Orientation of Teaching, Research, and External Engagement Activities of Academics in Mexico

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Abstract. Some results of the international survey Academic Profession in the Knowledge based Society (APKIS) applied in Mexico are presented. The orientation of the teaching, research, and external engagement activities, and the differentiating effect of some variables, was analyzed in a sample of 3,757 full-time academics of 116 Higher Education Institutions. Referencing the international surveys of 1992 and 2007, it was found that there are changes and continuities in the activities of Mexican academics. The type of institution variable has a generalized differentiating impact on the orientation of the activities.

Keywords: Academic profession, teaching, research, external engagement, higher education, Mexico.

Meksikos akademinės bendruomenės mokymo, mokslinių tyrimų ir išorinių institucijų dalyvavimo kryptys

Santrauka. Straipsnyje pateikiami kai kurie Meksikoje atliekamos tarptautinės apklausos „Akademinė profesija žinių visuomenėje" (angl. *Academic Profession in the Knowledge based Society*) rezultatai. 3 757 visu krūviu dirbančių mokslininkų ir dėstytojų iš 116 aukštųjų mokyklų imties analizuojamos mokymo, mokslinių tyrimų ir išorinių institucijų dalyvavimo kryptys bei diferencijuojamasis kai kurių kintamųjų poveikis. Lyginant su 1992 ir 2007 metų tarptautinių apklausų rezultatais nustatyta, kad Meksikos akademinės bendruomenės veikloje esama pokyčių ir tęstinumo. Be to, institucijos tipo kintamuoju, kuris lemia generalizuotą diferencijuojamąjį poveikį veiklos kryptims.

Pagrindiniai žodžiai: akademinė profesija, dėstymas, moksliniai tyrimai, išorinių institucijų dalyvavimas, aukštasis mokslas, Meksika.

Since the academic profession began to be theorized in the eighties of the last century, it has been sought to explain how and to what degree contextual changes have affected the conditions and ways in which academics carry out their activities. For this reason, the nature of the disciplines of knowledge, as well as the characteristics of the system and higher education institutions (HEIs) where academics are attached have been considered as essential factors (Clark 1991, 1987, 1987b; Eugene-Haas, 1996; Altbach & Boyer, 1996; Gil et al., 1994).

The last decades of vertiginous social changes, associated with globalization, have had a profound impact on higher education and in the policies that concern the academic profession. Consequently, this has motivated the periodic conduct of survey-type research: the first coordinated by The Carnegie Foundation for the Advancement of Teaching in 1992, then with the Changing Academic Profession (CAP) project in 2007, and finally, the study carried out under the name of Academic Profession in the Knowledge based Society (APIKS) in 2018; efforts that have sought to update national analyses and establish international comparisons on the characteristics of academic work. Other types of studies have been added to these surveys, including qualitative ones (Phillips, 2014; Sancho, 2013; García, Grediaga & Landesmann, 2005), and together they have made it possible to analyze to what extent and in which aspects Clark's classical theory continues to be useful (1987 & 1987b). In addition, post-Clark research has been adding new factors to form multidimensional theoretical referents (Teichler, 2017; Cummings & Teichler, 2015; Shin et al., 2014; Brennan, 2006; Teichler, Arimoto & Cummings, 2013; Galaz et al., 2012; Galaz y Gil, 2009) with greater potential to explain the academic profession today.

Discipline continues to be a robust factor for differentiating academic activities inside and outside the university, as was initially developed by Clark (1987) in his theoretical proposal, the central thesis of which is that "the centralism of the discipline configures the academic profession so strongly that the academic organization is affected" (p. 16).

Becher (1992) confirmed the role of the nature of knowledge and the disciplines' culture in guiding the work carried out by academics and how these aspects function in relating to the world outside academia. From the grouping and description of Becher on the cultures of the disciplines, and following the "Becher style" (Clifford, 2009) for the purposes of this article, STEM (science, technology, engineering, and mathematics) fields can be identified as a combination of hard-pure and hard-applied sciences, and not as a mixture of soft-pure and soft-applied sciences, in addition to Medical Sciences as hard-applied disciplines.

These theoretical references – posited by Clark and Becher – on the role of disciplines as a factor that helps to explain different types of academic work commitments (internally and externally linked) are compatible with more recent theories that analyze the relationships between academics and agencies outside the university (Perkmann et al., 2013).

