Self-perception of research skills: Psychology students in a virtual**

Verónica Elsa López-Alonso[1]*; Xochitl López-Aguilar[2]; Laura Evelia Torres-Velázquez[3]; Assol Cortés-Moreno[4]; Jorge Guerra-García[5]

[1, 2] Universidad Nacional Autónoma de México, FES-Iztacala-GI Nutrición, México [1] https://orcid.org/0000-0002-7957-9013 velopez@unam.mx [2] https://orcid.org/0000-0002-0601-7845 xochitll@unam.mx [3, 4, 5] Universidad Nacional Autónoma de México, FES-Iztacala-GI Aprendizaje Humano, México. [3] https://orcid.org/0000-0002-8258-0920 lauratv@unam.mx [4] https://orcid.org/0000-0002-5944-3733 assol@unam.mx [5] https://orcid.org/0000-0003-1273-5752 guerra@unam.mx

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Abstract

Introduction: Previous research has shown deficiencies in the training of researchers. **Objective:** To evaluate the perception of the research skills of psychology students belonging to the Research Field from the Behavioral, Cognitive Behavioral and Inter behavioral traditions, and compare it with their level of knowledge about the research process. **Method:** Eighty-two Psychology students participated in the first application and 70 in the second. A questionnaire was developed to self-assess the perception of research skills and general knowledge of methodology, statistics, and research report writing. **Results:** The students' perception was that their investigative skills improved after completing an internship at a distance. **Discussion:** Inserting students into research groups enhances the development of their research skills, even in a remote model. Some factors involved and the benefits of real situations as a teaching strategy are discussed.

Keywords: Vocational training; research; researcher; self-perception; higher education.

Autopercepción de habilidades de investigación: estudiantes de psicología en una práctica virtual

Resumen

Introducción: Investigaciones previas han demostrado deficiencias en la formación de investigadores. **Objetivo:** Evaluar la percepción de las habilidades de investigación de estudiantes de psicología pertenecientes al Ámbito de Investigación desde las tradiciones Conductual, Cognitivo Conductual e Interconductual y compararla con su nivel de conocimiento sobre el proceso de investigación. **Método:** Participaron los 82 estudiantes inscritos en la Práctica de Investigación en una primera aplicación y 70 de ellos en la segunda. Se elaboró un cuestionario para autoevaluar la percepción de las habilidades de investigación y conocimientos generales de metodología, estadística y escritura del reporte de investigación. **Resultados:** La percepción de los estudiantes fue que sus habilidades investigativas mejoraron después de haber cursado una Práctica a distancia. **Discusión**: Insertar a los estudiantes en grupos de investigación mejoró el desarrollo de estas habilidades, aun en modalidad a distancia. Se discuten algunos de los factores que intervienen y beneficios de situaciones reales como estrategia didáctica.

Palabras clave: Formación profesional; investigación; investigador; autopercepción; enseñanza superior.

***Correspondence:**
Verónica Elsa López-Alonso1
velopez@unam.mx

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Introduction

The isolation conditions caused by the COVID-19 pandemic generated a significant impact on education that required the implementation of virtual teaching strategies to guarantee the continuity of academic training in the different undergraduate programs offered by the National Autonomous University of Mexico (UNAM). At the Iztacala campus, the curriculum of the undergraduate degree in Psychology implemented in 2016 proposes research courses that students can choose from in the third or fourth year of the program from different theoretical traditions. Each module includes the respective theoretical subjects (Theory, Methodology, and Tutorials) along with a Research Practicum.

The restrictions imposed by the pandemic led to the migration of all subjects, including practicums, to the virtual environment. In this sense, it is crucial to examine the training process and experiences that took place under these exceptional circumstances. The focus of this study is particularly on exploring the students' perception of the research skills they acquired under this distance modality.

