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Artículos científicos

¿Dónde, cómo y cuánto? Una aproximación al primer empleo de los egresados de Ingeniería Civil de la Universidad Michoacana

Where, how and how much? An approach to the first job of Civil Engineering graduates from the Universidad Michoacana

Onde, como e quanto? Uma abordagem do primeiro emprego dos graduados em Engenharia Civil pela Universidad Michoacana

Rosa Vega Cano

Universidad Michoacana de San Nicolás de Hidalgo, Facultad de Economía “Vasco de Quiroga”, México

rosa.vega@umich.mx

<https://orcid.org/0000-0002-5668-1429>

Fabiola García Rangel

Universidad Michoacana de San Nicolás de Hidalgo, México

fabiola.garcia@umich.mx

<https://orcid.org/0000-0002-4864-9672>

Resumen

Desde hace varias décadas, han existido críticas que hablan de la necesidad de que haya congruencia entre la formación que reciben los estudiantes universitarios, las demandas sociales y las exigencias del mundo laboral. Por lo tanto, se ha vuelto un imperativo para las instituciones de educación superior (IES) realizar estudios de seguimiento a egresados. En ese sentido, el objetivo de esta investigación consistió en describir cómo ha sido la inserción laboral y cuáles son las características del primer empleo de los egresados de la Licenciatura en Ingeniería Civil de la Universidad Michoacana de San Nicolás de Hidalgo. Se trata de un trabajo exploratorio que se realizó desde un enfoque cuantitativo, que concluye señalando que el ámbito de desempeño profesional de los recién egresados es el local, en labores administrativas que implican la gestión y el desarrollo de proyectos y obras civiles. Por lo

tanto, se enfatiza en la importancia de sostener canales de comunicación con los principales actores de este sector de la actividad económica, de tal forma que pueda garantizarse la creación y consolidación de fuentes de empleo para los egresados.

Asimismo, se concluye que debe reconocerse que el mercado laboral valora las competencias transversales que los egresados poseen y no solo los conocimientos especializados de la carrera que estudian. Por lo que es necesario que las universidades propicien la formación integral de sus estudiantes, a partir de la escucha atenta de las necesidades del entorno. Se trata, pues, de establecer una alianza fundamental para el desarrollo sostenible.

Palabras clave: Estudiantes universitarios; trayectorias laborales; inserción laboral; empleabilidad; educación superior.

Abstract

For several decades there have been critics about the need for consistency between the training received by university students, social demands and the demands of the world of work, which is why it has become an imperative for higher education institutions (IES) carrying out follow-up studies on graduates. In this regard, the objective of this research will be to describe how the labor insertion has been and what are the characteristics of the first job of the graduates of the Civil Engineering Degree of the Universidad Michoacana de San Nicolás de Hidalgo. This is an exploratory work that was carried out from a quantitative approach, which concludes by pointing out that the field of professional performance of recent graduates is local, in administrative tasks that involve the management and development of projects and civil works, for which emphasizes the importance of maintaining communication channels with the main actors in this sector of economic activity, in such a way that the creation and consolidation of sources of employment for graduates can be guaranteed.

Likewise, it is concluded that it should be recognized that the labor market values the transversal skills that graduates have and not only the specialized knowledge of the career they study, so it is necessary for universities to promote the comprehensive training of their students, from attentive listening to the needs of the environment. It is therefore a matter of establishing a fundamental alliance for sustainable development.

Keywords: University students; labor trajectories; labor insertion; employability; higher education.

Resumo

Há várias décadas há críticas que falam da necessidade de coerência entre a formação recebida pelos universitários, as demandas sociais e as demandas do mundo do trabalho. Por isso, tornou-se imperativo para as instituições de ensino superior (IES) realizar estudos de acompanhamento dos egressos. Nesse sentido, o objetivo desta pesquisa foi descrever como tem sido a inserção laboral e quais são as características do primeiro emprego dos egressos do Curso de Engenharia Civil da Universidad Michoacana de San Nicolás de Hidalgo. Trata-se de um trabalho exploratório que foi realizado a partir de uma abordagem quantitativa, que conclui apontando que o campo de atuação profissional dos recém-formados é local, em tarefas administrativas que envolvem a gestão e desenvolvimento de projetos e obras civis. Destaca-se, assim, a importância da manutenção de canais de comunicação com os principais atores deste setor da atividade económica, de forma a garantir a criação e consolidação de fontes de emprego para os diplomados.

Da mesma forma, conclui-se que há que reconhecer que o mercado de trabalho valoriza as competências transversais que os diplomados possuem e não apenas o conhecimento especializado da carreira que estudam. Portanto, é necessário que as universidades promovam a formação integral de seus alunos, baseada na escuta atenta às necessidades do ambiente. Trata-se, portanto, de estabelecer uma aliança fundamental para o desenvolvimento sustentável.

Palavras chave: Estudiantes universitarios; trayectorias de empleo; inserción laboral; empleabilidad; Educación superior.

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The studies of graduates and the justification of the relevance of higher education

Higher education institutions (HEIs) are considered a fundamental element and lever for the development of countries, since part of their mission is to train professionals who will promote this development, with the possibility that this impact will positively transcend from the local to global level.

However, for several decades there have been criticisms regarding the disconnection between higher education, the labor market and social demands, and it has been a challenge for HEIs to carry out studies of relevance of the educational offer and monitoring and evaluation of the performance of the graduates.

In Mexico, the National Association of Universities and Institutions of Higher Education (ANUIES) considers that the results of institutional graduate follow-up programs is one of the inputs that allows for a comprehensive assessment of the quality, effectiveness, and social impact of education. higher (ANUIES, 2018). Likewise, the Inter-institutional Committees for the Evaluation of Higher Education (CIEES) consider the follow-up of graduates as an evaluation mechanism and a requirement for the accreditation of educational programs. However, the incorporation of this type of study in the agendas of higher education institutions (HEIs) is relatively recent, despite the fact that the first studies were carried out towards the end of the 1970s and 1980s (García, et al. , 2018).

The current proliferation of these studies is due to the fact that they are considered fundamental supports for institutional decision-making regarding the professional training of students and an important link for communication with their graduates (Bezies, et al., 2011).

The competencies that university graduates require to perform in the labor market and to address the resolution of new and increasingly complex problems imply the interrelationship of pedagogical, organizational, and infrastructure aspects that must be considered by higher education institutions. The Covid-19 pandemic is the most recent experience that humanity has lived, which proves its vulnerability to the global environment.

In this new reality, the challenge is to train critical, creative, self-managed university students who are capable of self-regulation and of working collaboratively with professionals from other disciplines (Perales, 2021); that is, today more than ever, the idea that graduates must have transversal skills and not only those associated with specific knowledge of the discipline in which they completed their university studies is reinforced (Hernández, 2019).

Therefore, HEIs must be vigilant in monitoring the results obtained by their educational programs. Even the opinion and experiences that the graduates of the university classrooms express after a few years, constitute aspects that are evaluated to qualify the results obtained by the higher level educational programs and accredit their quality, according to the established standards. by the Interinstitutional Committees for the Evaluation of Higher Education (CIEES, 2018).

In theoretical terms, Planas (2013) points out that graduate follow-up studies must start from the premise that the working life of a professional is defined by a diversity of factors that have to do, of course, with education and work. , but it is not limited only to these areas, but also includes family and social aspects, so this type of analysis should not be considered a fixed image of the graduates' trajectory, but rather an image that captures a specific moment in the itinerary that individuals follow in their transition from student to professional life.

