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Structured Graduate Programs Design Proposal for UNEXPO Institutions System

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Abstract: The UNEXPO (National Experimental Polytechnic University) system is a public institution dedicated to teaching and researching in engineering area. It was formed to bring together three main institutes located in Venezuelan cities and three more institutes located in rural areas, so that to collectively and collaboratively serve the regions in optimal ways. The academic activity started in 1982 graduating engineers and technicians, although less effort has shown by authorities to develop programs in graduate engineering areas. A proposal for designing a structured graduate program is presented. The structured program presented, will hopefully set the basis to develop graduate and doctoral studies in engineering and related areas to the whole university system, and to achieve academic and social development to the country.

Key words: Engineering graduate, postgraduate structured, postgraduate integrated.

1. Introduction

In 1941, decisions were made to create graduate studies separated from the used to be standard engineering programs. This decision made it possible to develop university institutions capable to offer graduate studies to people holding an undergraduate diploma. Nowadays, there are 160 universities and colleges for higher education offering academic five years engineering degrees, academic three years for technical degrees, which called TSU (Técnico Superior Universitario) in Venezuela, and also graduate programs.

The UNEXPO (National Experimental Polytechnic University) system is a public institution dedicated to teaching and researching in engineering area. It was formed to bring together three main institutes located in Venezuelan large cities and three more institutes located in small cities, so that to collectively and collaboratively serve the regions in optimal ways. At present, the UNEXPO system has a main campus in Barquisimeto founded in 1962, a main campus in Puerto Ordaz founded in 1964, and a main campus “Luis Caballero Mejías” located in Caracas and founded in 1974, all of them offering five year duration engineering programs. Between 1982 and 1984, the UNEXPO system increased its coverage including campuses in the small cities of Charallave and Guarenas close to Caracas, and Carora close to Barquisimeto, to offer three years duration engineering technical programs (called TSU in Venezuela) [1]. Therefore, up to the year 1984, the UNEXPO system has three main campus offering careers in electrical engineer, mechanical engineer, industrial engineer, chemical engineer and computer engineer; and three secondary campuses offering three years duration technical programs in construction, electric and mechanic. It is only in 1988 that the UNEXPO system initiated graduate programs in the main Barquisimeto campus and later on in the rest of the main campuses. Although secondary campuses include additional programs in engineering (mechatronic, railway, rural

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and industrial), none of them offer graduate studies. In summary, at present, the main campuses of the UNEXPO system offer five year programs in engineering and a limited graduate studies at the level of specialties, master degree, few doctoral program and none post doctoral program. However, secondary campuses do not offer any graduate studies. The question is then, why secondary campuses after 30 years of operation, with a population around 2,000 students, 250 expert teachers, nearly 3,000 students already with engineering degrees and with UNEXPO strong presence in those regions, do not have graduate programs? Moreover, there are 18 higher education institutes nearby and an industrial development in those small cities where professionals take part, which means a possible industrial population interested in undergoing postgraduate studies.

The majority of graduate students are interested in continuing and enhancing education, and for professors, the demand is even greater, since it is through graduate education that teachers and/or researchers can fully achieve promotions and a successful career development.

Due to the fact that all secondary campuses are geographically distant from the main campuses and there are other educational institutions which are relatively new in the region, it can be justified the development of academic graduate studies within the areas [2]. Thus, a broad scope design proposal is made herein which enables to establish a graduate program covering all specializations and professional needs, within a legal frame [3].

The paper is organized as follows: Section 2 describes problem approach; Section 3 is the methodology; Section 4 is legislative theoretical framework; Section 5 is a survey of population study; Section 6 presents design of a structured postgraduate program; Section 7 is a proposal of a structured postgraduate program design for UNEXPO campuses; and Section 8 presents conclusions.

2. Problem Approach

UNEXPO as a public university must guarantee the education of professionals, graduates and professors providing postgraduate studies so they can be able to do researchers and to be better qualified to undergo academic purposes. In spite of the fact that UNEXPO has three subsequent campuses placed in Carora, Charallave and Guarenas, and after 30 years of undergraduate education experience, it has not had a justification strong enough to efficiently develop an academic graduate program.

3. Methodology

The method used herein is a desk-based descriptive research and the object of study is based on a survey; and a structured designed proposal was established.

