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Articles scientists

Empleabilidad de egresados de posgrado de la Facultad de Geografía: factores asociados y pertinencia de formación en la Universidad Autónoma del Estado de México

Employability of Graduate Alumni from the School of Geography: associated factors and relevance of training at the Universidad Autónoma del Estado de México

Empregabilidade de pós-graduados da Faculdade de Geografia: fatores associados e relevância da formação na Universidade Autônoma do Estado do México

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Resumen

El trabajo analiza la inserción y el desempeño laboral de egresados de la Maestría en Análisis Espacial y Geoinformática de la Facultad de Geografía de la Universidad Autónoma del Estado de México. El objetivo fue identificar los factores que se asocian con la inserción y el desempeño laboral, así como su relación con la formación recibida y la satisfacción profesional. Se desarrolló un estudio de enfoque mixto. Por un lado, se aplicó una encuesta basada en la metodología de la Asociación Nacional de Universidades e Instituciones de Educación Superior (ANUIES) a 64 egresados pertenecientes a 13 generaciones (2008–2020). Por otro, se realizaron 15 entrevistas semiestructuradas entre enero y febrero de 2024 para profundizar en la trayectoria laboral y la valoración del programa. Los resultados de la encuesta muestran una tasa de inserción laboral de 73%, con predominio del sector público, especialmente en el ámbito educativo. El análisis estadístico del instrumento identifica como factores asociados a la inserción laboral la experiencia profesional previa, el prestigio institucional y el dominio de software geoespacial, particularmente los Sistemas de Información Geográfica (SIG). Asimismo, más del 80% de los egresados encuestados y la

totalidad de los entrevistados señalaron aplicar los conocimientos adquiridos durante su formación en su desempeño profesional. Se concluye que el programa presenta una alta pertinencia profesional; no obstante, se identifican áreas de mejora relacionadas con la actualización tecnológica, el acompañamiento docente y la equidad de género.

Palabras clave: educación superior, egresados de posgrado, empleabilidad, inserción laboral, satisfacción profesional.

Abstract

This paper analyzes the job placement and performance of graduates from the Master's Program in Spatial Analysis and Geoinformatics at the School of Geography in the *Universidad Autónoma del Estado de México*. The objective was to identify the factors associated with job placement and performance, as well as their relationship with the training received and professional satisfaction. A mixed-method approach was used. A survey based on the methodology of the National Association of Universities and Institutions of Higher Education (ANUIES) was administered to 64 graduates from 13 cohorts (2008–2020). 15 semi-structured interviews were conducted between January and February 2024 to explore career paths and program evaluations. The survey results show a job placement rate of 73%, predominantly in the public sector, especially in the field of education. The statistical analysis of the instrument identifies prior professional experience, institutional prestige, and proficiency in geospatial software, particularly Geographic Information Systems (GIS), as well as factors associated with job placement. Furthermore, over 80% of the surveyed graduates and all interviewees indicated that they have applied the knowledge acquired during their training in their professional practice. It is concluded that the program has high professional relevance; however, areas for improvement are identified related to technological updates, faculty support, and gender equity.

Keywords: employability, graduate alumni, higher education, labor market insertion, professional satisfaction.

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Resumo

Este estudo analisa a inserção profissional e o desempenho de graduados do Programa de Mestrado em Análise Espacial e Geoinformática da Faculdade de Geografia da Universidade Autônoma do Estado do México. O objetivo foi identificar os fatores associados à inserção profissional e ao desempenho, bem como sua relação com a formação recebida e a satisfação profissional. Foi utilizada uma abordagem de métodos mistos. Primeiramente, um questionário baseado na metodologia da Associação Nacional de Universidades e Instituições de Ensino Superior (ANUIES) foi aplicado a 64 graduados de 13 turmas (2008–2020). Em seguida, 15 entrevistas semiestruturadas foram realizadas entre janeiro e fevereiro de 2024 para explorar com maior profundidade as trajetórias de carreira e as avaliações do programa. Os resultados do questionário mostram uma taxa de inserção profissional de 73%, predominantemente no setor público, especialmente na área da educação. A análise estatística do instrumento identifica a experiência profissional prévia, o prestígio institucional e a proficiência em softwares geoespaciais, particularmente em Sistemas de Informação Geográfica (SIG), como fatores associados à inserção profissional. Além disso, mais de 80% dos graduados pesquisados e todos os entrevistados indicaram que aplicam o conhecimento adquirido durante sua formação em sua prática profissional. Conclui-se que o programa possui alta relevância profissional; no entanto, foram identificadas áreas para melhoria relacionadas a atualizações tecnológicas, apoio do corpo docente e equidade de gênero.

Palavras-chave: ensino superior, graduados de pós-graduação, empregabilidade, inserção profissional, satisfação profissional.

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Introduction

This work is part of the graduate studies carried out at the Faculty of Geography of the Autonomous University of the State of Mexico (UAEMéx) and seeks To identify the factors associated with entry into the labor market, the relationship with the training received and the professional performance of graduates of the Master's Degree in Spatial Analysis and Geoinformatics (MAEG).

Graduate studies allow us to understand, through a series of sequential analyses, the contextual, economic, labor, and academic situation of the programs and, eventually, some personal, professional, or other characteristics. in graduates of any educational institution (Gómez et al., 2017).

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Over time, the Mexican education system has faced a series of challenges that have hindered its growth and sustained development at different educational levels, including internal social movements and periods of political and economic instability with recurring crises. These conditions have affected the availability of budgetary resources allocated to education, impacting aspects such as the quality, coverage, and equity of the education system in the country.

Since the end of the previous presidential term (2018–2024), the situation has changed significantly in some respects. The supply and demand for higher education have increased; consequently, access and coverage have improved, especially at the postgraduate level, but not necessarily equity and quality. It is natural that, in such a diverse country, students from areas with higher rates of social exclusion face greater difficulties accessing higher education, and even more so postgraduate studies, which translates into low retention and graduation rates (Ruiz-Flores et al., 2014; Silva Laya, 2012). Despite efforts to improve quality, educational institutions lack adequate infrastructure, qualified faculty, and "transferable best practices in education" (Quinto et al., 2024, p. 2940), which affects the overall learning experience.

Educational policy has favored the provision of public and private services at different educational levels, but despite the requirements for program accreditation and certification, it has not been possible to regulate and improve their quality, especially in the private sector, even though quality is currently one of the fundamental pillars for educational development. In this regard, Priego et al. (2012) point out that "many evaluations have not always used indicators that explicitly assess the relationship between the educational process and the world of work" (p. 25).