Likewise, in epistemological terms, it is important to highlight that, according to some authors, there is a difference between studies of graduates and follow-up studies of graduates; in the former, the analysis starts from samples taken at one or several moments in time, while in the latter, the same sample is analyzed repeatedly at different times, with the intention of studying the trajectory developed by each graduate considered in the sample (García, et al., 2018).

In this sense, the results shown in this document are part of a study of graduates of the Bachelor's Degree in Civil Engineering of the Universidad Michoacana de San Nicolás de Hidalgo, and have the objective: to describe how the labor insertion has been and what are the the characteristics of the first job of the graduates of the generations that studied with the current plan during 2009-2020.

Workplace experiences of graduates of civil engineering degree programs in Mexico

The bibliographic review around studies of graduates of civil engineering degree programs in Mexico allowed to identify aspects that may mean areas of opportunity to consider within the formative processes of students while they are studying in higher education institutions, since The current environment and the diversity of sudden and abrupt changes that characterize it urge these institutions to respond appropriately to social demands, which

requires evaluating and following up on all the processes that imply the fulfillment of their substantive training functions, generation and dissemination of scientific and technological knowledge.

In a study carried out by Solís et al. (2006), the experience in the first job of the graduates of the Civil Engineering Degree from the Universidad Autónoma de Yucatán (UADY) is described from the generational cohorts from 1996 to 2002, in which 458 engineers graduated who studied a same curriculum.

The collection of information was carried out by applying a survey to a sample of 116 individuals and the instrument used was designed by the General Coordination of Graduates of UADY, considering various national and international methodological recommendations to carry out studies of this type. The main findings of the study related to job placement, satisfaction with the professional practice and the contributions of the study plan to the development of competencies are shown in Table 1 below.

Table 1. Professional insertion, satisfaction with the professional practice and contributions of syllabus to the development of competences of the graduates of the Bachelor's Degree in Civil Engineering of the Universidad Autónoma de Yucatán

Category	Main findings
Professional insertion	<ul style="list-style-type: none"> • 72% said they had worked for some time while they were studying (89% in an occupation that was directly related to civil engineering). • 65% had a job when they finished their studies and 23% obtained it in less than six months. • Most (40%) got their first job on the recommendation of a friend, fellow student, or family member. • 44% indicated that conducting an interview was the main requirement to obtain their first job and only 13% mentioned the option of having a civil engineering professional title.
Satisfaction with professional practice	<ul style="list-style-type: none"> • The majority stated that they were dissatisfied both with their level of income and in other seven aspects (hierarchical position achieved, professional activities carried out, work environment, development expectations, putting into practice the knowledge acquired, professional recognition achieved and opportunity to respond to problems of social relevance). • The majority feel satisfied only in one aspect: the possibility of doing something for the benefit of society).
Contributions of the syllabus to the development of competences	<ul style="list-style-type: none"> • The two competencies that most graduates rated favorably were: technical knowledge of the discipline (83%) and extensive knowledge of the theoretical approaches of the discipline (78%).

Source: Prepared by the authors based on Solís, et al. (2006, pp. 131-132)

Another study on graduates of the Civil Engineering Degree was carried out by Bezies et al. (2011) at the Universidad Autónoma del Estado de Hidalgo (UAEH). The main objective of this study was to obtain information on the professional practice of its graduates, provide feedback on the curricular review and promote communication with the institution for training and updating activities (p.9).

To collect information, a survey was applied to ten graduates of the January-June 2010 school year, using the instrument developed by ANUIES (1998) as a guide. The findings of the study

in relation to employment history, professional performance and opinion on professional training are summarized in Table 2 below.

Table 2. Work history, professional performance and opinion on the professional training of the graduates of the Bachelor's Degree in Civil Engineering of the Universidad Autónoma del Estado de Hidalgo

Module	Main findings
Work trajectory	<ul style="list-style-type: none"> • All those surveyed stated that they had current employment at the time of answering the survey. The majority (66.7%) took between six months and a year to find it. • The main difficulty in finding a job that was mentioned was the lack of work experience (66.7% attribute it to this cause). • 44.4% mentioned that they got their first job on the recommendation of a friend or relative.
Professional performance	<ul style="list-style-type: none"> • In general, the majority of those surveyed feel satisfied in each of the different aspects included in their professional performance. • The categories that reached a level of "very satisfied" were: putting into practice the knowledge acquired in the degree, the possibility of carrying out their own ideas and the possibility of doing something of benefit to society. • The categories that had mentions at the "dissatisfied" level were: professional recognition, hierarchical position and salary obtained; the content and environment of the work; the possibility of responding to problems of social relevance and the possibility of doing something of benefit to society.
Opinion on vocational training	<ul style="list-style-type: none"> • According to what was expressed by the majority of those surveyed, there is satisfaction regarding the knowledge and skills that they were able to develop in their disciplinary training; however, they are not satisfied with the knowledge and skills of a humanistic nature.

Source: Prepared by the authors based on Bezies, et al., 2011, pp. 24-34

Finally, a study of graduates carried out by the Graduates Office of the Universidad Autónoma Metropolitana (UAM), Unidad Azcapotzalco, in 2017, was found, which is also based on the methodology proposed by ANUIES (1998) and considers seven dimensions of analysis for the graduation cohort corresponding to 2012.

In the same way that we proceeded to highlight the results of the two works described above, Table 3 summarizes the main findings of the study carried out on a sample of 22 graduates of the civil engineering degree from the UAM Unidad Azcapotzalco, around the trajectory and location in the labor market, professional performance and satisfaction with vocational training.

Table 3. Trajectory and location in the labor market, professional performance and satisfaction with the professional training of the graduates of the Bachelor's Degree in Civil Engineering of the Universidad Autónoma Metropolitana-Unidad Azcapotzalco

Dimension	Main findings
Trajectory and location in the labor market	<ul style="list-style-type: none"> • 72.2% worked during the last year of the degree; in 78.6% of the cases, the work coincided with the studies. • 66.7% looked for a job upon graduating from their degree and all got a job in less than six months. • 88.9% stated that they were working at the time of responding to the survey, indicating the approval of a formal interview as the main requirement to have obtained it. • 25% obtained the job through an external job bank and 18.8% through the recommendation of a teacher, friend or family member.
Professional performance	<ul style="list-style-type: none"> • 100% of graduates are satisfied with their performance in terms of the possibility of responding to problems at work. • In eight aspects, more than 75% of those surveyed are satisfied (the implementation of the knowledge acquired in the degree, the possibility of carrying out their own ideas, the professional recognition achieved, teamwork, the possibility of coordinating a work team, the content of the work/activity, the work environment and the possibility of responding to problems of social relevance). • Only with regard to salary (income and benefits) and the hierarchical position reached, they declared feeling dissatisfied (55.6 and 66.7%, respectively).
Satisfaction with vocational training	<ul style="list-style-type: none"> • Learning independently is the skill with which 100% of graduates feel most satisfied to have developed or strengthened during their professional training.

Dimension	Main findings
	<ul style="list-style-type: none"> • Only two aspects were indicated as unsatisfactory in this regard: verbally expressing opinions or ideas clearly and precisely, and leadership attitudes (22.2% in each case). • In the other eight items, the majority of response frequencies were above 70% in a certain degree of satisfaction (regular + a lot).

