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Artículos científicos

La formación de estudiantes de posgrado. Un análisis desde sus competencias de investigación

The Training of Postgraduate Students. An Analysis from Its Research Competencies

A formação de alunos de pós-graduação. Uma análise de suas competências de pesquisa

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Resumen

La investigación es una actividad sustantiva para mejorar la calidad de vida de las personas. Una forma de contribuir a ello desde el aula es mediante el impulso de las competencias de investigación en el estudiantado de posgrado. Y en ese sentido, el objetivo de esta investigación fue evaluar las competencias de investigación de los estudiantes de maestría y doctorado en Tecnología Avanzada del Instituto Politécnico Nacional. La metodología que se utilizó fue cuantitativa. La investigación fue no experimental con diseño transversal y su alcance fue exploratorio y descriptivo. La muestra empleada fue probabilística y estratificada. Los resultados evidenciaron que las competencias de investigación en el alumnado son sólidas. Se concluye que las competencias de investigación no se desarrollan de forma unilateral o autónoma, sino que se encuentran asociadas a los profesores, a los planes y programas de estudio, a los proyectos de investigación y a las instituciones de posgrado; son factores que se interrelacionan e interactúan de forma positiva.

Palabras clave: centro de investigación, desarrollo de habilidades, formación de investigadores, indicadores educativos, metodología.

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Abstract

Research is a substantive activity to improve people's quality of life. One way to contribute to this is by promoting research skills in postgraduate students. And in that sense, the objective of this research was to evaluate the research skills of the master's and doctoral students in Advanced Technology of the Instituto Politécnico Nacional. The methodology used was quantitative. The research was non-experimental with a cross-sectional design and its scope was exploratory and descriptive. The sample used was probabilistic and stratified. The results showed that the research skills in the students are solid. It is concluded that research competencies are not developed unilaterally or autonomously, but are associated with professors, study plans and programs, research projects and postgraduate institutions; They are factors that interrelate and interact in a positive way.

Keywords: research center, skills development, researcher training, educational indicators, methodology.

Resumo

A pesquisa é uma atividade substantiva para melhorar a qualidade de vida das pessoas. Uma forma de contribuir para isso a partir da sala de aula é promovendo habilidades de pesquisa em alunos de pós-graduação. E nesse sentido, o objetivo desta pesquisa foi avaliar as habilidades de pesquisa dos mestrandos e doutorandos em Tecnologia Avançada do Instituto Politécnico Nacional. A metodologia utilizada foi quantitativa. A pesquisa foi não experimental com delineamento transversal e seu escopo foi exploratório e descritivo. A amostra utilizada foi probabilística e estratificada. Os resultados mostraram que as habilidades de pesquisa nos alunos são sólidas. Conclui-se que as competências de pesquisa não se desenvolvem de forma unilateral ou autônoma, mas estão associadas a docentes, planos e programas de estudos, projetos de pesquisa e instituições de pós-graduação; São fatores que se inter-relacionam e interagem de forma positiva.

Palavras-chave: centro de pesquisa, desenvolvimento de habilidades, formação de pesquisadores, indicadores educacionais, metodologia.

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Introduction

Research is a substantive activity because through its development solutions have been found to improve the quality of life of human beings (Peinado, Montoy and Torres, 2020). From this perspective, from a diagnosis, followed by the design, execution and follow-up to solve problems that favor humanity, postgraduate research must respond to the most fundamental needs (Rockinson, 2018; Zambrano and Chacón, 2021). This process begins with the selection of applicants, a phase where various determining elements are reviewed to formally enter a postgraduate degree (Peinado, 2020), and among them is detecting the skills that applicants already bring with them, as well as identifying those that should be develop if accepted. Therefore, the research training process should promote the development of these skills from the start (Hernández, Estrada and Keeling, 2018; Salgado and Aguilar, 2021).