While education is not necessarily geared towards establishing a direct link between training and employment, it is a constitutionally enshrined right that aims to foster growth, personal development, and social inclusion (Blanco, 2006; Rodino, 2015). According to Blanco (2006), education is essential for human development, as it enables the exercise of citizenship and promotes intercultural understanding. In this sense, education strengthens the moral, social, and cultural capacities of individuals, contributing to the progress of humanity (Brito et al., 2019). The concept of inclusion is intrinsically linked to social justice, equality, and equity.

Over the past two decades, postgraduate studies have shown growth in enrollment, particularly at the master's level. According to Peinado *et al.* (2021), in the 2012-2013

academic year, 200,644 students enrolled in postgraduate programs: 79.5% in master's programs, 11.2% in specialist programs, and 9.3% in doctoral programs, representing a 21% increase compared to the 2010-2011 enrollment period. Following the author's own idea, as cited by the National Council of Science and Technology (CONACYT), in 2018, the number of graduates with a specialization was 20,399 , an increase of 5% compared to 2017, while the number of master's graduates in the same year was 94,890, an increase of 8% compared to 2017, and the number of doctoral graduates totaled 9,310, an increase of 0.5% compared to the previous year, clearly highlighting both those who aspire to and those who graduate at the master's level.

In this context, “graduate programs require indicators related to the training of professionals at the highest educational level and their impact on solving the problems demanded by society and science” (Martínez et al., 2005, p. 3). For this reason, data from alumni surveys are very valuable, not only for developing productive placement plans (Silva Laya, 2012), but also for meeting new evaluation criteria, which include social relevance, equity, contribution to society, attention to national problems, articulation and collaboration, as well as recognition of diversity, evaluation, and comprehensive feedback on training processes (Secretariat of Public Education [SEP] and National Council of Science and Technology [CONACYT], 2021).

As part of this approach, the present research analyzes various variables based on the responses provided by the graduates themselves. To this end, a survey was administered and interviews were conducted during the last two months of 2023 and the first two months of 2024.

The information gathered allowed for an examination of aspects related to graduation efficiency, job placement, the relationship between education and work, and job satisfaction. Based on this analysis, potential challenges in training and job performance were identified, with the aim of providing input for improving the educational program.

Background

Graduate studies have become a valuable tool for analyzing and improving higher education programs. These studies allow us to understand the academic and professional trajectories of graduates and assess the relevance of their training to the demands of the labor market. Along these lines, Ávila and Aguirre (2005) assert that they are a fundamental instrument in the self-evaluation processes of educational institutions regarding degree

programs, due to the type of information they provide for decision-making. These studies make it possible to analyze graduates' professional profiles , the knowledge and skills developed throughout their education, their evaluations of their training, their employment prospects, as well as the roles or tasks performed in the professional field and their relationship to the training received. As a result, organizations and institutions have promoted the establishment of criteria and institutional mechanisms aimed at strengthening graduate tracking, fostering greater collaboration with employers, and promoting the efficient use and management of resources allocated to the evaluation and improvement of educational programs.

A clear example of this is that the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2019), in its World Declaration on Higher Education in the 21st Century, adopted in Paris in October 1998, proposed that Higher Education Institutions (HEIs) assume greater responsibility towards society and be accountable for the management of national and international public and private resources. However, problems persist in the interaction with students and graduates, as well as in resource management, which affects the quality of education in higher education institutions.

The Organization itself, in reference to the quality of teaching, points out that it must encompass all its functions and activities for the community and the university world. (UNESCO, 1998), This is reflected when students graduate and join the productive sector.

Graduate studies, with an emphasis on their employability or work, represent an important point for HEIs for the evaluation of programs and as a source of data for those seeking jobs in accordance with their area of training, which represents a topic related to the labor market that requires a close link between personal, educational, marketing, institutional and social factors (López and Villamil, 2019) .

Reviewing some contributions to these studies, at the international level, Mora's article (2008) stands out, which analyzes the success "in the incorporation of European university graduates into the labor market" (p. 41).

Another important contribution from the same year is the work of Solem et al. (2008), who discovered that, in terms of employability for American geographers, there was already a need for general skills ranging from time management and writing ability to information management and computer literacy.

Along the same lines, other works with American geographers include those of Kodrzycki (1999), Franklin and Ketchum (2012) and Coomes et al. (2022), who analyze the

influence that universities in that country have on the availability of labor in their local area, in addition to academic job offers in the field of geography, between 1990 and 2011, in universities in the United States, highlighting how the labor market in this field of knowledge is closely linked to economic cycles.

Two relevant works related to the object of study are the article by Guirland (2023), who analyzes the topic of work with graduates of postgraduate studies and that of Álvarez and Romero (2015), who carry out a characterization of the employability of university graduates in Latin America, with emphasis on Ecuador.

In 2011, Mexico authorized a government initiative to incorporate more institutions and scholarships for students, with the goal of motivating more young people to complete their professional studies (De Vries and Navarro, 2011). Under this logic of expanding higher education, improvements in the employment conditions of graduates would be expected. However, the employability of postgraduate students does not necessarily improve.

Regarding studies of postgraduate graduates in Mexico, the work of Salgado et al. (2015), Macías and Luna (2020), and Figueroa and Bernal (2021), conducted at UNAM, UdeG, and UV, stand out, among other relevant contributions in the field. Specifically, at the Faculty of Geography of UAEMéx, this type of research began in 2006, stemming from recommendations by accrediting bodies that requested data to assess aspects of job placement and performance, as well as professional satisfaction.

The first study, conducted in 2006 with information from graduates of the Bachelor's Degree in Geography, included data from the early eighties until 2005. Subsequently, in 2007, a study corresponding to the Bachelor's Degree in Geoinformatics Sciences was carried out, with the methodology of the Directorate of Professional Studies of the UAEMéx, which resulted in the first follow-up report of graduates of that program. (UAEMéx, 2007).

Years later, in 2018, the study titled "*Employment and Career Path of Geographers Graduated from UAEM, Cohorts 2003 to 2015*" was published (Pérez et al., 2018). Three years later, between January and April 2021, the first study of graduates from the Master's Program in Geography and Geotechnological Development (MAEG) was conducted. The aim was to create an initial database that would allow for maintaining contact with graduates during the pandemic, in order to eventually obtain information regarding their academic standing, graduation, and employment status (UAEMéx, 2021).