Although this migration for some was only an "emergent adjustment," academic activities went from being face-to-face to a virtual environment without attending to the didactic forms that this implied, which caused feelings of discomfort and complaints among students, such as lack of communication with professors, excessive workloads, lack of feedback (Miguel, 2020), among others. Environments were created in which professors and students were not trained or did not have the necessary infrastructure (appropriate spaces, computer equipment, internet connection, to mention a few). The survey by the National Institute of Statistics and Geography (INEGI, 2020) indicates that 57.5% of higher-level students spent six hours or more studying; only 65.3% of students had access to a laptop or desktop computer; 25.1% of higher education students did not complete the 2019-2020 semester due to a lack of resources or because they had to work. Undoubtedly, the conditions derived from the pandemic affected the students' training; therefore, it is necessary to analyze the students' perspectives regarding their training.

Although this change to virtuality affected academic training in a generalized manner, this study focuses on the teaching of research because training in this area promotes generic learning applicable to the different areas and functions of the psychologist's professional work. In general terms, the teaching of research in psychology favors the skills of inquiry, criticism, reflection and analysis, systematization, and decision-making, among others (Casilla et al., 2015). In addition to this, it has been found that students with initial experience in research processes are more focused on the task compared to their peers without this type of experience, and they show a greater willingness to delve deeper into the issues and find solutions (Murtonen et al., 2008). It should be noted that there is no single profile on the competencies that a researcher should have (Pérez-Reveles et al., 2014); each discipline and country has its own. Luis Arturo Rivas Tovar's model (LART) was proposed as a universal model (Rivas-Tovar, 2011). It considers that the researcher must have the following basic competencies: 1) pose a research problem, 2) develop a contextual framework, 3) review the state of the art, 4) create and validate a data collection instrument, 5) build, validate and simulate models, 6) master data analysis techniques, 7) master the scientific writing style, 8) present research papers at conferences, and 9) master the English language, as well as have knowledge of art and culture in general.

The development of research skills in undergraduate students is associated with attendance to specialized courses and with the integration of students into research groups (Acón-Hernández et al., 2019; Blanco-Balbeito et al., 2014); in addition, facing them with real situations and allowing students to design their research strengthens the development of their competencies (Pavlova et al., 2021). The problem is that few undergraduate students have the opportunity to participate in research activities; consequently, doing a thesis for graduation may be the first contact they have with these (Castro

et al., 2018). Unfortunately, some universities have displaced thesis work (Villegas-Muro et al., 2020), with other degree options considered to be faster and more expeditious, but which reduces the possibilities of participating in work that involves a research process. At UNAM (2022), the choice of the thesis as a degree alternative ranked third (3,745), being below the broadening and deepening of knowledge (7,465) and the general knowledge exam (4,433), while the option of research activities was placed in ninth place (130). According to Rojas-Solís et al. (2021), one of the reasons given by students for not doing a thesis is the difficulty in writing it.

Likewise, the courses in the curricula are insufficient to develop research skills; students perceive themselves with low proficiency, a condition that was reported in undergraduate Medicine (Acón-Hernández et al., 2015; Ángel et al., 2010; Carrillo-Larco & Carnero, 2013; Vera-Rivero et al., 2021), Psychology (Araujo et al., 2013; Fernández & Villavicencio, 2017; Illescas et al., 2014), and Dentistry (Castro et al., 2018). In general, students lack the skills to search for information, choose, analyze, and synthesize the information retrieved, and elaborate scientific texts (Fernández & Villavicencio, 2017; Illescas et al., 2014), in addition to methodological and statistical strategies (Araujo et al., 2013).

The factors involved in the development of knowledge of research methods and skills in psychology students are still unclear (Balloo et al., 2016), these may depend on multiple factors, such as cognitive and motivational variables, individual experience, and knowledge. Among other factors that can be added are the extraordinary circumstances that were experienced during the COVID-19 pandemic, which caused modifications in the lives of professors and students not only due to the fact of the use of virtuality but also because of the socioemotional affectations due to the condition of social isolation.

