Affective, Cognitive, and Behavioral Attitudes towards Research in Peruvian University Students

José Calizaya-López[1*], Deyvin Herlin Cabana-Mamani[2], Juan Domingo Banda-Cárdenas[3], Erín Olga Trujillo-Medina[4], Dery Saida Miauri-Aza[5], Roberto Cervantes-Rivera[6]

[1,2,3,4,6]*Universidad Nacional de San Agustín de Arequipa, Perú.*
Email: jcalizayal@unsa.edu.pe
[5]*Universidad Católica San Pablo, Arequipa, Perú.*

Abstracts: The affective, cognitive, and behavioral attitudes towards research in students of public and private universities in Peru were analyzed according to socio-academic variables. Methodology. 2448 university students from a public university and 4 private universities participated; intentional sampling was used. In addition, the study was descriptive-comparative, quantitative, and non-experimental. An adequately validated measurement instrument was applied to determine students' attitudes. Results. A moderate level was found in attitudes towards research in university students (mean = 77.06, standard deviation = 12.32, median = 77, ranges from 0 to 140) for both affective and cognitive attitudes found at moderate level observing some assessment of favorable attitude, however, in behavioral attitude the average was low, being valued as unfavorable attitude towards the research. It is concluded that university students according to the area of health sciences have better attitudes towards research than students of social sciences and engineering; in addition, students of public universities have better cognitive attitudes than private students, as well as are women who present better clarity in the behavioral and cognitive attitude than male students and are the students of the last cycles of study those who value and present a more extraordinary vocation for research than students of the first cycles.

Keywords: Attitudes towards research, University students, Public and private universities.

1. INTRODUCTION

In the current Peruvian context, the universities stimulated by the new University Law 30220 since its enactment in 2014 [1] have achieved significant achievements in their human resources, significantly increasing the number of research professors to 8462 duly qualified and registered for this year in the national registry of science and technology of the council of science and technology of Peru, However, this effect is not evident in the university student although a central objective of the university is to train new researchers to build a knowledge society with high impact for the country's economy [2].

Among the main difficulties that arise in training university researchers from the academic classrooms, we can find that most students enter universities to train professionally and not perform in research. There is little interest in being included in research teams; also, they do not present interest in science because the teachers who teach the research courses do not apply adequate methodologies, and many do not were trained as researchers, perceive that research is very complex and challenging to understand methodologically and above all there is an obligation to pass courses related to research to develop the thesis and be able to graduate, without criteria of critical analysis, few methods and approaches, limited innovation, and precariousness in writing and writing due to lack of reading, competences that have not been acquired and are the profile of a student researcher [3-4].

In this sense, it should be reflected by the universities through their authorities that their academic activities should be oriented first on strengthening formative research and then assigning research subjects to research professors to improve research skills in university students. It is necessary to recognize that the researcher has personal merit because even in the country, not all the facilities are provided to the Researchers who work in academic institutions, mainly due to the lack of financial support to promote impact research; being necessary to reconsider the subject to obtain better results [5].

Although undergraduate research is observed in crisis due to low production and quality (low number of scientific articles and high number of theses without significant contribution), this requires attention from the bodies that supervise the universities where the quality of teaching is promoted [6], as well as from the authorities

themselves in the universities, of the trainers and especially of the university student who should put more interest in building adequate attitudes towards research [7].

Therefore, to encourage positive attitudes towards research in university students, curricular meshes must be improved, the nature of the scientific process must be understood [8], the habit of reading, the adequate search for information, scientific debate in the classroom, identify attitudes and capacities for research, constitute seedbeds in research by areas of study, and seek internal and external relationships for the financing of the execution of research projects.

Regarding the dimensions of the study of attitudes toward research, these have been categorized into three perspectives: affective, cognitive, and behavioral. First, the affective dimension refers to the feelings and emotions research produces in the student. Secondly, the cognitive dimension is related to the level of knowledge the student has acquired about scientific research. Third, the behavioral dimension refers to what the student does or should do with the study [9-10].

