Data and Metadata. 2024; 3:327
doi: 10.56294/dm2024327

ORIGINAL

Variables associated with the development of research competencies in university students from Southern Peru: A cross-sectional study

Variables asociadas al desarrollo de las competencias investigativas de los estudiantes universitarios del sur peruano: Un estudio transversal

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Cite as: Estrada-Araoz EG, Farfán-Latorre M, Lavilla-Condori WG, Calcina-Álvarez DA, Yancachajlla-Quispe LI. Variables associated with the development of research competencies in university students from Southern Peru: A cross-sectional study. Data and Metadata. 2024; 3:327. https://doi.org/10.56294/dm2024327

Submitted: 23-12-2023 **Revised:** 08-03-2024 **Accepted:** 29-05-2024 **Published:** 30-05-2024

Editor: Adrián Alejandro Vitón Castillo

ABSTRACT

Introduction: the development of research competencies among university students is a crucial aspect of contemporary academic education. These competencies have not only become indispensable for professional advancement but are also essential for societal progress. However, their development is not always uniform, and their acquisition is associated with various variables.
Objective: to determine the variables associated with research competencies in university students from Southern Peru.
Method: a quantitative, non-experimental, cross-sectional descriptive study was conducted. The sample consisted of 302 university students selected through probabilistic sampling. Data collection was done using the Research Competencies Questionnaire, which had adequate metric properties.
Results: research competencies of 72,8 % of students were moderately developed, 17,5 % were not developed, while 9,6 % were fully developed. Furthermore, upon evaluating dimensions, it was found that organizational, communicational, and collaborative skills were also moderately developed. Additionally, it was determined that research competencies were significantly associated with membership in research groups and the number of weekly hours students dedicated to research activities ($p<0,05$).
Conclusions: membership in a research group and greater dedication of hours were associated with a higher level of development of research competencies. Moreover, overall, it was determined that the majority of students had a moderate level of development of these competencies.

Keywords: Research Competencies; Scientific Production; Scientific Research; Students; Research Training.

RESUMEN

Introducción: el desarrollo de competencias investigativas entre los estudiantes universitarios es un aspecto crucial en la formación académica contemporánea. Estas competencias no solo se han vuelto indispensables para el desarrollo profesional, sino que también son fundamentales para el avance de la sociedad. Sin embargo, su desarrollo no siempre es uniforme y su adquisición se asociaría a diversas variables.
Objetivo: determinar las variables asociadas a las competencias investigativas de los estudiantes universitarios del sur peruano.
Método: estudio cuantitativo, de diseño no experimental y de tipo descriptivo transversal. La muestra estuvo conformada por 302 estudiantes universitarios seleccionados mediante un muestreo probabilístico. Para la recolección de datos se aplicó el Cuestionario de Competencias Investigativas, el cual tenía adecuadas propiedades métricas.
Resultados: las competencias investigativas del 72,8 % de estudiantes se encontraban medianamente

desarrolladas, del 17,5 % no estaban desarrolladas, mientras que del 9,6 % se encontraban desarrolladas. Además, al evaluar las dimensiones se halló que las habilidades organizativas, comunicacionales y colaborativas también se encontraban medianamente desarrolladas. Por otro lado, se determinó que las competencias investigativas se asociaban de manera significativa a la pertenencia a grupos de investigación y a la cantidad de horas semanales que los estudiantes dedicaban a desarrollar actividades investigativas ($p<0,05$).
Conclusiones: la afiliación a un grupo de investigación y una mayor dedicación de horas se relacionaron con un mayor nivel de desarrollo de las competencias investigativas. Además, en términos generales, se determinó que la mayoría de los estudiantes tenían un nivel medio de desarrollo de estas competencias.

Palabras clave: Competencias Investigativas; Producción Científica; Investigación Científica; Estudiantes; Formación en Investigación.

INTRODUCTION

In the contemporary academic and professional context, the acquisition and development of investigative competencies (IC) have become fundamental elements for success in various areas of knowledge.[1] These competencies can be understood as the ability to employ skills to identify problems, acquire new knowledge, explain scientific phenomena, and draw evidence-based conclusions about science-related issues.[2]

These competencies, necessary in academic and professional settings, represent a comprehensive set of crucial knowledge, skills and attitudes that enable students to explore, analyze and critically understand existing knowledge.[3] They also enable students to conduct research effectively.[4] Their importance transcends academia, as they play a fundamental role in both the academic and professional development of students, preparing them to address research not only during their education, but also in their future career.[5]

The development of CI requires the implementation of didactic strategies within and outside the curriculum, which allows the student to cultivate and strengthen these skills through active practice.[6] These opportunities not only provide a space to apply theoretical knowledge in real situations, but also foster the development of practical skills and critical thinking.[7]

Therefore, it is imperative to promote the guidance, execution and evaluation of research projects, seminars, research assignments, coursework and integrative projects, as they contribute to the development of IQs.[8] In this sense, universities have the task of integrating these competencies in a cross-cutting manner in their curricula to address the challenges posed by society.[9] To achieve this, it is essential that students are provided with the necessary resources to foster critical thinking and reflection on the situations they face,[10] which will enable them to thoroughly understand problems, manage information effectively and develop viable solutions through the collection of relevant data.[11]

There are several classifications of ICs, which vary according to the authors' considerations or perspectives.[12] In the context of the present research, we chose to work with the approach proposed by Ollarves & Salguero,[13] who classified ICs into three main skills: organizational, communicational and collaborative. These three skills are considered essential components for the development of IC.