According to the above, few undergraduate programs promote the development of research skills and competencies. In the case of the new psychology curriculum taught at FES Iztacala-UNAM, research is an important component that is stimulated in students as part of their professional training. This is organized in two stages: the first one has the purpose of developing theoretical, methodological, and applied skills. Among the subjects in this stage are four "Methodological Strategies" and four "Statistical Processes," the purpose of which is for students to become familiar with basic research processes. The second stage aims at supervised training in seven areas of professional practice (Clinical, Organizational, Education, Development, and Teaching of Psychology, Special Education, Health, and Social and Research), for which there are theoretical, methodological, and practical subjects (Facultad de Estudios Superiores Iztacala [FESI], 2016).

From all the above, the concern arises to know the perception of psychology students about the research skills acquired during the virtual teaching modality and if this perception is congruent with the knowledge of the subjects acquired under the virtual modality. Therefore, the general objective was to evaluate the perception of research skills of psychology students belonging to the Research Domain from the Behavioral, Cognitive Behavioral, and Inter-behavioral (C-CC-IC) traditions and compare it with their level of knowledge about the research process. To achieve this, the following specific objectives were proposed: A) To evaluate the students' perception of their research skills at the beginning and end of the courses included in the Research Area. B) To contrast the students' perception of their research skills and the knowledge shown at the end of the courses included in the Research Area.

Method

Design

It was a study with a pretest/posttest design with a single group. The pre-experimental pretest-posttest design is considered an intrasubject, and this consists of the observation of a group before and after an intervention (Manterola & Otzen, 2015). In this case, the participants were the same students for the first and second applications; the first was conducted upon entering the C-CC-IC Traditions Practice and the second upon completion.

Participants

In the first application, 82 fifth (n = 39) and seventh (n = 43) semester psychology students participated, with a mean age of 21.23±0.14 years, of which 52.4% (n = 42) were female and 47.6% (n = 38) were male. Being elective subjects, both fifth-semester and seventh-semester students were taking Research Practicum and related subjects for the first time. For the second application, information was retrieved from 70 sixth (n=29) and eighth (n=41) semester students, with a mean age of 22.84±0.55 years, of which 55.7% (n=39) were female and 44.3% (n=31) male. Twelve students who answered the first questionnaire did not participate in the second application. All students came from the same public institution located in the conurbation area of Mexico City.

Instruments

For the self-assessment of research skills and knowledge, a questionnaire was prepared, taking up the competencies indicated in the LART model (Rivas-Tovar, 2011), which included bibliographic search, formulation of objectives, hypothesis development, problem statement, sampling, research designs, research scopes, instrument construction, data analysis, discussion and research report preparation, presentation in academic forums, and English language proficiency. The *instrument for evaluating research skills* included a total of 15 items for self-evaluation of skills with a Likert-type scale (with the answers: insufficient, sufficient, outstanding, or exceptional), the order of the scale goes from lacking to maximum development of each skill, and 21 questions on basic knowledge of methodology and statistics (with multiple-choice answers and some open-ended answers). For content validity, the questionnaire was evaluated by three expert judges (professors in the field) and tested in a pilot study with some graduate students of the same degree.

Procedure

The application of the instrument was carried out in two moments: the first was at the beginning of the practicum and the second at the end of it; entering the practicum implies the insertion of the students into the professors' research projects. Due to the conditions of isolation due to the COVID-19 pandemic, the subjects were taken remotely, and the questionnaire application was carried out through a Google form. The professors of some of the Research subjects (Theory, Methodology, Tutorials, or Practice of the Behavioral, Cognitive-Behavioral, and Inter-Behavioral traditions) invited and sent the link to the questionnaire to their students. The time taken to respond was approximately 30 minutes.

This research, derived from PAPIME project PE305020, "Proposal for coordinated work for professors in the field of research in the Behavioral, Cognitive-Behavioral, and Inter-Behavioral tradition (C-CC-IC)," was approved by the Evaluation Committee of the Social Sciences Area. Among the functions of this Committee is to evaluate the research projects (relevance, viability, quality, transcendence, and ethical aspects) submitted to the Program of Support for Projects to Innovate and Improve Education (PAPIME-DGAPA) of UNAM. Likewise, before answering the questionnaire, the Google form described the objective of the research and requested the voluntary participation of the students, making it clear that their decision would have no consequences on their academic grades and that the information provided was confidential and for research purposes. The participants were treated ethically and humanely under the code of ethics of the Publication Manual of the American Psychological Association, sixth edition in Spanish.

