

TEACHERS FROM THE TECHNOLOGICAL INSTITUTES OF THE STATE OF CHIHUAHUA IN RELATION TO THE PROGRESS OF THE PROGRAM FOR PROFESSIONAL DEVELOPMENT

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Abstract -- This study examines the evolution of full-time teaching staff (PTC) assigned to the Technological Institutes of the state of Chihuahua between 2015 and 2024, specifically those recognized by the Program for Professional Teaching Development (PRODEP).

A comparative analysis was conducted of the percentages of FTP with PRODEP over a nine-year period (2015-2024) in the different technological institutes of Chihuahua, within which there is marked diversity in the structure of teaching staff between the different Technological Institutes, suggesting variations in hiring policies, academic approaches, and institutional priorities. The data indicate diversity in the level of qualification of PTCs with postgraduate degrees across the network of technological institutes in the state of Chihuahua.

Research at the Technological Institutes of Chihuahua and Ciudad Juárez consistently shows the highest percentages of PTCs with PRODEP in relation to their staff base. This may indicate greater stability, longevity, or volume of their teaching staff.

Sustained and notable growth is documented at the Instituto Tecnológico Superior de Nuevo Casas Grandes, with a significant increase in the percentage of PTCs with PRODEP since 2016. This suggests strong expansion and consolidation of the institution.

The Instituto Tecnológico de Delicias shows steady percentage growth over time, with an acceleration in recent years, which could reflect a gradual increase in its staff base.

Institutes such as IT in Cuauhtémoc, Jiménez, and Parral show greater variability in their percentages, which

could be related to smaller workforces and more specific hiring processes.

Keywords-- PRODEP (Program for Professional Teacher Development), Chihuahua Technological Institutes, Full-Time Teachers, TECNM (National Technological Institute of Mexico).

Abstract -- This study examines the evolution of full-time teaching staff (PTC) assigned to the Technological Institutes of the state of Chihuahua between 2015 and 2024, specifically in those with the recognition of the Program for the Professional Development of Teachers (PRODEP).

A comparative analysis was conducted of the percentages of full-time professors (PTC) with PRODEP (Program for the Promotion of Professional Development) status over a nine-year period (2015-2024) in the various technological institutes of Chihuahua. This analysis revealed a marked diversity in the structure of teaching staff among the different institutes, suggesting variations in hiring policies, academic approaches, and institutional priorities. The data also indicate a diversity in the qualification level of full-time professors with postgraduate degrees across the network of technological institutes in the state of Chihuahua.

Research at the technological institutes of Chihuahua and Ciudad Juárez consistently shows the highest percentages of full-time professors with PRODEP certification relative to their total staff. This may indicate greater stability, tenure, or size of their teaching staff.

Sustained and notable growth has been documented at the Instituto Tecnológico Superior de Nuevo Casas Grandes, with a significant increase in the percentage of full-time faculty members with PRODEP status since 2016. This

suggests strong expansion and consolidation of the institution.

The Instituto Tecnológico de Delicias has shown consistent percentage growth over time, with acceleration in recent years, which could reflect a gradual increase in its staff.

Key words – PRODEP (Program for the Professional Development of Teachers), Technological Institutes of Chihuahua, Full-Time Professors, TECNM (National Technological Institute of Mexico).

INTRODUCTION

The study seeks to analyze the progress of teachers in the Technological Institutes of the State of Chihuahua in the Program for the Professional Development of Teachers (PRODEP), which dates back to its predecessor, the Program for the Improvement of Teachers (PROMEP), created by the Ministry of Public Education (SEP) in 1996[5]. Over time, the program has evolved with the central objective of strengthening the professionalization of teaching staff and, in the case of higher education, improving research and teaching capabilities to consolidate academic bodies [3].

Background and original objectives: PROMEP 1996-2013.

Origin: PROMEP was created in 1996 as a response to improve the academic level of teachers and promote the development of academic bodies in Higher Education Institutions (HEIs).

- **Faculty functions:** The program sought to ensure that professors devoted themselves full-time and effectively to their duties, maintaining a balance between teaching and knowledge generation.
- **Academic bodies (AB):** Their main objective was to strengthen the ABs of institutions to generate scientific and social knowledge. By 2013, the program had achieved significant improvements in the academic qualifications of teaching staff.
- **Results and challenges:** Although PROMEP had a positive impact on academic capacity, it faced challenges in achieving its initial quantitative goals. Some institutions violated their own rules on faculty hiring, promotion, and tenure, while PROMEP was unable to stop these practices.

Evolution to PRODEP (2013-present)

PROMEP was transformed into PRODEP to continue the work of teacher professionalization, but in a cross-cutting manner for different educational levels, including higher education [3,5].