In addition to the disciplines, two other factors influence the activities of academics and the way in which they carry out their external participation: the type of institution

and the characteristics of each higher education system (HES). According to Clark's classical theory, academics are permanently influenced by external and internal forces: on the one hand, the discipline and the HES (which includes the predominant orientation of the national system, the policies to finance and promote the work of academics, government priorities for the development of science and technology, in addition to the demands of the industrial and business sectors) act as a centrifugal force that attracts and presses academics from and outside of the HEIs; on the other hand, labor affiliation institutions act as a centripetal force that pulls and presses from and inside the HEIs, based on internal regulation that guides policies and mechanisms established by each institution.

It is recognized that Clark's classic model (1987, 1987b) continues to be useful as a theoretical reference since it postulates the discipline and the type of institution as differentiating variables and establishes the need to consider a broader contextual framework composed by each HES. This theory undoubtedly requires extension and updating based on the most recent trends in higher education and the advancement of science, technology, and innovation in the world and in the country. In this sense, for the case of the academic profession in Mexico, five other variables were considered in this article: two that, a decade ago, proved to be relevant in various countries based on an international survey of academics (Finkelstein, 2014), such as sex and type of contract. Also, three more variables that are important in the HES of Mexico – given the influence of public policy programs on academic work – analyzed through participation in the National Researchers System (SNI from its initials in Spanish) as well as the academic's level of studies and stage of academic career (Galaz & Gil, 2009; Osorio, Blanco y Rositas, 2013; De Vries & Álvarez, 2014; Gil & Contreras, 2017).

In Mexico, the results of the Reconfiguration of the Academic Profession in Mexico (RPAM from its initials in Spanish) project (Galaz & Gil, 2009; Estévez & Martínez, 2012; Galaz, et al., 2012), derived from the CAP survey, allowed to identify differences between full-time academics according to their working conditions, affiliation institutions, and participation in national programs of public policies. According to the RPAM project hypothesis, the academic profession was reconfigured as an effect of public policies (Galaz & Gil, 2009). The comparison of the results of the RPAM survey with those of the previous 1992 survey (Altbach & Boyer, 1996) allowed its authors to measure several changes in academia (Galaz & Gil, 2009; Galaz & Viloria, 2014): composition by sex (moderated and not constant increase in the percentage of participation of women in relation to men), maximum degree with which one gains access to occupy a definite position (postgraduate, without being an absolute rule), age of beginning or incorporation into academic work (with a considerable increase). These changes behaved unevenly according to the type of institution where an academic worked.

A decade after the RPAM survey, it was considered pertinent to explore possible changes in the academic profession. In collaboration with the international APIKS project, integrated by researchers from 30 countries, a national survey was applied in Mexico that sought to give continuity to the previous studies and, at the same time, incorporate new analysis dimensions with an emphasis on commitment and social contribution,

associated with various activities – teaching, research, and external engagement – as possible effects of international trends on how Mexican academics work.

The previous CAP survey design was based on a traditional university model and provided an overview of the academic work (Cummings, W. & U. Teichler, 2015). Although the CAP design included a dimension on the social "relevance" of academic work, for APIKS it was considered that the new survey required updating the model according to the contemporary characteristics of the HEIs, since they present some differences, especially due to the influence that external forces, interested in the role of higher education in the production of knowledge and innovation, have been exerting. One hypothesis is that the changes of the last decade tend to balance academic functions between the old tasks of teaching and research and the activities of the so-called third mission of the university, or its external engagement. What all HEIs have in common is that their third mission is aimed at achieving "a social contribution, whether with respect to teaching, learning, applied or basic research activities, or social responsibility" (Gaish et al., 2019, p. 141).

The orientation of the academic activities – teaching, research, and external engagement – has been studied based on establishing the time academics dedicate to each of these tasks, the preferences they have for them, their research productivity (such as the number of articles published), innovative teaching methods (such as project-based learning) (Shin, et. al., 2014), and the most widely used forms of external engagement (Perkmann, et al., 2013).

Based on the theoretical perspective and the background exposed, this article aims to analyze the orientation of the teaching, research and external engagement activities carried out by Mexican academics, considering the effect of classic differentiating variables (discipline and type of institution) and most recent data such as , gender, type of contract, level of studies, participation in the SNI, and stage of academic career.

Method

Participants

The APIKS survey was applied in Mexico in 2018 to a sample of academics from various HEIs, which included all public research centers, federal public institutions, and state public universities. Also, it includes 46 public technological institutions offering undergraduate and graduate degrees and the 14 largest private institutions with a more academic trajectory. These HEIs included in the sample comprise 60% of the universe of full-time academics of the Mexican HES (National Autonomous University of Mexico [UNAM], 2017). After several refinements and weightings in the database to obtain more reliable and representative results, a sample of 3,757 academics from 116 HEIs was obtained. A similar questionnaire to the one used in the international APIKS project was applied online (*http://www.mie.uson.mx/encuesta*) to collect information on teaching, research, and external engagement activities, among other relevant aspects of academic work (Estévez et al., 2020). The questionnaire was answered voluntarily, and the anonymity of the participants was preserved.

