

How the Academic Profession is Perceived in Public Technological Universities in Mexico

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Abstract

In this descriptive study, we utilized the national database that was obtained from the international APIKS, Academic Profession in the Knowledge – Basic Society survey, where 3,776 Mexican professors participated from the different public research centers, federal public institutions, state public institutions, technological public institutions, as well as from private institutions. This research emphasizes on the analysis of the public technological institution subsystem, in the variables of gender, preference between teaching and research contract situation, salary, labor and salary, professional environment, that are part of the elements composing the instrument applied to the professors working in higher education institutions. One of the purposes is to find out more about productivity, degree of satisfaction about the conditions and academic work nationwide.

Keywords: higher education, academic profession, teaching, research, technological

1. Introduction

Currently, higher education is reaching different dimensions, therefore, due to the importance that technology has currently, several countries around the world refer to an institutionalized technological higher education. Such is the case of Germany, Chile, France, and Portugal, just to mention a few. In these places, the situation is as follows: in Germany, there are currently 17 technological universities focusing mainly on teaching Sciences, Technology, Engineering, and Mathematics (STEM). In addition to this, they have a great liaison with companies both inside and outside the country, which grants these institutes a great level of prestige (My German University, 2021). In Chile, technological institutes not only focus on teaching STEM subjects, but they also include Administration, Health Matters, and Gastronomy; always concentrating on excellence in education, thus ensuring the employability of their students (Instituto Tecnológico de Chile, 2022). Technological institutes in France, are the best in the country due to their focus on Research and Engineering, where most of the alumni are able to find a position (Estudia en Francia, 2022). In Portugal, these institutes have the goal of promoting and developing higher education, and are able to excel due to the high level of their students, as well as promoting research and innovation (Keystone Master Studies). The UNESCO in its 3rd World Conference on Higher Education WHEC (2022) considered that higher education is an integral part of the right to education nowadays, at the same time of serving the purpose of producing pertinent knowledge, prepare thorough professionals, and have social responsibility, thus concluding with the objective of enriching education opportunities, and consequently provide better professional opportunities.

In Mexico, Technological Institutes (TI) started in 1948 in the states of Durango and Chihuahua. In 1959, they were separated from the Instituto Politecnico Nacional directly from the Ministry of Public Education or the Secretaria de Educación Pública (SEP). In 1990, Decentralized Technological Institutes started activities (Polytechnical Institutes operating differently from Federal TIs since they were created as entities that depended on State governments (Tecnológico Nacional de México, 2019). Currently, this subsystem is composed of 254 institutions, 126 Federal Technological Institutes, 122 Decentralized Technological Institutes, 4 Regional Centers of Equipment Optimization and Development and an Interdisciplinary Technological Research and Teaching Center, and a National Technological Research and Development Center (Tecnológico Nacional de México, 2022). Since its beginnings, technological education has been directed to the productive sector which currently is generating a direct gap between education and the work field since this is centered in the trends and

growing needs in the different regions in the country (Martínez, 2019). Among the activities and productivity of the professors at the Public Technological Institutes (PTI) we can highlight the fact that staff of full-time professors has increased in comparison to the number of professors which has decreased with regards to previous years. This is due to the new areas of development in education which has been adapting to student needs. However, the academic range has increased within this population since with the years there has been a higher number of professors with postgraduate degrees (Amado et al., 2013b). In this sense, the number of professors and researchers in the National Researcher System (SNI in Spanish) has increased to 36,554, and 3,767 are currently part of the technological subsystem, which represents a total of 10.30% out of the total (Conacyt, 2022).

Within the functions of the Ministry of Public Education (SEP, 2018) for technological and polytechnical universities, the most important items are proposing policies for development and reaching objectives, promoting curricular design, development, and innovation of the different academic programs, promoting participative planning processes within the institutions, in addition to promoting self-assessment processes and external evaluation of the education programs and to trigger that integral institutional strengthening programs are created. According to the 2020-2024 Sectorial Education Program (SEP, 2020) it is necessary to reinforce education programs and policies with the purpose of ensuring higher education in the country while improving their quality, both in their facilities and technological equipment. Estévez et al., (2021) mentions that Mexico has come a long way in the last couple of decades as far as research, however, it is significant that the number of hours allocated per week to research are insufficient. In spite of this, there is an excessive number of hours allocated to teaching, in comparison to other countries where there is a higher emphasis to research activities, thus promoting knowledge productivity in universities. By the year 2012, technological public institutions had a greater participation of professors, however, most of them did not have postgraduate degrees, they also had a higher teaching productivity at a bachelor's degree level and a lesser participation in research and teaching at a master's and PhD degree level. In addition to this, even though there was an increase in the number of female professors, there was still a male predominance (Amado et al., 2013a).