Organizational skills involve knowledge of functions, university and research policies and actions both at the university level and in research practice. Communication skills are essential, as they allow for a broad and multifaceted vision by exchanging experiences and knowledge from different perspectives, which is essential for effective problem solving. Finally, collaborative skills encourage joint work in workshops, debates and forums to enrich the research.[13]

In the Peruvian context, the approval of University Law 30220 in 2014 marked a significant milestone for implementing research in a cross-cutting manner.[14] This law, which encourages research at all educational levels, from undergraduate to postgraduate, poses a major challenge for the university system: to ensure that its students acquire the necessary IQs.[15,16] This task implies the need to generate innovative solutions that not only drive scientific progress, but also contribute to the welfare of the community.[17]

In this context, it is essential that universities assume a proactive role in promoting the development of CI among their students.[18] These competencies are essential for students to carry out quality research, whether for their final undergraduate projects, academic theses or in their future professional careers.[19] This initiative not only responds to the demands of today's society, but also reflects the quality of university education by training people capable of generating knowledge and scientific research in a conscious and responsible manner.[20]

However, despite efforts and the recognized importance of these competencies, effective implementation in some universities faces significant challenges.[21] These challenges include the presence of faculty with limited experience in research and scientific publication,[22] institutional deficiencies in infrastructure and available resources,[23] as well as a lack of commitment on the part of some students to actively participate in research activities.[24]

In recent years, research has been conducted to determine the level of IQ development of university students and the results are heterogeneous. Some research revealed that students' IQs were at a low level,[25,26] while other research reported that they were at a regular or intermediate level.[27,28,29] On the other hand, it was found that interest,[30] previous knowledge about research,[31] collaborative work,[32] having published a research article,[33] the study cycle,[27,34] belonging to a research group[35] and to a student scientific society[36] were factors that determined the development of IQ among students.

Knowing which variables are associated with the development of IQ in Peruvian university students is of critical importance in the Peruvian educational panorama and is fundamental for a thorough understanding of this variable. By analyzing IQ and the associated variables, it will be possible to identify aspects that could be improved in the academic training of students. Furthermore, by knowing the variables that influence the development of IQs, universities and teachers can design specific programs and activities to promote them. This will not only improve the quality of higher education, but will also strengthen the professional skills of graduates, thus contributing to the advancement of a more innovative and knowledge-based society.

Finally, the objective of the present research was to determine the variables associated with the IQs of university students in southern Peru.

METHOD

A quantitative approach was used, since numerical measurement and statistics were used to determine behavioral patterns of the participants. Regarding the design, it was non-experimental, since the IQ variable was not deliberately manipulated, it was only observed. Regarding the type, it was descriptive and cross-sectional, because an analysis of the characteristics of the variable was developed and the information was collected at a single time.[37]

The study population consisted of 1400 students in their eighth, ninth, tenth, eleventh and twelfth semesters of studies at the universities of the Madre de Dios region (Peru): Universidad Nacional Amazónica de Madre de Dios (UNAMAD) and the branches of Universidad Andina del Cusco (UAC) and Universidad Nacional San Antonio Abad del Cusco (UNSAAC). On the other hand, the sample included 302 students, obtained through probability sampling with a confidence level of 95 % and a significance level of 5 %.

For data collection, a virtual survey was structured in the Google Forms platform, which consisted of two sections. In the first section, sociodemographic and academic information was collected (sex, age, university, area of study, semester, employment status, support for research, inclusion in a research group, articles published and hours devoted to research). In the second section, the Research Competencies Questionnaire was administered.[12]

This questionnaire is made up of 42 Likert-type items (very frequently, frequently, occasionally, rarely and never) and consists of 3 dimensions: organizational skills (items 1 to 12), communication skills (items 13 to 36) and collaborative skills (items 37 to 42). The psychometric properties of the questionnaire were determined in a previous study through the processes of validity (Aiken's V= 0,920) and reliability (α= 0,890).[27] In this sense, it can be affirmed that the questionnaire is valid and reliable.

Before carrying out the data collection, the necessary procedures were carried out to obtain the necessary authorizations from the relevant university authorities. Subsequently, the WhatsApp messaging application was used to invite students to participate in the research. For this purpose, they were provided with the survey link along with a clear explanation of the purpose of the research and instructions for completing the questionnaire. It is estimated that the entire process took approximately 20 minutes, and once the participation of the 302 students was assured, access to the instrument was deactivated.

To carry out the statistical process, SPSS version 25 software was used. The descriptive results were presented in a figure. On the other hand, the nonparametric Chi-Square statistical test (X^2) was used to determine whether there was a statistically significant association between IQ development and the proposed sociodemographic and academic variables.

Regarding ethical considerations, this research was conducted considering the ethical principles established in the Declaration of Helsinki. It is necessary to point out that the students were informed about the purpose and nature of the research. Therefore, they gave their informed consent, thus ensuring the privacy, confidentiality, anonymity and voluntary nature of their participation.

RESULTS

According to table 1, more female students participated, who were between 18 and 24 years old, enrolled at UNAMAD, whose major was Social Sciences, who were in their tenth semester and were not working. In addition, more students participated who did not receive economic support to develop research or belong to any research group, had not published scientific articles and dedicated up to 8 hours per week to research activities.

