

Scale of Attitudes Towards Research (EACIN-R): Psychometric Properties in Peruvian University Students

Escala de actitudes hacia la investigación (EACIN-R): propiedades
psicométricas en universitarios peruanos

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Summary

This instrumental research aimed at confirming the psychometric properties of the EACIN-R Attitudes Towards Research Scale, which contains three factors with 28 items included in three subscales: interest, vocation, and research assessment. Two hundred twenty students from a Peruvian university participated, 82 men and 138 women. Confirmatory factor analysis and Horn's parallel analysis confirmed the internal structure of the instrument, the trifactorial model, and the number of items in each subscale. Cronbach's alpha index, for the reliability analysis, yielded a value of .898 in the test total. In addition, reliability was obtained for each of its factors, vocation (.862), assessment (.692), and research interest (.757). It is concluded that the instrument presents a good level of internal consistency, and its use is supported to measure this construct in university students with similar characteristics to the participants in this study.

Keywords: Attitudes; Reliability; EACIN-R; Attitudes Scale; Research.

Resumen

El objetivo de esta investigación instrumental fue confirmar las propiedades psicométricas de la Escala de Actitudes hacia la Investigación EACIN-R, misma que contiene tres factores con 28 ítems comprendidos en tres subescalas: interés, vocación y valoración de la investigación. Participaron 220 estudiantes de una universidad peruana, 82 hombres y 138 mujeres. Mediante el análisis factorial confirmatorio y el análisis paralelo de Horn se confirmó la estructura interna del instrumento, el modelo trifactorial y el número de ítems de cada subescala. El índice alfa de Cronbach, para el análisis de fiabilidad arrojó un valor de .898 en el total de la prueba. Además, se obtuvo la fiabilidad para cada uno de sus factores, vocación (.862), valoración (.692) e interés por la investigación (.757). Se concluye que el instrumento presenta un buen nivel de consistencia interna y se apoya su uso para medir este constructo en estudiantes universitarios con similares características a los participantes en este estudio.

Palabras claves: Actitudes; Confiabilidad; EACIN-R; Escala actitudes; Investigación.

INTRODUCTION

The commitment to research is one of the main characteristics of universities as academic training centers, present in their primary purposes and functions. Research is understood as an essential and mandatory function: "responding by producing knowledge and developing technologies to the needs of society, with special emphasis on the national reality" (Law No. 30220, 2014).

Research work in higher education involves scientific and technical activities to promote science and innovation for the sake of social progress, and has three components: teaching, scientific and technical training, research and development, and scientific and technological services (OECD, 2002). Duarte (2013) mentions that the key factors for research in a country are a good education, academic training, and the early start of scientific training.

For universities to fulfill this function, they need to have institutional capacities to create policies, strategies, and processes that support research practices sustainably and permanently with the support of the main actors: teachers and students. These and other elements are part of the requirements for the accreditation of universities in the country under charge of the National System of Evaluation, Accreditation, and Certification of Educational Quality (SINEACE, 2019).

Various evidence of the difficulties students face in acquiring a research attitude is found, such as the technical report presented by the National Institute of Statistics (INEI, 2015). This report reveals that of the total number of female graduates (women) from public and private universities in Peru, only 49.7% earned a professional degree. Meanwhile, of the total number of male graduates (men), only 36.4% earned their professional degree. Of all graduates (men and women) from public universities, 40.2% earned a professional degree, of which 53.4% opted for the thesis modality.

Regarding the positive perception of university graduates about the development of competencies, including those related to research, the following is evident: critical thinking, 60.5% in public universities and 60.3% in private universities; teamwork, 59.6% in public universities and 58.1% in private universities; report or document writing, 55.7% in public universities and 56.6% in private; presentation of ideas, 51.4% in public universities and 54.4% in private universities; use of computer tools, 49.1% in public universities and 56.2% in private universities, among others (INEI, 2015).