Outcomes Variables

Eight outcomes or dependent variables were selected to analyze the orientation of the academic activities (the two external engagement variables are unpublished and distinctive of APIKS project; the others have been considered since previous surveys):

Weekly Hours Spent in each Activity

Weekly hours that academics spent on teaching (courses and other support activities), research, and external engagement activities (weekly hours).

Project-Based Learning

Use of project-based learning by academics in their teaching practices. This item is answered in a type-Likert format (1 = *Nothing*, 5 = *Much*).

Research Productivity

Number of articles published in the last three years.

External Engagement Activity related to Research

The self-reported external engagement activity related to research, that academics perform the most to contribute to society (percentage).

External Engagement Activity related to Teaching

The self-reported external engagement activity related to teaching that academics perform the most to contribute to society (percentage).

Preferences for Research Activities

A self-reported question about academic interest in research activities. This question is answered in a type-Likert format (1 = *teaching*, 2 = *for both, but more for teaching*, 3 = *for both, but more for research*, and 4 = *Research*). In the study, we considered that categories 3 and 4 implicate a strong research interest.

Input Variables

Seven input variables, potentially differentiating, were selected. The first five are similar to those used in previous international and national surveys:

Discipline

Discipline categorized in STEM, non-STEM, and Medical Sciences based on the disciplines proposed by the APIKS international project (Stephenson, 2020) and on the classification by Uddin et al. (2021).

Type of HEIs

The HEIs in which the academics are employed were classified into two large groups according to their characteristics (Estévez et al., 2020; Galaz, et a., 2012): (a) HEIs

with strong research (public research centers, federal public universities, and state public universities) and (b) HEIs with weak research (technological institutes and private institutions).

Type of full-time contract

A full-time contract was classified as permanent/non-permanent according to previous surveys (Finkelstein, 2014).

Academic career stage

The career stage was categorized in two sets: less than 7 years as full-time professor and more than 7 years as full-time professor, thus preserving the two groups used in the analyses of the previous surveys (Finkelstein, 2014).

Gender

Categorized in two groups: females/males.

Academic level of study

Categorized in three levels: Bachelor/Master/Doctorate, in the same way that the classification was used in the RPAM project (Galaz, et al., 2012).

SNI belonging

Participation in SNI (yes/no) in the same way as it was used in the RPAM project (Galaz, et al., 2012).

Data analysis

Missing values were less than 3% of the data. They were treated using the multiple imputation procedure available in SPSS. The descriptive analyses (frequency, median and deviation standard) were calculated. Finally, we conducted a multiple regression analysis using the SPSS v. 26 software.

Findings

Descriptive Results

Table 1 shows the results of the outcome variables. Compared with the results obtained a decade ago (Galaz et al., 2012), the results show an increase in weekly hours dedicated to teaching, research, and external activities: 21.5 hours for teaching, 10.2 hours for research, and 1.6 hours for external engagement or service; it should be noted that in terms of dedication to teaching, the hours of class in front of groups and the time dedicated to

support activities were added: preparation of classes and teaching materials and learning assessment, among other important tasks.

The results on the preferences of full-time academics indicate that more than half are inclined towards research (59.4%), which denotes a critical change when compared with the data from the two previous surveys that reported higher percentages in the preference for teaching (59% in 1994 and 55% in 2008) (Estévez & Martínez, 2012). In summary, the results in hours dedicated to activities and the preferences for one of them indicate that academics have increased the time allocated to conducting research, without loss of the time dedicated to teaching, in congruence with the shift in preferences for knowledge generation.

The other variables in Table 1 allow us to analyze the orientation that is followed when performing teaching, research, and external engagement activities; the result expresses the percentage of those who responded to carrying out such activities to a great extent. In the teaching activity, one variable was selected to analyze how many academics carry out their teaching using potentially innovative methods focused on the development of students' competencies, such as project-based learning, with almost 60% of the participants; after a decade, there is a similar percentage in learning by projects (58%), as reported by the RPAM survey in 2008 (Estévez, 2014). Regarding research activity, the result indicates an increase of almost double in the number of articles published in the last three years, compared to the 2008 survey that reported a general mean of 2.04 articles (Estévez, Martínez & Martínez, 2009).