Table 1. Distribution of the sample

Sociodemographic and academic variables		n= 302	%
Sex	Male	107	35,4
	Female	195	64,6
Age	Between 18 and 24 years old	215	71,2
	Between 25 and 31 years old	66	21,9
	Between 32 and 38 years old	9	3,0
	Between 39 and 46 years old	12	4,0
University	UNAMAD	240	79,5
	UAC	42	13,9
	UNSAAC	20	6,6
Study area	Social Sciences	182	60,3
	Engineering	51	16,9
	Health Sciences	69	22,8
Semester	Seventh	3	1,0
	Eighth	103	34,1
	Ninth	73	24,2
	Tenth	105	34,8
	Eleventh	9	3,0
	Twelfth	9	3,0
Employment status	Work	146	48,3
	Does not work	156	51,7
Financial support for research	Yes	30	9,9
	No	272	90,1
Membership in research groups	Yes	35	11,6
	No	267	88,4
Publication of scientific articles	Yes	6	2,0
	No	296	98,0
Hours per week dedicated to research	Between 0 and 8 hours	277	91,7
	Between 9 a.m. and 5 p.m.	19	6,3
	Between 18 and 27 hours	6	2,0

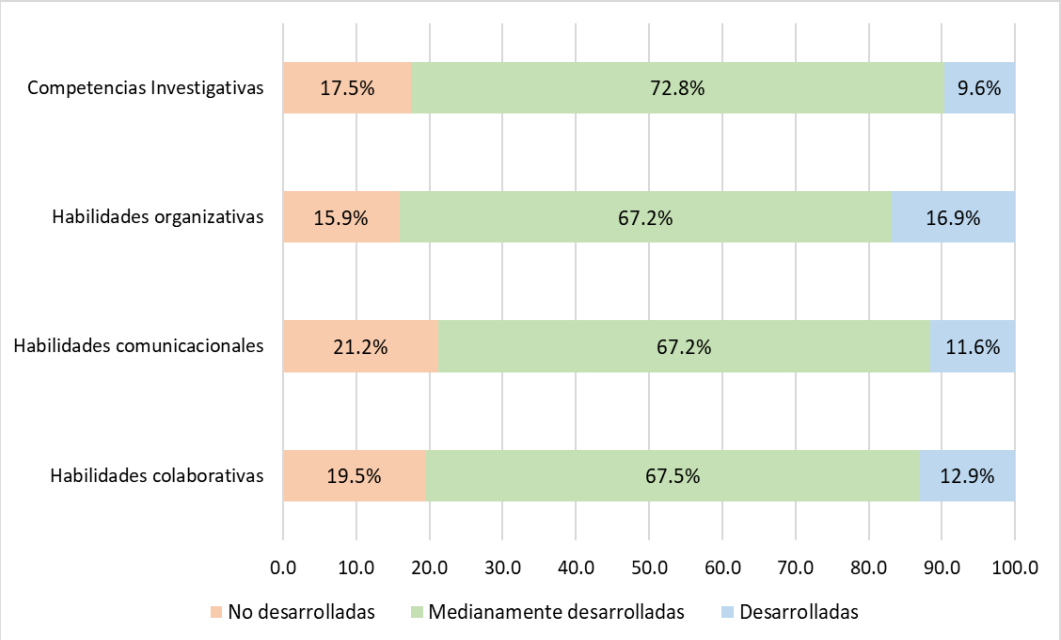

Figure 1. Distribution of percentages of the research competencies variable and its dimensions

https://doi.org/10.56294/dm2024327

Figure 1 shows that the IQs of most students were moderately developed. In addition, when evaluating the dimensions, it was found that organizational, communication and collaborative skills were also moderately developed.

Table 2 shows that IQ was significantly associated with membership in research groups and the number of hours per week devoted to research activities (p<0,05). This implies that students who actively participated in research groups and devoted more time to research-related tasks showed higher levels of IQ.

Table 2. Association between research competencies and sociodemographic and academic variables