The above results show the conditions of research teaching/learning at university, such as the inclusion of special subjects in which science and its methods are barely discussed, often only at the end of the degree program, and teachers who have not developed positive attitudes towards research (Olivera, 2020). These aspects are reflected in the attitudes of students who are not willing to do research, even though it is a component of professional training and is applied in the labor market.

Likewise, the lack of motivation to research may be related to how reality is perceived and the lack of interest in changing it and/or promoting successful experiences. It is understood then that research not only contributes to training for professional performance, but also goes

beyond this; science is progress and well-being and produces significant changes in societies (Piclín, 2008).

Blanco (2008) states that among the factors related to student research capabilities and competencies are attitudes which influence teaching/learning and immediate academic achievement. For Allport (1935), an attitude is a mental and neuronal state which is structured in experience and exerts a directive or dynamic influence in people's response to the objects and situations with which they relate, giving rise to pleasant or unpleasant feelings and thoughts towards them, approving or disapproving them (Alonso et al., 2015). For Escalante et al. (2012), they are theoretical constructs inferred from certain external behaviors, generally verbal.

Thus, attitudes are shown as a condition for research and as part of the qualities intended to be developed in university education. Thus, it is up to universities to foster, maintain and develop them within the framework of the so-called formative research. These, together with habits, skills, and knowledge, favor students to build knowledge and appropriate disciplinary concepts and theories to interact in the scientific world (Castro, 2017); they also usually guarantee students' motivation, interest, and effort (Quezada et al., 2019).

The context plays a relevant role insofar as attitudes are acquired from other people through social learning, in situations in which one interacts with and observes their behavior; learning that occurs through various processes within the cultural and social environment (Baron & Byrne, 2005). Attitudes are not expressed independently of culture, values, affections, experiences, or consciousness (Piclín, 2008).

Likewise, Kerlinger (2002) defines scientific research as a systematic, controlled, empirical activity of rigorous approach to reality to know it, describe it, explain it, and/or understand it to transform it, if necessary. It implies assuming an onto-epistemic and methodological perspective when building knowledge (Ruiz, 2011). For this study, the attitudes towards research construct is defined as an intentional, constant, and acquired process related to this activity, supported by one's values and perceptions.

Thus, knowing the student research attitudes is a previous step to implementing strategies to consolidate positive attitudes that contribute to fostering scientific research. According to the explanatory models, the most frequently used method for measuring attitudes is the Likert-type scale, which consists of a set of positive and negative statements related to a specific object; this type of scale is used to measure primary data, in which it is necessary to consider the social context in which the research is conducted (Blanco, 2011).

To provide useful and reliable tools to account for attitudes towards research in specific contexts and thus provide coping strategies, measurement instruments have been constructed and/or validated, such as the Attitudes Towards Research Scale Revised Version (EACIN-R) by Aldana et al. (2020), which has been cited on several occasions and applied in countries such as Colombia, Mexico and Peru (Bendezú, 2021; Loayza-Rivas, 2021; Rojas-Solís et al., 2021).

Research Background

In Tacna (Peru), Ramos (2019) found the psychometric properties of the *Attitudes Towards Scientific Research Scale* by Portocarrero and de la Cruz (2006). In a sample of 243 Psychology students from a private university, he obtained a Cronbach's alpha of .54, indicating low internal consistency. From the principal component analysis with varimax rotation, he identified five components: proactivity, teacher as a role model, rejection of research activities, disinterest in science, and exclusivity of scientific activities. The author recommends evaluating the instrument validity and increasing the number of items of the components with lower alpha to increase internal consistency.

Arellano-Sacramento et al. (2018), in the study's theoretical framework: *Attitude towards research of university students* in Lima (Peru), designed and validated by experts as an instrument to measure attitudes towards research. This instrument is composed of 27 items, grouped into six dimensions, namely, preparation of articles, participation in research, attitude towards the activities carried out by the university to promote research, attitude towards the possibility of doing research at university, and attitudes towards literature review. In a sample of 194 students from 6th to 9th cycle (semester) of stomatology, they obtained a Cronbach's alpha of .65, which indicates moderate reliability, tending to be low. The authors recommend validating the scale in different health sciences schools and departments.