The APIKS project is the third of a series of international research where we intend to analyze the situations present in the different participating countries, from the perspective of faculty and researchers. This generates a wider perception of the higher education situation in the areas of: teaching, research, governance, among others (Huang, Aarrevaara, & Teichler, 2022). Also, Tilak, (2022) states that the application of this instrument has achieved a financial increase in the society of knowledge, thus triggering works on research and innovation in science and technology within Higher Education Institutions.

National and international studies of the academic profession conducted in Mexico highlight the International Survey of the Carnegie Foundation in 1991-1992 studying the Development of Teaching Over the Academic Profession in 14 countries. The Reconfiguration of the Academic Profession in Mexico 2007 (RPAM) 22 countries, the Academic Profession in the Knowledge – Basic Society (APIKS) 30 countries, which was also applied to the professors in higher education institutions. When reference is made particularly regarding the professional development of the parents that have higher education levels, it is more likely that the children maintain or exceed that level (Galaz et al., 2012). In other words, in the world panorama, the sustainable development of higher education is of vital importance; starting with teaching where the importance of prioritizing quality education and the integration of the different areas of knowledge in order to achieve a sustainable society is key (Ramos, 2020). In Europe, in the year 2000, they started to try to establish public and social policies to promote and support the academic profession without a gender distinction in every sector: social, education, labor, and there has been a notorious evolution in the presence of these different areas. However, these efforts are insufficient, due to the fact that the numbers continue showing a higher number of men especially teaching in universities, even when the number of alumni with postgraduate degrees in science and technology for women have successfully increased (Matarranz, & Ramírez, 2018). It is important to highlight that the regulations and public policies on higher education and non-discrimination, end up generating a very different result in daily life, where there is a difference between the gender dedicated to research and teaching. Without a doubt, it is more complicated for women to enter, and move forward in the hierarchical positions of the academic profession (Lozano, Iglesias & Martínez, 2016). On the other hand, Carvalho, Montané & Pessoa (2012) mention that in Iberian America strong efforts have been made for academic improvement, however these efforts have been insufficient. The changes reflected in education public policies in general have achieved favorable changes in higher education. According to (Merma & Gavilán, 2013; Rubio, 2007) in Latin America where the increase in the number of women teachers in higher education is still not significant enough. It is true that there has been a promotion in soft subjects, but there is still resistance regarding

subjects related to Engineering, Innovation, Technology and Mathematics. At the same time, in order to achieve a transversality of the academic profession in institutions, (Duran, 2017; Gutiérrez et al., 2020) agree on the fact that it is important that there are significant changes both in society, as well as in education and social policies to generate equal opportunities in academics, which will lead to significant changes in the insertion of academics without gender distinction in important job opportunities in the different public, social, and private sectors. In Mexico, there is still and evident inequality in job opportunities within universities, and even more for those with a higher hierarchy. Besides, there is still an evident gap regarding the areas considered between men and women as those developing in Sciences, Innovation and Technology (Miranda, 2007; Garay & Valle 2012; Cerva, 2018).