Source: Prepared by the authors based on UAM, 2017, pp. 45-67.

The data presented show that there is a more or less generalized opinion that graduates have sufficiently strengthened the theoretical knowledge related to their career, but that universities still have debts in terms of promoting the development of so-called "soft skills" (British Council , 2016); that is, those that have to do with critical thinking and problem solving; collaboration and communication; creativity, leadership and personal development. These findings coincide with the results of a study on the perception of the performance of interns in the civil engineering career at the Universidad Nacional de Ingeniería, in Nicaragua, where it is highlighted that employers from 66 organizations from both the private and public sectors highly value the capacities to adapt to change, analysis, integration into work teams, as well as communication and problem solving (Navarro and Blandón, 2020). This situation does not seem to be recent and neither is it unique in the case of the institutions that have been reviewed. In an investigation carried out by Vega, et al. (2012) on the results of graduate follow-up studies at universities in different countries (Spain, Canada, the United States, Chile, Mexico, Colombia, Argentina and Costa Rica), it is highlighted that the demand for professional profiles with generic skills has opened. There has been a significant gap between the university education system and the labor market for more than three decades, imposing great challenges on HEIs in terms of offering a higher education that meets both technical requirements and the attributes or skills of knowing how to be, do and live together. , which the world of work requires in a highly changing environment.

Methodology

The present research work is of an exploratory type and was carried out from a quantitative approach. The information that was analyzed was compiled through the survey of graduates applied by the Universidad Michoacana de San Nicolás de Hidalgo through the web portal of the Sistema Integral de Información Administrativa (SIIA) to those who have completed all the credits of the educational program that attended (in this case, the graduates of the Civil Engineering Degree). Said survey follows the structure and content of the Basic Scheme for graduate studies proposed by the National Association of Universities and Institutions of Higher Education (ANUIES) based on the collaboration of recognized experts on the subject and with the intention of contributing to HEIs They can count on important inputs to make sound decisions regarding the institutional planning that involves the training of their students (ANUIES, 1998).

It is important to mention that, once the authorities of the Faculty of Civil Engineering were aware of the objective of this research, they expressed their interest in knowing the results, recognizing that they constitute very significant inputs for decision-making and the improvement of academic programs. . In this sense, they were in charge of the management before the SIIA to obtain the information corresponding to the graduates of the Bachelor's Degree in Civil Engineering.

The database that was made available for this research work included the response of 922 respondents who responded between 2013 and 2020. Of these, only the responses of 477 cases were analyzed, corresponding to cohorts that completed their studies with the plan of studies in force from 2009 to 2020. It should be noted that the ANUIES methodological recommendations indicate that it is convenient to include cohorts by year of graduation and that they can be joined as long as they correspond to the same study plan and have graduated five years or more. (ANUIES, 1998); however, recent studies indicate that two or three years of graduation can be considered (Acosta, 2022).

Considering both criteria, in this study it was decided to divide the generations of graduates into two blocks: in one the generations 2009-2014 to 2012-2017 (who had more than three years of having graduated) were included and in another those corresponding to 2013 -2018 to 2015-2020 (who had graduated three years or less); all of them, within the validity of the same study plan. With this, compliance with the two recommended methodological aspects was considered: the year of graduation and belonging to the same plan, since both constitute

indicators of homogeneity in terms of the academic context and the economic and social environment in which the students who are trained are trained. correspond to the cohorts that are analyzed (ANUIES, 1998).

The complete ANUIES instrument consists of 107 questions referring to both qualitative or categorical and quantitative variables and is made up of 15 sections (ANUIES, 1998). However, for the purposes of the analysis presented here, only the responses to specific questions in some of them were taken. The variables included in this study can be seen in Table 4, below.

Table 4. Variables analyzed from the instrument proposed by ANUIES

Variables	Section of the instrument to which it corresponds
Country and state of residence	General data of the graduate and socio-family background
Género, edad, estado civil, número de hijos, condición de propiedad de la vivienda (propia, prestada o rentada)	Gender, age, marital status, number of children, home ownership status (own, borrowed or rented)
Origen de los recursos económicos para el sostenimiento de los estudios	Origin of financial resources to sustain the studies
Year of admission, year of graduation, condition of completion of the degree and condition of degree	Undergraduate
Postgraduate studies or continuing education after the degree	Continuation of training
Time to obtain the first job, difficulties in obtaining it, main requirement, degree of relationship between studies and work in the first job, types of activities carried out and factors that influenced obtaining it	Trajectory and location in the labor market
Employment status, job position, monthly income, sector (branch) and main activity performed	Professional performance
Degree of satisfaction between professional training and professional performance and satisfaction with the	Satisfaction with the institution and with the course taken

Variables	Section of the instrument to which it corresponds
degree and the institution	

Source: prepared by the authors

The processing and analysis of the information was carried out using the statistical package for the social sciences SPSS (for its acronym in English). With the same software, the response frequencies in each of the items were analyzed, correlations were tested, and tables and graphs were constructed to present the research findings.

What do the data from the survey of graduates of the Faculty of Civil Engineering of the Universidad Michoacana tell us?

Of the 477 cases analyzed, 100% reside in Mexico; 90% in Michoacán and the rest in other entities, including Baja California, Baja California Sur, Chiapas, Federal District (Mexico City), State of Mexico, Guanajuato, Guerrero, Hidalgo, Jalisco, Nuevo León, Oaxaca and Queretaro.

An evident majority (86%) identified with the masculine gender; the average age was 25.6 years, although it ranges between 22 and 33. 84% indicated being single; 60% live with their parents and 12% have children (a third of them have more than one child). During the degree, 82% supported their studies through family support, 12% with their own resources and the rest with some scholarship or other type of support.

At the time of answering the survey, 66% had a degree and the rest were in the process. Among the main reasons why the latter had postponed their degree, are: lack of time (48%) and scarce economic resources (30%).

The Universidad Michoacana was the first option that 94% of those surveyed considered to carry out their undergraduate studies; 93% specifically to study the Degree in Civil Engineering. The reasons referred to for considering studying said career were: 38% for having a vocation and personal skills in that area; 23% for considering it a career with high labor demand; 19% for the prestige of the institution; 13% due to the contents of the study plan and the rest stated that they had other reasons such as ease of admission, being a profession with a family tradition and because they had received advice to study it.