Finally, between 2022 and 2023, data collection was carried out with graduates from the three undergraduate programs offered by the faculty, the MAEG, and, for the first time,

a study was initiated with graduates of the doctoral program in Geography and Geotechnological Development.

Problem statement

Mexico's economic situation, within the context of its democratic transition, directly impacts the job placement opportunities for university graduates, from undergraduate to doctoral level. However, entering the labor market remains challenging due to difficulties related to the types of programs studied, professional training, and the prevalence of underemployment and unemployment. Added to this are personal, family, and institutional factors that contribute to an adverse job market, regardless of the level of education attained.

Graduates of educational programs typically seek to enter the job market as soon as possible; however, only a portion manage to find employment. In many cases, the urgency to secure immediate income limits reflection on the conditions of labor market integration, since not everyone succeeds, and those who do not necessarily analyze the implications of joining the economically active population.

Given this situation, the question arises: what factors influence the labor market insertion process of graduates of the Master's Degree in Spatial Analysis and Geoinformatics at UAEMéx, during the period 2015-2022?

To answer this question, the objective of the work is to identify both the requirements and the factors that, according to spatial analysts, intervene in this process, in addition to the areas of employment, their relationship with postgraduate training and the level of satisfaction, through a statistical analysis of data derived from the application of an instrument adhering to the methodology of the National Association of Universities and Institutions of Higher Education (ANUIES), adjusted for the purposes of the work and complemented by a series of semi-structured interviews and participant observation .

Theoretical argument

The theoretical frameworks that typically underpin studies of graduates from Higher Education Institutions (HEIs), particularly regarding labor issues, can be numerous and varied, depending on the perspective from which they are viewed. Given the focus of this research, which centers on academic training, employability, satisfaction with that training, work, and income, we draw upon the human capital perspective of Gary Becker (1975) and

Theodore Schultz (1985). They suggest that investment in human capital (a concept introduced by Schultz) plays a significant role, as workers improve their skills and income, which clearly has positive repercussions on their living conditions. On the other hand, Pierre Bourdieu's (1986) theory of social capital defines social capital as the set of current and potential resources linked to the possession of a network of more or less institutionalized relationships of mutual knowledge and recognition, which provides each member of that network with the support of collectively held capital.

An argument that fully coincides with the results of this work and shows a strong influence on labor market insertion, as a product of personal relationships and on the levels of job satisfaction of graduates, derives from the perception of space addressed from humanistic geography by Yi-Fu Tuan , since in this satisfaction several aspects influence, among which the perception of the graduates themselves stands out, which is related to the training received, the work environment and the salary, among other elements of singular relevance that have to do with their place or workspace.

Understanding the relationship between employability, job satisfaction, and salary requires a perspective that integrates experience and future goals. Tuan (1976) emphasizes the importance of studying how people experience and make sense of their environment, highlighting how these experiences affect their behaviors, relationships, and thought processes. This perspective, rooted in perception theory, integrates elements of humanistic geography, psychology, anthropology, and philosophy to better understand the complexity of human experience in relation to space, in this case, the workplace.

These studies provide information on how education is linked to professional development, and they also help to adapt, where appropriate, the program content to meet the professional demands and employment situation of recent graduates (Zandomeni and Chignoli, 2008).

Results

It has become clear that graduate studies seek to identify program relevance and employability as key quality indicators according to the requirements of evaluation and accreditation bodies. In this regard, and to contextualize the areas analyzed in this section, a recent study (Meza Mejía et al., 2024), based on the analysis of 60 articles published in Mexican journals, identifies several areas of analysis: population characteristics, level of

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satisfaction, reported social mobility, labor market integration, professional performance, and evaluation. As can be seen, several of these areas are directly or indirectly linked.

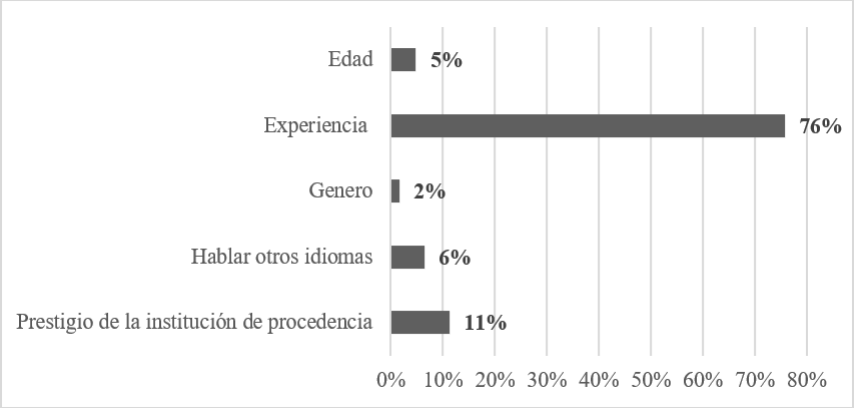
To begin with the results of this study, it is important to clarify some aspects of the general profile of the 64 graduates who make up the sample. This group is predominantly male, with 56% and 44% female, respectively. The predominant age groups are 28-38 years (67%) and 39-49 years (20%), mostly from within Mexico: primarily from municipalities in the Toluca Valley, followed by the northern, eastern, and southern parts of the State of Mexico, as well as the states of Chiapas, Durango, Jalisco, Puebla, and Querétaro. There are also records of international graduates from countries such as Spain and Colombia. Diverse academic paths were identified within their original undergraduate programs, although the presence of geographers, geoinformaticians, and geologists trained in the same faculty and related fields at UAEMéx is noteworthy.

In terms of employability, the results reveal that nearly three-quarters (73%) are currently employed, indicating a favorable employment rate. While the remaining individuals are not currently working, this does not mean they are unemployed; rather, some are engaged in other activities, such as studying at another level of education, participating in scholarships or internships, or writing theses.

Analyzing employment by gender allows us to examine potential differences between men and women, as well as problems associated with the workplace, including acts of aggression, mistreatment, harassment, sexual or workplace harassment, discrimination, and inequality in working conditions and wages (Velázquez Narváez and Díaz Cabrera, 2020). Of the total sample (n = 64), 43% of the men surveyed are employed, while this proportion is 30% for women. Meanwhile, 15% of men and 13% of women report being unemployed. These data reveal a difference in the distribution of employment by gender within the sample analyzed.