Main changes:

- **Comprehensive professionalization:** PRODEP has sought to consolidate the professionalization of full-time teachers (PTC) in research, teaching, technological development, and innovation, promoting the articulation and consolidation of the CA.
- **New academic community:** The objective is to generate a new academic community with social responsibility, capable of transforming its environment.
- **Expansion and restructuring:** The program has undergone restructuring and modifications to its operating rules, affecting its functioning and calls for applications at different times, especially for the higher education level.

Impact and changes in the Technological Institutes of Chihuahua [3].

The implementation of PRODEP in the Technological Institutes of the state of Chihuahua has been framed within the general model of the National Technological Institute of Mexico (TecNM).

- **Full-time professors (PTC):** The program is aimed at PTCs at technological institutes (federal and decentralized).
- **Support offered:** Calls for applications and internal guidelines for the implementation of the program have been issued, including various types of support for education and training.
- **Recognition and incentives:** Support has been provided for high-quality postgraduate studies, and recognition and support for PTCs with a "Desirable Profile" has been encouraged.
- **Challenges and impact:** As at the national level, the implementation of PRODEP in higher education institutions has had its own dynamics. Although progress has been made in teacher qualification, there have also been challenges, such as skepticism on the part of some teachers and changes in the rules of operation. In the particular case of Chihuahua, the rules of operation and support have been channeled through TecNM.

Without a doubt, each update and modification to the program has been aimed at improving and strengthening teacher performance in institutions to help train students who are increasingly competitive and skilled for the workplace. Therefore, it is hoped that the study will show year-on-year growth in the number of full-time teachers with PRODEP.

DEVELOPMENT

The study uses information from the TecNM in the state of Chihuahua for the period 2015 to 2024, referring to full-time teachers who are part of the Program for

Professional Teacher Development Program (PRODEP) and their progress during the program.

The recognition granted by the Undersecretary of Higher Education of the Federal Government's Ministry of Public Education through the Program for Professional Teacher Development to full-time teachers who satisfactorily fulfill their university duties and provide evidence of this for at least the last fifteen years [1].

The program guidelines describe the characteristics of these full-time professors (PTC) with desirable profiles: This refers to professors who, in accordance with the characteristics and orientation of each subsystem, have a level of academic and/or technological qualification higher than that of the educational programs they teach; has the preferred or minimum degree and carries out, in a balanced manner, activities related to teaching, the generation or innovative application of knowledge, applied research or technological development, the assimilation, development, and transfer of technologies or innovative educational research, and tutoring and academic management-linkages [1,6].

Symbolic recognition of Prodep profiles is granted for a period of three or six years and allows the PTC to participate as a leader in projects funded by Prodep through the Academic Bodies. There are various types of financial recognition; if the PTC is, for example, a former Prodep scholarship recipient and rejoins the institution, or consists of support for the acquisition of furniture and computer equipment for the PTC's cubicle, the financial support is a one-time amount and varies from 30,000 to 40,000 pesos depending on the PTC's degree (master's or doctorate). The basis of the 2020 call for support for basic academic work equipment involved a reduction to 20,000 and 30,000 pesos, respectively [11].

Requirements for obtaining the PRODEP profile:

To obtain PRODEP (Program for Professional Development of Teachers), full-time teachers (PTC) must meet requirements such as having a full-time appointment, having obtained a doctoral degree (preferably) or a master's degree (minimum), and demonstrating activities in teaching, research, tutoring, and/or academic management during the evaluation period. It is essential to attach documentation proving these activities in PDF format and within the stipulated deadline [3,5].

Main requirements [9]:

Appointment: Be a full-time professor with a position at a public higher education institution (HEI).

Academic degree: Have obtained a doctorate (preferable) or a master's degree (minimum) from a recognized institution. For the health field, medical specialties may also be considered as a minimum degree.

Demonstrable activities: Verify activities in at least one of the following areas during the evaluation period (generally the last 3 years) [8]:

- **Teaching:** Have taught a curricular subject to a group with a minimum workload of 4 hours per week.
- **Research:** Have participated in research projects or have produced academic work (articles, books, etc.).
- **Tutoring:** Have supervised bachelor's, master's, or doctoral theses.
- **Academic management:** Participate in the updating of educational programs, outreach activities, or management within the institution.
- **Other:** Meet the other requirements established in the specific call for applications for each year and each institution.

Additional considerations [2,7,8]

Format: Documentation must be legible and in PDF format. It is important to check the file size requirements, which are usually a maximum of 1 MB.

Evaluation: Applications go through an evaluation process that includes review by peer committees. It is essential to submit complete and correct documentation to avoid delays or rejections.

Renewal: Specific requirements are established for renewal of recognition, such as academic production over a longer period and supervision of doctoral theses.

The Teaching Staff Development Program (PRODEP) covers the entire educational population at the national level. However, at the higher education level, its scope is limited to full-time professors working in higher education institutions [10].

