Follow-Up Study for Graduates of Mechatronics Engineering

Mejías Brito Johann, Silva Medina Pedro I., Guerrero Vaca Adriana M., Tejeda Castrejón Jesús F. & Lugo Báez Rosario

Electrical and Electronic Engineering Department/ Instituto Tecnológico de Colima, México

Abstract: The follow-up studies for graduates constitute an important link between the educational, social and productive sectors. With the development of this work refers to a follow-up study of the graduates of Mechatronics Engineering of the Instituto Tecnológico de Colima, with the purpose of identifying the new training demands of the work environment, all with the purpose of adapting the educational offer to the needs of society. The present research was designed through the quantitative method for obtaining and analyzing numerical data referring to the detailed information of the graduates, which are obtained through the use of an online questionnaire. Derived from this study was obtained the relevant information of the graduates on the professional professional, the opinions and suggestions on the quality of the education received and the new demands of the labor market and the social environment.

1. Introduction

The complex scenario - political, economic, social and scientific - that surrounds the task urgent need for effective responses to challenges of these contexts, related to the needs of globalized, competitive and highly technological societies [1]. At the present time, follow-up studies on graduates are an important link between the education sector and the social sector, because they allow establishing a relationship between the student’s training processes and their insertion in the labor market, as well as the professional activities that these perform play. Several authors [2-6] consider that the graduate is an important source of information.

These studies emerge as an educational evaluation tool that allows us to understand the relationship that exists between the professional profile and the nature of the task that the university graduate plays in the work context, as well as establishing whether there is a congruence between his / her training and professional practice [ 7]. In the same way, it allows the university to know where and how it is located, its social and economic performance and how to reflect the values acquired during its academic formation, these aspects give account of the pertinence of the academic programs and curricula of the Institutions [2].

The above arguments allow us to affirm that studies on the impact of graduates in society are a concern of higher education, interested in knowing the performance of graduates. The current trend, as stated by several authors [6], [8-11], is to evaluate the professionals by the level of mastery of the competences, acquired during their formation, that allow them to perform the functions for which they are contractors. Consequently, the success of higher education institutions is measured on the basis of the results of their students with respect to their employment status and social commitment [6].

The current economic, technological, social and cultural changes generate new challenges for Mexican universities; one of these is the constant evaluation of the impact of academic processes on society [6]. Within the national strategies of Mexico, it is established that for the country to move to the knowledge society, it is necessary to change its vision about the educational environment, giving it a sense of inclusion where everyone has access to a quality education, for which is necessary to implement policies to strengthen the articulation between educational levels and the productive sector, in order to generate a quality human capital that deters national innovation [8].

The curriculum map of Mechatronics Engineering is based on a flexible curricular design that allows the continuous and systematic adaptation to the requirements of local, regional and national development; as well as the permanent incorporation of scientific and technological progress; the integral formation of the student body; the establishment of strategies that promote the formation of professionals who show creativity, entrepreneurship and competitiveness. An important aspect to consider in the curricular model is the credits, the Tecnológico Nacional de Mexico (TecNM) adopted in its approach by competences, which allows a set of criteria to assign numeric value to all learning activities established in the curriculum. With the
purpose of accumulating and transferring credits and even of other institutions of higher education.

In order to meet the requirements set out above, a number of graduate studies have been carried out, highlighting the importance of their achievement, since they benefit students, graduates, employers, institutions and society in general.

Corresponding to this need, in the Instituto Tecnológico de Colima, actions are developed to assess the relevance of the training of its students with the requirements of the labor market. In order to verify compliance with the profile of the Mechatronics Engineering program, the Department of Electrical and Electronic Engineering of this Institution, as part of the process of designing specialties and following up the accreditation process of this academic program, has developed Actions to know the performance of their graduates. The development of this work intends to carry out a follow-up study to the graduates of this engineering, with the purpose of identifying the new formative demands of the work environment, all with the purpose of adapting the educational offer to the needs of society.

2. Methods

The design of the present investigation was made through the quantitative method for the obtaining and analysis of numerical data referring to the detailed information of the graduates of the Mechatronics Engineering. According to the scope of the research, it was a descriptive study, having had a detailed understanding of a context within the graduate population of the aforementioned degree from the Instituto Tecnológico de Colima. To develop this research, a questionnaire was designed to be applied to graduates, where the fundamental aspects of similar work by different authors [10] and [12-14] were considered. Likewise, it was based on what was proposed in the Tuning Project, which proposes a continuous dialogue between education and social needs; Considering also the perception of authors like [15, 16], who consider that the Tuning Questionnaire has proven to be an effective instrument with high levels of reliability and validity in diverse global identities since it was created with a universal language to measure various disciplinary areas regardless of the location where you study.

The application of surveys is an ideal tool to know the perception of the graduate in terms of the training received and to understand the work and academic path that each individual experiences once the professional title has been obtained [13]. Taking into account the different authors [14, 15], [17, 18], online surveys are the most reliable and those that generate lower costs.

