



Interdisciplinarity In The Curriculum Titling Option

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ABSTRACT:How is the Degree Academy of the Communications and Electronics Engineering career of the INSTITUTO POLITECNICO NACIONAL, Campus ESIME Culhuacán carry out the Degree by Curricular Option with the specific purpose of integrating interdisciplinarity? Through this work, the importance of teacher bonding is reflected in their various specialties where teachers guide and advise students in the preparation of research projects in order to obtain their engineering degree. **Prospective Project Development is the subject in eighth semester and Engineering Project is the subject in the ninth semester**, where students in teams of up to three participants together with their subject teachers and their advisors and tutors combine communication, experience and theoretical-practical participation as active subjects in the production of the knowledge reflected in their projects.

KEYWORDS: Higher education, interdisciplinarity, curricular qualification

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I. INTRODUCTION

Increasing interdisciplinarity is the main goal in higher education institutions in Mexico since 1990, both public and private higher education institutions have proven that research has become interdisciplinary on a large scale. Currently, there are already magazines of international publications and indexed in almost all areas and countries to spread information worldwide. Interdisciplinarity in the last decade has shown that some problems are so complicated that they should not be solved by a single discipline. Interdisciplinarity involves the combination of two or more academic disciplines within one, for example in engineering projects, since it involves knowledge from various fields such as Methodology, Economics, Sociology, Biology, Chemistry, Mathematics, Physics and more..

II. DEVELOPMENT

It is about creating or complementing something new with external thought and knowledge, it is related to an interdisciplinary field which is an organizational unit that crosses the boundaries or traditional boundaries between academic disciplines and schools as new needs and professions emerge (Vienni2004). The large engineering work teams are usually interdisciplinary such as the creation of a hydroelectric plants, mobile telephony, Google Maps or digital animation, which require the integration of several specialties. The interdisciplinary term is now implicit in junior high secondary education and higher education, where there is an opportunity to carry out degree research projects or scientific works that require methodologically the collaboration of various disciplines together with that of specialists in various areas.

Groups of researchers, students and teachers are involved with the aim of linking and integrating different ways of thinking, professions or technology with a specific perspective but with the main idea of a common goal progress and innovation.

Study and research groups: students, teachers and advisors.

To integrate the interdisciplinarity within the I.P.N. Titling or Graduation Academy by Curriculum Option in the Escuela Superior de Ingeniería Mecánica y Eléctrica campus ESIME Culhuacán, teachers of different specialties are involved and act as advisors during the two semesters required to finish the project that the students chose. At the same time the students take the two subjects that will allow them to have the right to a

curricular qualification, that is, they need a grade of no less than eight (B or B+) and 90% attendance is required each semester). Joining some interdisciplinary disciplines related to each other and with defined relationships so that their activities do not occur in isolation, dispersed or fractionated (Sans 2002). Here are some examples: Electromagnetism (of magnetic theory and its relations with electricity), Process Control (of the relationships of mathematics and control theory), Robotics (of the relations of electronics and mechanics).

The interdisciplinarity is proposed in the degree projects of the Engineering in Communications and Electronics career as a concrete offer that facilitates the linking of the different disciplines of higher education in the work and personal contribution of each teacher, that forms part of the common good and growth for themselves as teachers, tutors and students while carrying out their projects. Since interdisciplinarity in this case, is achieved and grows when teachers also grow personally in the relationship with the students and other teachers as well, it is important to carry it out freely in the pursuit of the objectives within the binding unit and when the teachers can provide a free personal sense of their knowledge and activity to support the student in the development of his degree project. The student chooses to take in eighth semester the subject: **Prospective Project Development** and in the ninth semester: **Engineering Project**.

Based on this it is understood, that a very important part of training and growth in the teaching profession is based on how educational institutions of higher education emphasize collaborative work and interdisciplinarity. The common goal of teachers is to be the way or the means to offer an openness and link between teachers and students in the constant search for the improvement of the academic community and where those involved do not lose their identity and without renouncing to their own knowledge (Pino Diaz 2010).

These personal contributions are only possible in a field of teaching-dialogue in search of the truth with the other teachers in an environment of generosity and friendship. Science requires a strong interdisciplinary collaboration and a collaborative work mentality, the mutual help of this knowledge can be an example and key to thoroughly understand this interdisciplinary union, because one science enriches another.