In this article, the research focused solely on historical data from the Technological Institutes of the State of Chihuahua, which are:

- Cuauhtémoc City Technological Institute.
- Technological Institute of Cd. Jiménez.
- Technological Institute of Ciudad Juárez.
- Chihuahua Institute of Technology.
- Chihuahua II Institute of Technology.
- Delicias Institute of Technology.
- Nuevo Casas Grandes Higher Technological Institute.
- Parral Institute of Technology.

Table 1. Information on full-time and full-time professors with postgraduate degrees, 2015-2016.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2015-2016									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	53	82	135	50	13	63	30	37.04	60.00
I.T. de Cd. Jiménez	31	38	69	29	9	38	19	42.03	65.52
I.T. de Cd. Juárez	136	222	358	160	23	183	92	44.69	57.50
I.T. de Chihuahua	106	213	319	240	47	287	101	75.24	61.67
I.T. de Chihuahua II	80	115	195	96	29	125	53	49.23	55.21
I.T. de Delicias	36	56	92	45	15	60	31	48.91	68.89
I.T. Superior de Nuevo Casas Grandes	31	78	109	32	9	41	19	29.36	59.38
I.T. de Parral	59	127	186	130	21	151	71	69.89	54.62

Source: Prepared internally using data obtained from statistics on the TecNm 2015 website.

Table 2. Information on full-time and full-time professors with postgraduate degrees, 2016-2017.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2016-2017									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	53	84	137	51	13	64	33	37.23	60.78
I.T. de Cd. Jiménez	30	39	69	30	12	42	22	43.48	73.33
I.T. de Cd. Juárez	136	221	357	155	25	180	90	43.42	58.06
I.T. de Chihuahua	101	207	308	230	54	284	106	74.68	69.57
I.T. de Chihuahua II	88	117	205	104	36	140	67	50.73	64.42
I.T. de Delicias	43	64	107	44	12	56	24	41.12	54.55
I.T. Superior de Nuevo Casas Grandes	33	63	96	25	8	33	19	26.04	76.00
I.T. de Parral	60	122	182	126	22	148	65	69.23	51.59

Source: Prepared by the author using data obtained from TecNm 2016 statistics.

Table 3. Information on full-time and full-time professors with postgraduate degrees 2017-2018.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2017-2018									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	43	77	120	53	13	66	33	44.17	62.26
I.T. de Cd. Jiménez	28	36	64	29	12	41	22	45.31	75.86
I.T. de Cd. Juárez	131	215	346	156	24	180	92	45.09	58.97
I.T. de Chihuahua	100	200	300	227	55	282	158	75.67	69.60
I.T. de Chihuahua II	96	126	222	100	40	140	75	45.05	75.00
I.T. de Delicias	37	64	101	47	13	60	27	46.53	57.45
I.T. Superior de Nuevo Casas Grandes	39	61	100	33	11	44	24	33.00	72.73
I.T. de Parral	55	102	157	120	24	144	67	76.43	55.83

Source: Prepared by the author using data obtained from TecNm 2017 statistics.

Table 4. Information on full-time and full-time professors with postgraduate degrees 2018-2019.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2018-2019									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	55	87	142	52	12	64	32	36.62	61.54
I.T. de Cd. Jiménez	3	37	40	32	14	46	23	80.00	71.88
I.T. de Cd. Juárez	128	212	340	155	27	182	93	45.59	60.00
I.T. de Chihuahua	92	187	279	211	49	260	136	75.63	64.45
I.T. de Chihuahua II	85	123	208	104	40	144	75	50.00	72.12
I.T. de Delicias	36	67	103	47	13	60	25	45.63	53.19
I.T. Superior de Nuevo Casas Grandes	42	66	108	34	11	45	28	31.48	82.35
I.T. de Parral	66	131	197	131	27	158	74	66.50	56.49

Source: Prepared by the author using data obtained from the TecNm 2018 portal statistics.

Table 5. Information on full-time and full-time professors with postgraduate degrees, 2019-2020.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2019-2020									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	41	79	120	51	10	61	32	42.5	62.75
I.T. de Cd. Jiménez	28	38	66	30	13	43	22	45.45	73.33
I.T. de Cd. Juárez	140	217	357	153	27	180	91	42.86	59.48
I.T. de Chihuahua	88	167	255	188	46	234	119	73.73	63.30
I.T. de Chihuahua II	76	116	192	99	32	131	64	51.56	64.65
I.T. de Delicias	37	64	101	46	13	59	25	45.54	54.35
I.T. Superior de Nuevo Casas Grandes	44	66	110	34	11	45	28	30.91	82.33
I.T. de Parral	61	122	183	128	27	155	76	69.95	59.38

Source: Prepared internally with data obtained from statistics on the TecNm 2019 portal.