In the national context, as well as in the rest of Latin America, research and teaching are a resource that is not equally distributed between the hours and activities for academics since there is a higher dedication to teaching and not so much to research, in comparison to other countries in Asia or Europe, where there is a higher priority given to research (Teichler & Proasi, 2021). Mexico has sought the way to promote that professors can obtain higher academic degrees in their profession, so nowadays there are more that have a master's or even PhD degrees. This had a higher promotion with the 2000 public policies, in addition to the number of professors in the SNI (Amado et al., 2013b). On the other hand, new professors entering universities, as well as those with more experience mention that they feel a higher degree of commitment with their performance and participation in teaching. However, those belonging to the SNI keep a higher commitment to research, and not only to teaching, according to the balance of the academic indicators required by the different memberships in Mexico. Estévez et al., (2020) mentioned that professors agree on the fact that conditions are not the best, and there is a lack of resources to be able to carry out their teaching and research activities. At the same time, there is also a higher participation by females in the different higher education subsystems, but in proportion there are still more men in the profession (Galaz et al., 2012). On the other hand, women have had more difficulties to enroll in the SNI, which favors men. In time they have been granted easier access (Gutiérrez et al., 2020). Public policies have taken the task to develop different development programs and support to research projects for professors in the different education institutions that do a good job; however, it is important to mention that there is an evident development in the participation of both genders (Galaz & Gil-Antón, 2013). Therefore, for the purposes established in the present descriptive study, we will be analyzing the variables of the International Academic Profession in the Knowledge Society Survey, from the perspective of teachers in Mexican universities. So, we can establish as the main issue: What has been the evolution of the academic profession from the perspective of professors in public technological universities in Mexico? In the Results section we will be showing some of the results from the analysis of this topic.

2. Method Description

The method used for this research is of a descriptive nature exploring the data base resulting from APIKS, conducted in 30 countries. It is important to mention that we only used results from Mexico. There was a total of 3,776 participating professors in total. They integrate the sample representing the five types of Higher Education Institutions (IES): public research centers, federal public institutions, state public institutions, technological public institutions, and finally private institutions. Our study subjects are the teachers who participated in the national survey. This study emphasizes on the analysis of the public technological institution subsystem. We will particularly be analyzing the variables of gender, science, technology, engineering, and mathematics (STEM); the preference between teaching and research, labor situation of the contract, salary, professional environment. To analyze the data, we used descriptive statistics with frequencies and percentages (Hernández et al., 2014). The integration of the sample is of five types of higher education institutions integrated by Public research centers, federal public institutions of higher education institutions, state public institutions, public technological institutions and private institutions. We had the participation of 127 institutions out of a total of 139 selected from the APIKS database, the response rate of full time professors (PTCs) is of 3,776 which represents a 5.91% of the total answers in the survey applied to the total universe of 63,800 professors in Mexico (Estévez et al., 2020).

The methodology for the participation of the 30 countries was established based on the faculty population. Therefore, each one of the countries defined their own sample sizes and data collection from the APIKS project. For Mexico, we took the population of professors and established the size of the sample. Afterwards, we defined the procedure. In this process, we selected the emails of different academic researchers to invite them to participate and we included the link to the survey <http://www.mie.uson.mx/encuesta>. This survey had variables on academic career, professional situation, work situation, and activities, teaching, research, liaison activities, governance and management, and finally, about their personal background. This gives the total of 138 reactives. The management of the data obtained was done through SPSS, a program where we did the tables that we

analyzed in our research. For the time being, we only used the results from these reactivities as a form of descriptive analysis. We will later conduct a comparative analysis in the future.

3. Results

The results of the descriptive analysis are shown in each table, where we present the variables of gender, preference between research or teaching, degree of job and professional satisfaction.

Table 1 describes the percentage of women (56%) and men (50%) from a total of 1,986 professors of the State Public Institutions which represents a higher participation in the study in comparison to Public Technological Institutions, where the participation was only 8% and 9% respectively.

In addition to this as we may suppose, a higher percentage of professors with STEM participation are also in Public Institutions, since Technological ones only have a 2% participation.

Table 1 describes the participation in the STEM gender in each one of the Higher Education Institutions Subsystem (IES).

Table 1. Gender distribution and STEM participation per institution type

Type of IES	Gender		Total	STEM		Total
	Women	Men		No	Yes	
Public Research Centers	3%	4%	135	1%	10%	134
Federal Public Institutions	22%	29%	996	22%	37%	996
State Public Institutions	56%	50%	1986	55%	46%	1987
Public Technological Institutions	8%	9%	336	12%	2%	335
Private Institutions	10%	7%	323	10%	5%	323
Total	1529	2247	3776	2607	1168	3775

Source: Own design.

