

A New Engineer for a New Global Market

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Abstract - This is a work that has been conceived to attend the increasing need of a new kind of professional principally Engineers, considering that they are responsible for a big part of the Science and Technology development in the world. It is a Project that has been developed for two years in University Center of Lusíada and it is in fact a simple purpose based in a research with the Academic Community and Human Resource Consultants. It is basically the adoption of a Curriculum to the Engineering Courses with the inclusion of some subjects that are supposed to give the students the skill to overpass the challenge of the new work market of the South America. This is the main goal of the Project described in this paper, it is a way to form Engineers that will be able to deal with the various unexpected situations as a consequence of this new world order. Although it is a young project it has been showing some profitable results.

Introduction

Latin America is a complex continent where exist several countries with different origins within a similar historical process. At the present historical moment the conflict created in the colonial economy comes up now with the globalization process in a wider and acuteness way, with the neoliberalism policy which imposes again an uniform economy to our countries by means of International market and its institutions as World Bank, International Monetary Fund and others. This historical moment presents also contradictions in the global world, the countries are jointing in blocs If this integration is made by International enterprises, in another way we know that the circulation of capital and products are realized through the borders and it brings also people, ideas and knowledge.

As concerns to the Engineering Education in view of the global economy and in our case, the Mercosur which 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 which has been implemented by Science an Technology Ministry of Brazil.

The Project we have developed suggests the inclusion of some subjects which we believe will give the future Engineer the enlightenment and experience that are necessary to overpass the new competitive global work market.

Science and Technology

The globalization of the Economy was possible because of the Technological advances based in electronic and informatics; the development of a network of instant communication comprising the entire planet; and the economical integration between countries, regions and continents, commanded by big corporations and International enterprises. So we have the named Global Society.

All this make us think about the responsibility of the Institutions of Education which are inserted in this new global society, because they are at the same time being transformed and also transforming. That is why a discussion about Science and Technology is always important.

Human life is social and there is no science that is not in any way social science because it develops and happens into a physical and time space. It processes in the world, in the rational and in the empirical world that are mixed [1].

Science is a process of creation of new concepts elaborated by the observation and quantizing of the phenomenon. These concepts unify or comprehension of the world and this process of creation is presently unique more audacious and of larger competence. Science worries with what we name the "Why to do".

Technique is basically the manner in which technical details are treated. It is about the basic physical movements that are used to realize any plan. It is what we name "How to do".

So Technology that is the manner of accomplishing a task using technical methods or knowledge, we can say that it is the sum of "Why to do" and "How to do" or it is the sum of Science and the Technique.

Some Considerations about Engineering Education

Analyzing the Engineer and his formation it is necessary to consider all the changes that society has been passed through and how as a professional, the Engineer can adopt some of them without loose his identity as a person and as a unique professional [2].

Thinking about Engineering Education presently and what it can become in a near future, as well as to

realize the space dimension that exceed the Campus, it is important to consider the dynamic of the relations between space and time, in connection with society, with the College and the person that have been and can become in the future.

The Engineering Education can be expressed as a virtual process which gets up to date while it occurs, in according to the place and time. It attempts to the changes in the several ranges of society, getting them appropriated, placing the professional formation in constant reformation and construction, generated between the conflict of the old and the new.

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 which questions the stabilized, that reforms the problem building and testing new broaches.

This consideration does not happen only, and does not finishes in the formation itself but it extends in the professional practice as a continuous feed-back 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 that he is able to resist the pressures of fashions and learning how to consider and acts 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 can emerge to attend the needs and singularities of the person. And also without denying the reality and in seclusion in a single world as a resistance to the changes and transformations but also submitting to them totally.

It is necessary to create an space, a moment to the discussion and investigation of social and professional points of Engineering, opening a channel to dialogue with the difficulties of being an Engineer in a social context which is in constant and rapid transformation.

The conceive and appliance of this Project takes into account the material and human resources available in the University Center.

The Purpose of the Project

After a research with professionals who are just working and those who are teaching at the university, and after a discussion we concluded that the following subjects could be included in the Engineering Courses: Philosophy; Development of Projects (in the different Levels); Assisted Training Period; Human Resource and Management Strategies [3].

This is an experience that has been realized now for two years and a partial result can be got.

These subjects allied with the Basic Science can provide to our Engineers a new view and a new way to face and overpass the challenges of the new century's work market.

Considerations about the subjects

The contents of the subjects were elaborated in a way to avoid unnecessary information not to overload the students and also to keep their interest. The objective is basically to stimulate the creativity of the students and the adoption of strong Ethic models.

The Philosophy - that is the study and the creation of theories about basic things such as the nature of existence, knowledge, thought, or about how people should live - is very important principally because it is a great opportunity to the students to discuss all those matters. Socrates, Plato and Aristotle for example, give 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 behaving topics in human resources 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 subjects 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 besides to learn how to work as a team.

Development of Projects can count with an advisor Professor who accompanies the student, since first year of College. 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 College formation. Anyway they learn how to propose, to develop and to present their projects which is an important achievement for their carriers in the future. When they finish the course they will be able to report to everyone with confidence no matter the number of people they have to do it.

Assisted Training Period which is basically the experience of working in an Enterprise. The students work effectively fulfilling a program developed by both, the Faculty and the Enterprise. The student is assisted by a Professor and a supervisor or coordinator until to complete the work. This subject gives the practical experience that show the students not only the "know how to do" and the "why to do" but also the practice.

Management Theories provides the future Engineer skills 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 in practical exercises. This is an important subject 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 Ethic [4].

The Distribution of the Subjects

The subjects are offered along the course of five years and the following distribution was adopted so that the students have:

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

The distribution suggested was conceived taking into account the considerable number of Basic Science Subjects of Specific areas of Engineering which are essential [5,6].

The goal is to improve the Engineering Education, modifying those aspects that make the course so much and only technical. And it has to be made without overload the just heavy and tight schedule of most Engineering Courses [7].

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 objective of the subjects which is to give the student an opportunity to meditate and think about and not only to achieve knowledge. Like the others subjects a minimum score is required to the approval for next year.

It is important to emphasize that the students can count with well equipped Libraries, Internet access and a staff specially trained for helping to solve doubts.

Results

Although it is a little early because the experience has been developed for two years, it is possible to get some results.

Evaluations of some subjects has showed positive results. Philosophy is one example and it has had a good impact since the students related the increasing of their ability of developing criterion. It helps a lot when making a decision is necessary, principally when the decision involves Ethic and common well fare. They

also provided more confidence to face the responsibilities and the growth of the perception of what surrounds the work itself.

Conclusions

The Technology produced by Science modifies the Society and the Technological Society modifies the Science and so we have a continuous circle each time more and more complex and accelerated. The present Society is distant from yesterday and it is far from tomorrow.

Previously the work was developed with the dimension of past in the present, now the work is developed with the dimension of the future, with the prediction.

So the transformed Society and also transformer, has been designed for a future, it conceives Institutions and people that reflects this way of being.

As Engineering is the agent of progress and so the agent of transformation of human life, it is time not only to meditate but to change and to do effectively something to make it better. This Project focus the necessity to form Engineers that are in according to the reality of South America and the social aspects of Engineering as well as to the new work market. In more three years we will have a new kind of Engineers, more creative, more critics and more attempt to the quick transformations in the every aspects of professional life integrated with the new world.

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