Muñoz et al. (2020), in a sample of 382 university students from Trujillo (Peru) from 6th to 10th cycle (semester), confirmed the psychometric processes (content validity; Pearson correlation coefficient, construct validity) of the *Research Attitude Index* (IAI) of the same authors; the instrument measures three dimensions: institutional context, intrinsic motivations and training quality, but they do not mention the degree programs in which it was applied.

Taking into account the characteristics of these instruments, such as having been designed for a specific degree program, such as Psychology or Stomatology (Ramos, 2019; Arellano-Sacramento, 2018) or that the authors did not mention in which degree programs they applied the instrument (Muñoz et al., 2020), low internal consistency (Arellano-Sacramento, 2018; Ramos, 2019), too many dimensions of the scales that may overlap with each other (Arellano-Sacramento, 2018; Ramos, 2019), it was decided to confirm the psychometric properties of the EACIN-R as it is more in line with the criteria of the research team and the literature review. In addition, it is assumed that this scale overcomes some deficiencies that these instruments might have.

The EACIN scale has three versions in Colombia, 2011, 2016, and 2020. The first version (Aldana & Joya, 2011) was constructed based on the multidimensional model of the psychological construct attitudes (Cortés & Barragán, 2009; Myers, 1996). This model consists of three dimensions: affective, cognitive, and behavioral. The affective is what the person feels, the feelings of liking or disliking inspired by the object in question. The cognitive indicates what the person knows or thinks he/she knows, wrongly or not, about the object. The behavioral is what we do or are willing to do with the object of the attitude.

The first version, *Attitudes towards scientific research in research methodology teachers*, is composed of 61 items, validated by five expert judges. The scale was piloted in a group of

participants with similar characteristics to the study population and obtained a Cronbach's alpha of .97 in a sample of 17 research teachers (Aldana & Joya, 2011).

The second version, *Scale to Measure Attitudes Towards Research (EACIN): content validation and reliability* (Aldana et al., 2016), consists of 34 items, product of the content validation made by eight experts with a master's and/or Ph.D. degree and with publications of research results. This version retained the multidimensional structure of the previous one. A Cronbach's alpha of .85 was obtained in a sample of 190 participants: undergraduate and graduate students, graduands, teachers, and academic-administrative staff.

The 2016 version was validated by Cota et al. (2019) in a sample of 238 Mexican university students from education, engineering, and administration degree programs. From the exploratory factor analysis, they found a measurement model with two factors: cognitive and behavioral. Cronbach's alpha coefficient yielded a final value of .71, indicating good internal consistency. The authors recommend validating the instrument in other countries and with other actors in the academic community.

In Mexico, Quezada et al. (2019) validated the same version of the scale (2016) on 392 Psychology students from a public university. They concluded that the instrument had good internal consistency, while Cronbach's alpha coefficient was .90, and found a correlation between grades in research subjects and the desire to engage in research. The exploratory factor analysis yielded three factors: *affective-behavioral*, *cognitive*, and *behavioral-affective*.

Therefore, this study aimed at confirming the psychometric properties of the *EACIN-R* in a sample of Peruvian students since no instrument with similar characteristics was found, such as different versions, rigor in the preparation, validation, nomination of subscales according to the content of the items and an adequate extension.

METHOD

Type of Study

The type of research was quantitative, which focuses on objectively measuring with statistical and/or mathematical data the frequency and/or magnitude of a phenomenon or object in a given context (Hernández et al., 2014; Meneses, 2013). The design was instrumental, which is used to prepare and adapt tests and evaluate their properties (Montero & León, 2007).