In the current context, many higher education students seek to continue their studies with the expectation of improving their job prospects. However, education does not guarantee a good job or salary, as other factors are involved (Spence, 1973). When those currently employed are asked about the factors that directly influence their entry into the labor market, it is observed that, despite their diversity, accumulated experience stands out with a high percentage, followed by the prestige of the institution where they completed their postgraduate studies and proficiency in a foreign language (Figure 1). Other aspects are also present with data below six percentage points.

Figure 1. Factors that influenced obtaining current employment



Original work

When graduates were asked about their places of employment, Table 1 shows the reported institutions, including those who reserved the right to answer, for the entire sample. This information is key to understanding the areas of professional practice and reveals diverse options where graduates apply their MAEG knowledge. The results show a higher percentage of graduates working at UAEMéx itself, followed by the National Institute of Statistics and Geography (INEGI), some private companies and consulting firms, and civil organizations and associations. The roles reported by respondents include administrative activities, teaching and research, cadastral surveying, and land-use planning, all aligned with the training received in the program.

These results demonstrate the areas of performance in which graduates are employed, as well as the degree of application of knowledge in their respective jobs. A relevant aspect is that, although as Yánez Contreras and Acevedo González (2010) indicate, the labor market has been oriented towards occupational profiles conditioned by the relationship between travel time and the distance between the place of residence and the place of work.

The data show that GIS, as indicated by this group, constitutes one of the main strengths for employability and has become a crucial tool for spatial analysts, enabling the understanding of territorial patterns through the using of statistics and spatial data models (Fuenzalida Díaz and Cobs Muñoz, 2013). However, adapting to new technologies, especially digital ones, continues to represent a challenge for geographers in educational institutions (Solem et al., 2008).

Table 1. Distribution by type of institution where graduates work.

Classification	Name of the company or institution	Number of MAEG graduates
Educational institutions	Autonomous University of the State of Mexico (UAEMéx)	19
	University Institute of Lisbon, Portugal (ISCTE-IUL)	
	Higher Normal School of the Valley of Toluca	
	Benito Juárez University for Well-being (UBBJ)	
	Autonomous University of Chiapas (UNACH)	
	Mexiquense University of the Bicentennial (UMB)	
	Technological University of Querétaro (UTEQ)	
	Argos College and High School	
	Terra School Civil Association	
Governmental Institutions	Mexican Food Security (SEGALMEX)	16
	General Directorate of Planning and Institutional Development (DGPYDI)	
	National Institute of Statistics and Geography (INEGI)	
	Government of the State of Mexico	
	Ministry of Environment and Natural Resources (SEMARNAT)	
	Ministry of Public Education (SEP)	
	Attorney General's Office of the State of Mexico (FGJEM)	
	Water and Sanitation of Toluca (AyST)	
	Finance Secretariat, Cadastre of Mexico City	
	Secretariat of Infrastructure, Communications and Transportation (SICT) of the Federal Government of Mexico	
	Registry and Cadastral Institute of the State of Puebla (IRCEP)	
	Mexican Institute of Pyrotechnics (IMEPI)	
	National Commission for the Knowledge and Use of Biodiversity (CONABIO)	
	Municipal Housing Institute (INMUVI)	
Private Companies and Consultancies	GEOLANDER Consultores SC / UAEMéx	5
	Consulting Studies and Projects for Territorial Planning, SC	
	WhereIsMyTransport	
	Inbursa	
	Nestlé	
Civil Organizations and Associations	Center for Geographic Studies of Territorial and Environmental Analysis SC	5
	The Nature Conservancy	
	Humania	
	State Institute of Energy and Climate Change (IEECC)	
	Ducks Unlimited de México, AC (DUMAC)	
Unanswered		19
Total		64

Original work

Along the same lines regarding job placement, Figure 2 shows the year in which graduates enter the labor market. This data allows us to observe the time elapsed between

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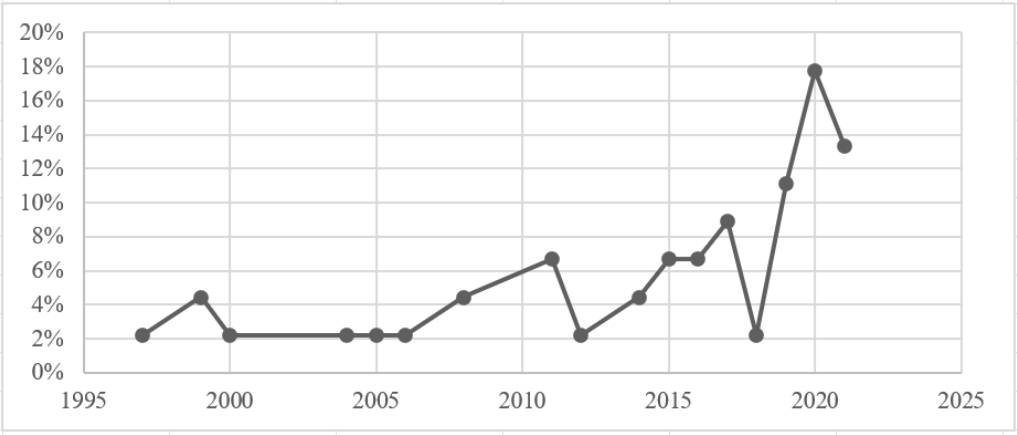
graduation and employment, which is relevant for evaluating the speed and effectiveness of job placement for spatial analysts after completing their postgraduate studies. The results reflect the temporal distribution of graduates' job placement.

It can be observed that after a relatively low level of employability, a significant increase was recorded between 2019 and 2020; however, from the beginning of the pandemic, a new decline was observed, as happened in almost the entire labor market in Mexico, with some exceptions.

Figure 2. Year of entry into current employment



Original work

Regarding relevance, the relationship between employment and the program's training is analyzed. Figure 3 shows graduates' perceptions of the degree to which the knowledge acquired during the master's program is applied in their work, allowing for an assessment of the extent to which the academic training received is relevant to performance in their work areas.

The graph shows that over 80% of graduates believe there is a high degree of alignment between their education and their work. A correlation is identified between the application of acquired knowledge and employment; greater application leads to a greater impact on the job market.