Table 6. Information on full-time and full-time professors with postgraduate degrees 2020-2021.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2020-2021									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	53	87	140	52	10	62	29	37.14	55.77
I.T. de Cd. Jiménez	28	40	68	27	13	40	19	39.71	74.07
I.T. de Cd. Juárez	136	214	350	151	33	184	111	43.14	73.51
I.T. de Chihuahua	98	179	277	214	49	263	131	77.26	61.21
I.T. de Chihuahua II	74	112	186	99	33	132	60	53.23	60.61
I.T. de Delicias	36	65	101	47	10	57	20	46.53	42.55
I.T. Superior de Nuevo Casas Grandes	38	60	98	33	10	43	27	33.67	81.82
I.T. de Parral	65	128	193	123	28	151	77	63.73	62.60

Source: Prepared by the author using data obtained from statistics on the TecNm 2020 website.

Table 7. Information on full-time and full-time professors with postgraduate degrees 2021-2022.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2021-2022									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	54	88	142	50	10	60	28	35.21	56
I.T. de Cd. Jiménez	27	37	64	28	13	41	19	43.75	67.86
I.T. de Cd. Juárez	136	195	331	139	35	174	105	41.99	75.54
I.T. de Chihuahua	109	191	300	222	51	273	144	74.00	64.86
I.T. de Chihuahua II	85	116	201	102	34	136	64	50.75	62.75
I.T. de Delicias	36	66	102	44	10	54	21	43.14	47.79
I.T. Superior de Nuevo Casas Grandes	38	58	96	33	10	43	25	34.38	75.76
I.T. de Parral	60	125	185	123	25	148	77	66.49	62.60

Source: Prepared by the author using data obtained from TecNm 2021 statistics.

Table 8. Information on full-time and full-time professors with postgraduate degrees 2022-2023.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2022-2023									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	M	H	Total	M	H	Total
I.T. de Cd. Cuauhtémoc	50	83	133	52	9	61	28	39.10	53.85
I.T. de Cd. Jiménez	27	38	65	28	13	41	19	43.08	67.86
I.T. de Cd. Juárez	128	187	315	136	34	170	101	43.17	74.26
I.T. de Chihuahua	114	204	318	237	57	294	151	74.53	63.71
I.T. de Chihuahua II	81	107	188	90	32	122	60	47.87	66.67
I.T. de Delicias	35	62	97	45	11	56	21	46.39	46.67
I.T. Superior de Nuevo Casas Grandes	40	58	98	31	11	42	25	31.63	80.65
I.T. de Parral	59	122	181	126	26	152	80	69.61	63.49

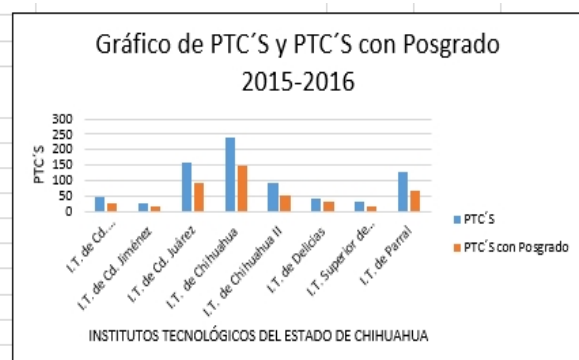
Source: Prepared by the author with data obtained from TecNm 2022 statistics.

Table 9. Information on full-time and full-time professors with postgraduate degrees 2023-2024.

PROFESORES DE TIEMPO COMPLETO, PROFESORES DE TIEMPO COMPLETO CON POSGRADO DE LOS INSTITUTOS TECNOLÓGICOS DEL ESTADO DE CHIHUAHUA, CICLO ESCOLAR 2023-2024									
INSTITUTO	Docentes			PTC			PTC con posgrado		
	M	H	Total	Total	M	H	Total	% PTC's	% PTC's con Posgrado
I.T. de Cd. Cuauhtémoc	55	79	134	58	12	23	35	43.28	60.34
I.T. de Cd. Jiménez	27	36	63	28	13	7	20	44.44	71.43
I.T. de Cd. Juárez	131	177	308	139	38	66	104	45.13	74.82
I.T. de Chihuahua	106	175	281	227	61	94	155	80.78	68.28
I.T. de Chihuahua II	68	99	167	89	27	30	57	53.29	64.04
I.T. de Delicias	36	65	101	47	12	19	31	46.53	65.96
I.T. Superior de Nuevo Casas Grandes	39	59	98	33	11	13	24	33.67	72.73
I.T. de Parral	59	115	174	127	24	55	79	72.99	62.20

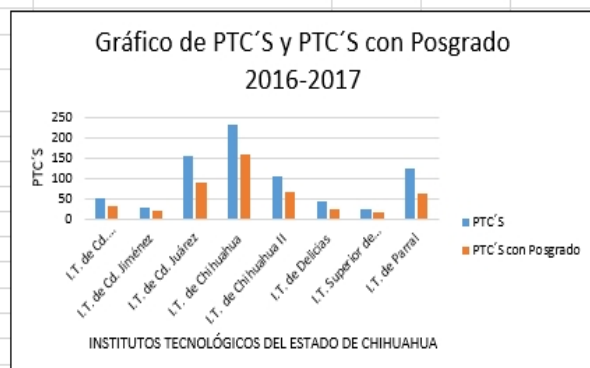
Source: Prepared by the author using data obtained from statistics on the TecNm 2023 website.