As such, the results in activities of external engagement of the academic are new-fashioned, since they are variables that were used for the first time in the APIKS 2018 project survey. In this project, it was considered that academics carry out some activities in a manner related to the other two activities; for this reason, some questions were asked in this regard and analyzed in this article. The external engagement activity related to research that academics perform the most to contribute to society is consultancy (15.8%), while for a teaching-related external engagement activity, academics resort more to offering conferences and public speeches (38.9%) as a way of social contribution.

Table 1. *Responses to Outcomes Variables (N = 3757)*

Variables	M	SD
Weekly hours spent in teaching	24.12	6.91
Weekly hours spent in research	12.52	9.2
Weekly hours spent in external engagement	3.54	4.14
Number of articles published in the last three years	3.89	3.58
Variables	*n*	%
Consultancy	596	15.8
Conferences and public speeches	1461	38.9
Project-based learning	2172	57.0
Preferences for research activities	2209	59.4

The following tables present the analyses of academic activities according to the differentiating variables. Table 2 indicates that in medical sciences, academics spend more hours teaching; fewer articles were reported in the non-STEM areas than in the other two areas in which, by the way, they express similar numbers; the preference for research is 8 points higher in STEM, consistent with a more significant number of hours dedicated to this activity. In terms of bonding activity, there are fewer academics in medical sciences dedicated to consulting, although they dedicate one more hour to bonding with society, possibly through other means or mechanisms.

Table 2. *Orientation of Academic Activities by Discipline (N = 3757)*

Variables	STEM (*n* = 2286)		Non-STEM (*n* = 1081)		Medical Sciences (*n* = 390)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Weekly hours spent in teaching	23.52	6.68	24.68	7.35	26.08	6.78
Weekly hours spent in research	13.09	9.38	11.84	8.94	11	8.5
Weekly hours spent in external engagement	3.48	4.18	3.46	3.59	4.07	5.05
Articles published in the last three years	4.37	3.71	2.83	3.11	4.03	3.33
Variables	*n*	*%*	*n*	*%*	*n*	*%*
Consultancy	383	16.7	170	15.8	42	10.8
Conferences and public speeches	829	36.3	468	43.3	162	41.7
Project-based learning	1327	58.1	619	57.3	226	57.9
Preferences for research activities	1421	62.5	1134	54.1	212	54.8

In Table 3 some differences can be noticed in the orientation of the teaching, research, and external engagement activities according to the type of HEIs where the academic works. The results show that the type of HEIs has a substantial differentiating effect in all the variables considered, except in the number of hours dedicated to external engagement. Academics from institutions with "strong research" dedicate more hours to this activity, have more of such a preference and publish more articles than academics from other institutions. It also distinguishes that in HEIs with "weak research," more academics promote project-based learning as part of teaching methods. In both external engagement activities, there are differences found between the academics of the two types of HEIs: academics from HEIs with weak research resort more to consulting, while a high percentage of those who work at HEIs with strong research mostly hold lectures and speeches as an external engagement activity.

Table 3. *Orientation of Academic Activities by Type of HEIs (N = 3757)*

Variables	Academics in HEIs with strong research (*n* = 3108)		Academics in HEIs with weak research (*n* = 649)	
	M	*SD*	*M*	*SD*
Weekly hours spent in teaching	23.48	6.85	27.06	6.97
Weekly hours spent in research	13.16	9.41	9.44	7.37
Weekly hours spent in external engagement	3.59	4.17	3.31	3.97
Articles published in the last three years	4.20	3.60	2.42	3.06
Variables	*n*	*%*	*n*	*%*
Consultancy	460	14.8	136	20.9
Conferences and public speeches	1270	40.8	190	29.4
Project-based learning	1714	55.2	457	70.6
Preferences for research activities	1891	61.5	318	50.2

Table 4 shows that males spend lesser hours teaching than females but spend more hours in research. Also, male productivity is slightly higher than female productivity. Hours spent on external activities are similar for both genders. Females use project-based learning more often, thus maintaining a trend observed in 2008 (Estévez, 2014), and men register higher percentages in preference for research.

Table 4. *Orientation of Academic Activities by Gender (N = 3757)*

Variables	Males (*n* = 2108)		Females (*n* = 1649)	
	M	*SD*	*M*	*SD*
Weekly hours spent in teaching	23.54	6.90	24.88	6.90
Weekly hours spent in research	13.27	9.52	11.54	8.67
Weekly hours spent in external engagement	3.52	4.30	3.56	3.92
Articles published in the last three years	4.31	3.75	3.36	3.27
Variables	*n*	*%*	*n*	*%*
Consultancy	368	17.4	227	13.8
Conferences and public speeches	846	40.1	614	37.3
Project-based learning	1169	55.4	1003	60.8
Preferences for research activities	1306	62	903	54.7

The data in Table 5 show that whether academics belong to the SNI is a clear differentiating variable in most of the variables: hours of dedication to teaching and research, number of articles published, preferences and external engagement activities that they engage in the most. As expected, given the trend observed since the 2008 survey (Galaz, et al. 2012), today academics who are members of the SNI dedicate fewer hours to teach-

ing and twice as many to research, publish more than double the number of articles, and almost all of them prefer this activity, compared to the academics who do not participate in this recognition system.