Sociodemographic and academic variables		Research competencies			p-value
		Undeveloped	Moderately developed	Developed	
Sex	Male	13 (12,1 %)	81 (75,7 %)	13 (12,1 %)	p>0,05
	Female	40 (20,5 %)	139 (71,3 %)	16 (8,2 %)	
Age	Between 18 and 24 years old	34 (15,8 %)	158 (73,5 %)	23 (10,7 %)	p>0,05
	Between 25 and 31 years old	16 (24,2 %)	46 (69,7 %)	4 (6,1 %)	
	Between 32 and 38 years old	1 (11,1 %)	8 (88,9 %)	0 (0,0 %)	
	Between 39 and 46 years old	2 (16,7 %)	8 (66,7 %)	2 (16,7 %)	
University	UNAMAD	43 (17,9 %)	174 (72,0 %)	23 (9,6 %)	p>0,05
	UAC	7 (16,7 %)	29 (69,0 %)	6 (14,3 %)	
	UNSAAC	3 (15,0 %)	17 (85,0 %)	0 (0,0 %)	
Study area	Social Sciences	36 (19,8 %)	126 (69,2 %)	20 (11,0 %)	p>0,05
	Engineering	3 (5,9 %)	45 (88,2 %)	3 (5,9 %)	
	Health Sciences	14 (20,3 %)	49 (71,0 %)	6 (8,7 %)	
Semester	Seventh	1 (33,3 %)	2 (66,7 %)	0 (0,0 %)	p>0,05
	Eighth	22 (21,4 %)	73 (70,9 %)	8 (7,8 %)	
	Ninth	7 (9,6 %)	59 (80,8 %)	7 (9,6 %)	
	Tenth	22 (21,0 %)	71 (67,6 %)	12 (11,4 %)	
	Eleventh	1 (11,1 %)	6 (66,7 %)	2 (22,2 %)	
	Twelfth	0 (0,0 %)	9 (100,0 %)	0 (0,0 %)	
Employment status	Work	23 (15,8 %)	109 (74,7 %)	14 (9,6 %)	p>0,05
	Does not work	30 (19,2 %)	111 (71,2 %)	15 (9,6 %)	
Financial support for research	Yes	6 (20,0 %)	21 (70,0 %)	3 (10,0 %)	p>0,05
	No	47 (17,3 %)	199 (73,2 %)	26 (9,6 %)	
Membership in research groups	Yes	4 (11,4 %)	23 (65,7 %)	8 (22,9 %)	p<0,05
	No	49 (18,4 %)	197 (73,8 %)	21 (7,9 %)	
Publication of scientific articles	Yes	1 (16,7 %)	3 (50,0 %)	2 (33,3 %)	p>0,05
	No	52 (17,6 %)	217 (73,3 %)	27 (9,1 %)	
Hours per week dedicated to research	Between 0 and 8 hours	52 (18,8 %)	203 (73,3 %)	22 (7,9 %)	p<0,05
	Between 9 a.m. and 5 p.m.	0 (0,0 %)	13 (68,4 %)	6 (31,6 %)	
	Between 18 and 27 hours	1 (16,7 %)	4 (66,7 %)	1 (16,7 %)	

Table 3 reveals that organizational skills were also significantly associated with membership in research groups and the number of hours per week devoted to research activities (p<0,05). This indicates that students who were part of research groups and devoted more time to research activities tended to have more developed organizational skills.

Table 3. Association between organizational skills and sociodemographic and academic variables

Sociodemographic and academic variables		Organizational skills			p-value
		Undeveloped	Moderately developed	Developed	
Sex	Male	14 (13,1 %)	71 (66,4 %)	22 (20,6 %)	p>0,05
	Female	34 (17,4 %)	132 (66,7 %)	29 (14,9 %)	
Age	Between 18 and 24 years old	31 (14,4 %)	144 (67,0 %)	40 (18,6 %)	p>0,05
	Between 25 and 31 years old	15 (22,7 %)	46 (69,7 %)	5 (7,6 %)	
	Between 32 and 38 years old	1 (11,1 %)	6 (66,7 %)	2 (22,2 %)	
	Between 39 and 46 years old	1 (8,3 %)	7 (58,3 %)	4 (33,3 %)	
University	UNAMAD	42 (17,5 %)	160 (66,7 %)	38 (15,8 %)	p>0,05
	UAC	6 (14,3 %)	29 (69,0 %)	7 (16,7 %)	
	UNSAAC	0 (0,0 %)	14 (70,0 %)	6 (30,0 %)	
Study area	Social Sciences	30 (16,5 %)	122 (67,0 %)	30 (16,5 %)	p>0,05
	Engineering	4 (7,8 %)	39 (76,5 %)	8 (15,7 %)	
	Health Sciences	14 (20,3 %)	42 (60,9 %)	13 (18,8 %)	
Semester	Seventh	0 (0,0 %)	3 (100,0 %)	0 (0,0 %)	p>0,05
	Eighth	17 (16,5 %)	70 (68,0 %)	16 (15,5 %)	
	Ninth	8 (11,0 %)	54 (74,0 %)	11 (15,1 %)	
	Tenth	22 (21,0 %)	63 (60,0 %)	20 (19,0 %)	
	Eleventh	1 (11,1 %)	5 (55,6 %)	3 (33,3 %)	
	Twelfth	0 (0,0 %)	8 (88,9 %)	1 (11,1 %)	
Employment status	Work	21 (14,4 %)	103 (70,5 %)	22 (15,1 %)	p>0,05
	Does not work	27 (17,3 %)	100 (64,1 %)	29 (18,6 %)	
Financial support for research	Yes	5 (16,7 %)	20 (66,7 %)	5 (16,7 %)	p>0,05
	No	43 (15,8 %)	183 (67,3 %)	46 (16,9 %)	
Membership in research groups	Yes	2 (5,7 %)	19 (54,3 %)	14 (40,0 %)	p<0,05
	No	46 (17,2 %)	184 (68,9 %)	37 (13,9 %)	
Publication of scientific articles	Yes	2 (33,3 %)	2 (33,3 %)	2 (33,3 %)	p>0,05
	No	46 (15,5 %)	201 (67,9 %)	49 (16,6 %)	
Hours per week dedicated to research	Between 0 and 8 hours	48 (17,3 %)	188 (67,9 %)	41 (14,8 %)	p<0,05
	Between 9 a.m. and 5 p.m.	0 (0,0 %)	12 (63,2 %)	7 (36,8 %)	
	Between 18 and 27 hours	0 (0,0 %)	3 (50,0 %)	3 (50,0 %)	

Table 4 shows that communication skills were significantly associated with membership in research groups (p<0,05). The above means that students who were part of research groups showed a higher level of communication skills compared to those who were not affiliated.