The isolation and lack of interpersonal relationships among teachers hinder interdisciplinarity. Teachers usually lack the time to achieve this academic collaborative treatment, because they feel obliged to devote more time to their own specialty. Interdisciplinarity is a benefit where, what is interesting in the case of curricular qualification, is to pose the problem well, because a good approach to the problem leads to a better or wiser problem solution. At the end each science has its place, and it is related to their own cognitive level, some sciences may be superior according to the distinctive theme. In the same way different sciences can be linked from the principle that each science is a different mode of human behavior of the researcher before the situation in which he is more or less committed and then, they can be linked together hierarchically according to the academic and personal commitment.

III. METHODOLOGY

Methodology in an investigation process provides the ordering of the corresponding steps for each type of research. In this case each degree project. At the same time, this activity is based on the practice and experience of the teachers, institution researchers and tutors. What are the strategies for implicit learning in interdisciplinarity? To answer this question, it is necessary to analyze it from several points of view. The students are from the last semesters with different specialties within their own career: **Acoustics, Electronics, Communications, Computing and Control**. The youthful condition in this academic unit as in many others is varied, and with all that it implies, like their economic status, parents academic situation, if the student works and studies at the same time, if he is single, if he lives alone, if he maintains himself or comes from another city etc. but in the first place and putting aside all the obstacles is the desire to become a professional, in this case an Engineer in Communications and Electronics.

Something to think about: Putting into practice the knowledge of the scientific quality criteria socially legitimated, is the reason that science is facing a change towards social, labor and academic accountability producing an integral graduate with an educational application and the use of knowledge for problem solving, who are treated in cooperation among the teachers of the subject, two engineers according to their area, a methodologist, advisory teachers and tutors.

For this interdisciplinarity commitment what important factors should be taken by the teachers, tutors and advisors, in order to achieve this institutional goal?

-First, dialogue with the student so he can realize that there is this general "ignorance" and that no one knows everything, even the scientists, there is always something to learn or to discover. For the students, the main objective is to achieve a technical-practical result that at the same time will allow him to specify and finish a research project for his degree that has to be completed and functioning perfectly at the end of the ninth semester.

- The student should **be led wisely** to look for the possibility of facing the probabilities of success and resolution.
 - In order to advance and apply science the student should **be able to use the laboratories** and have the instruments and **specialized equipment** that he needs, (two sessions of three hours in the laboratory per week, and the possibility to assist every time that he requires it).
 - The student during the two semesters will have the **support and advice of the methodologist** to ensure that he understands the content of the structural outline of the dissertation and thesis.
 - Sessions are scheduled at the convenience of the student** for attention by his two advisors.
 - The student during the two semesters **will constantly make oral presentations** to his teachers and advisors in class with Power Point or Prezi for example, along with **the written report as he advances**, to check the progress of his project.
- The student will **obtain his evaluations periodically in order to feedback** with his engineering professors, advisors and methodologist to be able to check doubts and realize autonomous learning with the internet.

IV. RESULTS

We have to become familiar with the different approaches to knowledge in order to carry out changes in higher education: globalization. The degree or Titling by the curricular option, is an outstanding opportunity for the application of interdisciplinarity where it is required to favor self-training and be at the forefront in the different fields of scientific knowledge, that help students to develop their skills and attitudes as a human product with social and labor repercussion. Adequate teaching material and the updating of the faculty staff and of the Degree Academy were required. The teacher acquired and developed didactic abilities in addition to the knowledge of his specialty in order to share this teaching successfully.

V. CONCLUSIONS

Achieving the integral formation of the Communications and Electronics Engineer, more than an intention, must be a purpose and this implies a constant search and update of the main needs of interdisciplinary learning generated from the problems of the profession and the rapid advance of knowledge that must declare the preparation of integral professionals committed with themselves and with society with the aim of achieving efficiency, effectiveness and competitiveness by analyzing the criteria conclusions that support the interests of the country.

The students showed a high level of motivation to integrate interdisciplinarity in these subjects for their degree where they managed to combine all the knowledge acquired and their different skills in solving problems achieving their own benefit, for the family and society.

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