation, will contribute a lot to the improvement of the quality of the approach. In fact the information represents the core of the Mecatronics. On the other side using the potential of information allows the synergetic effect of the systemic approach. The mechatronic technology brings in the highlights the information issue that is driving component in relation to mater and energy. This position of information is motivated by Japanese with the following arguments [4]:
- information ensures satisfying the spiritual needs of human being;
- only information increases the new value added to all things;
- information means culture.
“Mechatronic education” is an efficiently solution for the interdisciplinarity promoting, stimulation of initiative and creativity. The interdisciplinary preparation facilities the solving of professional reconverting. The training teachers in Mechatronics for secondary education is essential for the increasing of educational act quality assembly. The modern means given by the information and communication technology stand for a essential support in these approaches. Using the mobile laboratories of education by integration in the continuous training activities and professional reconverting will essential contribute to improving the approaches qualities in this case.

The National Program or Education for Integration (NPEI) results in the making a national mechanism compatibly to the ones existant in European Community that allows a performant management of human and material resources both national and regional plan. The arguments performed in the first part of this paper are illustrating on the definition Mechatronics as ruling of approaching within NPEI Mechatronics supposes by definition an integrator vision. The creative potential of Mechatronics cannot be exploited without a performant management of knowledge in the field. [5]

2 The National Educational Network for Integration (RNEI)

RNEI represents the basic structure which lead to the accomplishment of the goals i. e.:
- unify the national efforts in the field of Mechatronics both on the educational and research level;
- establishing the structures for integrating the research resources into the top economic fields;
- creating the conditions for strengthening the role of Mechatronics in Romania;
- the systemic approach in the fields of education.

At present, RNEI consists of departments from the main Romanian universities, which has collaborated for 10 years in order to promote the use of Mechatronics in education, research and production fields[2].

In suit with European experience it is expected as the integration impact to be immediately on all fields. After the making network and working validating, the integration effort will keep on progressively covering and other institution and associations.

Thus, NPEI will become a sustainable for education and research – development academically and industrially. By creating Regional Educational Centers for Integration (Centre Regionale de Educatie pentru Integrare - CREI) as main nuclei in the structure of the National Educational Network for Integration (Reteaua Nationala de Educatie pentru Integrare - RNEI), it becomes possible to guarantee equal chances concerning the access to information of the population from different zones and activity areas.

The participation of the universities to support the activity of CREI will stimulate their involvement in programs of regional development. Our program will be a challenge for all educational institutions. The organizational framework created by it will stimulate them and help them develop in the future.

The managers’ participation in training courses of Mechatronics will help them understand more easily the sense of the evolution in technological development in order to establish adequate development strategies for the firms[3]. The involvement of the local communities in the educational programs will benefit school and community alike.

3 Engineering education

The development of agreement allows engineers to perform for the progress of tendencies;

The development of trials allows engineers the performing and assuming responsibility in the context of tendencies. The quality of education means to define some useful objectives/goals of educational standards which to allow students achieving of these aims. As useful objectives of engineering education, can be defined as follows:
- academic standards;
- needs of society;
- endeavours of students;
- requirements of industry;
- standards imposed by professional organizations of engineers;
- fundamental principles knowledge of studied engineering field.
- practical limits of educational desiderata development

Information technology training

In the engineering education also the forming of some skills necessarily to practical activity of design and service/operational of equipments and plants matter. The achievement of these objectives by students follows to involve as:
- By using the research on the development kind of learning process and defining teaching procedures relied on the efficient didactic experience; the professional pedagogic development of many teachers.
- Establishment of some assurance procedures of didactic process quality by setting and observing of some standards.

Cognitive aspects of curriculum. Knowledge means information which was memorized and that can be reproduced as answer at a addressed question. If the
students are interested and understand, the assimilation process of knowledge can be fast and easy. Skills are acts that people make them easily, but out of habit such as: oral communication; walking; drawing; common equations solution; typing; conversational foreign language, etc. Even if some skills are handly named and others intellectually, in fact the skills are mentally because the their learning process took place into brain. Unlike knowledge, skills, they do not fat learn however much the student would be interested. Understanding is the skill to use clearly and creatively drafts to :
- explanations ;
- new projects ;
- correcting of some unusually mistakes ;
- looking for the answer at diverse questions ;
- reasons and talking.

Individual study – specifically applied continuing professional development of Graduated Engineer – is also taken into account to conceive, design and draw up the course Web. Understanding is the key of thinking and the skills explanation to solve some issues which the case is stood on. Understanding consists of two parts: elucidation (understanding) absolutely of abstract drafts which depend on understanding. Once the drafts being known – such features – can be forgotten.