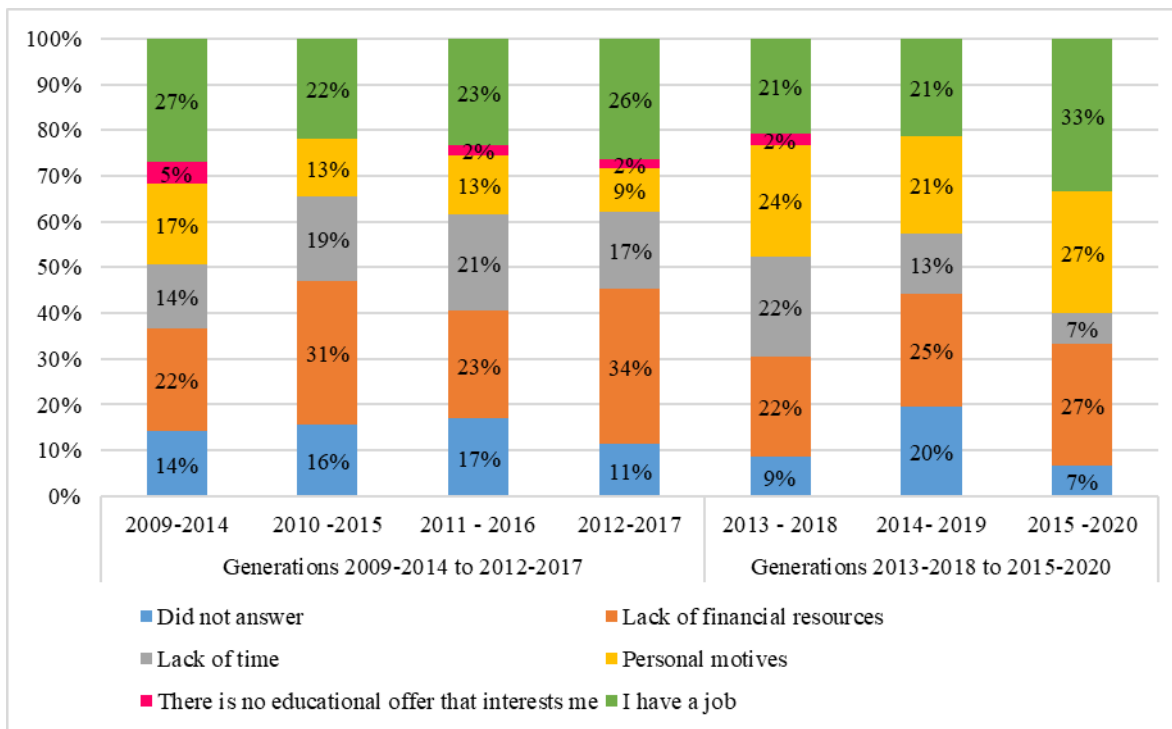
When analyzing the data by blocks of generational cohorts, we found that, in the case of socioeconomic variables, there are some differences. For example, the more years that

have passed after graduation, the more cases of graduates who are married or living in a free union, who have children and who have their own home, are observed, this last variable being the one that shows a greater increase, if we compare the first generation (2009-2014) with the last of the analysis period (2015-2020), since it goes from 63% to 73%. This may be the result of having a job and a more favorable economic situation to become independent from their parents.

In all the cohorts studied, the proportion of graduates who have completed post-graduate studies (which can be short courses, diplomas or a postgraduate degree) is small, ranging between 11 and 17% for the generations of the first block and between 7 and 21 % in the most recent generations; which is striking, since they have less than three years of completing their credits.

In practically all cases, the reasons given for not having completed post-graduate studies at the time of answering the survey are the lack of economic resources, the lack of time and the fact that they are working (Figure 1).

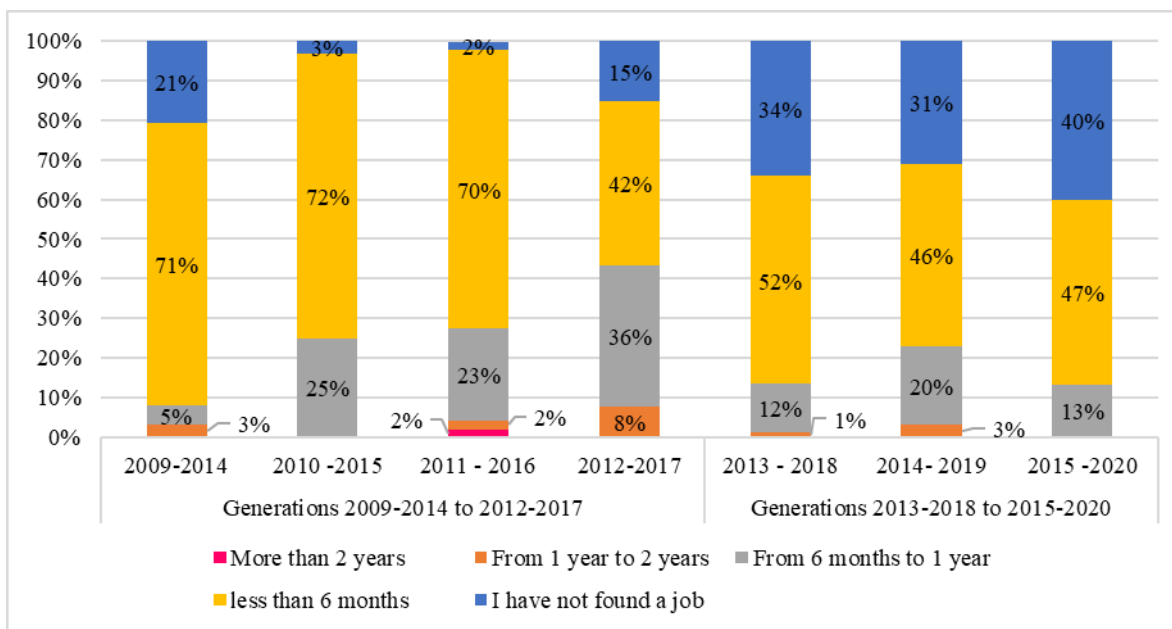
Figure 1 Reason why he did not carry out other types of studies at the end of the degree



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

Regarding the first job, the graduates reported that it has taken them, in general, less than six months to get it. However, it stands out that only in two generations of the first block there is a minimum proportion of unemployed. Even in the most recent generations, the data on unemployment is striking, given that between one and three years have passed since their graduation, and the generations of the first block that did not find work in less than six months did so in less than one year (Figure 2).

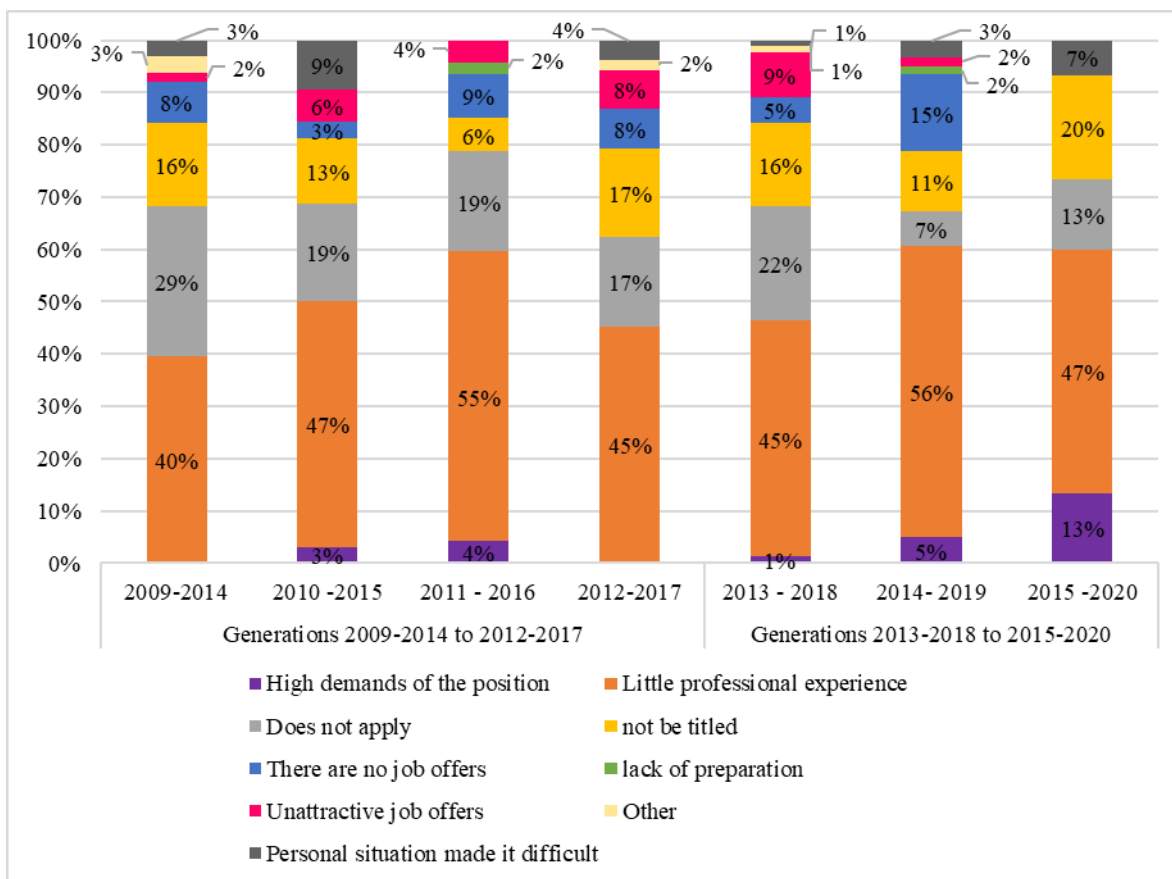
Figure 2 Time to get the first job, once the undergraduate studies are completed