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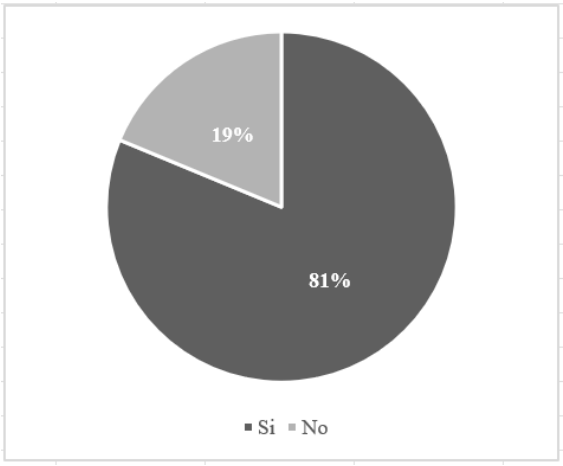
Figure 3. Relationship of work with acquired knowledge

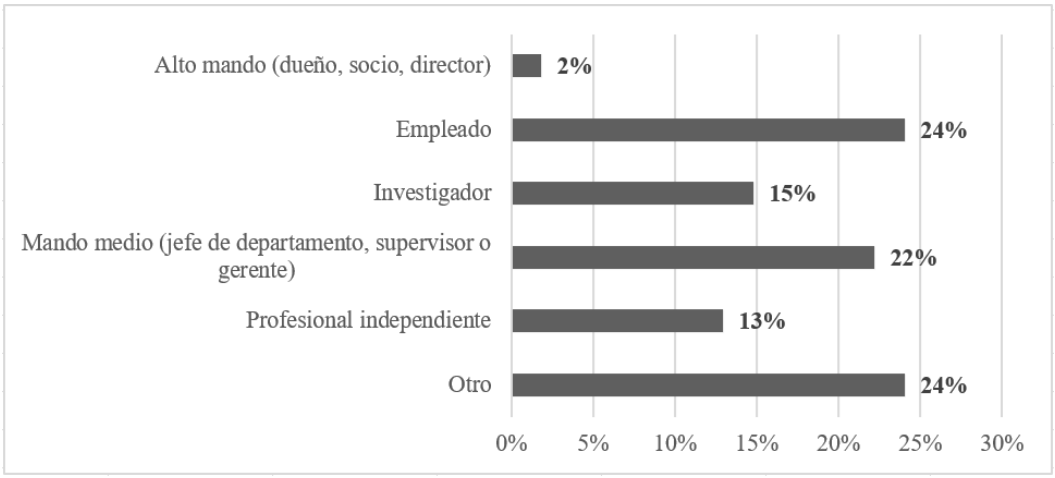


Original work

To illustrate the roles graduates play, Figure 4 presents the positions they hold in their jobs. This information allows for an assessment of the quality and level of responsibility associated with their work and its relationship to their academic training in their professional development.

The results highlight, among the most important categories, the employee status, without specifying the specific role due to the type of information collected by the instrument, followed by those holding responsibilities as middle managers, research professors, and independent professionals, in that order. It is important to note that a high percentage, close to a quarter, preferred not to answer, so their employment status is not specified.

Figure 4. Position held at work



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Understanding the economic sectors where spatial analysts work has allowed us to distinguish the career options stemming from their multidisciplinary training, which encompasses physical, socioeconomic, environmental, and technological aspects. This is a common characteristic among geographers, geoinformaticians, and geologists within the faculty, depending on the specific curriculum of each degree program.

These professionals, particularly geographers, constitute the main entry profile for the program, consistent with Balchin's (1983) observation that their skills make them attractive to employers in various sectors. Based on these results, the extent to which the knowledge acquired in the master's program is transferable and applicable to different economic sectors is identified, according to the graduates' areas of professional practice.

As can be seen in Figure 5, the main activity is linked to educational services at all levels, especially higher education due to their advanced training. Their participation in public administration is also noteworthy, as demonstrated by the positions they hold, followed by environmental services and specialized technical services.

This last sector refers to areas such as thematic cartography, GIS applications, and spatial analysis using satellite imagery, geared towards providing professional services and specialized technical consulting. Although this sector represents a smaller proportion, some graduates report favorable working conditions in terms of remuneration and job satisfaction. The rest work in sectors such as transportation and mobility, construction, agriculture, and energy.

Figure 5. Economic subsector to which the company or organization where you work belongs

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The satisfaction component was assessed along two main operational dimensions: professional training and post-graduation performance. The first dimension considered aspects related to the type of program, its content, competencies, academic staff, and the training institution. The second dimension included aspects related to the workplace, such as time to find employment, experience, position, salary, work environment, future prospects, and their fulfillment.

The results for the first dimension are presented in Figure 6. It shows that the majority of respondents expressed a positive perception of the training received, while a smaller proportion reported low levels of satisfaction. However, those who declared themselves completely satisfied represented less than a third of the total, suggesting room for improvement in the perceived quality of the training.

Additionally, through direct interviews (n=15), some participants identified areas for improvement related to the academic experience, particularly regarding faculty support. Among the issues raised were limited follow-up in thesis advising, a lack of clarity in the coverage of course content, and, in some cases, communication perceived as lacking empathy. Furthermore, some participants mentioned dynamics in which students assume a central role in leading the sessions.

In addition to the above, as shown in Figure 6, although in a small proportion, participants expressed low levels of dissatisfaction related to the lack of updated course content and its limited application in the workplace, specifically regarding *software licensing*. This should be of concern to those responsible for the program, as it highlights areas of opportunity that can be addressed through resource management for the continuous improvement of content and for the training of teaching staff, particularly for strengthening professional skills aligned with the demands of the labor market.

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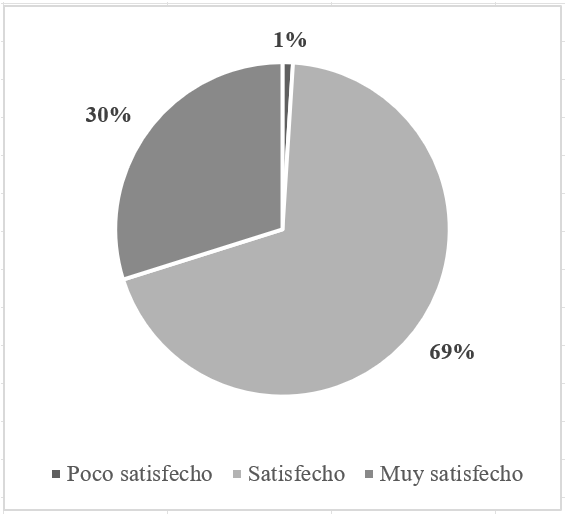
Figure 6. Level of satisfaction with the master's degree training



Original work

Regarding the second category, concerning satisfaction with graduates' professional development, Figure 7 shows, as in the previous case, a high prevalence of graduates satisfied with their professional development. The highest proportion, those who declare themselves completely satisfied, slightly exceeds half of the total.