When research skills are exercised in the student body, the strengthening of capacities that allow them to develop better quality work is promoted and at the same time it is possible to channel the link between teaching and research (Alsaleh, 2020; Vázquez, 2021). In this same sense, Tapia, Cardona and Vázquez (2018) postulate that the appropriation of investigative skills by students implies a permanent, flexible, strategic and progressive process. In short, the research process directly affects the acquisition of skills that are required in the academic and research field (Cardoso, 2020; Gómez, Isea and López, 2020; Stein and Sim, 2020). A clear example is research projects, as they are tangible evidence that they favor the formation of skills and abilities in postgraduate students. (Gonzales y Carrasco, 2021; Patiño, 2019; Peinado *et al.*, 2020).

Research competency concepts

When reviewing the concept of research competencies in the literature, it was observed that there is no single criterion for definition and classification. For example, for Hernández et al. (2018) research skills are expressed in the dialectical link between cognitive, motivational components and personality qualities. Along these same lines, Moros (2018) defines investigative skills as the cognitive process by which postgraduate students must be able to develop concepts from the observation of existing realities from the social context.

However, the studies by Tapia et al. (2018) and Stein and Sim (2020) maintain that the accompaniment and experience of the teacher make up the main axis in the research process, both foundations are invaluable in the pedagogical process and in obtaining research

skills. While Jung (2018) proposes that the research skills of postgraduate students are influenced by other factors, such as study plans, supervision styles and learning culture. And other works point out that the changes within postgraduate institutions also affect the dynamics of research, particularly in relationships, organizational culture and leadership configuration (Borders, Wester and Driscoll, 2020; Diaz, 2021; Peinado, Montoy and Cruz, 2021).

Cardoso and Cerecedo (2019), for their part, explain that investigative competencies are the set of abilities, skills, and attitudes that allow the elaboration and development of projects based on the detection of problems and in which scientific and technological progress is implicit. And in a synthetic way, Aliaga and Luna (2020) comment that investigative competencies are knowledge, skills or attitudes that must be applied in the performance of the investigation function. Likewise, Manríquez (2018) emphasizes that in order to develop a certain investigative competence, the affective and motivational predisposition of the students must not be set aside, and he establishes that attitude and aptitude are key variables in the task of expanding the skills in question.

Finally, Gómez et al. (2020) specify that investigative skills are technical training that emphasizes wisdom, knowing how to know and knowing how to do. In addition, they indicate that professional skills are not only grouped in the skills required to perform a job, but also in behavior, analytical skills, creativity, innovation, planning and the ability to respond to problems through research. . And in this more holistic sense, Aliaga, Juárez and Herrera (2021) establish that research skills are the set of actions that identify, interpret, argue and provide solutions to the problems of reality.

Previous studies on research skills

Research competencies have been examined from different methodologies and from different approaches. In the case of Valenzuela, Valenzuela, Reynoso, and Portillo (2021), they emphasized the search for information, research methodology, data analysis, and research communication. For their part, Tapia et al. (2018), with the implementation of an online course in the background, analyzed research skills and classified them into two groups: 1) generic skills in research and 2) skills in the research process, that is, disciplinary skills in research that make it possible to identify, propose, problematize, plan, develop, lead and present the results of an investigation.

In this same context, Moros (2018) asserts that, from the different subjects, it is necessary that postgraduate students be provided with the cognitive, methodological and procedural tools that foster observation, understanding, analysis and critical reflection for a greater understanding of its reality in the investigation. Xiao (2018) oriented her work towards teaching strategies, cognitive dimension, personal qualities, metacognitive aspects and professional aspects of postgraduate students, also including teaching work. In turn, Hernández et al. (2018) dissected their study into three components: 1) cognitive development, translated into the level reached by thought and different properties of intellectual functioning; 2) the motivational factor, made up of the contents and psychological processes that enable the stimulation, support and orientation for an efficient scientific investigative performance, and 3) the dimension of personality qualities associated with the development of investigative competencies, conceived in a critical attitude or self-criticism, responsibility and scientific honesty.

On the other hand, Cardoso and Cerecedo (2019) set out to identify the investigative skills with which students enter postgraduate programs in the field of administration. The competencies that were identified were on the design of the research, of an instrumental nature, and management of the dissemination of knowledge. Similarly, Gómez et al. (2020) focused their work on the theoretical and practical knowledge of students for the development of research projects, taking basic, methodological and professional skills as a starting point. They express that postgraduate students must master these skills to promote the acquisition of new knowledge, complex thinking and critical logic, as well as to facilitate their interpretation and study. Under this same argument, Aliaga and Luna (2020) aligned the investigative skills within the process of construction and transmission of knowledge with the serious purpose of solving environmental problems collaboratively and, at the same time, valuing sustainability to have a present and future life with dignity.