According to table 5, collaborative skills were significantly associated with the number of weekly hours

https://doi.org/10.56294/dm2024327

devoted to research activities (p<0,05). This indicates that students who devoted more time to research activities had a higher level of collaborative skills compared to those who devoted less time.

Table 4. Association between communication skills and sociodemographic and academic variables

Sociodemographic and academic variables		Communication skills			p-value
		Undeveloped	Moderately developed	Developed	
Sex	Male	16 (15,0 %)	77 (72,0 %)	14 (13,1 %)	p>0,05
	Female	48 (24,6 %)	126 (64,6 %)	21 (10,8 %)	
Age	Between 18 and 24 years old	44 (20,5 %)	144 (67,0 %)	27 (12,6 %)	p>0,05
	Between 25 and 31 years old	17 (25,8 %)	43 (65,2 %)	6 (9,1 %)	
	Between 32 and 38 years old	1 (11,1 %)	8 (88,9 %)	0 (0,0 %)	
	Between 39 and 46 years old	2 (16,7 %)	8 (66,7 %)	2 (16,7 %)	
University	UNAMAD	49 (20,4 %)	166 (69,2 %)	25 (10,4 %)	p>0,05
	UAC	10 (23,8 %)	24 (57,1 %)	8 (19,0 %)	
	UNSAAC	5 (25,0 %)	13 (65,0 %)	2 (10,0 %)	
Study area	Social Sciences	44 (24,2 %)	117 (64,3 %)	21 (11,5 %)	p>0,05
	Engineering	6 (11,8 %)	40 (78,4 %)	5 (9,8 %)	
	Health Sciences	14 (20,3 %)	46 (66,7 %)	9 (13,0 %)	
Semester	Seventh	1 (33,3 %)	2 (66,6 %)	0 (0,0 %)	p>0,05
	Eighth	28 (27,2 %)	62 (60,2 %)	13 (12,6 %)	
	Ninth	10 (13,7 %)	56 (76,7 %)	7 (9,6 %)	
	Tenth	25 (23,8 %)	68 (64,8 %)	12 (11,4 %)	
	Eleventh	0 (0,0 %)	7 (77,8 %)	2 (22,2 %)	
	Twelfth	0 (0,0 %)	8 (88,9 %)	1 (11,1 %)	
Employment status	Work	30 (20,5 %)	102 (69,9 %)	14 (9,6 %)	p>0,05
	Does not work	34 (21,8 %)	101 (64,7 %)	21 (13,5 %)	
Financial support for research	Yes	7 (23,3 %)	20 (66,7 %)	3 (10,0 %)	p>0,05
	No	57 (21,0 %)	183 (67,3 %)	32 (11,8 %)	
Membership in research groups	Yes	5 (14,3 %)	21 (60,0 %)	9 (25,7 %)	p<0,05
	No	59 (22,1 %)	182 (68,2 %)	26 (9,7 %)	
Publication of scientific articles	Yes	1 (16,7 %)	4 (66,7 %)	1 (16,7 %)	p>0,05
	No	63 (21,3 %)	199 (67,2 %)	34 (11,5 %)	
Hours per week dedicated to research	Between 0 and 8 hours	62 (22,4 %)	186 (67,1 %)	29 (10,5 %)	p>0,05
	Between 9 a.m. and 5 p.m.	1 (5,3 %)	13 (68,4 %)	5 (26,3 %)	
	Between 18 and 27 hours	1 (16,7 %)	4 (66,7 %)	1 (16,7 %)	

Table 5. Association between collaborative skills and sociodemographic and academic variables

Sociodemographic and academic variables		Collaborative skills			p-value
		Undeveloped	Moderately developed	Developed	
Sex	Male	16 (15,0 %)	74 (69,2 %)	17 (15,9 %)	p>0,05
	Female	43 (22,1 %)	130 (66,7 %)	22 (11,3 %)	
Age	Between 18 and 24 years old	41 (19,1 %)	146 (67,9 %)	28 (13,0 %)	p>0,05
	Between 25 and 31 years old	15 (22,7 %)	42 (63,6 %)	9 (13,6 %)	
	Between 32 and 38 years old	1 (11,1 %)	7 (77,8 %)	1 (11,1 %)	
	Between 39 and 46 years old	2 (16,7 %)	9 (75,0 %)	1 (8,3 %)	
University	UNAMAD	46 (19,2 %)	162 (67,5 %)	32 (13,3 %)	p>0,05
	UAC	12 (28,6 %)	25 (59,5 %)	5 (11,9 %)	
	UNSAAC	1 (5,0 %)	17 (85,0 %)	2 (10,0 %)	
Study area	Social Sciences	42 (23,1 %)	114 (62,6 %)	26 (14,3 %)	p>0,05
	Engineering	5 (9,8 %)	40 (78,4 %)	6 (11,8 %)	
	Health Sciences	12 (17,4 %)	50 (72,5 %)	7 (10,1 %)	
Semester	Seventh	1 (33,3 %)	2 (66,7 %)	0 (0,0 %)	p>0,05
	Eighth	22 (21,4 %)	68 (66,0 %)	13 (12,6 %)	
	Ninth	12 (16,4 %)	50 (68,5 %)	11 (15,1 %)	
	Tenth	23 (21,9 %)	69 (65,7 %)	13 (12,4 %)	
	Eleventh	0 (0,0 %)	7 (77,8 %)	2 (22,2 %)	
	Twelfth	1 (11,1 %)	8 (88,9 %)	0 (0,0 %)	
Employment status	Work	29 (19,9 %)	101 (69,2 %)	16 (11,0 %)	p>0,05
	Does not work	30 (19,2 %)	103 (66,0 %)	23 (14,7 %)	
Financial support for research	Yes	5 (16,7 %)	22 (73,3 %)	3 (10,0 %)	p>0,05
	No	54 (19,9 %)	182 (66,9 %)	36 (13,2 %)	
Membership in research groups	Yes	5 (14,3 %)	24 (68,6 %)	6 (17,1 %)	p>0,05
	No	54 (20,2 %)	180 (67,4 %)	33 (12,4 %)	
Publication of scientific articles	Yes	1 (16,7 %)	4 (66,7 %)	1 (16,7 %)	p>0,05
	No	58 (19,6 %)	200 (67,6 %)	38 (12,8 %)	
Hours per week dedicated to research	Between 0 and 8 hours	57 (20,6 %)	190 (68,6 %)	30 (10,8 %)	p<0,05
	Between 9 a.m. and 5 p.m.	1 (5,3 %)	11 (57,9 %)	7 (36,8 %)	
	Between 18 and 27 hours	1 (16,7 %)	3 (50,0 %)	2 (33,3 %)	