When comparing attitudes towards research in Peruvian university students, according to social and academic variables, research was found that attempts to explain these attitudes in both public and private university students, considering a more significant number of positive reports in health science students than in science and engineering and social science students, where it is described that health students have better attitudes towards research than students in other areas. This is because, within their academic training, a greater interest in participation in experimental design research is encouraged, in addition to the fact that it is a requirement within their curricular training [11-12-13-14].

Likewise, according to the sex of the student, studies were found that indicate no significant differences between male and female students presenting similar levels in attitude according to the affective, cognitive, and behavioral dimensions [15]. However, in aspects related to research, such as implications and predisposition to research, female students perform better than male students [16].

And when comparing attitudes towards research according to the academic cycle, it was shown that students of the last cycles present better attitudes than students of the other cycles considering that their main objective is graduation and take a greater interest in developing the thesis [17]. In addition, the research proposals are made to develop the research subjects to learn the methodology, which is considered an instrumental approach and not an orientation of scientific production [18].

It is for these considerations that, according to what has been described, the need arises to know the attitudes towards research in Peruvian students considering their academic profile to understand the difficulties that arise in the university environment.

Therefore, the general objective was to analyze the affective, cognitive, and behavioral attitudes toward scientific research in students of public and private universities in Peru, according to socio-academic variables.

2. MATERIALS AND METHODS

The research used the descriptive-comparative methodology, quantitative approach, and non-experimental – cross-sectional design [19], and information collection was carried out from April to October 2022.

2.1. Participants

2448 university students from a public university and 4 intentionally selected private universities participated, including students with current enrollment for 2022 and attending virtual and blended classes, as well as students from all university cycles from the first to the twelfth.

2.2. Instrument

The scale of attitudes towards the EACIN research [20], adapted by Quezada and Landero [9], was used. The instrument comprises 35 Likert-type items with 5 response options (0 = strongly disagree and 4 = strongly agree). In addition, it presents 3 dimensions: affective (items 2, 3, 6, 11, 14, 17, 19, 25, 27); cognitive (items 1, 7, 12, 15, 20, 22, 26, 28, 29, 31, 32, 33); and behavioral (items 4, 5, 8, 9, 10, 13, 16, 18, 21, 23, 24, 30, 34, 35). Likewise, the instrument added socio-academic variables such as age, sex, place of origin, type of university, area of studies, and university cycle. Likewise, the data of informed consent were recorded.For the version of the local sample, the reliability levels of the scale were obtained by the method of internal consistency with the McDonald's ω test. Therefore, the instrument has good reliability when the ω values ≥ 0.700 [21], for the case ω = 0.815 was obtained according to the reliability assessment of the instrument is highly reliable.

2.3. Procedure

For the application of the instrument, we had the authorization of the directors of the universities; then, the instrument was adapted to the Google Forms format and applied individually to the student through social networks and institutional email before the information of the objective of the research, the instructions of the inventory and the confidentiality of the data provided, agreeing to participate voluntarily (admitting the respective informed consent).

2.4. Data Analysis

The data were analyzed using the Shapiro-Wilk test's normality distribution, evidencing no normal distribution ($p < 0.001$). Mean, skewness, kurtosis, and standard deviation were determined. In addition, variance homogeneity tests were performed. Considering using nonparametric tests. A descriptive analysis of attitudes toward research was performed to determine the favorable or unfavorable attitudes. In addition, the student's attitude was compared according to the type of university, area of studies, university cycle, sex, and age. To compare two independent samples, the Mann-Whitney U was used with their respective effect size (TE), and the probability of superiority (PSest) was calculated, obtaining that the interpretative norms are no effect (PSest ≤ = 0.0), small (PSest ≥ 0.56), medium (PSest ≥ 0.64) and large (PSest ≥ 0.71) [22]. The comparison of k-independent samples was made with Kruskal Wallis H and Pos Hoc tests. Its effect size used was square epsilon (ε^2) [23], being its interpretative norms small for $\varepsilon^2 \geq 0.01$, medium for an $\varepsilon^2 \geq 0.06$ medium, and large for an $\varepsilon^2 \geq 0.14$ [24]. For statistical analysis, JAMOVI 1.2.27 was used [25].