However, in the study González et al. (2020), four components were observed to determine investigative competencies: 1) design, 2) instrumental, 3) personal, and 4) management for disclosure. While Vázquez (2021) conducted his research towards five types of skills: 1) cognitive skills, those that allow interactions between the elements of a reality; 2) technological skills, are tools that help in the processes of search, organization, analysis and interpretation of information; 3) methodological skills, are the knowledge of methods, techniques and instruments to collect and analyze information; 4) skills to manage research, are skills to efficiently identify, obtain and manage the resources of research projects, 5)

skills for teamwork, are the cognitive, social and attitudinal capacities to enhance human talent and the generation of knowledge.

For Zambrano and Chacón (2021), research skills in postgraduate students must be manifested in the academic, research and social responsibility fields. Touching the point, that of social responsibility, it is convenient to mention that the humanistic side of education guides the pedagogical practice to the care of the environment, to the acquisition of critical thinking through research and, consequently, to a social development. sustainable (Aliaga and Luna, 2020). Under this paradigm, ethical behavior is a fundamental pillar to educate and prepare postgraduate students in research practices and processes (Sivasubramaniam, Dlabolová, Kralikova & Khan, 2021). New researchers must be trained on these fundamentals.

Apart from the aforementioned studies, there is the use of the English language, which is an element that does not appear among the definitions previously exposed, but that is essential to mention, since sometimes it becomes a very complicated challenge to overcome (Cacheiro , González and López, 2020). It is worth saying that it should be considered as a necessary and urgent skill when disclosing the results of an investigation. Perhaps it is not configured as a competition because it is normally perceived as an entry requirement (Peinado, 2020).

Having said the above, and taking into account the studies mentioned so far, it can be established that research competencies are the abilities, skills, and attitudes aimed at solving problems to achieve a better quality of people. The praxis of these skills generates the experience required to achieve research that contributes scientific and technological advances to humanity.

Research is a substantive activity and skills are an inherent factor in this activity. For this reason, the objective of the present investigation was to evaluate the research competences of the students of the master's and doctorate in Advanced Technology of the National Polytechnic Institute (IPN), since we consider it essential to generate and know quantitative data associated with the skills, capacities and attitudes of graduate students. The question that guided the research was: what is the level of mastery of research skills in master's and doctoral students of the Advanced Technology postgraduate course? The importance of investigating research skills in postgraduate students lies in producing an evaluation process that quantifies their management (Manríquez, 2018). But it also serves to design strategies, make decisions to modify postgraduate study plans and programs, train

teaching staff on this topic, improve student counseling and tutoring, develop research projects together with students, disseminate research results , among others.

Method

The evaluation of research skills must be expressed in indicators or behaviors that can be clearly observed (Manríquez, 2018). Due to the above, the methodology used for the present study was quantitative. It was a research with a cross-sectional design, with an exploratory scope and a descriptive approach (Baena, 2017, Peinado et al., 2021). As a research technique, the case study was used, with which the central facts of the studied phenomenon were identified in depth and detail.

The population under study was made up of postgraduate students in Advanced Technology from the Center for Research and Technological Innovation of the IPN (Bonilla and Peinado, 2014). Of a total of 67 students (34 master's and 33 doctoral), 43 students participated (22 master's and 21 doctoral), which represents 64.7% and 63.6% of the enrollment, respectively. In this way, a probabilistic and stratified sample was formed.