DISCUSSION

In the context of research, IQs are essential to carry out quality studies and contribute to the advancement of knowledge in various disciplines.[38] These competencies are more than just tools; they represent the set of skills and abilities that researchers use to design, execute and communicate their research effectively.[39] Therefore, the present research focused on determining the variables associated with the IQs of university students in southern Peru.

A preliminary finding reveals that the IQs of most students were only moderately developed. This suggests that students faced difficulties or limitations in their research-related skills and knowledge, which may translate into poor ability to pose relevant research questions, design robust studies, collect and analyze data effectively, or interpret their research results. These difficulties may impact their ability to conduct quality research and obtain accurate results.

Similar results were obtained by Ayala[28] who conducted an investigation to evaluate the IQ of Peruvian students in the ninth and tenth cycles of the professional career of education and determined that the

predominant level was regular. Similarly, it is related to what was reported by Álvarez et al.[40] who developed a study with the purpose of analyzing the perception of IQ mastery of Ecuadorian students of the professional career of medicine and found that they had a moderately adequate mastery. Both cases highlight the need to address the deficiencies in research training in both countries.

Within a context of high research demands, it becomes imperative to strengthen IQ among students.[41] This not only implies having a theoretical and methodological mastery, but also the ability to carry out the search, selection, organization and analysis of essential information for the generation and dissemination of knowledge.[42] In this sense, it is essential to evaluate these competencies, as they reflect the level of mastery of the theoretical and methodological foundations necessary to address the challenges in a knowledge society. This approach, both practical and axiological, epistemological and entrepreneurial, becomes crucial in an interdisciplinary and complex context.[43]

Another finding shows that IQ was associated with membership in research groups. This means that those students who were part of some research group showed higher levels of IQ than those who did not belong to any group. This suggests that participation in collaborative activities may contribute to the development of research skills and knowledge in students.

These findings are aligned with the results of Castro[35] who found that certain experiences, such as participation in research groups, allowed students to improve their IQs and complement teachings that, within the curriculum, might not have fully met their expectations and learning needs. Similarly, Robles et al.[44] found that participation in research groups was a factor influencing scientific production at the Universidad Católica del Norte (Chile). In both cases, the role played by these experiences in the integral formation of students and in the promotion of a research culture in the academic environment is highlighted.

It was also found that IQ was associated with the number of hours per week that students dedicated to research activities. This indicates that those students who dedicated more hours to these activities tended to develop a higher level of IQ. Therefore, it can be affirmed that regular practice and dedication to research activities can contribute significantly to the development and strengthening of students' research skills.

This is consistent with what was reported by Prado[45] who determined that the time dedicated to research was a determining factor of IQ and scientific productivity among teachers and students. Similarly, Castro[46] found that time devoted to research was correlated with higher levels of IQ development and scientific production of university students. These findings support the idea that dedication to research work can have a significant impact on IQ development.

Based on the findings of this research, it is recommended that university authorities implement training programs aimed at improving specific research skills, such as the search for, selection and analysis of information, as well as the effective communication of research results. It is also urged to promote more active participation in research projects led by both faculty and student groups. In addition, it is suggested that research activities be integrated in a cross-cutting manner in the curriculum of all professional careers. Finally, it is crucial to foster interdisciplinary collaboration to enrich the research process and improve students' IQs.

This research has the strength of addressing a topic of interest in the university context; however, it is not without some limitations that require attention. First, a disproportion in the sample was observed in terms of the number of students according to the university of origin. In addition, the use of a self-administered data collection instrument could lead to overestimation or underestimation of responses. Therefore, for future research, it is suggested that the sample size be expanded, especially by including a larger number of UNSAAC students. Likewise, the use of additional data collection instruments is recommended in order to provide greater objectivity to this process.