Again, this result highlights challenges in the professional development of graduates, possibly linked to the areas of opportunity mentioned in the previous section. This underscores the need to strengthen ties with the labor market and improve employability and professional growth opportunities.

To achieve this, it is necessary to engage with both graduates and employers, a practice that has been limited in postgraduate studies. In the case of the program analyzed (in effect since 2017), the available institutional information indicates that only two graduate studies have been conducted, and no formal follow-up exercises with employers have been identified.

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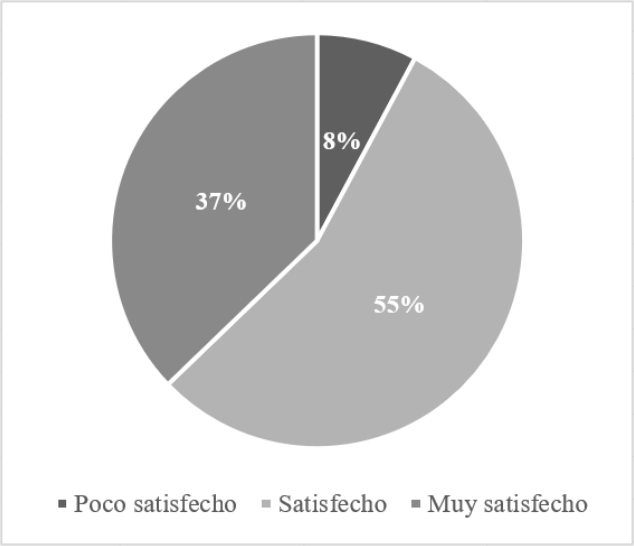
Figure 7. Level of satisfaction with professional development



Original work

Discussion

The employability of graduate students in Mexico is a central aspect for evaluating the relevance and quality of academic programs, particularly in contexts where the relationship between education and employment is increasingly demanding. In this study, the empirical findings allow us to discuss key elements that influence employability, as well as job satisfaction levels and the performance of graduates from the MAEG program.

A key aspect to highlight is the high employability rate, close to three-quarters of respondents, suggesting a favorable relationship between training received and job performance. However, this figure should be qualified by the differences found between men and women, where a gender gap persists in access to employment (57.5% men and 42.5% women). This situation aligns with the findings of Velázquez Narváez and Díaz Cabrera (2020), who note that gender continues to influence opportunities and treatment in various work environments. While the program has a solid foundation, It is suggested that institutional strategies incorporate a gender equity perspective aimed at closing these structural gaps.

Another relevant finding is the role of prior experience and institutional prestige in obtaining employment. According to the results presented in Figure 1, accumulated experience stands out with the highest percentage, followed by the prestige of the institution of origin and proficiency in a foreign language. This result is consistent with human capital theory; however, in this case study, the weight of institutional prestige and professional

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networks is also observed to be decisive. Consequently, labor market integration depends not only on acquired knowledge but also on the social and symbolic capital that shapes the professional identity of graduates.

Regarding the applicability of the acquired knowledge, 81% of respondents recognize a high degree of correspondence between their academic training and the functions they perform in the workplace, particularly in the application of GIS, spatial analysis, and land-use planning. This indicates a good alignment between the program's curriculum and the demands of the professional field.

This result aligns with the testimonies shared by over 80% of graduates in the interviews conducted, who also identified areas requiring updating, such as strengthening the GIS laboratory with specialized software (QGIS, gvSIG, or GRASS GIS) and integrating emerging technologies, such as high-resolution remote sensors, drones for mapping, and geospatial big data platforms. Specialized literature (Solem et al., 2008; Fuenzalida Díaz and Cobs Muñoz, 2013) highlights that the high technological component of disciplines such as geoinformatics and applied geography makes continuous updating essential, thus justifying the relevance of the program analyzed.

The sectors in which graduates find employment are diverse, demonstrating the program's versatility. From higher education and the public sector to private consulting and civil society organizations, spatial analysts are able to work in a wide range of fields. However, this diversity also presents the challenge of adapting the curriculum to strengthen specific competencies based on different occupational profiles. According to the results obtained, this requires addressing the lack of more direct dialogue with employers, as well as developing a differentiated training strategy, possibly by application area, that reinforces the current lines of knowledge generation and application (LGAC) in the program, in accordance with labor market demands.

Finally, perceptions of professional satisfaction, both with the training received and with career development, are mostly positive, although with significant reservations. Around a third of graduates report being completely satisfied, while qualitative interviews reveal several problems, including insufficient faculty support in thesis supervision, a lack of adherence to course content, and pedagogical practices perceived as lacking empathy or inadequate. These findings suggest that the program should consider not only what is taught, but also how it is taught and under what conditions the training process is managed.

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Taken together, the discussion of these results highlights the need to maintain an institutionalized system for tracking postgraduate graduates, not as an external requirement, but as an integral part of institutional processes and policies aimed at ensuring educational quality. The voice of alumni, complemented by the perspective of employers, is key to effectively providing feedback on both curriculum management and teacher training processes; however, this remains an outstanding task, possibly for future studies.

Conclusions

This study allows us to conclude that the MAEG, taught at the Faculty of Geography of the UAEMéx, exhibits favorable levels of employability and a high perception of relevance to labor market demands. However, this job placement is nuanced by factors external to the program, such as prior experience and institutional prestige, as well as by structural elements that require attention, including the persistence of gender gaps in employability.

The survey results demonstrate a solid application of technical knowledge, particularly in GIS and spatial analysis; however, the interviews identify areas for improvement regarding content updates and teacher support. In this respect, pedagogical practices and the integration of theory and practice should be systematically reviewed to respond more effectively to the dynamics of the labor market.

In terms of educational policy and institutional management, the study highlights the need to implement regular and structured graduate tracking mechanisms through periodic surveys —annual or biannual— conducted via interviews and other means under the coordination of the MAEG (Master's in Graduate Studies), with the aim of strengthening the program's relevance, quality, and future prospects. Including employers in these activities would allow for comprehensive feedback, ensuring that the graduate program responds not only to academic performance indicators but also to the demands of the professional environment.