Data Analysis

Descriptive statistics were used for data analysis: mean ± standard error of the mean (SEM), frequencies, and percentages. The knowledge data were compared with a Student's t-test for related samples. The results are presented in terms of percentage differences to know how much the students' perception of their skills changed after participating in some of the practicums. The statistical package GraphPad Prism version 8 was used for data analysis.

Results

Table 1 presents how students perceive their research skills; the data indicate an improvement in the perception of the skills after taking the subjects

in the field of research; the percentages tended to increase mainly in the option of outstanding skill, followed by exceptional and sufficient, in this order by the number of skills that improved in each response option. Negative values indicate the extent to which the perception of skills rated as insufficient decreased and moved to higher scales; likewise, some that were initially considered sufficient decreased and moved to the categories of outstanding and exceptional.

By their percentage improvement, the skills can be grouped into three: those that improved between 1% to 5.99% (in italics), those that are between 6% to 10.99% improvement (in gray with italics), and those that are above 11% (in bold). Because the new perceptions are concentrated in the outstanding category, it is necessary to detail them.

In the outstanding option (see Table 1), skills such as bibliographic search, elaboration of objectives, sample selection, data analysis and processing, interpretation of results, and language, improved between 1% and 5.99%. The skills regarding formulating a research problem, developing a hypothesis, selecting techniques and instruments, projecting perspectives, drafting a research report, and presenting at academic events improved between 6% and 10.99% (more on participation in academic events later). The skills rated with higher percentages (between 11%-14%) were selecting the research design and drawing conclusions.

In the exceptional option, the skills that improved between 1% and 5.99% were the formulation of the research problem, hypothesis development, sample selection, and interpretation of results; the literature search improved by more than 6% and discussion skills by 12%, the latter skill being one of the best rated (see Table 1). Additional information on the literature search is presented below.

In the category of sufficient (see Table 1), the skills of interpretation of results and research

Table 1

Perception of Research Skills in Psychology Students After Practicum

Question / Self-assessment	Insufficient	Enough	Outstanding	Exceptional
1. Bibliography search skills	-4.88%	-3.87%	*2.62%*	*6.13%*
2. Ability to formulate a research problem	-3.03%	-5.22%	*6.83%*	*1.43%*
3. Skills to elaborate an objective	-3.03%	-.39%	*5.43%*	-2.02%
4. Hypothesis development skills	0.63%	-11.95%	*8.26%*	*3.07%*
5. Skills to select the population, sample and type of sampling.	-6.49%	-.55%	*4.98%*	*2.05%*
6. Research design selection skills	-8.71%	-1.95%	**12.89%**	-2.23%
7. Skills to select techniques and instruments	-9.3%	-.94%	*10.03%*	.21%
8. Skills for data analysis and processing (statistics).	-10.91%	*9.02%*	*1.46%*	.42%
9. Skills for the interpretation of results	-10.31%	*5.95%*	*2.72%*	*1.64%*
10. Skills for the discussion of results	-2.41%	.07%	.28%	**12.05%**
11. Skills to draw conclusions	-3.63%	-7.49%	**13.57%**	-3.45%
12. Skills to elaborate future perspectives	*2.78%*	-3.63%	*7.42%*	-1.01%
13. Research reporting skills	-6.49%	*3.8%*	*10.07%*	.21%
14. Presentation skills for academic events	-19.79%	**13.03%**	*6.55%*	.21%
15. English language skills	*4.81%*	-8.15%	*4.36%*	-1.01%

Note. Percentage difference calculated with the data obtained in the application of the questionnaire before and after taking the Research Practicum. Negative numbers indicate a decrease in that category. The data show a decrease in the categories of insufficient and sufficient and an increase in the categories of outstanding and exceptional, which suggests that the students perceive themselves as having improved their research skills after taking the practicum. In italics, percentages between 1-5.99%; in gray with italics, percentages between 6-10.99%; in bold, percentages higher than 11%.

reporting increased from 3% to 5.99%, data analysis and processing by 9%, and presentation at academic events by 13%; although these last skills were rated as sufficient, it is necessary to point out an improvement, since in the scale of insufficient it can be seen how these skills decreased, and express an increase between the options of sufficient and outstanding. These results suggest that these skills related to statistics and the dissemination of results require greater attention from professors.