Table 5. *Orientation of Academic Activities in SNI and Not SNI Academics (N = 3757)*

	SNI (*n* = 1153)		Not SNI (n = 2604)	
Variables	*M*	*SD*	*M*	*SD*
Weekly hours spent in teaching	18.34	5.79	26.72	6.97
Weekly hours spent in research	18.52	9.13	9.59	7.68
Weekly hours spent in external engagement	2.97	3.52	3.79	4.36
Articles published in the last three years	6.73	3.5	2.64	2.81
Variables	*n*	*%*	*n*	*%*
Consultancy	450	17.2	146	12.6
Conferences and public speeches	919	35.3	542	47.1
Project-based learning	652	56.6	1518	58.3
Preferences for research activities	1049	91	1159	44.5

In both external engagement activities, differences are found yet again among academics: those who do not participate in the SNI resort more to consulting as something related to research products, while the members of the SNI selected conferences and speeches as a derivative activity of teaching.

The level of studies of the academic proved to be a differentiating variable only in some of the activities carried out (see Table 6). In this sense, the trend detected in 2008 is confirmed (Galaz et al., 2012): at a higher level of studies, there are higher percentages of academics with a preference for research, and academics with doctorates are those who dedicate fewer hours to teaching and more to research. It draws attention to the fact that academics with master's degrees dedicate more hours to teaching and less to research than those with a bachelor's degree. In terms of teaching methods, doctors use project-based learning more than the rest. In external engagement, a difference is observed in the level of studies: conferences and speeches are activities carried out mainly by academics with doctorates.

Moreover, the results of input variables show differences in the preference for research, with higher percentages in newcomers (less than 7 years as a full-time professor) (70.2%) and less preference among academics with more than seven years of experience (57.5%); besides, the research-related consulting-type external activity is less performed (15.6%) by academics with greater seniority than by younger ones (17.8%). In other words, the academic stage does not make a difference in most of the activities that are performed.

Table 6. *Orientation of Academic Activities by Academic Level of Studies (N = 3757)*

	Bachelor's degrees (*n* = 174)		Master's degree (*n* = 1374)		Doctorate's degree (*n* = 2127)	
Variables	**M**	**SD**	**M**	**SD**	**M**	**SD**
Weekly hours spent to teaching	24.28	8.66	28.1	7.24	21.7	6.21
Weekly hours spent to research	10.88	12.23	8.03	7.07	15.1	9.12
Weekly hours spent to external engagement	3.78	4.03	3.85	4.76	3.35	.3.76
Articles published in the last three years	0.67	1.75	2.22	2.68	5.23	3.57
Variables	**n**	**%**	**n**	**%**	**n**	**%**
Consultancy	23	12.9	235	17.1	330	15.5
Conferences and public speeches	49	27.8	420	30.5	953	44.8
Project-based learning	91	52	765	55.7	1265	59.5
Preferences for research activities	44	25.1	457	33.3	1648	77.5

Novice academics dedicate a similar number of hours to activities, publish the same number of articles, and guide their activities in a similar way to those with more years of experience in the academic profession.

Like the results based on the academic career stage, the percentages are similar in almost all the variables according to the type of contract (permanent and non-permanent full-time), except in published articles, where it increased from 3.10 to 4.01, which is almost a percentage point to be considered in the case of scientific publications. Therefore, it can be said that the type of contract does not make any difference in most activities.

Inferential Results

The results of the linear multiple regression analysis for all eight outcomes or dependent variables provide a confirmation of most descriptive analysis: Type of HEI is one significant predictor of all outcomes variables, while discipline has a predictive power in part of the variables; therefore, Clark's theoretical proposal remains in force. Membership to the SNI has a weighty influence on a good number of variables. Gender also presents significant difference in only three of the variables. And the academic career stage presents a negative association with three variables (hours dedicated to research, preferences for research, and project-based learning), giving more weight to young academics. The results presented in the following paragraphs can be seen with more detail in the annexed Table 7.