Figure 1. Comparison of full-time professors and full-time professors with postgraduate degrees at the Technological Institutes of the State of Chihuahua for the 2015-2016 academic year.



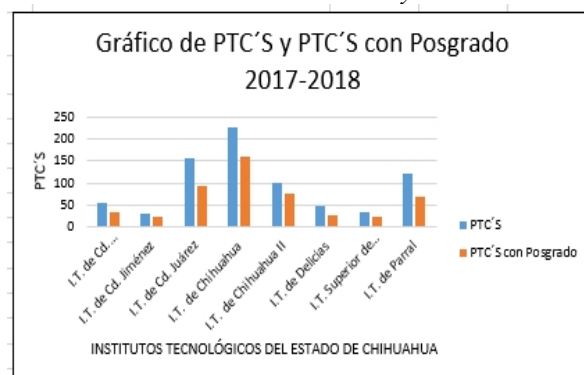
Source: Prepared by the author using data obtained from statistics on the TecNm 2015 website.

Figure 2. Comparison of full-time professors and full-time professors with postgraduate degrees at the Technological Institutes of the State of Chihuahua for the 2016-2017 academic year.



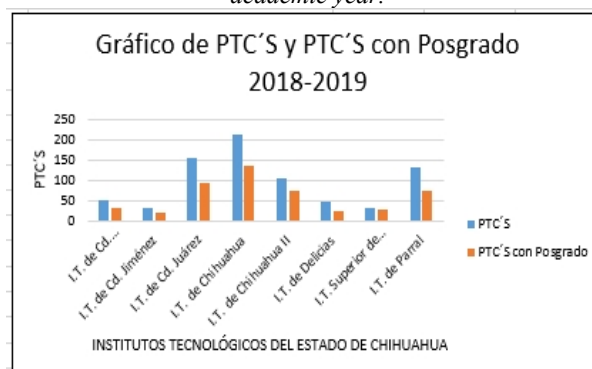
Source: Prepared by the author using data obtained from statistics on the TecNm 2016 website.

Figure 3. Comparison of full-time professors and full-time professors with postgraduate degrees at the Technological Institutes of the State of Chihuahua for the 2017-2018 academic year.



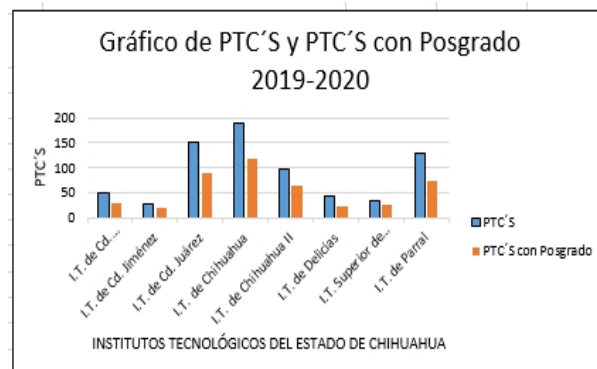
Source: Prepared by the author using data obtained from statistics on the TecNm 2017 website.

Figure 4. Comparison of full-time professors and full-time professors with postgraduate degrees at Chihuahua State Technological Institutes during the 2018-2019 academic year.



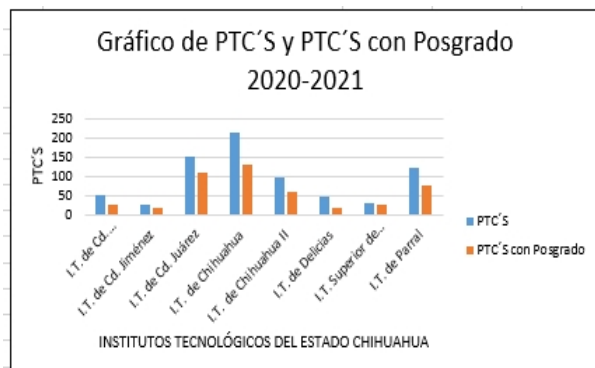
Source: Prepared by the author using data obtained from statistics on the TecNm 2018 website.

Figure 5. Comparison of full-time professors and full-time professors with postgraduate degrees at the Chihuahua State Technological Institutes for the 2019-2020 academic year.



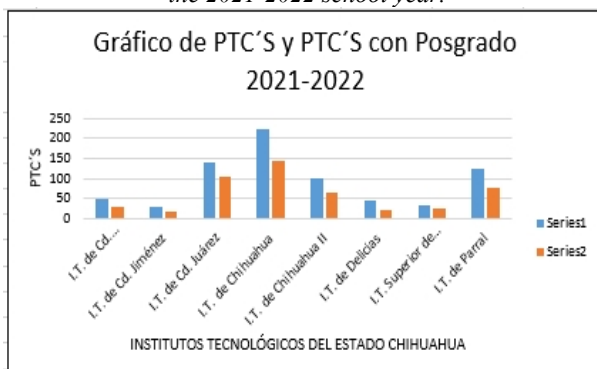
Source: Prepared by the author using data obtained from statistics on the TecNm 2019 website.