- applying accordingly these drafts in the activities/ acts prior to enumerated.

At present, students specialized in Mechatronics from Faculty of Materials Engineering, Mechatronics and Robotics benefit by three forms of training: traditional, advanced hardware – within the framework of laboratories adequately endowed and the individual study estimated by carrying out the papers and homeworks.

4 Conclusion

The paper also presents a case study accomplished at the Faculty of Material Engineering, Mechatronics and Robotics of Valahia University of Targoviste. The subjects chosen were students of this faculty. A SWOT analysis as well as a number of proposals were made in order to increase the efficiency of the informatized instruction in technical university education.

To achieve the case study on the preferences of students from The Faculty of Materials Engineering, Mechatronics and Robotics for study, a questionnaire has drawn out in which the students have been asked to be as sincerely as possible.

The questionnaire is a technique by which is followed the obtaining of some data by consulting many people, that allows wording of more fundamental conclusions.

Methodologically, this technique requests the following stages:
- designing of an “experimental” questionnaire;
- checking of questionnaire by open interviews;
- finalizing of questionnaire;
- initiating of questionnaire and to supplement it;
- gathering of answers and their processing;
- results utilization.

The questionnaire, comparatively with interview performs some advantages, such as:
- questioned person can consider more on questions and therefore can more correctly answer;
- allows questionnaire of more number of subjects in short time relatively, which ensures wording of more fundamental conclusions.

But, it also performs some drawbacks:
- it does not allow obtaining of additional information;
- it does not fill in all persons the questionnaire;
- questioned individuals are not always sincerely.

43 individuals have been questioned (23 men and 20 women) from 20 students specialized in Mechatronics year 4 and 23 specialized in Mechatronics year 2 of study.

The questionnaire requests to students who fill in it to state their sex, age, study year and preference for the training kind as part of Faculty of Materials Science, Mechatronics and Robotics.

As a result of questionnaire the following conclusions are drawn:
- 62.79 % students prefer a computer technology training and only 4.65 of them consider the individual study an opportunity and the rest prefers traditional training;
- the students are very satisfied of their communication by computer technology with university teaching staff (58.15%) and only 4.65 of them are very dissatisfied;
- questioned about what is in their opinion the main barrier in informational communication between them and the university teaching staff, the students rank on the first position the lack of time 41,86%, and on the second position 34,88%, there is mentioned the unscientifical language used by some of the professors during their communication with the students;
- regarding the main reasons that worsen the communication process between the students and the professor, it has been revealed that 23,25% of the students are afraid of being criticized in front of their colleagues, 27,90% are not interested in communication process, and 37,22% consider that the lack of a feedback from the professors is one of the reasons that worsen the communication;
- students being questioned about the tools that can improve the communication between them and the university teaching staff, 62,79% answered that this
process should mainly address to the student and his problems, because, the professor can easily achieve an efficient communication when he/she knows the student’s problems, and, 37.21% chose as a tool for the improvement of communication the finding of the best communication processes;
- among the students questioned 41.86% consider that the role of communication is to inform, 25.58% believe that the communication in itself has to explain something, 27.91% consider that the role of communication is to persuade and, 4.65% consider that communication has to describe something;
- questioned about the tools used by the professors during their communication with the students, 51.16% of them mentioned that the professors use new techniques and apparatus such as video-projectors while teaching, and at present, 6.98% of them use scientific magazines and 2.33% use brochures;
- questioned about the conditions that lead to an efficient communication, the students (41.87%) answered that the message transmitted during communication has to be consistent and symbolic both to the students and the professor, and 34.88% mentioned that the communication has to be intelligible;
- when questioned about the qualities the university teaching staff should possess, and, which of them is the most important in oral communication from their point of view, the students provided the following answers: 9.30% of them consider the pleasure to talk as being the most important quality of a professor when communicate orally, 13.95% see the naturalness the most important one, 23.25% find clarity very important, 6.98% consider correctness important as well, 13.95% support the precision, 11.63% support the harmony, and 20.94% believe that the concision is the most important of all (a concrete speaking without useless ramblings).

5 Proposals
- the university teaching staff has to dedicate more time to the communication processes both when the communication is among the professors and when it refers to the communication to the students;
- in order to avoid malfunction occurrence in the communication process, the students should manifest more interest during their communication to the professors so that the feedback to be possible;
- communication should focus more on the students and their related problems;
- I propose to the other professors to use other modern tools in communication process;
- the relation words-actions should be assured so that the message to be pointed out and to accomplish the desired impact on the receptor.

Fig. 1 Representation of schematic item questionnaire design of the study case
References