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

The two main reasons that the graduates themselves point out as causes of their difficulty finding a job are little professional experience and not having a degree (figure 3).

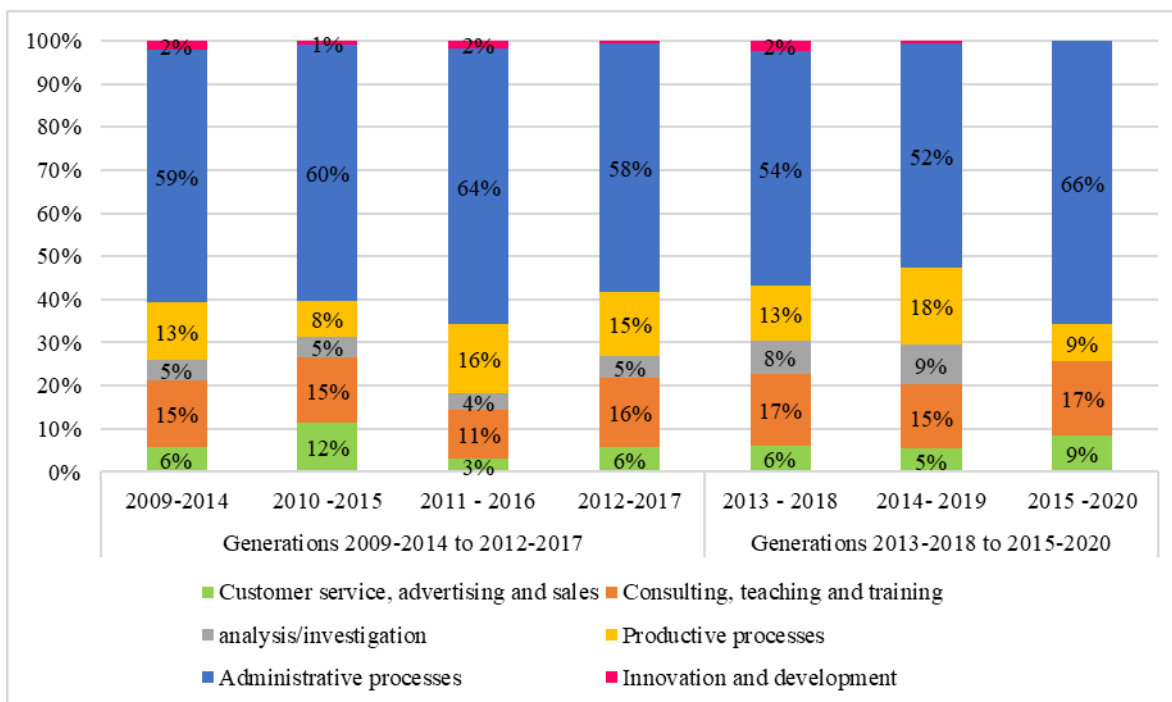
Figure 3 Reasons why it is delayed or difficult to get a job



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

Considering the proportion of the sample that is actually working, the majority is performing functions in administrative processes. That is, they participate in planning, organization, supervision, coordination, management and/or evaluation activities of projects and works, regardless of the block or cohort to which they belong. The activities with minimal participation are those related to innovation and development (figure 4). This is possibly due to the fact that, when asked how they would rate the degree of relationship between their studies and the work they did in their first job (or do, if they remain in it), most responded that there is a medium coincidence. This was indicated by between 30% and 47% of the cohorts throughout the analysis period, except in the first generation. In the latter, the majority (43%) responded that they believe that there is or was a total coincidence.

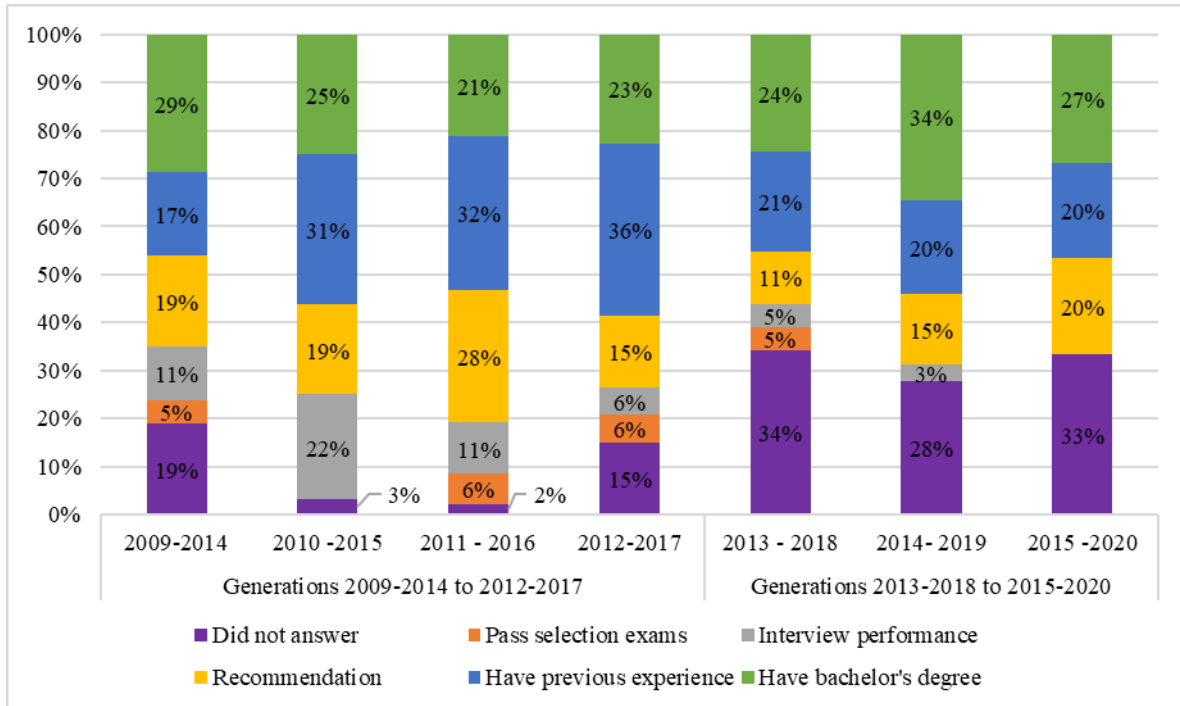
Figure 4 Type of activities carried out in the first job



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

As for the main requirement to get their first job, in addition to having completed their undergraduate studies, most say that it is to have a degree or have some recommendation. This was the case in all the cohorts of the period analyzed (figure 5).