Table 2 shows the preference between research and teaching of professors in the different IES classifications which mentioned to have an affection for both, even though most of them are more inclined to research. This trend is present in all IES.

Table 2. Preference between research and teaching among professors

Type of IES	Preference between research and teaching				Total
	Teaching	Both, but more teaching	Both, but more research	Research	
Public Research Centers	0%	5%	78%	17%	134
Federal Public Institutions	2%	24%	63%	11%	988
State Public Institutions	3%	32%	61%	4%	1977
Public Technological Institutions	7%	33%	55%	4%	329
Private Institutions	15%	40%	41%	4%	320
Total	146	1109	2245	248	3748

Source: Own design.

Table 3 shows the opinion of professors regarding their current work situation regarding contracts and salary, to which most of them expressed to be highly satisfied with this section.

Table 3. Degree of satisfaction on their current work situation regarding contract and salary

Type of IES	Their current work situation regarding contract and salary					Total
	Not very satisfied	Poorly satisfied	Regularly satisfied	Highly satisfied	Very highly satisfied	
Public Research Centers	5%	8%	11%	37%	39%	134
Federal Public Institutions	8%	3%	6%	26%	56%	996
State Public Institutions	5%	7%	17%	34%	37%	1986
Public Technological Institutions	7%	9%	13%	34%	37%	335
Private Institutions	2%	2%	10%	39%	47%	322
Total	210	212	500	1231	1620	3773

Source: Own design.

Table 4 presents a degree of satisfaction that is generally pretty high of professors regarding their workloads and environments in the different Public Education Institutions.

Table 4. Degree of satisfaction regarding workloads and environments

Type of IES	Their current work situation regarding workloads and environments					Total
	Not very satisfied	Poorly satisfied	Regularly satisfied	Highly satisfied	Very highly satisfied	
Public Research Centers	2%	7%	14%	35%	41%	134
Federal Public Institutions	6%	6%	11%	30%	48%	997
State Public Institutions	5%	7%	18%	37%	34%	1987
Public Technological Institutions	6%	6%	14%	37%	37%	336
Private Institutions	3%	6%	15%	35%	41%	323
Total	182	252	572	1315	1456	3777

Source: Own design.

Table 5 shows the degree of satisfaction in the general current professional ambiance of professors, who mentioned that they had a high or very high satisfaction on this issue.

Table 5. Degree of satisfaction regarding their current general professional environment

Type of IES	Their current general professional environment					Total
	Not very satisfied	Poorly satisfied	Regularly satisfied	Highly satisfied	Very highly satisfied	
Public Research Centers	4%	8%	17%	40%	31%	134
Federal Public Institutions	7%	7%	19%	34%	33%	996
State Public Institutions	5%	6%	19%	37%	33%	1986
Public Technological Institutions	5%	5%	13%	40%	37%	335
Private Institutions	2%	3%	11%	33%	51%	322
Total	201	227	657	1375	1313	3773

Source: Own design.

4. Conclusions

The studies conducted along the different moments have proven the degree of satisfaction for professors who have a preference for research and teaching activities, and show to be highly satisfied both professionally and with the existing labor conditions in their institutions. This represents a continuity for the studies conducted by Galaz and Gil (2013). Therefore, it is necessary to continue exploring the comparison between public technological institutions in Mexico.

It is important to highlight that, professors in public technological institutions feel highly satisfied in their professional ambiance where they are currently embedded and only one third are happy with the existing workloads in the institutions where they work.

Academic research in Public Technological Institutions has reflected the low evolution in the participation of the gender in science and technology, especially in hard sciences careers belonging to STEM, as well as those

professors who have incorporated to the National Researcher System, who guarantee the participation in teaching and research and the compliance with academic performance with other productivity indicators with the current workloads in higher education institutions. However, education still faces great challenges.

It is important to mention that impact that this APIKS research has had in Mexico, has allowed us to find out more and analyze through the applied instrument, a detailed analysis of the academic activities related to teaching and research of the participating professors and researchers on areas such as: productivity, teaching, research, as well as their satisfaction regarding their work situation, income, contract, and the incorporation of women in science and technology activities, and the disciplines of hard sciences such as STEM.

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