The questionnaire design, which has become an online survey for the information system, can be divided into 4 sections: (I) General Data, (II) Labor information, (III) Academic and professional trajectory, and (IV) Evaluation of the quality of the program. All this with the idea that the survey is easy to answer for the user; It is also intended to provide the possibility for subsequent analysts to quickly identify the fashions and / or frequencies in the answers related to the corresponding sections. The instrument was sent to all the graduates of the degree program in Mechatronics Engineering of the Instituto Tecnológico de Colima, a total of 104. It is important to note that this study in its current stage does not seek to verify or refute approaches, but to gather information from the graduates, which will allow the adjustment of the educational program to the requirements of society and the labor market.

For the analysis of the information a database was elaborated in Microsoft Excel initiating a previous codification of the same ones to facilitate their capture. For the interpretation, graphs were made with percentages as well as frequency tables that provided the basis for the description of the results obtained in this study. The time it took each graduate to answer the questionnaire ranged from 10 to 15 minutes, afterwards, the information generated was processed in its entirety to obtain results and analysis.

3. Results

The processing and analysis of the applied surveys allowed to know that 74% of the graduates of the program is titled and the remaining 24% has not done it for various causes, among which the lack of time to do it predominates and others do not require the Title to perform their work activities. Similarly, it was detected that 62% of the graduates chose the Mechatronics Engineering degree because of their curriculum and the location of the Institution, which is a very favorable indicator for this educational program. It was also possible to know that 90% of graduates speak at least one foreign language (English) and that some are also able to communicate in German. The description described can be seen in Figure 1.

In the section on continuing education, records indicate that 31% of the graduates are studying or finishing a postgraduate course. Similarly, 80% of the graduates are working and 3%, despite not having a job, has already been employed as a mechatronics engineer. Regarding the hierarchical level within the organization, 26% work as a technician, 23% as a researcher or technology developer, another 23% carry out activities related to their studies, 11% are in charge of an area as chiefs or people Of the same, 9% are entrepreneurs, 2%
management functions and 1% are dedicated to teaching. It was also detected that 61% of the graduates carry out activities that have a direct relationship with their professional training as a Mechatronics Engineer, 31% are only partially and only 8% work in activities outside their field of knowledge. The elements discussed above can be seen in Figure 2.

Regarding the question on how to obtain their source of employment, 31% obtained it through their stay of Professional Practice in the company they work, 25% through the recommendation of family and friends, 22% through the internet, 11% by other means, 8% through employment fairs and 3% through the institution's employment exchange. The survey shows that 36% of graduates work in large companies, 25% in microenterprises, 22% in small companies and 17% in small and medium-sized labor spheres. As for the turnover of the company where they work, 37% do it in the industrial sector, 20% in the service sector, another 20% in various sectors, 17% in the commercial sector and 2% in teaching and investigation. In the business sector, 69% of the graduates work in the manufacturing industry, 19% in commerce, restaurants, transport, financial services, communications, professional services, state government and 8% and 3% in the sector Mining and education respectively. It is important to add that 89% of graduates work for private enterprise and 11% do so in the public sector. The elements discussed above can be seen in Figure 3.

Analyzing the comments made by the graduates, it was possible to detect that, in a general way, these are performing, with excellent results, in activities that fully coincide with the established in their graduation profile. This is fully aligned with the objectives of the program, entering the industry in areas where it is required to design, design, build and manage mechatronics equipment and systems in the social, production and service sectors; As well as the operation and maintenance of the same.

However, it is important to consider that the follow-up of graduates and employers has to be improved in terms of frequency of monitoring and analysis; And on the results, there are areas of opportunity in professional updating, among these are: improving the quality of learning the foreign language and include other languages, increase the link with companies to favor the acquisition of career-focused experience Professional, to improve the process of selection of the company where it will be made of the Professional Practice. Encourage extracurricular activities in students to increase their ability to integrate in society, as well as to implement courses of leadership, personal development, skills and financial culture. It is also recommended to focus the subjects to the industry, increasing the talks and conferences on important aspects in these, as well as motivating the students to make exchanges abroad.
4. Conclusions

The graduate studies offer information for the educational evaluation processes because they represent a useful tool to know information based on the opinion and personal experience of the graduate on his professional practice in the labor market, on the type of training he received within the Institution of Higher Education, during his university career, and on the type of academic and professional improvement.

The development of this study allowed obtaining relevant information from the graduates about the professional performance, opinions and suggestions about the quality of the education received and the new demands of the labor market and the social environment.

There are high figures of employability of the graduates, who are generally performing in activities that fully match the established in their exit profile.

The main means to obtain the current employment was through the modality of Professional Residency, reaching this indicator 31%.

It was possible to know that of the total of graduates surveyed, 74% are qualified, 90% dominates another language, 13% have some postgraduate courses and 18 are currently enrolled, more than 80% of graduates are practicing their profession, 26% as a technician, 23% as a technology developer, 11% as head of area, 6% as a manager and 9% as an entrepreneur, the others are doing other activities related to their profile.

The graduates agree on the need to implement mechanisms to measure the level of satisfaction of students and graduates with the service of institutional orientation.

Employer’s opinions about the graduates show that there is an important degree of satisfaction with the performance of the graduates of the program.

5. Future Works

The results of this study should be used for the development of curricular improvements, it is also recommended that other bachelor's degrees from the Instituto Tecnológico de Colima carry out similar studies to know the situation of their graduates.

6. References