Weekly Hours Spent in Teaching

The input variables significantly explain the variance hours spent by academics in teaching activities ($F = 47.87$, $p < .001$, $R^2 = .09$). The results suggest that work in HEIs with

strong research (B = -.05, p = .003), having doctorate studies (B = -.08, p = < .001), and belonging to the SNI (B = -.23, p = < .001) was negatively associated with the number of hours dedicated to teaching.

Weekly Hours Spent in Research

The model explains a significative variance of hours spent in research by the academic (F = 142.17, p < .001, R^2 = .23). On the one hand, being male (B = .04, p = .014), working in a STEM discipline (B = .04, p = .015), in HEIs with strong research (B = .08, p < .001), and belonging to the SNI (B = .36, p < .001) had positive relationships with hours spent in research. On the other hand, more than 7 years' experience in a full-time contract was negatively associated to hours spent in research.

Weekly Hours Spent in External Activities

The input variables explain the significative variance (F = 4.07, p < .001, R^2 = .008) in hours spent in external activities by academics. The result shows that work in HEIs with strong research is positively associated (B = .04, p < .041) to external activities, whereas SNI belonging had a negative (B = -.09, p < .001) relationship with these activities.

Number of Articles Published in the Last Three Years

The input variables explain a significative variance in the number of articles in the last three years by academics (F = 270.96, p < .001, R^2 = .34). The number of published articles was positively associated with being male (B = .05, p < .001), working in STEM disciplines (B = .05, p < .001), working in HEIs with a strong research focus (B = .10, p < .001), having a doctoral degree (B = .19, p < .001), and SNI belonging (B = .39, p < .001).

Consultancy

A model that includes input variables explains the significative variance of consultancy as an external engagement activity for academics (F = 5.99, p < .000, R^2 = .012). Variables such as being male (B = .07, p < .001) and working in HEIs with strong research (B = .05, p = .003) were positively associated to this activity. Furthermore, SNI belonging (B = -.06, p = .003) had a negative relationship.

Conferences and public speeches

The input variables explain a significative variance in conferences and public speeches as an external engagement activity of academics (F = 28.41, p < .001, R^2 = .056). This external activity was positively associated only academics holding doctorate degrees (B = .19, p < .001), while it had a negative relationship with STEM disciplines (B = -.09, p < .001) and work in HEIs with strong research (B = -.010, p < .001).

Preferences for Research

A model that includes input variables explains a significative variance of preferences for research among academics ($F = 163.95$, $p < .000$, $R^2 = .24$). Variables such as a STEM discipline ($B = .05$, $p = .001$), work in HEIs with strong research ($B = .04$, $p = .001$), having a doctoral degree ($B = .27$, $p < .001$), and SNI belonging ($B = .25$, $p < .001$) were positively associated to academic preferences for research. Furthermore, more than 7 years' experience as a full-time professor ($B = -.07$, $p < .001$) was shown to have a negative relationship with research preferences.

Project-Based Learning

Input variables explain a significant variance of use of project-based learning by academics ($F = 12.01$, $p < .001$, $R^2 =. 02$). Being male and having more than 7 years' experience as a full-time professor was negatively associated with using project-based learning, whereas STEM disciplines were positively associated with this variable.

Discussion and Conclusions

Based on the results presented, it can be affirmed that there are significant changes among Mexican academics, while yet some tendencies that were revealed almost three decades ago in the main activities carried out by academics in Mexico still remain. Mexican academics now work more, and, for the first time, more than half prefer research over other functions (teaching and external engagement. Referencing the results of the first national survey of 1992 and the 2008 survey, the trend towards a gradual increase in the time that academics dedicate to their main activities is clear.

Even though preferences favor research, teaching is the predominant activity with more hours per week over the other two activities. This situation coincides with what occurs in other more advanced countries such as Canada, according to the results of the APIKS survey in that country (Stephenson et al., 2020), with a slightly more significant preference for research and teaching at the head with most of the working time spent to these activities. A comparative analysis of preferences for teaching and research according to the 2007 CAP survey showed that on average, 65% of academics from the advanced participating countries had preferences for research, except for the United States, with 56% for teaching, while in emerging countries – among which Mexico was located – teaching preferences predominated with 54% (Arimoto, 2020). After a decade, this result allows to recognize that Mexican academics have turned their preferences around, placing Mexico today as a country where academic work is more oriented towards research, as in advanced countries.

External engagement continues as a minor activity for academics, due to the little time that is still dedicated to it (compared to the other two activities), even though it has increased a couple of hours per week in the last decade. This result confirms that there is still a lack of balance between the three activities on behalf of Mexican academics. The

secondary position of external engagement activities, given the weekly dedication time, is not exclusive to Mexico; it is also observed in academics from Canada (4.3 hours) and Germany (2.4 hours) (Müller & Schneijderberg, 2020).