Participants

The general population consisted of 515 students in their final years of study (fourth and fifth) at the School of Social Sciences of a public university in Lima (Peru) who met the inclusion criteria, such as being enrolled during the first semester of 2021 and having taken at least one research subject. The sample of 220 participants was obtained by simple random sampling with a margin of error of 5% and a significance level of .05.

Instruments

The psychometric properties of the Attitudes Towards Research Scale (EACIN-R) by Aldana et al. (2020) were confirmed. Content validity was obtained by expert criteria in the second version of the scale (Aldana et al., 2016). The EACIN-R is a Likert-type scale made up of 28 items, with five response options ranging from 0 to 4. Where 0 indicates strongly disagrees and 4 strongly agree, 1 disagree, 2 neither agree nor disagree and 3 agree. The items are grouped into three subscales: vocation for, assessment of, and interest in research.

A *Vocation for research* is understood as an inclination towards this activity, which implies innate and acquired skills to enter the academic and scientific environment (Ríos, 2007). From the *Assessment of research*, this activity is considered a relevant factor for the evolution of knowledge and solving problems, which involves special characteristics of the actors, such as attitudes (De las Salas et al., 2014; Martínez & Márquez, 2014; Rojas et al., 2012). *Interest in research* is understood as having an affinity for and caring about the elements of this process.

Procedure

This section contains the process carried out to confirm the psychometric properties of the EACIN-R in a sample of Peruvian students:

Arrangements.

The corresponding arrangements were made to obtain the registration of the students at the School of Social Sciences of the Universidad Nacional de San Marcos, Lima - Peru.

Application of the instrument.

The information was collected online using a Google form, including the informed consent, the project objective, and its justification, indicating that participation was voluntary and considered risk-free for the participants, that the data would be used for research purposes only, and that the research article would be sent by e-mail.

Confirmatory factor analysis.

The confirmatory factor analysis (CFA) was applied using the free-scale least squares estimation method, and the measures of fit were obtained. The CFA is vitally important because of its usefulness in scale validation when there are specific constructs (Hair et al., 1999), i.e., the ideal thing is to have an underlying theory when there is prior knowledge of the number of factors and the items that are interrelated with their respective variables.

Statistical analysis of the EACIN-R/2020.

In evaluating the psychometric properties of the original version (EACIN-R 2020), the reliability found with Cronbach's alpha coefficient was .87. Using the Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett's sphericity test, it was determined the convenience of applying the exploratory factor analysis of principal components with Promax rotation and Kaiser normalization. In addition, Horn's parallel analysis was applied, which grouped the items into the same three subscales (Research interest, vocation, and assessment) (Aldana et al., 2020) to

construct a valid, shorter instrument and ensure that the scale nominations matched the meaning of the items

RESULTS

A total of 220 students in their final years of study (fourth and fifth) of the Anthropology, Archaeology, Geography, History, Sociology, and Social Work degree programs at the School of Social Sciences participated, of which 70 (31.8%) entered in 2016, 63 (28.6%) in 2017 and 87 (39.5%) in 2018. Of the total number of participants, 138 (62.7%) are women, the most representative group, with ages ranging from 20 to 32 years, 23 on average, and a standard deviation of 2.09 years. The male participants were 82 (37.3%), with ages ranging from 20 to 41 years, 24 on average, and a standard deviation of 3.72 years. The mean age of all participants was 23 years, with a standard deviation of 2.81 years.

When analyzing the psychometric properties of the Attitudes Towards Research Scale Revised Version (EACIN-R) in a Peruvian sample, Cronbach's alpha index was .898 for the test total, indicating good reliability. The reliability for each of its subscales was .862 for vocation, .692 for assessment, and .757 for research interest.

The total corrected correlation yielded values above .30 in most cases (24 items). Even though the correlation was lower than .30 in items 12, 19, and 21, it was close to this value; therefore, it is considered acceptable. The same did not occur with item 2, which yielded a value of .11, which is why special attention was paid to the quantitative analysis of this item, and the case was analyzed qualitatively by the research team to establish its relevance in the test. It was concluded that its inclusion was justified, following the researchers' experience and what is indicated in the literature.

