

The Forming Humanistic in Engineering Education

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Abstract

Viewing a future where the main aspects of life that we are sure about are the competitiveness and the constant changes. We at University Center of Lusiada have conceived and developed a new kind of course in order to prepare our students to face the new world order. A new order that to be good is not enough. It is necessary to be the best. To get this goal it is fundamental the scientific and technological dynamic to avoid the obsolescence. And more important than that it is to teach the students to learn by themselves. Taking all these aspects and the historical and policy moment of South America with the creation of Mercosul, we have developed an Engineering Course attempted to form the next generation of professionals. It is a project that is in fact a purpose of a curriculum that includes some humanistic subjects. The subjects will give the students the skills to overpass the challenge of the changing and unexpected global work market.

I. Introduction

The new century will certainly show a Mercosul politically and economically integrated and showing very good opportunities of work for all those people who are preparing themselves to face the common work market constituted by all the countries of the Mercosul Bloc which are: Brazil, Paraguay, Uruguay and Argentina.

The continental integration through Mercosul will amplify the horizons and will offer more opportunities to every Brazilian professional who demonstrates capability, competence and any other qualities that are common to high qualified people. This new professional should be aware that since now he would have to compete with more efficiency and quality in a much more hard market. These attributes will be obtained by means of solid knowledge that can be obtained in a good University Course.

As concerns to the Engineering Education in view of the global Economy and in our case in Brazil, the Mercosul that is the South American Bloc, it became necessary to search new ways of professional capability.

Our project considers not only the global changing but also the new educational policy that has been implemented by Science and Technology Ministry of Brazil.

The Project we have conceived, developed and applied is basically the adoption of some subjects which we believe will give the future Engineer the enlightenment and experience that are necessary to overpass the challenges of the post industrial era¹.

II. Engineering Education

Thinking about Engineering Education presently and what it can become in a near future, as well as to realize the space dimension that exceeds the Campus. It is important to consider the dynamic of the relations between space and time. The connection with society, with the College and the person that have been and can become in the future.

The Long Formation has to consider the necessity of preparing a professional who is able to deal with the instability because it is not possible to use the same practice for new situations. To deal with the new, the different and the movements requires a reflexive action that questions the stabilized, that reforms the problem building and testing new broaches².

This consideration does not happen only, and does not finish in the formation itself but it extends in the professional practice as a continuous feedback of knowledge. It also happens with partnerships and the exchanges with theorists and students. It is necessary an analytical look over the action before, during and after it (considering the perspective of what it can be).

Observing the difficulties that the future Engineer will face it is interesting to make him to look inside himself and view the process in which he is inserted. So he will be able to resist the pressures of fashions. He will learn how to consider and to act in each moment in according to his own singularities.

In this case the globalization does not mean to grind neither homogenizing but to approach the contact with the differences so that new diversities can emerge to attend the necessities and singularities of the person.

III. Considerations about the Project

The purpose of the Project we have developed is in essence the inclusion of some subjects of human sciences with the goal to stimulate our students so that they adopt a strong ethics and also to increase their creativity.

To get this goal the following subjects have been included in the curriculum: Philosophy, Development of Projects, Assisted Training Period, Human Resource and Management Strategy.

In 1999 the subject Sociology has been included because the coordinating group considered the necessity to increase the importance sense of Engineering for society and humankind. The goal is to show the students the commitment of Engineering with society, humankind and environment.

These subjects allied with the basic science can provide to our Engineers a new view and a new way “to make Engineering”.

IV. The Subjects

The Professors have elaborated the content of each subject avoiding unnecessary information in a way not to overload the students and also to keep their interest. The objective is basically to stimulate their creativity and the adoption of strong Ethics models³.

Sociology the most recent subject included in the Curriculum will provide the students an opportunity to discuss the science and technology commitment with environment and humankind in a large way. The main goal is to show them the importance of new policies of producing taking in account not only the environment but also the relation of man with nature.

Philosophy is a very important one principally because it is a great opportunity to the students discussing all those matters. Socrates, Plato, Aristotle gives them a whole spectrum of political philosophies.

This subject will provide the students not only how to deal with others ideas but also to increase their creativity, that is fundamental for any activity. Besides it enriches the conception of Ethic that is so important to the development of Science and Technology in according to environmental necessities.