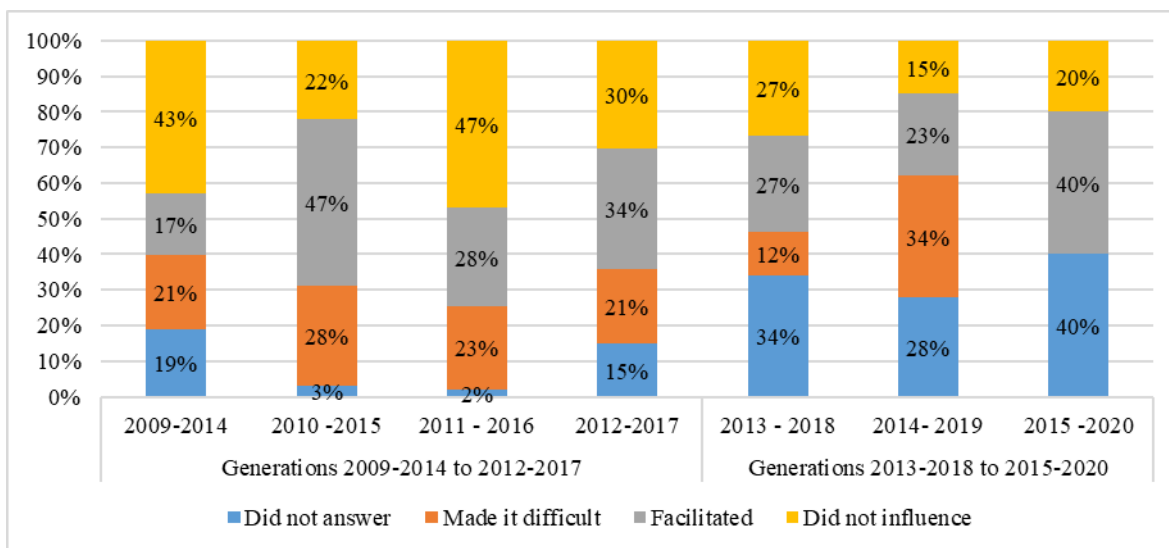
Figure 5 Requirement of greater weight to get the first job



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

In relation to what they consider to be the factors that influenced obtaining their first job, the general response considering all the cohorts was, firstly, the coincidence of the career with the needs of the company or institution; secondly, the acceptance of the degree in the labor market and, thirdly, the prestige of the Universidad Michoacana. Although previous work experience also received a significant response frequency as a factor that facilitated obtaining a job position in all the cohorts, it contrasts with the fact that it was an aspect in which a significant proportion answered that it has been a limitation. Therefore, it can be understood that for those who have some work experience before looking for their first job as university graduates, it is a favorable factor and, for the opposite case, those who do not have previous experience find it more difficult to get a job for the first time after to graduate from university classrooms (figure 6).

Figure 6 How did previous experience influence getting your first job?



Source: Prepared by the authors based on information provided by the Sistema Integral de Información Administrativa (SIIA). Universidad Michoacana de San Nicolás de Hidalgo.

In order to corroborate this hypothesis, the Chi-square test was used, using the SPSS statistical package. Since the survey does not include a specific question to identify if the respondent worked during their studies, the test was carried out considering the form of support of the studies, assuming that those who answered that it was with their own support was because they worked while studying and looked for the correlation with the time it took to get the first job. A result that was not statistically significant was obtained from this test, so an association cannot be attributed between the fact of having worked during the degree and getting a job more immediately.

However, the fact of having worked during the studies does not necessarily mean having obtained greater preparation for the labor market upon graduation, so in a next level of analysis the hypothesis was tested that the time it takes for the Obtaining the first job, once graduated from the degree, is associated with previous professional experience (this variable was taken from the question about what were the reasons that the respondents themselves declared that they had identified as possible causes for delaying or making it difficult to enter to first job). In this case, the Chi Square test gave a statistically significant result that allowed us to accept the hypothesis that there is an association between said variables. The test results are shown in Tables 5 and 6, below.

Table 5. Cross table with the variables: time elapsed to obtain the first job and reasons that the respondents found for the delay or difficulty

Count		Reason_delay_difficulty						Total
		Little professional experience	Does not apply	Not be titled	There are no job offers	Unattractive job offers	Other	
Time getting first employment	0 to 6 months	101	80	36	19	18	15	269
	6 months to 1 year	57	1	12	8	4	9	91
	1 to 2 years	9	0	3	0	1	2	15
	More than 2 years	1	0	0	0	0	0	1
	I have not found a job	52	6	19	7	3	14	101
		220	87	70	34	26	40	477

Source: Prepared by the authors

Table 6. Chi-square tests

	Value	df	Asymptotic (bilateral) significance
Pearson chi-square	69.666 ^a	20	.000
Likelihood ratio	84.000	20	.000
Valid cases	477		

Source: Prepared by the authors

Finally, in relation to the monthly income received in the first job, the survey does not include an explicit question in this regard, however, it could be deduced from the number of respondents who stated that they remained in their first job and that their income is the same as when they entered. In this sense, in the case of the cohorts corresponding to the first block, that is, for graduates who are more than three years old, 47% retain their first job; 20% of them consider that their monthly income remains the same as when they started working and indicate that they receive \$10,000 or less and, on the other hand, 57% indicated that their income has improved, receiving a current monthly amount greater than \$10,000. For the most recent generation, 37% remain in their first job, 21% earn \$10,000 or less per month from

their income, and 43% have seen their income improve, adding a higher monthly amount at the time of answering the survey. at \$10,000.

Discussion

Among the main challenges that universities currently face is, on the one hand, rethinking themselves as a key player in sustainable development and, on the other, strengthening their recognition and social relevance. In this sense, these educational institutions must develop strategies that allow strategic communication with local, state and national governments, as well as with companies and organizations, so that reflection on the attention of the most prevailing social demands is carried out. carried out synergistically with all the social actors and interest groups involved, integrating social responsibility transversally, in its three substantive functions: teaching, research and dissemination of knowledge and culture (Grimaldo, 2018).

In particular, the integration of the vision of sustainable development in university study plans and programs, as well as in their teaching-learning strategies, implies transforming their formative work and ensuring that their graduates are better prepared in terms of a social and critical for decision-making, which is an imperative, since from this perspective, which is already part of the international agenda of higher education, it is considered that the university must meet social needs through the technical and scientific knowledge that it contains. generates, transmits and disseminates, so that knowledge must be efficient, timely and socially applicable for the common good (Henríquez, 2018).