Continuing with the analysis of the psychometric properties of the scale, an exploratory factor analysis (EFA) was made to examine the behavior of the items within the scale. Using the principal components method, a KMO of .792 was obtained, which is acceptable. MSA norm scores were also found for the items with a minimum value of .520 and a maximum value of .900. The values for each item exceeded .50, so it was decided to keep them all. With the principal components method and Promax rotation with Kaiser normalization, a value of .876 was obtained, similar to that obtained with KMO, confirming that the factor analysis is very good.

Likewise, Horn's parallel analysis was applied to confirm the multidimensional model (trifactorial) and the number of items of each subscale and, therefore, the total number of items of the instrument.

Subsequently, the multidimensional (trifactorial) model was confirmed with confirmatory factor analysis (CFA) to verify the theory underlying the scale. A graphic representation of the structure of the trifactorial model (path diagram) was obtained, showing the observable variables and the latent variables: research vocation, interest, and assessment (Figure 1).

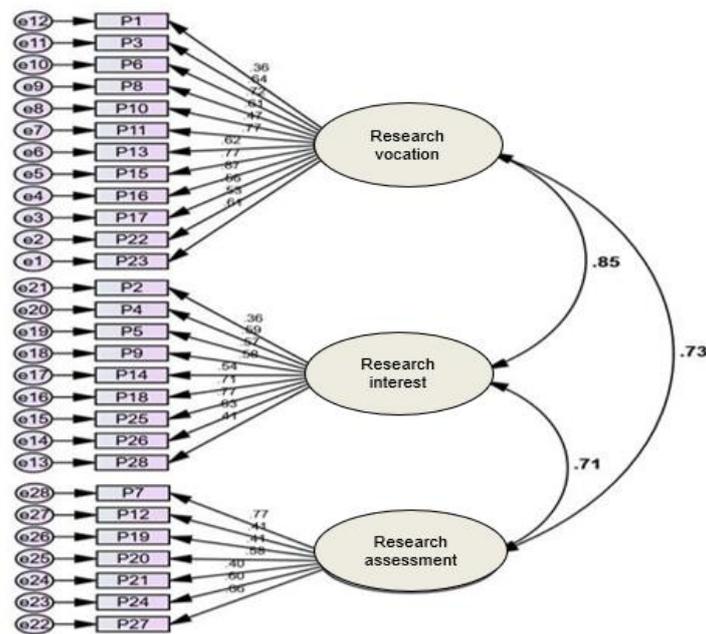


Figure 1.

Path Diagram of the model for measuring attitude towards research (EACIN - R) in a Peruvian sample.

Note. Adapted from Aldana et al. (2020).

Next the model was identified, and it was found to have a unique solution. The parameters of the model were estimated with the Free-Scale Least Squares Method, suitable for ordinal scale variables. It should be noted that there is a wide variety of estimation methods (Maximum Likelihood Method, Weighted Least Squares Method, Unweighted Least Squares Method, Generalized Least Squares Methods, among others); in this particular case, the Free-Scale Least Squares Method suitable for ordinal scale variables was used (Jöreskog et al., 2016).

It was verified that the structure of the trifactorial measurement model has a good fit. Catena et al. (2003), Uriel and Aldas (2005), and Hair et al (1999) suggest that the fit indices should be greater than .90 and that the RMR should be less than or equal to 0.08. The absolute goodness-of-fit statistic was a GFI of .942 > .90, AGFI of .932 > .932, and an RMR of .058 < .08, as well as the incremental goodness-of-fit statistics NFI of .922 > .90, RFI of .915 > .90, values that evidence good model fit (Table 1).

Table 1.