3. RESULTS

After the information was collected, the data were processed and analyzed. The descriptive analysis of the socio-academic variables of the university students was carried out, finding: according to the type of university, 21.3% were from the public and 78.7% from the private one; According to the area of studies, 36.6% were in Science and Engineering, 41.6% in Social Sciences and 21.9% in Health Sciences; to the academic cycle 28.1% first cycle, 26.8% second cycle, 21.7% third cycle, 11.7% fourth cycle, 11.0% fifth cycle and 0.7% sixth cycle; According to sex, 46.4% were male and 53.6% female, in addition, they presented an average age of 20.57 with a standard deviation of 2.66 in a range of 16 to 28 years.

Table 1. Numerical Analysis of Attitudes towards Research in University Students.

	M	OF	Md	Min.	Max.	Assessment
Attitudes towards research	77.06	12.32	77	0	140	
Affective	19.31	4.09	19	0	40	Average
Cognitive	29.63	6.69	30	0	60	
Behavioral	28.11	5.58	28	0	66	Unfavorable

Note: M = Mean; D = Standard deviation; Md = Median; Min. = minimum; Max. = Maximum

The table describes the attitudes towards research in university students, finding in the general scale average level, as well as in the affective dimensions (feelings and emotions produced by research) and cognitive (level of research knowledge). However, in the behavioral dimension (what does or should the student do with the research) the assessment tends to be unfavorable.

Table 2. Comparison of Attitudes towards Research by Type of University.

Dimensions of the attitude towards research	***Public***	***Private***			
	(n = 521)	**(n = 1927)**			
	Rank	**Rank**	**Or**	**p**	**PS_{est}**
Attitudes towards research	1307.01	1202.19	458995.0	.003	0.09
Affective	1267.65	1212.83	479503.0	.115	0.04
Cognitive	1348.21	1191.05	437529.0	.000	0.13
Behavioral	1184.87	1235.21	481336.5	.148	0.04

Note: N = Sample Size; Range = Average Range; U = U Mann Withney p = p value; PS_{est}= Probability of Superiority (Effect Size).

In the table, attitudes towards research were compared according to the type of university where the university studies, finding statistically significant differences in the general scale and the cognitive dimension, with students from public universities presenting better attitudes towards research than students from private universities, however, no significant differences were found in the affective and behavioral dimensions according to the type of university of the student presenting similar levels. Small effect size.

Table 3. Comparison of Attitudes towards Research by Area of Study.

Dimensions of the attitude towards research	**Science and Engineering**	**Social sciences**	**Health Sciences**			
	(n = 895)	***(n = 1018)***	***(n = 535)***			
	Rank	***Rank***	***Rank***	**H**	**p**	**ε^2**
Attitudes towards research	1157.06	1207.08	1370.46	31.606	.000	0.01
Affective	1161.77	1209.69	1357.62	26.645	.000	0.02
Cognitive	1162.52	1196.68	1381.11	34.796	.000	0.01
Behavioral	1220.91	1221.91	1235.43	.165	.921	6.75

Note: N = Sample Size; Range = Average Range; H = Kruskal Wallis' H; p = p value; ε^2 = Square Epsilon (Effect Size)

The attitudes towards research presented by university students according to the area of study were compared, finding statistically significant differences in the general scale and the affective and behavioral dimensions, being the students in the area of health sciences present better attitudes compared to the students of sciences and engineering and social sciences, however, in the behavioral dimension, no differences were found between the analysis groups. Small effect size.

Table 4. Comparison of Attitudes towards Research According to the University Cycle.