CONCLUSIONS

It is concluded that belonging to a research group and a greater dedication of hours were associated with a higher level of IQ development in university students from southern Peru. Furthermore, in general terms, it was determined that the majority of students showed these competencies to be moderately developed. These findings highlight the importance of constant practice and active participation in research activities for the growth and improvement of students' research skills.

BIBLIOGRAPHIC REFERENCES

1. Ciraso-Calí A, Martínez-Fernández JR, París-Mañas G, Sánchez-Martí A, García-Ravidá LB. The research competence: Acquisition and development among undergraduates in Education Sciences. Front Educ. 2022 May;7:836165. https://doi.org/10.3389/feduc.2022.836165

2. Coronado M, Arteta J. Competencias científicas que propician docentes de Ciencias naturales. Zona próxima. 2015;(23):131-144. https://doi.org/10.14482/zp.23.5797

3. Castillo I, Ramírez M. Research competencies to develop academic reading and writing: A systematic literature review. Front Educ. 2021;5:576961. https://doi.org/10.3389/feduc.2020.576961

4. Márquez A, Delgado S, Fernández M, Acosta R. Formación de competencias investigativas en pregrado: su diagnóstico. IC. 2018;5(2):44-51.

5. Duarte R, Palacios A, Guzmán Y, Segura L. Validation using structural equations of the "Cursa-T" Scale to measure research and digital competencies in undergraduate students. Societies. 2024;14(2):22. https://doi.org/10.3390/soc14020022

6. Castro Y. Desarrollo de competencias investigativas en estudiantes de las Ciencias de la Salud. Sistematización de experiencias. Duazary. 2020;17(4):65-80. https://doi.org/10.21676/2389783X.3602

7. Ipanaqué M, Figueroa J, Bazalar J, Arhuis W, Quiñones M, Villarreal D. Research skills for university students' thesis in E-learning: Scale development and validation in Peru. Heliyon. 2023;9(3):e13770. https://doi.org/10.1016%2Fj.heliyon.2023.e13770

8. Estrada O, Fuentes D, Simón W. La formación de habilidades investigativas en estudiantes de ingeniería en ciencias informáticas desde la asignatura de gestión de software: Un estudio de caso en la universidad de las ciencias informáticas, Cuba. Ingeniare Rev Chil Ing. 2022;30(1):109-123. https://dx.doi.org/10.4067/S0718-33052022000100109

9. Chávez K, Calanchez Á, Tuesta J, Valladolid A. Formación de competencias investigativas en los estudiantes universitarios. Univ Soc. 2022;14(1):426-434.

10. Castro Y. Marco de referencia de las competencias investigativas para la Educación Médica. Rev Cubana Inf Cienc Salud. 2023;34:e2190.

11. Tobón S. Formación integral y competencias. Pensamiento complejo, currículo, didáctica y evaluación. Bogotá: Ecoe; 2010.

12. Romaní B. Competencias investigativas y pensamiento crítico en los estudiantes de X ciclo de la Facultad de Educación de la UNMSM, 2021. (Tesis de posgrado). Universidad Nacional Mayor de San Marcos; 2022.

13. Ollarves Y, Salguero L. Una propuesta de competencias investigativas para los docentes universitarios. Laurus. 2009;15(30):118-137.

14. Estrada E, Gallegos N, Huaypar K. Calidad metodológica de las tesis de pregrado de una universidad pública peruana. Univ Soc. 2022;14(3):22-29.

15. Vílchez C, Huamán F. Factores asociados con la producción científica indizada en Scopus de la Universidad Nacional Mayor de San Marcos. Letras (Lima). 2019;90(131):244-260. https://doi.org/10.30920/letras.90.131.11

16. Espinoza E, Ríos A, Cuenca N. Formación de competencias investigativas en los estudiantes universitarios. Atenas. 2016;(33):1-10.

17. López J, García G. Desarrollo de competencias investigativas en el pregrado. Aproximaciones teóricas. Ref Pedagóg. 2022;10(2):34-49.

18. Arzuaga M, Cabrera J, Álvarez A. Competencias investigativas en educación superior en Latinoamérica: Análisis de publicaciones indexadas. Univ Soc. 2023;15(1):120-126.

19. Ríos P, Ruiz C, Paulos T, León R. Desarrollo de una escala para medir competencias investigativas en docentes y estudiantes universitarios. Areté. 2023;9(17):147-169. https://doi.org/10.55560/arete.2023.17.9.7

20. Estrada E, Yabar P, Roque E, Achata C, Jinez E, Guillen N, et al. Análisis bibliométrico de la producción científica de las universidades del suroriente peruano en la base de datos Scopus. J Law Sustain Dev. 2023;11(7):e1282. https://doi.org/10.55908/sdgs.v11i7.1282

21. Estrada E, Farfán M, Lavilla W, Quispe J, Mamani M, Jara F. Producción científica en la base de datos Scopus de una universidad pública del sureste peruano. Data and Metadata. 2023;2:111. https://doi.org/10.56294/dm2023111

22. Estrada E, Bautista J, Córdova L, Velazco B, Ticona E. Scientific production of the thesis advisors of a public university in the Peruvian Amazon. Univ Soc. 2023;15(3):453-459.