Goodness-of-Fit Indices

Model	X ² Discrepancy	gl	GFI	AGFI	RMR	NFI	RFI
EACIN-R	690.222	34 7	.94 2	.93 2	.05 8	.92 2	.91 5

Source. Elaborated by the author

Likewise, high correlations between the latent variables were found, which, in all cases, are higher than .70 (Table 2).

Table 2.

Relationship between the factors of attitude towards research.

Factors of attitude towards research	Correlation
Research vocation – Research interest	.846 (.85)
Research interest – Research assessment	.710 (.71)
Research vocation – Research assessment	.727 (.73)

Source. Elaborated by the author.

DISCUSSION

Among the reasons why the psychometric properties of the EACIN-R scale were evaluated, is that as it is composed, with the subscales research vocation, assessment, and interest, with their respective items, it allows measuring intrinsic aspects of the subject, ranging from the inner call to research activity, to positions of discouragement that make it difficult to get involved in the research process. It is also possible to measure, from the scale, the recognition of the value of research for the advancement of knowledge and problem solution. The EACIN-R does not consider external elements that may influence attitudes, such as institutional conditions or academic load.

The aim was to confirm the psychometric properties of the *Research Attitudes Scale-Revised Version (EACIN-R)* in Peruvian university students. Good internal consistency was obtained in that Cronbach's alpha index for the test total was .898 for the subscale research vocation, the value was .862 for research assessment .692, and research interest was .757. The correlation was positive and statistically significant among the three subscales.

Horn's parallel analysis confirmed the multidimensional model (trifactorial), the number of items corresponding to each subscale, and the total number of items of the instrument, showing that the EACIN-R is a useful and reliable tool to measure this construct in Peruvian students, thus making it possible to contribute to identifying factors to promote research activity in the country.

The results found are consistent with the analysis of other instruments in which similar measures were found for internal consistency, such as the scale reported by Muñoz et al. (2020), which yielded a value of .91 with the Omega coefficient and which contains subscales called intrinsic student motivations, training quality and institutional context. Likewise, they are similar to what was found by Castro (2017) in the design and validation process of a scale to evaluate attitudes towards formative research, which obtained the value of .827 with Cronbach's alpha index. The instrument is composed of five factors: perceived abilities, learning behaviors,

satisfaction/agreeableness, conceptual appropriation, and systematic exploration. However, it is focused on formative research, not research in general, which is the purpose of this study.

On the contrary, our results differ from the analysis of other instruments, such as the one validated by Ramos (2019) that yielded a Cronbach's alpha of .54 and the one validated by Arellano-Sacramento et al. (2018) with a Cronbach's alpha of .65, both of which indicate low internal consistency. These instruments are composed of dimensions such as the teacher as a model, proactivity, disinterest in science, rejection of research activities, the exclusivity of scientific activities (Ramos, 2019), attitude towards the production of scientific articles, attitude towards the actions of the university to encourage research in students, among others, (Arellano-Sacramento, 2018), dimensions different from those contained in the EACIN - R.

In terms of theoretical and practical implications, the results obtained indicate that the EACIN-R scale is reliable and useful to measure attitudes towards research in Peruvian university students. It is recognized that one of the weaknesses of this study was not having had a larger sample size due to the COVID-19 pandemic since the number of items is 28, which merited at least 280 participants to meet the quota of at least 10 participants per item (Kline, 2005).

CONCLUSIONS

The confirmation of the psychometric properties of the EACIN-R scale provides an instrument suitable for application in a population with similar characteristics to the one that participated in this study. Thus, it contributes with a useful tool to identify attitudes towards research in university students and eventually design guidelines to strengthen research activity in the country. Its use is feasible in different areas of knowledge to promote research, considering that it is one of the main functions of higher education and that attitudes towards it play an important role.

It is ratified that the EACIN-R is useful to measure attitudes towards research in Peruvian university students because its multifactorial structure of three factors: vocation, interest, and valuation, following the underlying theory, was confirmed. In addition, Cronbach's alpha was .898 in the test total, meaning a good internal consistency.