In this sense, from the United Nations Educational, Scientific and Cultural Organization (UNESCO), it has been pointed out that any university is able to work in coordination with the community in which it operates and contribute to social change. and has highlighted the case of African universities that, from their engineering schools, have worked on the recovery of fluvial and wastewater, evidencing the important role that HEIs have in sustainable development, even in less economically favored contexts (UNESCO, 2020). This example is also important to highlight that HEIs have the capacity to contribute to the fulfillment of the 17 objectives that have been drawn up in this regard from the international arena, which have to do with ending poverty, reducing inequalities with a focus on gender and respect for human rights and achieve sustainability in all the dimensions that

it implies, and to which all member countries of the United Nations Organization (UN) have committed themselves, with a view to 2030 (ONU, 2015).

In order to face the challenges in the sense described and guarantee a quality higher education, inclusive and locally and regionally relevant, as declared in 2018 by the III Regional Conference on Higher Education for Latin America and the Caribbean (UNESCO International Institute for Higher Education Superior in Latin America and the Caribbean [IESALC], 2018), it is necessary to consider the results obtained from the studies of graduates, in terms of the assessment that from them can be made of the degree of impact of the university in the social and productive environment (Floresvillar, 2014). The ANUIES in its document "Basic scheme for graduate studies" highlights the importance of carrying out this type of study as a way of studying the reality of what happens to graduates in the labor market and adds to this the usefulness of including the study of both economic and social trends to resize educational work. Given the current environment we are experiencing, environmental and cultural trends should be incorporated into this, to visualize this reality from the perspective of sustainability.

With regard to the educational policy of the Universidad Michoacana de San Nicolás de Hidalgo itself, the Institutional Development Plan in its Axis I. Strengthening of the substantive functions of the UMSNH: teaching, research and dissemination of culture, establishes that "students and teachers will have a high educational level, the study plans will be pertinent and work will be done for the job placement of graduates." (Universidad Michoacana de San Nicolás de Hidalgo [UMSNH], 2020a, p. 104). While, in the guiding principles of the Educational Model, it is intended that "University graduates be ethical, flexible professionals, capable of adapting and contributing to meeting the needs of society" (UMSNH, 2020b, p. 44). In this sense, it is an institutional duty of the Faculty of Civil Engineering of the Universidad Michoacana de San Nicolás de Hidalgo to describe, analyze and evaluate the performance of its graduates in the world of work and, in this way, have elements that allow taking the better decisions both for the improvement of their degree curriculum, and for the creation of new educational offers that allow the formation of professional profiles more relevant to the social, environmental and economic reality of their environment.

As it could be observed, the results obtained in this research coincide with those obtained by the studies cited in the review of the bibliography in Mexico and other countries and regions of the world, particularly in the sense of highlighting the high value that the

possession of soft skills has. or generic competences at the moment of starting working life, for which reason university graduates must be equipped with them in their transit through university classrooms.

This implies that higher education institutions, concerned about the insertion and career path of their graduates, must integrate among their institutional objectives the adaptation of the study plans to the demands of the current and highly versatile environment, in addition to offering their graduates a Solid training in the careers and areas of knowledge they study, in such a way that they are capable of generating new knowledge and basing their professional work on the social and cultural values of their communities and environments (Posada, 2022). To the extent that this is possible, the distance between higher education and the labor market can be shortened and, at the same time, more and better linkage channels between the university and its environment will be possible; a fundamental alliance to build bridges towards sustainable development.

Conclusions

As it could be observed, the scope of professional performance of the recent graduates of the Civil Engineering Degree is the same state of Michoacán and, particularly, in administrative tasks that imply the management and development of projects and civil works. In this sense, it is important to maintain open and constant communication channels with the main actors in this sector of economic activity, in such a way that new links can be established and existing ones strengthened, to guarantee the creation and consolidation of sources of employment for the graduates of the Universidad Michoacana and, above all, so that young people can access the opportunity to collaborate as students with whom they could become their employers, in such a way that upon graduation they have references of their skills and abilities and proof of their work experience, thus reducing the limitations to find the first job in a short period of time (no more than six months after graduation).

Another factor that can contribute to reducing the time to obtain the first job is the attention and accompaniment, by the institution, to those who are managing their degree, since the inefficiency in the procedures was one of the factors that were indicated as hindering early qualification and this, in turn, is one of the main requirements for insertion into the labor market.

An additional aspect that can be influenced by establishing better communication channels with employers and by linking young people from the time they are students, is the wages or salaries offered at the first job opportunity. As long as there is a reference to the level of training, responsibility and skill development of young people from before they are hired as graduates and with a formal job position, employers could be able to offer better working conditions, including, a better income.

On the other hand, the masculinization of enrollment in this educational program is evident, which shows, as in other studies, that universities are spaces where gender stereotypes are replicated and emphasizes the need to promote development of skills and interest of women in these disciplines.

Finally, it is important to consider that the data analyzed in this research, as well as those obtained in previous studies, show that it is necessary to overcome the vision that understands the relationship between higher education and employment as a cause-effect relationship from which It is considered that studying a university degree is the way to guarantee access to a good job, understood as the one that allows obtaining a high level of income. It must be recognized that the labor market values the transversal skills that graduates possess and not only the specific and specialized knowledge of the career they study, so it is necessary for universities to promote the comprehensive training of their students.

Future lines of research

Some possible lines of research that can be deduced from this analysis are: i) complement the information collected through the survey of graduates through a study of employers, which allows knowing from another angle the panorama of the employment prospects that the university graduates; ii) incorporate the gender perspective in the study of graduates and demonstrate the level of professionalization achieved by women graduates of this area, as well as the opportunities and limitations that the labor market shows them; and iii) study the feasibility of implementing a graduate follow-up system that allows knowing the long-term career trajectory and that the information generated is incorporated into the systematic reviews of the study plan. In this way, the institutional decisions that are made will consider this type of input.

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References

- Acosta, D. (20 de septiembre de 2022). *Vinculación con los empleadores para la mejora del perfil del egresado*. [Conferencia magistral]. Foro: La pertinencia de la Ingeniería Civil ante los desafíos globales. Facultad de Ingeniería Civil de la Universidad Michoacana de San Nicolás de Hidalgo.
- Asociación Nacional de Universidades e Instituciones de Educación Superior [ANUIES] (1998). *Esquema básico para estudios de egresados*. Asociación Nacional de Universidades e Instituciones de Educación Superior.
- Asociación Nacional de Universidades e Instituciones de Educación Superior [ANUIES] (2018). *Visión y acción 2030. Propuesta de la ANUIES para renovar la educación superior en México. Diseño y concertación de políticas públicas para impulsar el cambio institucional*. ANUIES.
http://www.anui.es.mx/media/docs/aviso/pdf/VISION_Y_ACCION_2030.pdf
- Bezies, P., Elizalde, L., Enciso, A., Gayosso, I., González, N., Herrera, C., López, M., Olvera, B., Ordaz, A., Pérez, J. y Zacatenco, M. (2011). *Resultados del Estudio de Egresados de la Licenciatura en Ingeniería Civil*. Universidad Autónoma del Estado de Hidalgo.
https://www.uaeh.edu.mx/adminyserv/dir_generales/evaluacion/spitel/seguimiento_de_egresados/42_Ing_Civil-sep2011.pdf
- British Council (2016). *Habilidades blandas para el aprendizaje, el trabajo y la sociedad*.
https://www.britishcouncil.pe/sites/default/files/habilidades_blandas_spanish_core_skills_brochure_final.pdf