As a research instrument, a single type of questionnaire based on the Likert scale was used. For its design, the review and analysis of previous studies was carried out, such as that of Jung, (2018), Manríquez (2018), Moros (2018), Xiao (2018), Tapia et al. (2018), Cardoso and Cerecedo (2019), Valenzuela et al. (2021), Vázquez (2021) and Zambrano and Chacón (2021), among others. The judgment of three experts was also used to reduce the probability of error in its configuration. Likewise, relevance, consistency and clarity were obtained from this exercise in the writing of the questionnaire (Aliaga et al., 2021; Baena, 2017; Wilson, 2017). To measure its reliability and internal consistency, Cronbach's alpha coefficient was used, which gave a value of 0.89, a good indicator that guarantees the reliability and quality of the instrument (Ivanov, Ivanova and Saltan, 2018; Taber, 2018). Based on the above, research skills were classified into four categories: 1) skills related to research design, 2) instrumental-type research skills, 3) research skills for the dissemination of results and 4) attitudinal research skills. There were 29 items, measured through five options, from totally agree (five) to totally disagree (one).

As a next step, a list of emails of the subjects to participate was compiled. Then the invitation to answer the online questionnaire voluntarily was sent. In total, 43 students responded, 22 Master's and 21 Ph.D. It is pertinent to mention that all the students who

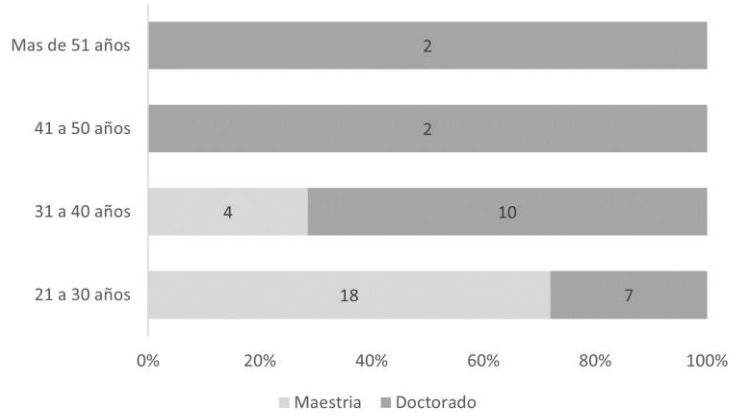
participated in the research were informed in a timely manner about the purpose and scope of this research work. They were also informed about the confidentiality of their personal data and the anonymity of their responses, as well as the relevance of the study for academic and research purposes.

Once the questionnaire was applied to the participating students, the field work was concluded. All the information and the data set obtained were processed in the SPSS Statistics version 25 computer program (George and Mallery, 2018), in which descriptive and inferential statistics were used to perform the statistical analysis. The interpretation of the results was also performed, obtaining percentages, the mean, the standard deviation (SD) and the Student's t-test.

Results

The first point was to establish the characterization of the participating students. Age was quantified in four intervals. The interval from 21 to 30 years old represented 58%, from 31 to 40 years old 32% and those from 41 to 50 years old and 51 years old and over, 5%. Figure 1 shows the figures in each of these time scales.

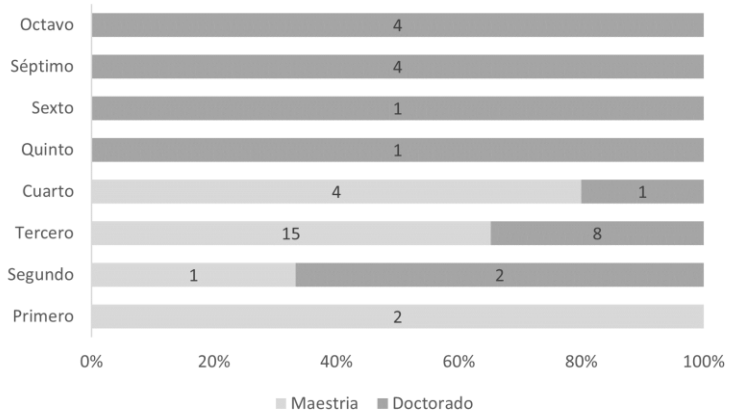
Figura 1. Edad de los participantes



Fuente: Elaboración propia

Regarding the semester in which the participating student body was enrolled, it was identified that 5% were in the first semester, 7% in the second semester, 53% in the third semester, 12% in the fourth semester, 2% in the fifth and sixth semesters and, last, 9% the seventh and eighth semester. These percentages correspond to both the master's degree and the doctorate. The amounts per semester are described in Figure 2.