It is suggested to investigate attitudes towards research in relation to other variables, such as sociodemographic contexts, comparative analysis between groups, gender perspective, or other aspects considered of interest. Following the recommendations of the specialized literature, it is important to include a larger sample size so that there are at least 10 participants for each item.

RECOMMENDATIONS

For future research, it is recommended to evaluate the concurrent criterion validity of the EACIN-R in different educational and cultural contexts.

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REFERENCES

- Aldana, G. M. & Joya, N. S. (2011). Actitudes hacia la investigación científica en docentes de metodología de la investigación. *Tabula Rasa*, 14, 295-309. <https://doi.org/10.25058/20112742.428>
- Aldana, G. M., Caraballo, G. J., & Babativa, D. A. (2016). Escala EACIN para medir actitudes hacia la investigación: validación de contenido y confiabilidad. *Aletheia*, 8(2), 104-121 <https://n9.cl/ppryy>
- Aldana, G.M., Babativa, D. A, Caraballo, G.J, & Rey, C.A. (2020). Escala de actitudes hacia la investigación -EACIN-R: evaluación de sus propiedades psicométricas en una muestra colombiana. *Rev. CES Psico*, 13(1), 89-103. <https://doi.org/10.21615/cesp.13.1.6>
- Alonso, J., Alonso, A. & Valadez, D. (2015). Actitud hacia la investigación científica en estudiantes de Enfermería. *El Arte del Cuidado*, 4(7), 21-35. <https://n9.cl/21qxt>
- Allport, G. (1935). Attitudes. En C. Murchison (ed.) *Handbook of social psychology*. Clark University Press.
- Arellano-Sacramento, C., Hermoza-Moquillaza, R., Elías-Podestá, M., & Ramírez-Julca, M. (2018). Actitud hacia la investigación en la Facultad de Ciencias de la salud de la Universidad Privada Norbert Wiener. *Revista de Investigación de la Universidad Norbert Wiener*, 1(7), 47-58. <https://doi.org/10.37768/unw.rinv.07.01.005>
- Baron, R. & Byrne, D. (2005). *Psicología social*. Pearson Education. <https://ayudacontextos.files.wordpress.com/2018/04/psi-social.pdf>
- Bendezú, M. (2021). *Actitud investigativa y autoaprendizaje de los estudiantes de la especialidad de administración de una universidad privada, Lima - 2020* [Tesis Maestría – Universidad César Vallejo. <https://n9.cl/9c2ya>
- Blanco, A. (2008). Una revisión crítica de la investigación sobre las actitudes de los estudiantes universitarios hacia la Estadística. *Revista Complutense de Educación*, 19(2), 311-330. <https://n9.cl/14ge3>