Finally, it is recommended that the findings of this research be integrated into postgraduate curricular decisions, promoting flexible, up-to-date and relevant training, in line with the contemporary challenges of higher education.

Future lines of research

The results obtained allow us to identify areas that, due to their relevance and complexity, require further analysis in subsequent research. Although these lines of inquiry were not explored in depth in this work, they emerge as strategic themes for strengthening the relevance and quality of the graduate program. Among them, the following stand out:

Gender gap in employability

The research identified a significant difference in access to employment between men and women; however, this study does not delve into the underlying causes. Therefore, it is suggested that future research incorporate intersectional approaches or comparative analyses with similar graduate programs to understand how other cultural, institutional, and even socioeconomic factors influence the employability opportunities of female graduates.

Influence of social capital and professional networks

The results indicate that integration into the labor market depends not only on acquired technical skills but also on institutional prestige and professional networks. In this regard, it is recommended that studies be developed that analyze the importance of social capital —understood, in Bourdieu's words (2001), as the set of resources associated with networks of relationships— in the career paths of postgraduate graduates, considering variables such as participation in associations, academic ties, and professional integration mechanisms.

Technological update and digital skills

The rapid evolution of geospatial technologies presents challenges for curriculum updates. In this context, it is suggested that continuing education models be explored that incorporate artificial intelligence applied to geospatial analysis and remote sensing, along with licensing schemes and emerging software linked to data science. Furthermore, it is relevant to evaluate the impact of these innovations on graduate employability.

Linkage with employers and curriculum relevance

This study focused on the perceptions of graduates; however, the incorporation of employers' perspectives remains pending. Including them would allow for differentiated curricular adjustments based on the previously discussed sectoral diversity, thus strengthening the link between academic training and the demands of the labor market.

Professional satisfaction and postgraduate development

Although general levels of satisfaction were identified, the evolution of career paths over time was not addressed. In this regard, longitudinal studies would allow us to understand

how expectations, mobility, and job stability vary depending on the training received, as well as on economic and technological changes.

Institutional models for tracking graduates

Finally, it is recommended to evaluate the effectiveness of graduate tracking systems, incorporating qualitative and quantitative indicators that promote feedback on both curriculum management and teacher training. This approach would contribute to consolidating a culture of continuous improvement in graduate programs.

Data availability

The data used in this study are not publicly available due to institutional restrictions, but may be provided upon reasonable request to the graduates department or the MAEG coordination.

References

Álvarez Gavilanes, J. E., & Romero Fernández, A. (2015). La empleabilidad de graduados universitarios en el contexto latinoamericano. *Atenas*, 4(32), 1–15. https://atenas.umcc.cu/index.php/atenas/article/view/449

Ávila, M., & Aguirre, C. (2005). El seguimiento de los egresados como indicador de calidad en los centros de educación superior. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 8(3), 1–5. https://digitum.um.es/server/api/core/bitstreams/8f8a6a5a-1489-4c65-bfb3-126c7e6eb0c8/content

Balchin, W. G. V. (1983). Careers for graduate geographers. *The Geographical Journal, 149*(3), 334–341. https://doi.org/10.2307/634008

Becker, G. (1975). *El capital humano: Un análisis teórico y empírico referido fundamentalmente a la educación*. Alianza Editorial.

Blanco, R. (2006). La inclusión en educación: Una cuestión de justicia y de igualdad. *Sinéctica. Revista Electrónica de Educación*, (29), 19–27. https://www.redalyc.org/comocitar.oa?id=99815739003.

Bourdieu, P. (1986). The Forms of Capital. En J. Richardson (Ed.), Handbook of Theory and Research for the Sociology of Education. https://es.scribd.com/doc/254096910/The-Forms-of-Capital-by-Pierre-Bourdieu

Bourdieu, P. (2001). Poder, derecho y clases sociales. Desclée de Brouwer. https://www.edesclee.com/img/cms/pdfs/9788433014955.pdf

Brito, S., Basualto Porra, L., & Reyes Ochoa, L. (2019). Inclusión social/educativa, en clave de educación superior. *Revista Latinoamericana de Educación Inclusiva, 13*(2), 157–172. https://doi.org/10.4067/S0718-73782019000200157

Secretaría de Educación Pública [SEP] & Consejo Nacional de Ciencia y Tecnología [CONACYT]. (2021, junio). *Programa Nacional de Posgrados de Calidad: Términos de referencia*. https://conahcyt.mx/wp-content/uploads/convocatorias/PNPC/2021/TerminosReferenciaRenovacion2021.pdf

Coomes, O. T., Abizaid, C., Breau, S., & Moore, T. R. (2022). The academic job market in U.S. geography and the business cycle: The long shadow of the 2007–2009 recession. *The Professional Geographer, 74*(4), 602–619. https://doi.org/10.1080/00330124.2022.2069137

De Vries, W., & Navarro, Y. (2011). ¿Profesionistas del futuro o futuros taxistas? Los egresados universitarios y el mercado laboral en México. *Revista Iberoamericana de Educación Superior, 2*(4), 1-23. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-28722011000200001

Figueroa, S., & Bernal Morales, B. (2021). Egresados del posgrado en una universidad pública mexicana: Autoevaluación de competencias de investigación. *RIAICES, 3*(2), 49–56. https://doi.org/10.17811/ria.3.2.2021.49-56

Franklin, R. S., & Ketchum, J. (2012). Working in a landscape of recession and expansion: Academic jobs in geography in the United States, 1990–2011. *The Professional Geographer, 64*(3), 321–335. https://doi.org/10.1080/00330124.2012.660455

Fuenzalida Díaz, M., & Cobs Muñoz, V. (2013). La perspectiva del análisis espacial en la herramienta SIG: Una revisión desde la geografía hacia las ciencias sociales. *Persona y Sociedad, 27*(3), 33–52. https://doi.org/10.53689/pys.v27i3.48

Gómez Rodríguez, H., Ortiz Muñoz, E. P., & González Fernández, M. O. (2017). El estudio de egresados para la mejora continua de las universidades: Estudio de caso de la ingeniería en computación. *RIDE. Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 7*(14), 162–184. https://doi.org/10.23913/ride.v7i14.279