Figure 6. Comparison of full-time professors and full-time professors with postgraduate degrees at the Technological Institutes of the State of Chihuahua for the 2020-2021 school year.



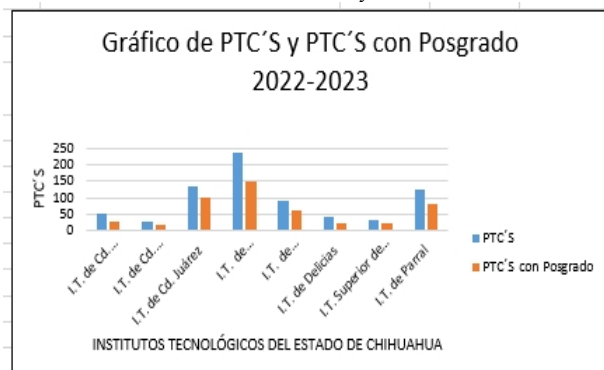
Source: Prepared by the author using data obtained from statistics on the TecNm 2020 website.

Figure 7. Comparison of full-time professors and full-time professors with postgraduate degrees at the Technological Institutes of the State of Chihuahua for the 2021-2022 school year.



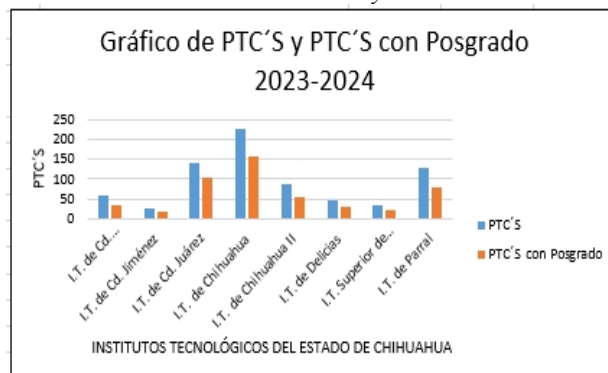
Source: Prepared by the author with data obtained from statistics on the TecNm 2021 website.

Figure 8. Comparison of full-time professors and full-time professors with postgraduate degrees at the Chihuahua State Technological Institutes for the 2022-2023 academic year.



Source: Prepared by the author using data obtained from statistics on the TecNm 2022 website.

Figure 9. Comparison of full-time professors and full-time professors with postgraduate degrees at the Chihuahua State Technological Institutes for the 2023-2024 academic year.



Source: Prepared by the author using data obtained from statistics on the TecNm 2023 website.

DISCUSSION AND ANALYSIS OF RESULTS

Comparative analysis of FTP averages at Chihuahua Technological Institutes (2015-2024).

During the period from 2015 to 2024, a study was conducted on the average percentage of full-time professors (PTC) at various technological institutes in the state of Chihuahua. The results show a significant variation in the distribution of full-time teaching staff at the different institutions:

Outstanding leadership: The Chihuahua Institute of Technology had the highest average, with 75.72%, making it the institution with the highest proportion of FTPs. It is followed by the Parral Institute of Technology, with 69.42%.

Intermediate range: Other institutes fell within the middle range of averages. The Chihuahua II Institute of Technology recorded 50.19%, while the Jiménez Institute reached 47.47%. The Delicias Institute of Technology and the Ciudad Juárez Institute reported averages of 45.59% and 43.90%, respectively.

Lowest averages: At the lower end of the spectrum were the Cuauhtémoc Institute of Technology, with 39.14%, and the Nuevo Casas Grandes Higher Institute of Technology, which had the lowest average of all, with 31.57%.

Analysis of PTC staff with postgraduate degrees at the Technological Institutes of the state of Chihuahua (2015-2024).

An examination of the data collected during the period 2015-2024 reveals significant variations in the proportion of full-time professors (PTC) with postgraduate studies in the different technological institutes in the state of Chihuahua.

Analysis of the observed averages allows for a comparative classification of academic capital in these institutions: The Nuevo Casas Grandes Higher Technological Institute has the highest average, with 75.97% of its teaching staff having postgraduate studies. It is followed by the Jiménez Technological Institute, with an average of 71.24%, and the Ciudad Juárez Technological Institute, with 65.79%. Other institutes such as the Chihuahua Institute of Technology (65.18%) and the Chihuahua II Institute of Technology (65.05%) show slightly lower averages, although they are close to each other.

At the bottom of the distribution are the Cuauhtémoc Institute of Technology (59.14%), the Parral Institute of Technology (58.76%), and the Delicias Institute of Technology (54.59%), which has the lowest average. The average information is based on full-time professors at each institute that offers postgraduate programs.