Human Resource shows and discuss human behaving topics in Human Resource Management offering the students the most recent aspects of it, as well as to put them in touch with executives of enterprises by means of meetings and talks. This subject presents the students how to deal with people while human being, mates, consumers and clients learning about the human resource management in different realities in different organizations. They can view a whole universe of possibilities and success since they learn about their own limits and how to work as a team.

Development of Projects can count with an advisor Professor who accompanies the student, during last two years of the course. This subject gives the students the designing, the execution and the interpretation of the results of a project.

It can be a little hard in the beginning because of the lack that exists between second grade formation and University formation. Anyway they learn how to propose, to develop and to present their projects, which is an important achievement for their careers in the future. When they finish the course they will be able to report to everyone with confidence, no matter the number of people.

Assisted Training Period, which is basically the experience of working in an Enterprise. The student works effectively fulfilling a program developed by the Faculty and the Enterprise. The student is assisted by a Professor and a supervisor of the enterprise until to complete the work.

This subject gives the practical experience that show the student not only the “know how to do” and the “Why to do” but also the practice.

Management Strategy provides the future engineer a good skill of Management Theories, the old and the newest ones. They have a wide discussion about the latest models of strategies and as much as possible, the opportunity of applying some of them. This is very important considering that a big amount of Engineers has to deal with management.

The main objectives as related above, are to give the students the basic knowledge about Philosophy and Science and the development of a strong Ethics as well as “learning to learn”^{4,5,6}.

V. Subjects Distribution

The subjects are offered along the course of five years and the following distribution has been adopted:

- Sociology and Philosophy in the first and second years respectively;
- Development of Projects and Assisted Training Period in the last two years;
- Human Resources and Management Strategies in the third and fourth years respectively.

The suggested distribution of the subjects was conceived taking into account the considerable number of Basic Science, Basic Science of Engineering and specific Subjects of Specific areas of engineering which are essential^{7,8}.

The goal is to improve the Engineering Education modifying those aspects that make the course so much and only technical. Besides, the knowledge they will achieve specially in Philosophy will contribute to get criterion about things that surrounds us and to develop a strong Ethics, which is so important in work relations. This distribution has to be made without to overload the just heavy and tight schedule of most Engineering Courses⁹.

VI. Engineering Course

The courses of Engineering that are offered are Electrical Engineering and Chemical Engineering. There are classes in the morning and in the evening. There are a number of sixty students per class.

The students are admitted in the Courses after getting approval in the hard exam that is called Vestibular that happens twice a year, in January and in July.

Besides the students are supposed to have fluency in any language preferably English and/or Spanish and to know how to use the technological tools available in the market.

VII. Evaluations

The evaluation criterion is up to the Professor responsible for each subject. It can be done by means of works, seminars and tests or any other method. This flexibility is important because of the subjects' objective that is to give the student an opportunity to meditate and think about and not only to achieve knowledge. Like the other subjects a minimum score is required to the approval for the following year.

It is important to emphasize that the students can count with well-equipped Libraries, Internet accesses and a staff specially trained for helping to solve doubts. A special schedule has been elaborated so that the students can have as much attention as possible without overload the schedule.

VIII. Results

Every year the Professors and the students have a questionnaire to answer. It is supposed that they answer it honestly so that it is possible to make an evaluation of the quality of the contents and the adjustments or changing that must be done to get a better result for next years.

An evaluation of some subjects has showed positive results like Philosophy that has causing a good impact in the students. On the contrary of what was expected they like it because it is a very relaxing class comparing with others. Assisted Training period has also given them the experience of working as Engineer and it helps them to get more confidence. Besides they have an opportunity of feeling what is to work as Engineers. The subject Development of Project works better if they have it in the last two years when it is possible for them to have a better performance.

IX. Conclusions

The technological process has caused deep transformations in the entire producing system and as a consequence in the work relations. What occurs is that an increasing number of people have work and not job. This situation demands extra abilities.

The University is an Institution created quite more than 700 years ago and it is also in constant evolution. Presently the Modern University is very important to the generation and the diffusion of knowledge. Besides its fundamental function to prepare citizens for life teaching them a profession is one of among other things. Its compromise is above all with the research and the appliance of new scientific knowledge that it generates.

As Engineer is the agent of progress and so the agent of transformation of human life, it is time not only to meditate but also to change and to do effectively something to make it better. Better Engineers, better Engineering.

Thinking about these aspects our Project comes to attend these new necessities. A new kind of Engineer committed with social values and prepared to face the challenges of the postindustrial era, inserted in the Mercosul reality.

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