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Expectations of the students of mechatronics in the conversion of technical training faculties into technology faculties of technology

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Abstract

In this study, it was aimed to determine the expectations of the students of Marmara University, Technical Training Faculty, The Department of Mechatronic Education in the conversion Technical Training Faculties into Faculties of Technology. The target population of the study was formed by the students of Marmara University, Technical Training Faculty, The Department of Mechatronic Education, and the sample was formed by one hundred students selected randomly from 1st, 2nd, 3rd and 4th grades. In the research, the relational scanning model was used. To prepare the survey questions, ten open-ended questions regarding the conversion into the Faculty of Technology were asked to the students; and then a 20-question Likert-type survey with 5 articles was prepared by analyzing these questions. The data was analyzed by the program of SPSS 15.0, and pie charts on results were provided.

According to the data obtained at the end of the study, the conclusions reached were that the title problem of the students of Mechatronic Education must be solved, that Technical Training Faculties cannot benefit from Erasmus and Socrates programs as they have no equivalence in European Union, that appropriate conditions for developing common projects with industry as Mechatronic Education is mostly practical due to the nature of the department, that differences of titles and diplomas the graduates of Technical Training - Department of Mechatronic Education and the students who will graduate from Faculties of Technology during conversion must be corrected with arrangements to be made, and that the diplomas gotten must be accepted outside the country.

Keywords: European union; technical education; technology faculty; mechatronic training.

1. Introduction

Mechatronics can be defined as the application of micro-electronic to mechanical engineering or a discipline enabling mechanic and electronic to be functionally combined with information technology and to be internalized (Histand, 1996; Acar,1993). Mechatronic was used in Japan in 1970s for the first time, by an engineer working in the electric company Yaskawa, with intent to enable electric motors to be controlled through computer. However,

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definition of Mechatronics in the Western countries has not been made as fast as the one made in Japan. Developments in the technology have put the more usage of electric-electronic materials and their control into the agenda; and consequently, Mechatronics has appeared as a requirement (Acar, 1993). Mechatronics engineers are the technical personnel who combine in a significant integrity the data based on machine, electric-electronic and computer systems; make available the design, production, maintenance and repair of automation products from washing machine to robot and from air bag safety systems in the vehicles to photo cameras by means of control technologies. As for the Mechatronics teacher, he/she is the person who provides students with training on Mechatronics in the educational institution or organization where he/she is employed.

According to the 2009 data, Mechatronics has a quota of 2905 students in 25 different universities in the Vocational High School of Turkey. It has a quota of 503 students in Engineering Faculties of 7 different universities, and totally 90 students in Technical Education Faculty, Marmara and Süleyman Demirel Universities (Ösym, 2009).

Department of Mechatronics Training in Technical Education Faculty was opened in 2003 for the first time in the Technical Education Faculty of Marmara University. It was followed by the Teaching Department founded in Süleyman Demirel University. Mechatronics Engineering Department is available in Kocaeli, Sabancı, Bahçeşehir, Atılım and Yıldız Technical Universities on a bachelor's degree basis (Vikipedia, 2009).

Main mission of Technical Education Faculties is to train teachers for Industrial Vocational High Schools and Technical High Schools. Number of these educational institutions, first of which was opened in 1937, is currently 19. By the new arrangement, all the Technical Education Faculties are decided to be turned into Technology Faculties; however, the conversion process is still ongoing. The Technical Education Faculties and their employees are suffering from serious employment problems at the moment. According to the 2006 statistics, total number of the students being educated in Technical Education Faculties is 28.097. It is known that the employment of the graduated students as specialist teacher is about 2%; moreover, any teacher assignation has not been made in many areas of expertise (Tev, 2009; Tekob, 2009).