Comparative analysis of the employment history of PTCs with PRODEP at the Technological Institutes of State de Chihuahua (2015-2024) The following study presents an analysis of the historical records of the Technological Institutes in the State of Chihuahua during the period 2015-2024. The data is analyzed based on the percentage that each institute's background represents of its respective workforce. This comparative approach allows for the identification of trends, growth patterns, and labor dynamics in different institutions over time.

Period 2015-2016

- **Chihuahua Institute of Technology (IT de Chihuahua):** It stands out with the highest percentage (11.91%), suggesting greater staff activity or a larger workforce compared to other institutes.
- **Ciudad Juárez Institute of Technology (IT de Cd. Juárez):** It has the second highest percentage (8.10%), confirming its relevance in the region.
- **IT Superior de Nuevo Casas Grandes:** Begins the period with 0.00%, indicating a period of zero activity or a late start in recording records.
- **Other institutes:** Most of the other institutes (Cuauhtémoc, Jiménez, Chihuahua II, Delicias, and Parral) remain in lower ranges (between 1.09% and 3.23%).

2016-2017 period

- **Growth trends:** Most institutes show a slight increase in their percentages.
- **Takeoff of the Nuevo Casas Grandes Higher Technical Institute:** It shows remarkable growth, going from 0.00% to 10.42%, which could

indicate a significant expansion of its workforce.

- **Consolidation of the leaders:** The IT of Chihuahua (13.31%) and the IT of Ciudad Juárez (9.24%) consolidate their positions.

2017-2018 period

- **Widespread growth:** All institutes show an increase in their percentages, suggesting a general trend of growth in the state's technology sector.
- **Notable increase:** The IT in Chihuahua reaches 15.00%, while the IT in Ciudad Juárez exceeds 10% (10.69%).

2018-2019

- **Notable increase:** Chihuahua's IT reaches its peak in the period with 19.71%.
- **Expansion of Nuevo Casas Grandes IT:** Continues its strong growth, reaching 19.44%.
- **Growth in Jiménez's IT:** Experiences a significant increase, reaching 7.50%.

2019-2020 period

- **Cuauhtémoc IT:** Shows a considerable jump in its records, reaching 10.00%.
- **Nuevo Casas Grandes IT:** Continues to rise, reaching 21.82%, its peak in the period analyzed.
- **Chihuahua IT and Ciudad Juárez IT:** Experienced a slight decrease compared to the previous period, although they remained at high percentages.

2020-2021

- **Percentage adjustments:** There is a slight decrease in the IT of Chihuahua and the IT of Nuevo Casas Grandes, suggesting a possible stabilization or adjustment in their workforce bases.
- **Stability in other institutes:** Most other institutes maintain relatively stable percentages.
- **IT in Parral:** Reaches its highest point at 11.40%.

2021-2022 period

- **Recovery at IT at Ciudad Juárez:** Its percentage increases again to 10.27%.
- **Continuity of the IT in Nuevo Casas Grandes:** Despite variations, it maintains a high percentage (22.92%).
- **Fluctuations in other schools:** Minor variations in percentages are observed in the rest of the schools.

Period 2022-2023

- **Decline in leaders:** The percentages for the Chihuahua IT and the Nuevo Casas Grandes IT show a decline, indicating a possible adjustment in the workforce.

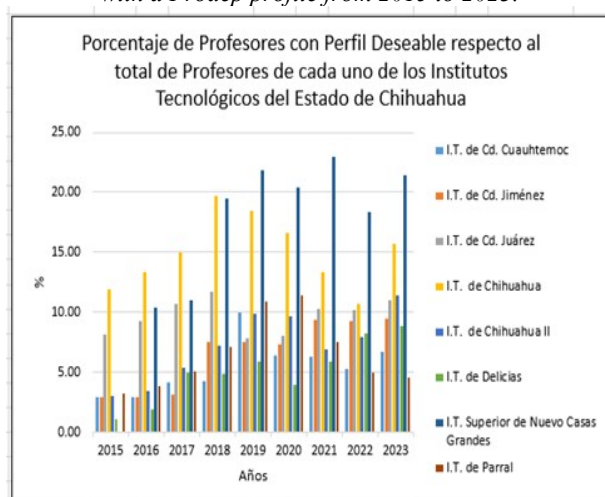
- **Growth in Delicias IT:** This shows a considerable increase, reaching 8.25%.
- **Consistency in Ciudad Juárez:** The IT in Ciudad Juárez remains above 10%.

2023-2024

- **End of cycle:** Data from the last period reveal a new increase in several institutes.
- **Chihuahua IT and Ciudad Juárez IT:** These show significant increases once again (15.66% and 11.04% respectively).
- **Growth of the IT in Delicias:** Continues to rise, reaching 8.91%.

The following graph is attached, showing the year-on-year variation from 2015 to 2023 of teachers with the desirable profile for each of the technological institutes in the state of Chihuahua.