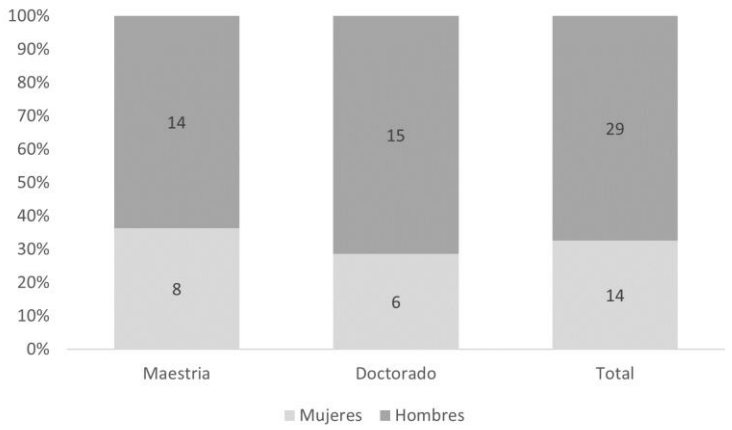
Figura 2. Proporción por semestre



Fuente: Elaboración propia

Regarding the proportion by gender, 33% corresponds to women (19% in master's degrees and 14% in doctorates) and 67% to men (33% in master's degrees and 35% in doctorates). The amounts are presented in Figure 3.

Figura 3. Distribución por género



Fuente: Elaboración propia

The next point was to determine the mean and standard deviation in each of the competencies. The results obtained can be seen in Table 1.

Tabla 1. Cálculo de la media y la desviación estándar de las competencias de investigación

Ítem	Competencias	Media	DE
I. Competencias relacionadas con el diseño de la investigación			
1	Comprendo cuáles son las funciones del marco teórico de una investigación	4.67	0.60
2	Entiendo cómo elaborar el marco teórico de una investigación	4.62	0.61
3	Identifico situaciones de mi entorno profesional susceptibles de ser investigadas	4.39	0.76
4	Soy capaz de formular el objetivo general y los objetivos específicos de una investigación	4.32	0.68
5	Conozco cómo hacer el planteamiento de un problema de investigación	4.20	0.80
6	Domino la habilidad para elaborar preguntas de investigación correctamente	4.16	0.68
7	Identifico cómo plantear una hipótesis	4.16	0.81
II. Competencias de investigación de tipo instrumental			
8	Soy capaz de organizar e interpretar los resultados de una investigación	4.46	0.50
9	Conozco la manera de plantear una conclusión	4.44	0.62
10	Reconozco el enfoque que debe tener una investigación	4.34	0.94
11	Conozco los diferentes diseños de investigación	4.27	1.05
12	Identifico técnicas e instrumentos para la recolección de datos de investigación	4.18	1.00
13	Domino y aplico los requisitos básicos que debe tener un instrumento de investigación	4.18	0.85
14	Puedo determinar el tipo de estudio en una investigación	3.88	1.15
15	Puedo diferenciar los tipos de muestreo en una investigación	3.81	1.23
III. Competencias de investigación para la divulgación de los resultados			
16	Elaboro mis propios manuscritos para ser presentados en congresos y en otros eventos de investigación	4.60	0.72
17	Domino la habilidad para citar y referenciar en un trabajo de investigación	4.37	0.81

18	Soy el enlace para publicar mis productos de investigación en congresos, revistas y otros	3.69	1.31
19	Domino la habilidad para redactar mis manuscritos en inglés	3.51	1.51
20	Conozco en dónde divulgar los resultados de mi investigación considerando la calidad y pertinencia de la revista o del evento	3.23	1.42
IV. Competencias de investigación de índole actitudinal			
21	La investigación sirve para resolver problemas de la sociedad	4.74	0.49
22	La investigación sirve para generar una mejor calidad de vida de las personas	4.58	0.73
23	La investigación sirve para resolver los problemas de la ciencia	4.41	0.95
24	Lo más importante de la investigación es su aportación al impacto social	4.30	0.93
25	La investigación sirve para generar beneficios económicos	4.16	0.94
26	Lo más importante de la investigación es su aportación al desarrollo sustentable	4.13	0.91
27	Lo más importante de la investigación es su aportación al impacto ambiental	3.95	0.89
28	Lo más importante de la investigación es su aportación metodológica	3.79	0.83
29	Lo más importante de la investigación es su aportación teórica	3.46	1.05

Fuente: Elaboración propia

Regarding the competencies related to the design of an investigation, the students indicated a positive perception about their understanding to elaborate the theoretical framework and understand what their role is in an investigation. Likewise, he identified knowing how to set a general objective, the specific objectives, the research questions, the hypothesis and the situations in his professional environment that could be investigated. It is convenient to note that all the items of this block of competences presented a standard deviation of less than one, this indicates a homogeneous assessment of the student body with respect to these research skills.