The second general aspect is the orientation of the three main activities that academics perform. The analysis of the results indicates that in teaching, the use of innovative teaching methods remains stable, which, a decade ago, placed the academics of Mexico in an advantageous position by showing them, at that time, as more diversified than the academics of Brazil and Argentina in terms of use of non-traditional methods, according to the results of the 2008 national survey (Estévez, 2014). According to the APIKS 2018 survey, Mexican academics resemble Canadians in using the project-based learning method (52.8%); while academics in Turkey claim to use traditional teaching methods, as 34% of them indicate the use of project learning and only that type of learning (Calikoglu et al., 2020).

In research, academics in Mexico are currently twice as productive in publishing scientific articles (3.9), which is consistent with the considerable increase in preference for this activity. This result refers to national policies that in the last decade have intensified their efforts to promote the development of science, technology, and innovation (Estévez-Nenninger et al., 2021). This increase has had among its effects the fact that academics starting out in their careers produce papers at the same rate as academics with more trajectory, as has been evidenced in the results analyzed in this work. The productivity of Mexican academics, measured by the number of articles published in the last three years, is close to the average reported in Germany (4.8), according to the APIKS survey (Müller & Schneijderberg, 2020), and the average of 4.1 of academics from the US in 2007 (Finkelstein, 2014). As an unprecedented finding in external engagement (as the previous surveys did not investigate it in this way) in general terms, consulting is the external activity linked to research that academics perform the most to contribute to society, while conferences and speeches are the external engagement activity related to teaching most preferred by academics to contribute to society.

There are tonalities in the orientation of academic activities; three variables show a generalized differentiating impact, although to different degrees: type of institution and participation in the SNI have conclusive results and gender has a moderate effect. This implies that two classic variables proposed by Burton Clark continue to show differentiating capacity, in the same way as a third variable of a national nature typical of HES policies in Mexico. Moreover, three variables show a partial shaping effect: discipline, career stage, and level of studies produce different results only in some of the activities analyzed.

From the identified contrasts in the activities, it is possible to discover a clear pattern of differences in the orientation of academic work: academics attached to HEIs in which the research function is strongly promoted, who are members of the SNI (therefore holding doctorate degrees), and who work in STEM areas are those who, to a greater extent, dedicate less hours to teaching and more to research, are inclined in their preferences for this activity, and tend to publish more articles than the rest of the academics. These

characteristics are slightly more accentuated in male academics as compared to women. A similar pattern of differences was found in the US, after comparing the results of the 2007 CAP survey and the 1992 Carnegie survey on academic activities according to two types of HEIs – "research universities" and "other-4 years" (with teaching programs that last this time), suggesting that "the type of institution continues to play a formative role in shaping the character of academic work" (Finkelstein, 2014, p .305).

On the one hand, the analysis by type of institution also made it possible to identify differences in external activities: while academics from HEIs with weak research resort more to consulting, a high percentage of those who work at HEIs with strong research mostly hold conferences and speeches as contributions to society. On the other hand, based on the results of the international APIKS survey, in Germany, Portugal, and Finland important differences have also been found in external activities according to the type of HEI in those higher education systems considered "binary" – research universities and universities of applied sciences (Götze et al., 2021).

The results of academic activities according to the variables of academic career stage and type of contract show that they do not have a differentiating effect, which is interesting and deserves reflection. As a conjecture to interpret this result, the achievement of permanence supposes, as a precondition, the meeting of a certain profile in advance, as well as carrying out the same activities and creating the products as the academics who have already achieved that status. Everything indicates that this phenomenon is an effect of public policy programs that have sought, for decades, to induce young academics to carry out their work based on the standards by which those who have developed a long academic career are measured and stimulated (Estévez et al., 2020), under the idea of "publish or die" (Lloyd, 2018) or the pressure to access higher levels of the so-called academic aristocracy (Galaz, et al., 2020).

It is likely that this situation of few differences found in the activities, according to career stage and type of full-time contract (permanent/non-permanent), is a trait of the idiosyncrasy or particularity of Mexican academics, since it contrasts with the gaps found in the activities of North American academics when analyzed from these two variables, according to the CAP 2007 survey (Finkelstein, 2014). This seems to be the case, even though it has been considered that "in the last 25 years, academics from Mexico and the United States have shown their own particular movements in different directions than academics from other countries who have been strengthening their research orientation" (Arimoto, 2020, p. 160).