It is noted that in the insufficient scale, the skills to elaborate future perspectives and language increased between 1% and 5.99% (see Table 1), both skills require further training (more information on language below).

As additional data, in the search for information students access through electronic media, the most used search engines were those in which the information can be found in Spanish (Google Scholar, Redalyc, Scielo, Dialnet), and a lower percentage went to the engines in which most of the information is in English (BidiUNAM, PubMed, Web of Science, Elsevier, Scopus). However, for the second application, consultation of the latter increased, mainly in BidiUNAM and Elsevier (see Table 2).

Regarding participation in specialized events, most students have not had the experience of exhibiting their research work (see Table 3), although, in the second application, there was an increase in participation in the modality of poster presentation (from 6.1% to 24.3%); participation mainly increased in events of the university attended by the students.

Concerning language, we found low proficiency in English comprehension (see Table 4) and in other skills, such as writing and speaking this language; only a low percentage say they are proficient in it (understanding, speaking, and writing). Despite the fact that the university the students attend has a language center, less than half of them are enrolled in any course, and a smaller percentage take private courses; even for the second application, a decrease in course attendance is observed. This has an impact on academic performance, as it makes it difficult to

Table 2
Information Search Media

	First application		**Second application**	
		%		**%**
Type of media for information search	Electronic	97.6	Electronic	100
	Printed	2.4		
Library usage	Yes	36.6	Yes	38.6
	No	62.2	No	60
	No answer	1.2	No answer	1.4
Databases used for information search (In order of query)	Google Académico	19.4	Google Académico	18.8
	Redalic	19.1	Redalic	18.5
	Scielo	18.8	Scielo	18.3
	Dialnet	18.3	Dialnet	16.9
	BIDIUNAM	10.5	BIDIUNAM	13.4
	PubMed	4.4	Elsevier	5.5
	Web of Science	3.1	PubMed	4.4
	Elsevier	2.5	Web of Science	2.5
	Scopus	1.9	Otras	1.1
	Otras	1.9	Scopus	0.82

Table 3
Participation in Academic Events

	First Application		Second Application	
		%		%
Type of participation in academic events	None	80.5	None	58.6
	Oral Presentation	8.5	Oral Presentation	8.6
	Poster Presentation	6.1	Poster Presentation	24.3
	Oral/Poster Presentation	3.6	Oral/Poster Presentation	8.6
	Attendee	1.2		
Type of academic events	None	75.6	None	60
	Event at FESI	15.8	Event at FESI	32.86
	International Congress	6.1	International Congress	5.71
	National Congress	2.44	National Congress	1.43

Table 4
English Language Level

	First Application		Second Application	
		%		%
English level	-Understands	39.02	-Understands	34.28
	-Writes	4.87	-Writes	2.85
	-Writes, speaks	1.22		
	-Understands, writes, speaks	36.6	-Understands, writes, speaks	40
	-Understands, writes	14.63	-Understands, writes	18.57
	-Understands, speaks	3.66	-Understands, speaks	4.28
Enrolled in an English course at FESI	Sí	40.24	Sí	27.14
	No	59.75	No	72.85
Enrolled in an English course outside of FESI	Sí	8.54	Sí	11.43
How it affects language	-Lack of understanding -Limits access to material -Lack of understanding of technical language -Invest more time in reading -Requires support (dictionary or translator)		-Limits access to materials -Lack of understanding -Invest more time in reading -Lack of understanding of technical language -Affects the delivery of assignments	

access documents, review information, and submit assignments; in addition, they consider that it requires a greater effort (investing more time).