Dimensions of the attitude towards research	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**			
	(n = 687)	**(n = 656)**	**(n = 531)**	**(n = 287)**	**(n = 269)**	**(n = 18)**			
	Rank	**Rank**	**Rank**	**Rank**	**Rank**	**Rank**	**H**	**p**	**ε^2**
Attitudes towards research	1247.05	1185.34	1216.65	1191.03	1289.06	1591.67	15.535	0.041	0.01
Affective	1255.94	1217.13	1179.71	1195.25	1266.91	1447.03	6.851	0.232	0.01
Cognitive	1217.91	1142.87	1231.34	1252.19	1356.93	1828.47	31.952	0.000	0.02
Behavioral	1274.04	1265.99	1223.04	1183.00	1126.10	1027.36	10.609	0.060	0.04

Note: N = Sample Size; Range = Average Range; H = Kruskal Wallis' H; p = p value; ε^2 = Square Epsilon (Effect Size).

When comparing the attitudes towards the research according to the student's university cycle, significant differences were found in the general scale and in the cognitive dimension, being the students of the last cycle who

present better attitudes than the students of the first cycles, however, in the affective and behavioral dimensions no significant differences were found between the analysis groups. Small effect size.

Table 5. Comparison of Attitudes towards Research by Sex.

Dimensions of the attitude towards research	Men (N = 1135) Rank	Women (N = 1313) Rank	Or	p	PS_{est}
Attitudes towards research	1216.01	1231.84	735495.0	0.581	0.01
Affective	1235.82	1214.72	732283.0	0.460	0.02
Cognitive	1186.52	1257.33	702021.0	0.013	0.06
Behavioral	1201.09	1251.58	704396.5	0.047	0.04

Note: n = sample size; Range = Average Range; U = U Mann Withney; p = p value; PS_{est}= Probability of Superiority (effect size).

When comparing the attitudes towards the research according to the sex of the university student, no statistically significant differences were found in the general scale and the affective dimension between men and women. However, in the cognitive and behavioral dimensions, significant differences were found according to sex, being female students who present better attitudes toward the research than male students. Small effect size.

4. DISCUSSION

The attitudes towards research in university students were investigated, finding in the general measurement average level, as well as in the affective dimensions (feelings and emotions that produce research) and cognitive (level of research knowledge). However, in the behavioral dimension (what does or should do the student with the research), the assessment tends to be unfavorable, with results related to studies [7-8].

When comparing the results of attitudes towards research according to the sex of the student, it was found that women obtained higher scores in the cognitive and behavioral dimensions than male students. This indicates that the implications and predisposition to research are mainly developed by female students because they perform better than male students at the level of knowledge and the presence of favorable attitudes towards research, as explained in [16].

According to the type of university, both public and private, statistically significant differences were found in the general scale and the cognitive dimension, being students of public universities present better attitudes towards research than students of private universities, which is a significant contribution because no studies were carried out according to these characteristics.

According to the study area, statistically significant differences were found in the overall scale and affective and behavioral dimensions, with health science students showing a more favorable attitude towards research than engineering, science, and social sciences [7-11-12-13-14]. This situation is because, within their academic training, health science students are more interested in participating in experimental design research, which is also a requirement within their curricular formation, as reported.

And when comparing attitudes towards research according to the academic cycle, it was shown that students of the last cycles present better attitudes than students of the other cycles considering that their main objective is graduation and take a greater interest in developing the thesis as highlighted [17-18].

In the Peruvian case, undergraduate university research is in crisis due to low production and quality (low number of scientific articles and high number of theses without significant contribution), a situation that must be reversed to improve university quality indicators [7].

University policies related to research should focus on more than financing research projects when the necessary profile needs to be formed. In that sense, most students are not included, and research institutes must be strengthened by integrating multidisciplinary teams so that the most significant number of students can participate.

Scientific research is a very important process to deepen knowledge. Therefore, the training of researchers should be promoted with greater importance in university classrooms [4].

The attitudes towards scientific research presented by Peruvian students are the result of the execution of the curricular meshes, being the responsibility of the University and its human resources (teachers), who must first form their skills to be a model for their students and motivate them to participate in scientific activity. Therefore, institutions should restructure curricula to encourage and promote science-based education.