Guirland, S. (2023). Empleabilidad e inserción laboral de los egresados de postgrado de la Facultad de Humanidades de la Universidad Nacional de Pilar, cohortes 2019 a 2022. *Ciencia Latina Revista Científica Multidisciplinar, 7*(2), 936–947. https://doi.org/10.37811/cl_rcm.v7i2.5375

Kodrzycki, Y. K. (1999). Geographic shifts in higher education. *New England Economic Review* (July/August), 27–47. https://www.bostonfed.org/-/media/Documents/neer/neer499b.pdf

López Obando, P., & Villamil Bolívar, H. H. (2019). Modelo de seguimiento a egresados con énfasis en empleabilidad. *Revista Electrónica Gestión de las Personas y Tecnología, 12*(35), 1–14. https://www.redalyc.org/journal/4778/477865641003/477865641003.pdf

Macías Mozqueda, E. Y., & Luna Lara, M. G. (2020). La trayectoria laboral de los egresados de un doctorado interinstitucional. *Revista de Educación y Desarrollo*, 75–84. https://www.cucs.udg.mx/revistas/edu_desarrollo/anteriores/55/55_Macias.pdf

Martínez González, A., Bernal Moreno, A., Hernández Cruz, B., Gil Miguel, A., & Martínez Franco, A. I. (2005). Los egresados del posgrado de la UNAM. *Revista de la Educación Superior, 34*(133), 23–32. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-27602005000100023

Meza Mejía, M. del C., Ortega Barba, C. F., & Toval Ávila, L. E. (2024). Revisión sistemática integrativa sobre estudios de egresados de instituciones de educación superior publicados en revistas mexicanas. *Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 14*(28), e687. https://doi.org/10.23913/ride.v14i28.1972

Mora, J. G. (2008). El éxito laboral de los jóvenes graduados universitarios europeos. *Revista de Educación*, (346), 41–58. https://www.educacionfpydeportes.gob.es/revista-de-educacion/numeros-revista-educacion/numeros-anteriores/2008/re2008/re2008-03.html

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO]. (1998). *Higher education in the twenty-first century: Vision and action.* UNESCO.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO]. (2019). Declaración mundial sobre la educación superior en el siglo XXI: Visión y acción. UNESCO. https://ess.iesalc.unesco.org/index.php/ess3/article/view/171

Peinado Camacho, J. D., Montoy Hernández, L. D., & Cruz Guerra, C. (2021). Análisis del posgrado escolarizado en México. *Dilemas contemporáneos: educación, política y valores, 9*(1), 1-21. https://doi.org/10.46377/dilemas.v9i1.2829

Pérez Alcántara, B. D., Carreto Bernal, F., & Reyes Torres, C. (2018). Inserción y trayectoria laboral de los geógrafos graduados de la UAEM, cohortes 2003 a 2015. *Praxis Investigativa ReDIE, 11*(20), 30-45. http://ri.uaemex.mx/bitstream/handle/20.500.11799/104367/PRAXIS%20INVESTIGATIVA%20ReDIE%20VOL.%2011%20No.%2020%20Enero-%20Junio%20de%202019.pdf?sequence=1&isAllowed=y

Priego Álvarez, H. R., Padilla Sánchez, D. A., & Ávalos García, M. I. (2012). Estudio del mercado laboral de los egresados de la Maestría en Ciencias en Salud Pública: Un análisis de su inserción laboral. *Perspectivas Docentes*, (50). https://doi.org/10.19136/pd.a0n50.588

Quinto, G. E. M., Cuenca, A. G. M., Pilozo, S. I. I., & Miño, R. M. A. (2024). Estrategias para mejorar la calidad de la educación en zonas rurales de Ecuador. Ciencia Latina Revista Científica Multidisciplinar, 8(2), 2926-2943. https://doi.org/10.37811/cl_rcm.v8i2.10724

Rodino, A. M. (2015). La educación con enfoque de derechos humanos como práctica constructora de inclusión social. *Revista IIDH, 61*, 1–23. https://www.corteidh.or.cr/tablas/r34228.pdf

Ruiz-Flores, J., Ramírez-Díaz, J. A., & Benítez-Zavala, A. (2014). Equity in access, retention and graduation in higher education in Mexico. *Journal of Education and Human Development, 3*(4). https://doi.org/10.15640/jehd.v3n4a20

Salgado Guadarrama, J., Méndez Salazar, V., Martínez Morales, E. G., & Rojas Rodríguez, M. T. (2015). *Seguimiento de egresados de la Maestría en Enfermería de la Universidad Autónoma del Estado de México* (Tesis de maestría). Repositorio Institucional de la Universidad Autónoma del Estado de México. https://core.ac.uk/download/pdf/55531885.pd

Schultz, T. (1985). *Invirtiendo en la gente: La cualificación personal como motor económico*. Ariel.

Silva Laya, M. (2012). Equidad en la educación superior en México: La necesidad de un nuevo concepto y unas nuevas políticas. *Archivos Analíticos de Políticas Educativas, 20*(4). https://doi.org/10.14507/epaa.v20n4.2012

Solem, M., Cheung, I., & Schlemper, M. B. (2008). Skills in professional geography: An assessment of workforce needs and expectations. *The Professional Geographer, 60*(3), 356–373. https://doi.org/10.1080/00330120802013620

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), 355–374. https://doi.org/10.2307/1882010

Tuan, Y.-F. (1977). Space and place: The perspective of experience. University of Minnesota Press.

Universidad Autónoma del Estado de México [UAEMéx]. (2007). *Reporte de seguimiento a egresados*. UAEMéx. Toluca.

Universidad Autónoma del Estado de México [UAEMéx]. (2021). *Estudio de egresados de la Maestría en Análisis Espacial y Geoinformática*. UAEMéx. Toluca.

Velázquez Narváez, Y., & Díaz Cabrera, M. D. (2020). Violencia y desigualdad laboral en México: Revisión teórica desde una perspectiva de género. *Andamios, 17*(42), 423–440. https://www.scielo.org.mx/scielo.php?pid=S1870-00632020000100423&script=sci_abstract

Yánez Contreras, M., & Acevedo González, K. (2010). El mercado laboral desde una perspectiva espacial. *Apuntes del Cenes*, 29(50), 73-97.

Zandomeni, N., & Chignoli, S. (2008). Estudio de seguimiento de egresados: El caso de los graduados recientes de la FCE-UNL. *Revista de Ciencias Económicas (UNL), 6*(1), 45–58. https://bibliotecavirtual.unl.edu.ar/publicaciones/index.php/CE/es/article/view/1117