As for the knowledge test, some improvements were found (see Table 5), the *Student's t-test* indicated a statistically significant increase in correct answers ($t(69)=2.104$, $p < .039$, d=0.252) and consequently in the grade ($t(69)=2.132$, $p < .036$, d=0.255). The percentage of students who achieved a passing grade increased in the second application relative to the first, but this improvement was extremely low.

Table 5
Knowledge Test Results

Variable	Application 1	Application 2
Correct answers	9.72±0.24	10.5±0.30*
Average Rating	4.85±0.12	5.25±0.15*
Approved	24.39%	37.14%
Average Passing Grade	6.32±0.08	6.44±0.15

*Note. Student's t-test for related samples indicated statistically significant differences. *p < .05*

Discussion

The objective of this research was to evaluate the perception of research skills of psychology students belonging to the Research Field from the Behavioral, Cognitive Behavioral and Interbehavioral traditions and to compare it with their level of knowledge about the research process. In general, the results indicate progress in the students' perception of their research skills after taking the different subjects of the Research field. Their perception is coherent with the evaluation of knowledge, but further work is required. Skills such as language, future proposals, statistics, and presentation in specialized events need more attention from professors.

Several studies have evidenced, from the students' perspective, the poor development of research skills in different undergraduate programs (Acón-Hernández et al., 2015; Araujo et al., 2013; Castro et al., 2018; Vera-Rivero et al., 2021). The factors involved in the development of these skills are multiple. For example, the lack of development of critical thinking and the level of course satisfaction (Landa-Blanco & Cortés-Ramos, 2021); student and professor commitment (Ortega et al., 2018); individual experiences and motivation (Balloo et al., 2016), among others. Thus, the training of researchers represents a great challenge for universities.

Our results are congruent with evidence in the field suggesting the enrichment of research skills in students with their incorporation into research groups (Acón-Hernández et al., 2019; Blanco-Balbeito et al., 2014). Although the activities of the different courses had to be carried out at a distance due to the conditions prevailing by COVID-19, the students perceived that their research skills were increased. The students' perception coincides with the evaluation of knowledge by increasing the number of successes and the percentage of students who achieved a passing evaluation; however, it is an aspect that needs to be strengthened to obtain forceful increases. As mentioned before, the percentages of improvement were low; possibly this has to do, in part, with the "emergent adjustments" to face-to-face programs to take them to virtual contexts, the lack of ICT use by professors and students, as well as the necessary infrastructure and economic conditions induced by the pandemic (INEGI, 2020; Miguel, 2020). Another assumption of these results is that, although students had courses in statistical methodology and processes before entering the Research Domain, it is likely that their knowledge has been diluted over time. Previous evidence shows that at the end of their programs, students forget some elements of methodology and statistics reviewed in the first years (Balloo et al., 2016; Pástor et al., 2020), so propitiating their insertion into a research group can help to remember and apply previous knowledge and build new ones. This suggests the need to review the programs of previous semesters and include student-centered didactic strategies.

Now that the health emergency has passed, it is necessary to review and adjust the programs of the Research Area to comply with the didactic techniques and methods required by a virtual modality or to carry them out under the theoretical

assumptions of a hybrid educational model. In addition, it is necessary to maintain refresher courses for professors on the use of ICTs, which can help to create more pleasant and friendly virtual environments. The purpose should be to increase student motivation and interest, improve the professor-student relationship, reduce workloads, and provide feedback on student performance. Designing appropriate virtual environments can help in the training of researchers. Previous work showed that undergraduate students presented an overall improvement of 13.49% in five research skills after studying in a virtual classroom designed for this purpose (Pástor et al., 2020); in this research, some of our categories reached similar percentages (as shown in Table 1).