Regarding the instrumental research skills, the students stated that they can recognize the approach in an investigation, as well as the basic requirements that a research instrument must have, the organization and interpretation of the results and the drawing of conclusions. However, the items "I can determine the type of study in an investigation" and "I can

differentiate the types of sampling in an investigation" presented a lower evaluation. The standard deviation in both cases was greater than one. In this same sense, in the items related to the different research designs and the techniques and instruments for data collection, a standard deviation greater than or equal to one was presented.

In relation to the research skills for the dissemination of the results, the students gave an affirmative assessment to the item "I write my own manuscripts to be presented at conferences and other research events", as well as to the item "I master the ability to citing and referencing in a research paper". This was not the case in the items: "I am the link to publish my research products in conferences, journals and others", "I master the ability to write my manuscripts in English" and "I know where to disclose the results of my research considering the quality and relevance of the magazine or the event"; in them the standard deviation was greater than one.

About the attitudinal research competencies, which referred to the understanding and opinion of the impact or scope that should prevail in an investigation, it was perceived that, for the students, the theoretical contribution and the methodological contribution are the ones with the least incidence in an investigation, followed by the environmental impact. On the contrary, the item "Research serves to solve problems in society" presented the highest indicator. Most of the items in this block of competencies presented a standard deviation of less than one, with the exception of the one that refers to the fact that the most important part of the research is its theoretical contribution.

To finalize the statistical analysis of the study, the t statistical test was used in order to establish the existence of differences for each program. A statistic t (program) = 0.53 and for p = 0.59 was obtained, which showed that there are no differences because they are within the interval of the critical value of -2.01 and 2.01 (the rejection values are located outside these parameters). In this way, it is interpreted that both in master's and doctorate students value their research skills in a similar way. These results are shown in Table 2.

Tabla 2. Evidencia de diferencias por programa mediante el estadístico *t*

Programa	*n*	Media	Varianza	Estadístico *t*
Maestría	22	4.20	0.11	t = 0.53
Doctorado	21	4.14	0.12	p = 0.59

Fuente: Elaboración propia

Discussion

Research is a substantive function in the postgraduate teaching-learning process (Peinado et al., 2020). Research skills are a bridge to improve people's quality of life. Due to the above, it is important to have specific data that measure these skills. Therefore, the objective of this research was to evaluate the research skills of postgraduate students. In this same sense, Gómez et al. (2020) and Gonzales and Carrasco (2021) report that the investigative skills developed in postgraduate students favor the appearance of new contributions in the field of science, promote innovation and creativity in case resolution and development. of alternatives that contribute to human development.

The results obtained here showed that the skills related to the research design are acceptable, since no significant discrepancies were observed between the data. In relation to the instrumental-type research competencies, the findings indicated that attention should be paid to how to determine the type of study and how to differentiate the types of sampling in an investigation, since there is a smaller statistical margin there than in the other items. of this category. The same happens in the works of Xiao (2018) and Cardoso (2020), they also found these same discrepancies in their studies. To address them, the authors suggest reviewing the teaching strategies applied in the classroom and making changes aimed at correcting these discrepancies. In the case of Jung (2018), he proposes that learning experiences be designed and implemented to encourage the development of skills and attitudes towards research.

Taking into account the findings in the research competencies for the dissemination of the results, a wide dispersion was observed in three of the five items, with greater emphasis on those related to being the link to publish, writing manuscripts in English and knowing the quality and relevance of the journal or the research event. By virtue of the above, it is suggested to carry out a detailed follow-up in the development of these research skills, paying

attention to the learning and practical implementation of these skills by students. (Rockinson, 2018).