Since Technical Education Faculty is matchless in the world, it is not possible to accredit them and since this status of the Technical Education Faculties decreases the interest in vocational and technical education a significant decrease is being observed in the quality of the incoming students. On the other hand, this situation causes an apparent demoralization in the students being educated, as well as motivation decrease and hopelessness about the future. Disappointment of the graduated students turns into social problems in the course of time. Discussions about the structure and capacity of the Technical Education Faculties, their graduates in the scope of employment surplus, the problems encountered by them in the business world and the solutions of these problems gained speed in the current period of time. These discussions generally focus on the following four main issues. These can be listed as the employment problem encountered by the graduates, who are trained as Technical Teacher and whose number increases with each passing day; unavailability of a defined title, authorization and responsibility of the graduates who could not be employed as a teacher; impossibility of accreditation of the Technical Education Faculties by international institutions due to their current structures; and inapplicability of student and academic member exchange programs due to the unavailability of their diploma equivalence in the EU countries and USA, and unavailability of any higher education institutions in the EU countries equivalent to Technical Education Faculties (Tev, 2009).

2. Conversion from Technical Education Faculties into Technology Faculties

Titles and status of the Technical Education Faculty graduates, who do not serve as a teacher, have not been defined yet. The graduates entering into the sector encounter a serious title, authorization and responsibility problems. In consequence of the developments in the business world, the meaning of engineering has gone beyond the classical meaning in the developed countries, and therefore two engineering types different from each other appeared as theory intensive engineering (Engineering) and practice intensive engineering (Technology Engineering). Activity areas of the both engineering types are complementary for each other. The current structure of the Technical Education Faculties negatively affects also the vocational, technical and secondary education. Generally the industry, business world and SMEs need well-equipped, productive and entrepreneurial application (technology) engineers. The Technical Education Faculties have not any international counterpart or equivalent. Due to this situation, it is not seen possible to accredit these faculties and programs.

Therefore, by means of the conversion into Technology Faculties, University-Industry relation will be enhanced more effectively by training practice-intensive engineers, and consequently the universities will come more close to the industry and an important gap will be filled in our country. SMEs have become highly widespread both in Europe and Turkey. Graduates of the Technology Faculties will be entrepreneurial personnel having a character adequate to evaluate these. Those who graduated from accredited programs will have the potentiality of finding job at any point of the world and of improving their professions. At the same time, this conversion will also bring along the structure that can meet the "International Quality Standards". The graduates will be defined and demanded technical person in stead of suffering from identity crisis and status ambiguity in the industry and business world. By this means, the way of enhancing the quality will be opened. By training a technical person type preferred by our country and the international industry, more successful students will be attracted to the Vocational, Technical and Secondary education and consequently to the Technology Faculties. In this way, the quality will be enhanced both in the secondary and higher education stages; and at the same time, the trend towards general high schools will decrease (Tev, 2009; Tekob, 2009).

Professional work and responsibility areas of the engineers and technology engineers are shown as graphic in the Figure 1 (ASME, 2000).

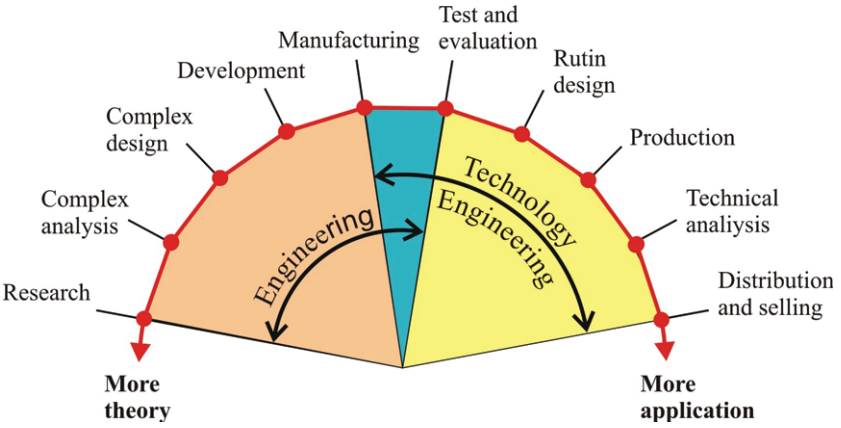

Figure 1. Comparison of engineering and technology engineering, (ASME, 2000).