4. Legislative Theoretical Framework

In Venezuela, in order to develop a postgraduate education, a series of laws and regulations must be evaluated, approved and accredited. Hence, a general review to determine the variables in a postgraduate design was carried out. Venezuelan legal system begins with its constitution, reformed in 1999, and in which there appears the importance of education. Afterwards, in 2009, it was set forth the Organic Law of Education which establishes the education as mandatory, public, free, of quality, integral, permanent as well as its continuity in all times and places in application processes, permanence, promotion and performance of professionals in the educational area. It also establishes that policies and programs of permanent education for teachers and professors must be planned, coordinated and carried out in order to enhance and update their knowledge [4].

Considering the legal sequence, the General Regulation of the Organic Law of Education in which appears a different education leaving in force the Act of Universities of 1970, was enacted in 1999 [5]. In such there is a National Council of Universities [6], which is the regulatory body of the educational system in

universities in charge of ensuring, coordinating, and deciding all postgraduate matters, having as an advisory body the Postgraduate National Advisory Council. Said Law establishes all matters related to the teachers and professors careers. It sets up that after a contest, the teacher will enter as an instructor and will be in an upper level only after being fulfilled all requirements in researches and working time. The promotion positions for professors are as follows: instructor, assistant, aggregate, associate, and full professor, requiring a Ph.D. or doctoral academic degrees to be promoted for associate professor and/or full professor. In 1995, through the Official Gazette, the National Council of Universities published that, in order to move to different levels or categories, a professor must publish graduate specialization papers or hold a master degree up to aggregate category; and must publish a doctoral thesis needed to ascend to any of the categories beyond aggregate.

In 1983, the National Council of Universities states the rules of accreditation graduate studies. These rules have been modified in 1996, 2000 and 2001. The last modification states that postgraduate studies are aimed for graduates and that universities may develop specialized technical programs for TSU graduates, and specializations, masters and doctorates for all graduates and post doctorates for doctorate students. Each postgraduate program must be designed, justified and submitted for approval [7].

For postgraduate degree academic studies assisted by a tutor, the minimum requirements are as follows:

- Technical specialization for TSU:
  - 24 credit units;
  - Preparation and approval of a technical written work;
  - Maximum extent time: three years.
- Specialization for graduates, engineers or equivalent:
  - 24 credit units;
  - Preparation and approval of a specialization degree thesis;
  - Maximum extent time: four years;
- Masters:
  - 24 credit units;
  - Preparation and approval of a thesis;
  - Maximum extent time: four years.
- Doctorate:
  - 45 credit units;
  - Preparation and approval of a doctorate thesis;
  - Maximum extent time: five years;
  - Instrumental knowledge of a language different from Spanish.
- Post-doctorate:
  - Not leading to an academic degree;
  - May have credit units and a research paper;
  - An approved certificate must be granted.

The UNEXPO legislation begins in 1991, but it is not until 1994 that the General Regulation of the University is published in the Official Gazette. Therein, it is stated as the main purpose of the university the educational and professional training in the technologic and scientific areas, in pure and applied sciences as well as in all other educational areas in undergraduate and graduate academic degrees. In 1999, UNEXPO University Council approved the rule to change the dedication of professors and states that for the category title of instructors, they must be at least studying for a postgraduate degree, but for other categories, the professor must have already completed his/her postgraduate studies. The 2001 UNEXPO Regulation of Entry and Promotion of teachers and researchers states that in order to ascend to the category of assistant or aggregate, a written paper of fourth and fifth grade level may be used, specialization, master's or doctoral thesis and the doctoral paper may be accepted for the categories of associate and full professor.

In 2007, UNEXPO council approved the Postgraduate Studies General Regulation [8], additionally stating the following:

- Technical specialization:
  - 77% mandatory courses;
  - 25% elective courses.

- Professional specialization:
- 18% mandatory credit units;
- 6% elective credit units.
- Masters degree:
- 12% mandatory credit units;
- 18% elective credit units.
- Doctorate:
- 12% mandatory credit units;
- 33% elective credit units;
- At least 50% of credits must be approved in the doctorate program.

5. Survey of Population Study

For this research, a survey was applied in Charallave Campus. Six graduate students and 39 professors of different categories were interviewed.