Figure 10. Percentage comparison of full-time teachers with a Prodep profile from 2015 to 2023.



Source: Prepared internally using data obtained from TecNm portal statistics from 2015 to 2020.

As can be seen, the objective is to increase the number of full-time professors with the PRODEP profile. In the state of Chihuahua, slight progress has been made, resulting in benefits for the institutions.

Siqueiros Quintana, María Guadalupe, 2018 [18] mentions in this regard: "According to PRODEP, since 2009, the call to participate in this program has been extended to more than 250 teacher training colleges. Certainly, although the data is increasing, it can be seen that the pace is very slow." She also refers to the progress made by full-time teachers in obtaining their PRODEP profile, arguing as follows: "Another indicator reported by PRODEP is the number of PTCs with postgraduate degrees and a desirable profile. When analyzing the

data on teachers with postgraduate degrees, a slight increase in their percentage can be observed each year." According to the table where the aforementioned information is concentrated, he concludes that in five years there was only a 3% increase proportional to the number of full-time teachers.

For his part, Edel Navarro Rubén, 2018 [19] mentions figures on full-time teachers who have obtained the PRODEP Profile at the basic level: "The teacher training subsystem has 5,217 PTCs, of which 48% (2,481 PTCs) have participated at least once in the Prodep calls since its implementation. Of these full-time teachers, 3,220 have postgraduate studies, but only 371 (8%) have the Desirable Profile Recognition in force in 2017, which is the minimum requirement to participate in Academic Bodies and receive support. The data also indicates that few professors are engaged in the four functions outlined by PRODEP, although it is possible that there are professors who meet the requirements but choose not to participate in the calls for proposals.

It also refers to Negrete Urbano Rigoberto, 2021.

[20] who discusses the impact of PRODEP on the academic capabilities of the Autonomous University of Baja California, obtaining the following data for his study and mentioning that: "ProDEP was implemented at the UABC in 1998 with the signing of a collaboration agreement between the SEP and the UABC. Since then and until July 2018, a total of 1,410 professors had received some recognition or support from the program. By 2018, the UABC had recognized 966 PTCs with the desired profile in force, 215 CAs recognized by the program, 3 PTCs with scholarships for postgraduate studies, 44 PTCs with support from new PTCs, 12 research projects supported by the call for proposals to strengthen CA in training, 11 PTCs from CAC or CAEC with support for short stays, and 4 PTCs from CAC and CAEC with support for postdoctoral fellowships.

With this, we can reaffirm that educational institutions aim to strengthen and raise the quality of their teaching staff, even when conditions are adverse, seeking to have their teaching staff enter this program.

CONCLUSIONS

These findings suggest a combination in the structure of full-time teaching staff among the state's technological institutes. The differences observed could indicate variations in hiring policy, academic focus, or institutional priorities at each campus. For a deeper understanding, it would be pertinent to conduct a qualitative analysis that investigates the underlying causes of this disparity.

In addition, they also suggest a diversity in the level of qualification of PTCs with postgraduate degrees across the technological institutes of the state of Chihuahua, which could be the subject of future research to explore the factors that influence these differences.

A comparative analysis of the PTCs with PRODEP from the technological institutes in Chihuahua from 2015 to 2024 allows us to identify several key conclusions:

1. **Changing dynamics:** There is no linear trajectory. Percentages fluctuate over the years, reflecting changes in staffing, the incorporation of new workers, or adjustments to databases.
2. **Leadership of the main centers:** The IT in Chihuahua and the IT in Ciudad Juárez consistently rank as the institutes with the highest percentage of records in relation to their workforce, suggesting a larger staff or greater longevity of their operations.
3. **Expansion of the Nuevo Casas Grandes Higher Technical Institute:** The sustained and remarkable growth of this institute, especially since 2016, is a significant finding. The increase from 0.00% to more than 20% in just a few years indicates strong expansion and consolidation in the state's technological education sector.
4. **Steady growth in Delicias:** The IT in Delicias has shown steady percentage growth over the years, with an acceleration in more recent periods, which could reflect a gradual increase in its workforce.
5. **Variability in smaller institutes:** Institutes such as the IT in Cuauhtémoc, the IT in Jiménez, and the IT in Parral show greater variability in their percentages, which could be related to smaller workforces or more specific hiring processes.

In summary, the study highlights the vitality of the technology sector in the state and the constant evolution of the workforce in each of its institutions.

Recommendations for future research: Conduct more in-depth studies to correlate these data with other indicators such as,

- Number of staff per institution
- Collect data on employee turnover.
- Analyze the growth rate of each institution.
- Institutional conditions and profile of teachers at the institution to obtain the PRODEP profile.

The ultimate goal of these more in-depth studies is to identify causal patterns (or robust correlations)

that enable institutions to develop evidence-based personnel management strategies, optimizing efficiency and promoting sustainable growth.

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