Research is not exclusive to one area of study but to all areas and all academics who must form the necessary attitudes to identify the problem and above all solve it, as well as use research as a matter of scientific production and not just a means to obtain the professional title.

Likewise, it is essential to continue carrying out studies with the subject in question, expanding the sample to more Peruvian universities, both public and private, considering not only the areas but also the study programs to compare if the results found follow the same trend over time, so that it is insisted on modifying the policies of the universities in research, Changes in curricular designs by study programs, promotion of student researchers that generate quality academic production and contribute to the visibility of the academic institutions themselves.

5. CONCLUSION

It is concluded that university students present average attitudes towards research, with a probability and tendency to be unfavorable. Health science students show better attitudes toward research than social sciences and engineering students. Furthermore, students from public universities exhibit better cognitive attitudes than students from private universities. Women display better clarity in behavioral and cognitive attitudes than male students. Students in the later cycles of study value and have a more significant vocation for research than students in the early cycles.

The research carried out has theoretical implications because it strengthens the knowledge of attitudes towards research to understand that students' attitudes tend to be unfavorable in most of them due to the personal and academic situations that arise in their educational institutions, as well as their perceptions. These expectations are frustrated during their professional training; considering that the subjects related to research are valued highly difficult because teachers do not use the appropriate methodological strategies to demotivate the student and also because students have not developed a favorable attitude, level of commitment to their studies, sustainable study habits and interest in discussing and investigating scientific issues.

Likewise, the study has practical implications because students must apply the knowledge acquired in the formulation and execution of research projects, in the participation and integration of research teams, as well as the availability of funding by institutions to promote scientific production in undergraduate training, this implies that to the extent that research is not promoted, favorable results will not be obtained. Students will only continue to train to be professionals rather than researchers.

REFERENCES

[1] University Law 30220. 2014. http://www.minedu.gob.pe/reformauniversitaria/pdf/ley_universitaria.pdf.

[2] L. Cervantes, L. Bermudez, and V. Pulido, "Situation of Research and its Development in Peru: Reflect of Current State of Peruvian University". Thought and Management, 2019; 46:311-322. https://www.redalyc.org/journal/646/64664303012/html/

[3] M. Landa Blanco, and A. Cortés-Ramos, "Psychology students' attitudes towards research: The role of critical thinking, epistemic orientation, and satisfaction with research courses". Heliyon, 2021; 7(12). http://doi.10.1016/j.heliyon.2021.e08504

[4] J. Cruz, G. Pinedo, and Y. Lescano, "Attitude towards research: an affective, cognitive and behavioral analysis in university students". Ibero-American Journal of Technology in Education and Technology Education, 2021; 29:20-26. https://teyet-revista.info.unlp.edu.ar/TEyET/article/view/1428/1447

[5] SLF. De la Cruz, JHI. Armandina, and VOL. Alfredo, "Attitude towards research and reading habits in higher education students". Journal of Social Sciences, 2022; 28(6):170-180. https://doi.10.31876/rcs.v28i.38830

[6] National Superintendence of University Higher Education. National Registry of Undergraduate Research Works. 2020. http://renati.sunedu.gob.pe

[7] L. Colquehuanca, "Attitudes towards research in nursing students of a private university in North Lima". Journal of Scientific Research Agora, 2022; 9(1):17-22. https://doi.org/10.21679/209

[8] G. Aldana, D. Babativa, G. Caraballo, and C. King, C. "Scale of attitudes towards research (EACIN): Evaluation of its psychometric properties in a Colombian sample". CES Psychology, 2020; 13(1):89-103. https://doi.org/10.21615/cesp.13.1.6

[9] L. Quezada, J. Moral, and R. Landero, "Validation of the Scale of Attitude towards Research in Mexican Students of Psychology". Evaluate Magazine, 2019; 19(1):1-16. https://doi.org/10.35670/1667-4545.v19.n1.23874