The questions were as follows:

(1) Would you like a postgraduate program in this campus? Yes or No.

(2) Would you like a postgraduate program at all levels? Yes or No.

(3) Would you like it to be associated in only one research end? Yes or No.

(4) Would you like that the approved postgraduate degrees be accredited for other following postgraduate degrees? Yes or No.

(5) Would you like it to be called: (a) technology, (b) engineering or (c) polytechnic?

Once the survey was applied, the results obtained were written in Table 1. The results show the trend of the population interviewed in Charallave, and indicates an acceptance to have a postgraduate program, highlighting the word technology.

6. Design of a Structured Postgraduate Program

The design of a postgraduate program associated to different levels and specializations depending on the undergraduate program gave rise to several alternatives that are stated as follows, as well as the reasons why they were approved or rejected.

Table 1 Survey results valued in percentages.

Question	Yes/A	No/B	/C
I	100%	0%	
II	94%	6%	
III	86%	14%	
IV	100%	0%	
V	66%	34%	0%

6.1 Graduate for Each Specialization

This would imply to develop as many graduate programs as specializations exist. It requires a lot of time and the design of at least four postgraduate programs in each level [9].

6.2 Unique Graduate with Different Special Mentions

This resembles the upper stated result though for legal purposes, each special mention would imply the design and approval for each specialization as it were a different graduate program.

6.3 Different Postgraduates for Each Postgraduate Level of Study

This would imply that the relevance, research line and justification should be different, which would set an inconsistency to guarantee the continuity of postgraduate studies.

6.4 Postgraduate with Only One Main Research Line

This alternative allows simplifying and maintaining all postgraduate levels under one subject matter, and thus grouping all specializations.

7. Proposal of a Structured Postgraduate Program Design for UNEXPO Campuses

Considering all legal matters within the national territory as well as in the UNEXPO, a proposal of a structured postgraduate program design using different levels integrated with a primary research line structure defined as technology and shown in Table 2. Table 2 shows postgraduate level, name of study, total of credits, postgraduate study accreditation or professional experience, and application and graduation requirements.

Table 2 Proposal of a structured postgraduate design.

Type of study	Credits	Accredited credits	Application requirements	Graduating requirements
Technical specialization in technology	24	3 C/U 3 years of professional experience	TSU or engineering degree	24 C/U pass technical written work
Technology specialization	30	6 C/U by postgraduate degree or 3 C/U 3 years of experience	Engineer or equivalent	24 C/U courses Pass 6 C/U thesis project
Research and technology Masters degree	36	9 C/U each postgraduate degree	Engineer degree or equivalent	30 C/U courses Pass 6 C/U thesis project Language proficiency Present a paper before a conference (ISBN) or PEII A
Doctorate in technology and innovation	60	24 C/U each postgraduate degree	Engineer or equivalent	48 C/U seminars 24 C/U doctorate schooling Pass 12 C/U doctoral thesis Language proficiency Write an article in a specialized journal (ISBN) or PEII B
Post-doctorate in advanced technology	30	12 C/U doctors degree	Doctors degree	21 C/U seminar Pass 9 U/C research paper Have a patent or PEII C

A structured planning is established considering five levels of study for academic postgraduate programs in Venezuela. This proposal includes an application requirement variable like if the researcher has been accredited. In Venezuela, there exists an Innovator and Researcher Incentive Program (PEII, in Spanish) assigned to the Ministry of Science and Technology where the country's researchers are accredited.

This variable is then used as an alternative for graduation requirements with the purpose of promoting investigation importance. Hence, if a teacher studies and has a specialization, masters, doctorate or post-doctorate degree, can fulfill all teaching categories established by Venezuelan laws.

8. Conclusions

The conclusions of our work are as follows:

(1) The proposal is a planning that allows the incorporation in postgraduate studies of all graduate students and teachers;

(2) The proposal as a structured planning allows teachers to overlap their career upgrading which guaranteeing promotions;

(3) To be an associate professor is required a doctorate degree, but this planning allows the study for the doctorate degree or just follows the model;

(4) The accreditation sequence considering previous postgraduate degrees allows an acknowledgement and incentive, and thus contributing to the professor's performance.

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