- Comités Interinstitucionales para la Evaluación de la Educación Superior [CIEES] (2018). *Proceso general para la evaluación y acreditación de programas educativos de educación superior*. <https://www.ciees.edu.mx/documentos/Proceso-General-para-la-Evaluacion-y-Acreditacion-de-Programas-Educativos-de-Educacion-Superior.pdf>
- Floresvillar, M. (2014). ¿Dónde están los egresados? *Revista de la Comisión Estatal para la Planeación de la Educación Superior del Estado de Guanajuato*, (11). <http://www.revistacoepesgto.mx/revistacoepes11/donde-estan-los-egresados>
- García, C., Treviño, A. y Banda, F. (2018). Caracterización del seguimiento de egresados universitarios. *Revista Estudios del Desarrollo Social: Cuba y América Latina*, 7(1), pp. 23-38. <https://www.redalyc.org/journal/5523/552364016015/html/>
- Grimaldo, H. (2018). El rol de la educación superior frente a los desafíos sociales en América Latina y el Caribe. En: P. Henríquez (Coord.), *Conferencia Regional de Educación Superior de América Latina y el Caribe. Córdoba, 2018. Resúmenes ejecutivos*. (pp. 87-94). Instituto Internacional de la UNESCO para la Educación Superior en América Latina y el Caribe (IESALC) y Universidad Nacional de Córdoba (UNC). <https://www.iesalc.unesco.org/2019/07/17/coleccion-cres-2018-conferencia-regional-de-educacion-superior-de-america-latina-y-el-caribe-cordoba-2018-resumenes-ejecutivos/>
- Hernández, D. (2019). Del enfoque adecuacionista al enfoque basado en competencias: una mirada a la inserción al mercado laboral de los egresados de Sociología. *Sociológica* 34 (98), 189-219. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0187-01732019000300189
- Henríquez, P. (2018). El papel estratégico de la educación superior en el desarrollo sostenible de América Latina y el Caribe. En: P. Henríquez (Coord.), *Conferencia Regional de Educación Superior de América Latina y el Caribe. Córdoba, 2018. Resúmenes ejecutivos*. (pp. 117-134). Instituto Internacional de la UNESCO para la Educación Superior en América Latina y el Caribe (IESALC) y Universidad Nacional de Córdoba (UNC). <https://www.iesalc.unesco.org/2019/07/17/coleccion-cres-2018-conferencia-regional-de-educacion-superior-de-america-latina-y-el-caribe-cordoba-2018-resumenes-ejecutivos/>
- Instituto Internacional de la UNESCO para la Educación Superior en América Latina y el Caribe [IESALC]. (2018). *Declaración de la III Conferencia Regional de Educación*

- Superior en América Latina y el Caribe*. IESALC-UNESCO y Universidad Nacional de Córdoba (UNC). <https://www.iesalc.unesco.org/2019/02/20/declaracion-final-de-la-iii-conferencia-regional-de-educacion-superior-en-america-latina-y-el-caribe-cres-2018/>
- Navarro, S. y Blandón, S. (2020). Desempeño de estudiantes de ingeniería civil desde la perspectiva de los empleadores, periodo 2014-2016. *El Higo. Revista Científica Volumen 10(01)*, 53-62. file:///C:/Users/Rosy/Downloads/NavarroBlandon_2020Performance.pdf
- Organización de las Naciones Unidas [ONU]. (2015). *Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible*. Organización de las Naciones Unidas. <https://www.fundacioncarolina.es/wp-content/uploads/2019/06/ONU-Agenda-2030.pdf>
- Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO]. (2020). *La Universidad como principal actor para alcanzar la meta de sostenibilidad*. UNESCO. <https://www.iesalc.unesco.org/2020/10/30/la-universidad-como-principal-actor-para-alcanzar-la-meta-de-sostenibilidad/>
- Perales, F. (2021). Estudio sobre egresados de la Universidad Pedagógica Nacional de Torreón, Coahuila en México. *Revista Electrónica Cooperación Universidad Sociedad*. 6 (2), 01-10. <file:///C:/Users/Rosy/Downloads/Dialnet-EstudioSobreEgresadosDeLaUniversidadPedagogicaNaci-8273773-1.pdf>
- Planas, J. (2013). Los itinerarios laborales de los universitarios y la calidad de su inserción profesional. *Revista de la Educación Superior*, 1(165), 31-62. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-27602013000100003
- Posada, C. (2022). Habilidades blandas y su influencia en el desempeño laboral del egresado Universitario. En: D. Auris, (Comp.), *Rutas de otra educación posible: Voces desde nuestra América* (230-235). Ediciones Auriseduca. <https://edicionesauriseduca.com/web/2022/02/04/rutas-de-otra-educacion-posible-voces-pedagogicas-desde-nuestra-america/>
- Solís, R., González, J. A. y Pacheco, J. (2006). Estudio de egresados de ingeniería civil en una universidad de México. *Ingeniería e Investigación*, 26 (3),129-134. <https://www.redalyc.org/articulo.oa?id=64326316>

- Universidad Autónoma Metropolitana [UAM] (2017). *Seguimiento de egresados generación 2012*. Universidad Autónoma Metropolitana. https://dcbi.azc.uam.mx/media/SeguimientoEgresados/Seguimiento_Egresados_Ingenieria_Civil.pdf
- Universidad Michoacana de San Nicolás de Hidalgo [UMSNH]. (2020a). *Plan de Desarrollo Institucional 2021-2030*. Universidad Michoacana de San Nicolás de Hidalgo. <https://www.umich.mx/documentos/Normatividad/PLAN%20DE%20DESARROLLO%20INSTITUCIONAL%202021-2030.pdf>
- Universidad Michoacana de San Nicolás de Hidalgo [UMSNH]. (2020b). *Modelo Educativo*. Universidad Michoacana de San Nicolás de Hidalgo. <http://www.informacionpublica.umich.mx/>
- Vega, A., González, E., Toro, G. Fonseca, G., Sánchez, J., Peña, M., Solar, M., Herrera, R. y Carrasco, S. (2012). Aspectos referenciales sobre la inserción laboral y seguimiento de egresados. En: Centro Interuniversitario de Desarrollo [CINDA]. *Seguimiento de egresados e inserción laboral: Experiencias universitarias*. Centro Interuniversitario de Desarrollo [CINDA], Grupo Operativo de Universidades Chilenas y Fondo de Desarrollo Institucional [MINEDUC-Chile]. <https://cinda.cl/wp-content/uploads/2012/03/seguimiento-de-egresados-e-insercion-laboral-experiencias-universitarias.pdf>

Rol de Contribución	Autor (es)
Conceptualización	Rosa Vega Cano y Fabiola García Rangel (igual)
Metodología	Rosa Vega Cano y Fabiola García Rangel (igual)
Software	No aplica
Validación	Fabiola García Rangel
Análisis Formal	Rosa Vega Cano y Fabiola García Rangel (igual)
Investigación	Rosa Vega Cano y Fabiola García Rangel (igual)
Recursos	No aplica
Curación de datos	Rosa Vega Cano y Fabiola García Rangel (igual)
Escritura - Preparación del borrador original	Rosa Vega Cano y Fabiola García Rangel (igual)
Escritura - Revisión y edición	Rosa Vega Cano
Visualización	Rosa Vega Cano
Supervisión	Rosa Vega Cano
Administración de Proyectos	Rosa Vega Cano
Adquisición de fondos	Rosa Vega Cano