[10] E. Barrios, and U. Delgado, "Design and validation of the questionnaire: Attitude towards research in university students". Innova Education Magazine, 2020; 2(2):280-302. https://doi.org/10.35622/j.rie.2020.02.004

[11] F. Romaní, F., and C. Gutiérrez, C. "Experience, attitudes and perceptions towards scientific research in medical students in the context of a curricular strategy for training research skills". Education Medica, 2022; 23(3). https://doi.10.1016/j.edumed.2022.100745

[12] JC. Huamani, JM. Calizaya, and M. Pacheco. "Attitude towards research in students of a public university in the city of Arequipa, Peru". Legal Page, Chapter 5, 2020; 157-187. https://editorialcimted.com/wp-content/uploads/2021/01/Tecnociencia-pr%C3%A1cticas-pedag%C3%B3gicas-y-competencias.pdf

[13] E. Maury, E. Valenzuela, M. Henríquez, and A. Rodriguez. "Disposition to scientific research in students of health sciences". Medical Horizon, 2018; 18(2):27-31. https://dx.doi.org/10.24265/horizmed.2018.v18n2.05

[14] E. Bullón, "Research training and attitude towards scientific research in students of social sciences of the UNCP". Socialium, 2019;3(1):1-11. https://doi.org/10.26490/uncp.sl.2019.3.1.521

[15] F. Rosario, G. Chamorro, and R. Moreno, "Attitudes towards research". Psyche Mag. 2016;5(1):55-275. http://revistas.ucv.edu.pe/index.php/ psiquemag/issue/download/213/Psiquemag%202016-17

[16] C. Berrocal, W. Montalvo, M. Camac, S. Berrocal, and R. Espejo, "Attitude towards research in undergraduate and graduate students at state universities in Lima, Peru". University and Society, 2022;14(S6):391-403. https://rus.ucf.edu.cu/index.php/rus/article/view/3471

[17] P. Chara, and A. Olortegui, "Factors associated with the attitude towards research in university nursing students". CASUS, 2018; 3(2):83-88. https://dialnet.unirioja.es/servlet/articulo?codigo=6536892

[18] LG. Reyes, AR. Casco, RA. Mejia, JC. Avila, OM. Cruz, DE. Avila, and JA. Fernández, "Attitudes towards research in Honduran university students". Paper presented at the Proceedings of the LACCEI International Multi-Conference for Engineering, Education and Technology, 2022-December. https://laccei.org/LEIRD2022-VirtualEdition/full-papers/FP100.pdf

[19] JM. Calizaya, "Some ideas from scientific research". Minerva, 2020; 1(3):35-39. https://doi.org/10.47460/minerva.v1i3.15

[20] G. Aldana, G. Caraballo, and D. Babativa, "Scale for Measuring Attitudes to Research (EACIN): Content Validation and Reliability". Aletheia, 2016; 8(2):104-121. https://aletheia.cinde.org.co/index.php/ ALETHEIA/article/view/325

[21] W. Revelle, "Procedures for Psychological, Psychometric, and Personality Research." [R package]. https://cran.r-project.org/package=psych

[22] JL. Ventura León, "Effect size for the Mann-Whitney U: contributions to the article by Valdivia-Peralta et al. " Chilean Journal of Neuro-Psychiatry, 2016; 54(4):353-354. https://dx.doi.org/10.4067/S0717-92272016000400010M

[23] M. Tomczak, and E. Tomczak, E. "We reviewed the need to report effect size estimates. An overview of some recommended measures of effect size." Trends Sport Sciences, 2014; 1(21):19-25.

[24] J. Cohen, J. "A primer of power". Psychological Bulletin, 1992; 112(1): 155–159. https://doi.org/10.1037/0033-2909.112.1.155

[25] The jamovi Project, "jamovi. (Version 2.3)" [Computer Software]. 2022. https://www.jamovi.org.

DOI: https://doi.org/10.15379/ijmst.v10i2.1215