The attitudinal research competencies revealed similar data between the items in this category, unlike the theoretical and methodological contribution. These results converge with the study by Zambrano and Chacón (2021) in that the integration of strategies that promote problem solving, as well as decision-making, autonomy and critical reflection of the student about real situations must be carried out. of your environment.

Among the data obtained in the research, it is relevant to highlight the perception of the student body insofar as the research serves to solve problems in society and to generate a better quality of life for people, since the items related to it obtained the scores higher. Patiño (2019) agrees with the fact that research skills in postgraduate students are a key factor in research training and that they allow consolidating the ability to integrate knowledge in order to solve real problems of people.

The data also revealed that the contribution to social impact and sustainable development are factors that stand out in the perception of those surveyed. Regarding this, Rockinson (2018), Tapia et al. (2018) and Aliaga and Luna (2020) advise to continue advancing in proposals that allow generating avant-garde research skills for postgraduate students and at the same time direct their inclusion in the teaching-learning process.

In addition to all of the above, he agrees with Peinado (2020) that research skills must be detected from the admission process, since they directly affect future students, the postgraduate program, teachers and in the institution where they will pursue their master's or doctoral studies. In this line, Cardoso and Cerecedo (2019) suggest developing a diagnosis on the entry profiles of students who begin their postgraduate training. For this, it is important to generate training methodologies based on the assessment of their skills at the beginning and during their training (Manríquez, 2018; Peinado et al., 2021; Tapia et al., 2018).

Another no less important issue associated with research skills is the participation of postgraduate students in research projects. It goes without saying that these are of the utmost importance due to the research products they generate, the contributions to the lines of research and the generation of new knowledge (Cardoso and Cerecedo, 2019; González et al., 2020; Peinado et al., 2020). . Another relevant component is the English language, because some postgraduate programs require mastering the skills to read, write, and speak in this language as an essential requirement (Cacheiro et al., 2020; Peinado, 2020). It also serves

as a tool to disseminate scientific knowledge through the experiences obtained in research work.

In summary, the results of this research show the need to continue transmitting investigative skills to postgraduate students. In this sense, the subjects linked to research are highly relevant in their training (Tapia et al., 2018; Vázquez, 2021). Updates in study programs can increase research skills in students (Borders et al., 2020; Diaz, 2021; Moros, 2018). For this reason, postgraduate educational institutions must also train teachers about the investigative skills they intend to instruct students (Stein and Sim, 2020; Xiao, 2018; Zambrano and Chacón, 2021), since one of the commitments Postgraduate fundamentals is to promote the generation and consolidation of knowledge through the investigative skills of students (Bonilla and Peinado, 2014; Salgado and Aguilar, 2021; Tapia et al., 2018), this implies emphasizing the teaching-learning process from the classrooms.

Among the limitations of this research, it can be mentioned that it is not generalizable. Additionally, it is not considered conclusive, since there is a lot of work to be done on the topic of research skills.

Conclusions

The results offer acceptable data regarding the skills in the student body. The level of mastery of these abilities, skills, capacities and attitudes in the master's and doctoral students of the postgraduate course in Advanced Technology is moderate, since no average lower than three was presented. It was also observed that the statistical differences by program are similar to each other. However, those that presented the lowest value in each category can be reinforced.

In keeping with these notes, it is also concluded that research skills are perceived from different angles and under different methods, whether qualitative or quantitative. This research reasons about them as part of the postgraduate training process. By virtue of this, investigative skills are not developed unilaterally or autonomously, but are associated with teachers, researchers, study plans and programs, research projects, institutions that teach postgraduate courses and other factors that are interrelated, interact and form a symbiosis to coexist and favor each other. In this same sense, the acquisition of these capacities not only serves to accredit the subjects, or to obtain the degree to which they are aspiring, but the

fundamental purpose is that they apply them to solve problems and improve the quality of life of people.

Future lines of research

For future research work on this topic, it is suggested to use techniques such as confirmatory factor analysis to explain the correlations between the variables or exploratory factor analysis to more accurately explore the dimensions of the observed variables. It should be said that these recommendations do not diminish the importance of this research, but rather that they seek to nurture the knowledge of this subject with more options.

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