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Annex

Table 7. Regression Analysis Summary for Variables Predicting

	B	SE B	B	t	p
Outcomes					
Weekly hours spent in teaching					
Input variables					
Gender	-.38	.46	-.01	-.83	.405
Non-STEM vs. STEM	-.87	.47	-.03	-1.86	.062
Type of HEIs	-1.75	.59	-.05	-2.93	.003
Type of contract	.67	.70	.02	.96	.338
Academic career stage	-.41	.68	-.01	-.59	.551
Academic level of study	-2.11	.54	-.08	-3.93	< .001
SNI belonging	-6.81	.58	-.23	-11.68	< .001
Outcome					
Weekly hours spent in research					
Input variables					
Gender	.73	.29	.04	2.47	.014
Non-STEM vs. STEM	.73	.30	.04	2.43	.015
Type of HEIs	1.96	.39	.08	5.04	< .001
Type of contract	.51	.45	.02	1.14	.256
Academic career stage	-.87	.43	-.03	1.98	.048
Academic level of study	2.79	.34	.15	8.14	< .001
SNI belonging	6.95	.36	.36	19.14	< .001
Outcomes					
Weekly hours spent in external engagement					
Input variables					
Gender	.06	.17	.01	.36	.718
Non-STEM vs. STEM	-.15	.17	-.02	-.86	.388
Type of HEIs	.45	.21	.04	2.05	.041
Type of contract	-.27	.25	-.02	-1.06	.289
Academic career stage	.21	.24	.02	-.86	.388
Academic level of study	-.03	.19	-.001	-.15	.881
SNI belonging	-.85	.21	-.09	-4.01	< .001
Outcomes					
Articles published in the last three years					
Input variables					
Gender	.39	.09	.05	3.96	< .001
Non-STEM vs. STEM	.82	.10	.11	8.16	< .001
Type of HEIs	.90	.13	.10	6.93	< .001
Type of contract	.45	.15	.04	2.97	.003
Academic career stage	.18	.15	.02	1.23	.22
Academic level of study	1.36	.11	.19	11.76	< .001
SNI belonging	3.05	.13	.39	24.17	< .001

	B	**SE B**	**B**	**t**	**p**
Outcomes					
Consultancy					
Input variables					
Gender	.192	.04	.07	4.25	< .001
Non-STEM vs. STEM	.04	.04	.01	.99	.321
Type of HEIs	.17	.06	.05	2.97	.003
Type of contract	-.10	.07	-.02	-1.48	.139
Academic career stage	.05	.07	.01	.844	.399
Academic level of study	.07	.05	.02	1.29	.194
SNI belonging	-.17	.05	-.06	-2.94	.003
Outcomes					
Conferences and public speeches					
Input variables					
Gender	.04	.05	.01	.883	.378
Non-STEM vs. STEM	-.28	.05	-.09	-5.44	< .001
Type of HEIs	-.39	.06	-1.10	-6.20	< .001
Type of contract	-.10	.07	-.025	-1.36	.173
Academic career stage	.11	.07	.02	1.46	.142
Academic level of study	.43	.05	.15	7.51	< .001
SNI belonging	.15	.05	.15	.883	.378
Outcomes					
Preferences for research					
Input variables					
Gender	.02	.02	.02	1.12	.263
Non-STEM vs. STEM	.07	.02	.05	3.44	.001
Type of HEIs	.09	.02	.04	3.29	.001
Type of contract	-.01	.03	-.003	-.17	.861
Academic career stage	-.14	.03	-.07	-4.39	< .001
Academic level of study	.39	.02	.27	15.84	< .001
SNI belonging	.38	.03	.25	14.34	< .001
Outcomes					
Project-based learning					
Input variables					
Gender	-.16	.04	-.06	-3.43	.001
Non-STEM vs. STEM	.15	.04	.05	3.21	.001
Type of HEIs	-.39	.06	-.11	6.44	< .001
Type of contract	-.08	.07	-.02	-1.21	.228
Academic career stage	-.06	.06	-.05	-3.21	.001
Academic level of study	.21	.05	.08	3.98	< .001
SNI belonging	-.11	.05	-.04	-1.81	.064

Notes: N = 3757, p < .05.
For the regression analysis the categorical variables were treated as dummy variables (gender 0 = female, 1 = male; Non-STEM vs. STEM 0 = Non-STEM and Medical Sciences, 1 = STEM; Type of HEIs 0 = weak research, 1 = strong research; Type of contract 0 = non-permanent, 1 = permanent; Academic career stage 0 = 7 years or less as full-time professor, 1 = more than 7 years as full-time professor; Academic level of study 0 = Bachelor and Master degrees, 1 = Doctoral degree; SNI belonging 0 = not belonging, 1 = belonging).