3. Objective

The objective of this study is to determine the expectations of the students of Marmara University, Technical Education Faculty, The Department of Mechatronic Education, regarding the conversion of the Technical Education Faculties into Technology Faculties.

4. Method

Relational scanning model was used in the research. With intent to prepare the questionnaire form questions, the students were asked 10 open-ended questions about the conversion into Technology Faculty. Then these questions were analyzed and a Likert type questionnaire consisting of 5 Articles and 20 questions were prepared. The data was analyzed by use of the software SPSS 15.0. The target population of the study was consisted of the students of Marmara University, Technical Education Faculty, The Department of Mechatronic Teaching; whereas the sample was consisted of one hundred students randomly selected from the 1st, 2nd, 3rd and 4th grades.

5. Findings

The form was applied to 100 students at the end of the 2008-2009 Academic Year-Spring Semester. The standard deviation and arithmetic average values were examined and tabulated as the descriptive values regarding the question phrases in the data collecting form.

In the Table 2 below, the articles having the highest participation ratio and frequency distribution in the form consisting of 23 articles are shown in order from the biggest to smallest one, according to their arithmetic average values. The following ranges were considered during the evaluation of the arithmetic averages of the opinions obtained in accordance with the grading (on the scale of five) of the form used in the study.

Table 1. Weighting the scale articles.

Given Weight	Options	Limit
1	Strongly Disagree	1.00–1.79
2	Disagree	1.80–2.59
3	Undecided	2.60–3.39
4	Agree	3.40–4.19
5	Strongly Agree	4.20-5.00

Table 2. Article frequency and percentage values regarding the website assessment form.

No	Phrases	SS	$\bar{X}$
1	I will suffer from the title problem after my graduation	0.61	4,25
2	The title and diploma difference between the technical teachers and practice engineers should be eliminated after the conversion.	0.60	4,11
3	Equivalence with the universities of the EU member countries should be provided.	0.70	3,97
4	Foreign language preparatory program should be provided.	0.83	3,89

As seen in the table above, in the study intended for determining the expectations of the students of Marmara University, Technical Education Faculty, The Department of Mechatronic Education, regarding the conversion of the Technical Education Faculties into Technology Faculties, the articles given high scores are;
"I will suffer from title problem after my graduation. (X=4.24 at "Strongly Agree" level), "The title and diploma difference between the technical teachers and practice engineers should be eliminated after the conversion. (X=4.11 at "Strongly Agree" level)", "Equivalence with the universities of the EU member countries should be provided. (X=3.97 at "Strongly Agree" level)", "Foreign language preparatory program should be provided. (X=3.89 at "Strongly Agree" level)" respectively. According to these data, the study group students expressed general opinions in the conversion process as their forward-looking expectations regarding the problems being suffered in the Technical Education Faculties.

6. Results and Discussion

The structure and capacity of the Technical Education Faculties, where approximately 29000 students in our country are being educated, and their graduates in the scope of employment surplus, as well as the problems encountered by them in the business world are being encountered by us today as an important problem. In this context, according to the data obtained in consequence of this study carried out with intent to determine the opinions of the students of the Department of Mechatronics Education, the conclusion has been reached as follows;

The title problem of the students of Mechatronics Education should be solved; the students cannot benefit from the Erasmus and Socrates programs due to the fact that the Technical Education Faculties have not their equivalent in the EU countries; since all the laboratory hardware and computer software in the Department of Mechatronics Education are in foreign language (English), foreign language preparatory program should be provided in the department; since Mechatronics Education is mainly practice intensive as a requirement of its nature, an environment suitable for developing joint projects together with the industry should be provided; the title and diploma difference between the graduates of the Technical Education Faculty, the Department of Mechatronic

Teaching and the students who will be graduated from the Technology Faculty should be eliminated by the regulations to be made in the conversion process; and additionally, the diplomas granted should be recognized abroad as well.

In this study, students of the Department of Mechatronics Education have expressed parallel opinions regarding the solutions of the problems being suffered up to today from the structure of the Technical Education Faculty.

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