Similarly, it has been said that students have insufficient knowledge of methodology and statistical analysis to conduct research (Acón-Hernández et al., 2015; Araujo et al., 2013; Vera-Rivero et al., 2021). In this study, participants perceived that they improved their methodology-related skills, placing them in the outstanding category, as did their statistical skills, although they only reached a sufficient level. This result is consistent with recent research in which recent graduates perceive themselves to have moderate statistical and quantitative skills (Awodoyin et al., 2021). This suggests the need to apply new didactic strategies in the teaching of statistics, where the student actively participates and proposes solutions to a real problem that has been detected (Del-Callejo-Canal et al., 2020; Fuentes, 2016), and that motivates their interest, as well as their creativity. In our case, the time available was insufficient to delve more deeply into statistical processes, only those related to their research projects were taken up again. This strategy must be used from the first years of training in higher education in order to have a stronger statistical ability.

On the other hand, it has been said that students lack the skills to perform information searches (Fernández & Villavicencio, 2017; Illescas et al., 2014). We detected that a major barrier for our students to perform this search and analysis is the English language, which is considered the "universal language" of science (Lopardo, 2019). The results indicate that less than 50% say they understand this language, this explains the preferential use of some search engines in which they find information in Spanish. They state that the language limits their access to academic materials, and, in addition, they state that they require more time to read. Despite the above, in the second application, an increase in the use of the BidiUNAM and Elsevier platforms was observed, possibly at the suggestion or request of their professors, which will undoubtedly enrich their training and research skills. It is important to highlight the time factor, in this case, the students considered that reviewing documents in English implied investing more hours of work in the translation of the material. Previous studies have found that the time required for searching, selecting, reading, and analyzing information is a factor that deters students from continuing research (AlGhamdi et al., 2014; Landa-Blanco & Cortés-Ramos, 2021). Although pandemic conditions and their consequences may partly explain the reasons why students did not enroll in language courses, it is necessary to inquire more about this and offer possible alternative solutions.

Regarding the dissemination of results, few students have the experience of participating in specialized academic events and are unaware of the publication process (Ángel et al., 2010). Our study shows that, from the students' perspective, they progressed in dissemination skills. This is related to the presentation of their work in some academic events, particularly their participation increased in the poster modality in local events held at FESI. Participation in specialized academic events and the elaboration of the research report on the Practicum subject strengthened the dissemination skills in oral and written form. This result shows the need to offer more local events or to obtain the necessary resources for students to live the experience of presenting their work beyond the classroom and to motivate them to publish their research report, even after having concluded their transit through the Research Area, and also to give them the opportunity to graduate with their final work in the thesis or publication modalities. All these activities can be important incentives for students to decide

whether to continue with research training.

Finally, although students prefer face-to-face advising (Figueredo, 2020), our results indicate that students improved their research skills in a distance situation. Teacher attention is crucial, whether in the distance or face-to-face modality. The training of researchers can be equated with the teaching of a trade that requires the continuous accompaniment, instruction, and guidance of consolidated researchers (Fonseca, 2020). This task should be left to professors with research experience (Ortega et al., 2018), this will help develop positive attitudes towards research and the consequent development of the skills required to carry it out.

Among the limitations of this research, we can mention that in the second application, it was not possible to recover the information of all those who participated in the first phase, nor did we recover the grade obtained in the subjects of the Research module or at least of the Practicum. We plan to continue with the application of the instrument to standardize it, with the purpose of knowing and intervening in the factors that influence the formation of researchers and recovering the grades obtained in each of the subjects, which can be an important indicator of the student's academic performance and the development of research skills.

It is worth mentioning that this study did not evaluate the socioemotional effects caused by the students' social isolation, as this was not part of the objective; however, we believe that this is an important factor that should be explored in a specific research project.

In conclusion, having taken the different subjects in the distance learning area influenced the students' perception of their research skills in bibliographic search, formulation of objectives, development of hypotheses, statement of the problem, sampling, research designs, research scopes, instrument construction, data analysis, elaboration of discussion, preparation of the research report, and presentation in academic forums. Although the students' perception was that they improved all their research skills, those related to statistics, language, future proposals derived from their research, and participation in academic events require further training. The students' confrontation with real situations is the best didactic strategy to develop their research skills, even in distance modalities. The evaluation of their knowledge is congruent with their perception, and although it has improved, it is necessary to continue working with didactic strategies focused on them; the learning of methodology and statistics should be based on research projects from the first semesters.

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