23. Estenssoro E, Friedman G, Hernández G. Research in Latin America: Opportunities and challenges. Intensive Care Med. 2016;42:1045–1047. https://doi.org/10.1007/s00134-016-4342-3

24. Duche A, Vera C, Pari N, Ramírez J. Competencias investigativas en educación superior: Research competencies in higher education. LATAM. 2023;4(5):204–217. https://doi.org/10.56712/latam.v4i5.1313

25. Dipas B, Rodríguez J, Rodríguez C, Rodríguez J. Investigación formativa para desarrollar competencias investigativas de los estudiantes. Ciencia Latina. 2022;6(6):9687-9708. https://doi.org/10.37811/cl_rcm.v6i6.4094

26. Alfaro M, Paucca N, Cóquel L, Méndez G, Roque I, Rafayle R. Enseñanza virtual y desarrollo de competencias investigativas. Horizontes. 2022;6(25):1477-1486. https://doi.org/10.33996/revistahorizontes.v6i25.428

27. Estrada E, Mamani M, Mamani M, Aguilar R, Jara F, Roque C. Research competencies assessment: Case of university students in the Peruvian Amazon. Multidiscip. Sci. J. 2024;6(9):2024172. https://doi.org/10.31893/multiscience.2024172

28. Ayala O. Competencias informacionales y competencias investigativas en estudiantes universitarios. Rev Innova Educ. 2020;2(4):668-679. https://revistainnovaeducacion.com/index.php/rie/article/view/133

29. Núñez N. Enseñanza de la competencia investigativa: percepciones y evidencias de los estudiantes universitarios. Espacios. 2019;40(41):26-41.

30. Gómez Y, Bazán A, Villalobos F. Student factors that difficult teaching-learning of research skills. Interacciones. 2017;3(3):101-110. https://doi.org/10.24016/2017.v3n3.68

31. Mugabo E, Velin L, Nduwayezu R. Exploring factors associated with research involvement of undergraduate students at the College of Medicine and Health Sciences, University of Rwanda. BMC Med Educ. 2021;21:239. https://doi.org/10.1186/s12909-021-02662-3

32. Núñez L, Yangaly J, Huaita D, Vásquez M, Rivera O. Factors associated with the development of research skills in graduate students. Int J Early Child Spec Educ. 2020;12(1):359-369. https://doi.org/10.9756/int-jecse/v12i1.201015

33. Castro Y, Sihuay K, Pérez V. Producción científica y percepción de la investigación por estudiantes de odontología. Educ Med. 2018;19(1):19-22. https://doi.org/10.1016/j.edumed.2016.11.001

34. Castro Y. Impacto de una sociedad científica estudiantil en el desarrollo de competencias investigativas. Rev Cubana Investig Bioméd. 2023;42(1):e2341.

35. Castro Y. Factores relacionados con las competencias investigativas de estudiantes de Odontología. Educ Med Super. 2021;35(4):e2929.

36. Valladares M, Serrano F, Guarnizo J, Rivera A, Valladares D, Mejía C. Factores asociados a la capacidad científica-académica básica en estudiantes de medicina de Latinoamérica. Iatreia. 2022;36(2). https://doi.org/10.17533/udea.iatreia.194

37. Hernández R, Mendoza C. Metodología de la investigación: las rutas cuantitativa, cualitativa y mixta. México: McGraw-Hill; 2018.

38. Espindola M. Importancia del desarrollo de la competencia en investigación en el estudiante de nivel superior. Ingenio y Conciencia. 2022;9(18):36-41. https://doi.org/10.29057/escs.v9i18.8854

39. Sandoval F, Sáez F. Revisión sistemática sobre competencias de investigación en estudiantes de educación superior. PE. 2023;16(2):186–211. https://doi.org/10.22235/pe.v16i2.3340

40. Alvarez R, Cabrera L, Mena S. Competencias investigativas en estudiantes de Educación Superior: aproximaciones desde estudiantes de Medicina. 593 Digital Publisher CEIT. 2022;7(4-2):312-327. https://doi.org/10.33386/593dp.2022.4-2.1425

41. Hernández M, Panunzio A, Daher J, Royero M. Las competencias investigativas en la Educación Superior. Yachana. 2019;8(3):71-80. https://doi.org/10.62325/10.62325/yachana.v8.n3.2019.610

42. Garro L, Romero S, Majo H, Alcas N, Guerra F. Competencias investigativas desde el enfoque socioformativo en posgraduados de Perú y Ecuador. revHUMAN. 2022;13(6):1-10. https://doi.org/10.37467/revhuman.v11.4087

43. Tobón S, Cardona S, Vélez Ramos J, López Loya J. Proyectos formativos y desarrollo del talento humano para la Sociedad del Conocimiento. Acción Pedagógica. 2015;24(1):20-31.

44. Robles P, Sánchez A, Ramírez P. Factores que influyen en la producción científica en la Universidad Católica del Norte. Universitas: Gestão e TI. 2016;6(1):33-39. https://doi.org/10.5102/un.gti.v6i1.4108

45. Prado N. Predictors of Research productivity among administrators, faculty, and students. LJHER. 2019;15(2):1-16. http://dx.doi.org/10.7828/ljher.v15n2.1319

46. Castro Y. Factores que contribuyen en la producción científica estudiantil. El caso de Odontología en la Universidad Nacional Mayor de San Marcos, Perú. Edumed. 2019;20(S1):49-58. https://doi.org/10.1016/j.edumed.2017.10.002

FINANCING

This research was financed by the Vice Rectorate of Research of the Universidad Nacional Amazónica de Madre de Dios.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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