- Blanco, N. (2011). Una técnica para la medición de actitudes sociales. *Revista de Ciencias Sociales*, 7(1), 45-54. <https://doi.org/10.31876/rcs.v7i1.25120>
- Catena, A., Ramos, M., & Trujillo, H. (2003). *Análisis Multivariado. Un Manual para Investigadores*. Editorial Biblioteca Nueva.
- Castro, S. (2017). Diseño y validación de un instrumento para evaluar la actitud hacia la investigación formativa en estudiantes universitarios. *Revistas Unisalle*, 1(70), 165– 182. <https://doi.org/10.19052/ap.3996>
- Cortés, J. & Barragán, C. (2009). Avances en el diseño de una escala de actitudes cognitivo-conductuales. *Psiquis*, 18(5), 46-156. <https://www.imbiomed.com.mx/articulo.php?id=63670>
- Cota, L. V., Beltrán, J., Tánori, J., & Vázquez, M. (2019). Propiedades psicométricas de una escala de actitudes hacia la investigación científica (EACIN): Estudio en alumnos universitarios mexicanos. *Revista Iberoamericana de Psicología*, 12(3), 43-54. <https://reviberopsicologia.iberu.edu.co/article/view/1711>
- De las Salas, M., Sunny, P. & Solangi, L. (2014). Actitud del estudiante universitario hacia la investigación en el núcleo Luz – Costa Oriente del Lago. *Revista Electrónica de Humanidades, Educación y Comunicación Social*, 18(21), 162–176. <https://doi.org/10.18294/pm.2018.1900>
- Duarte, S. (2013). Factores determinantes de la actitud emprendedora investigativa en científicos del Paraguay. *EduSol*, 8(24), 47-55. <https://www.redalyc.org/pdf/4757/475748663007.pdf>
- Escalante, E., Repetto, A. & Mattinello, G. (2012). Exploración y análisis de la actitud hacia la estadística en alumnos de psicología. *Liberabit*, 18(1), 15–26. <http://www.scielo.org.pe/pdf/liber/v18n1/a03v18n1.pdf>
- Hair, J., Anderson, R., Tatham, R. & Black, W. (1999). *Análisis Multivariante* (5a ed.). Prentice Hall Iberia.
- Hernández, R.; Fernández, C. & Baptista, M.P. (2014). *Metodología de la Investigación* (6a ed.). McGraw Hill.
- Jöreskog, K., Olsson, U. & Wallentin, F. (2016). *Multivariate Analysis with Lisrel*. Springer.
- Kerlinger, F. (2002). *Investigación del comportamiento* (4a ed.) McGraw-Hill.
- Kline, B. (2005). *Principles and practice of structural equation modeling* (2a ed.). Guilford Press.
- Loayza-Rivas, J. (2021). Actitudes hacia la investigación científica y estadística en estudiantes de Psicología. *ACADEMO Revista de Investigación en Ciencias Sociales y Humanidades*, 8(2), 165–177. <https://doi.org/10.30545/academo.2021.jul-dic.6>
- Martínez, D., & Márquez, D. (2014). Las habilidades investigativas como eje transversal de la formación para la investigación. *Tendencias Pedagógicas*, 24, 347–360. <https://revistas.uam.es/tendenciaspedagogicas/article/view/2110>

- Meneses, J. (Coord.). (2013). *Psicometría*. Editorial UOC.
- Montero, I., & León, O. (2007). A guide for naming research studies in psychology. *International Journal of Clinical and Health Psychology*, 7(3), 847–862. <https://www.redalyc.org/articulo.oa?id=33770318>
- Muñoz, J., Hinostroza, A., Daza, N., Nunura, L., Rodríguez, K & Abanto, W. (2020). Evidencia de los procesos psicométricos en la escala de actitud frente a la investigación en estudiantes universitarios de la ciudad de Trujillo. *Revista Científica PAIAN*, 11(1), 1-15. <https://doi.org/10.26495/rcp.v11i1.1319>
- Myers, D. (1996). *Psicología social*. McGraw-Hill Companies.
- Olivera, E. (2020). Actitudes hacia la investigación de bachilleres en administración y psicología de una universidad peruana. *Chakiñan*, 11, 70-81. <https://doi.org/10.1590/scielopreprints.820>
- Organización para la Cooperación y Desarrollo Económicos (2002). *Manual de Frascati 2002: propuesta de norma práctica para encuestas de investigación y desarrollo experimental. medición de las actividades científicas y tecnológicas*. Fundación Española Ciencia y Tecnología. <https://bibliotecadigital.infor.cl/handle/20500.12220/18732>
- Instituto Nacional de Estadística e Informática (2015). *Encuesta Nacional a Egresados Universitarios y Universidades*. INEI. <https://acortar.link/ZDGLg>
- Congreso de la República del Perú (2014, julio 9). Ley Universitaria, Ley No 30220. <https://ep.unap.edu.pe/derecho/ley-no-30220-ley-universitaria/>
- Sistema Nacional de Evaluación, Acreditación y Certificación de la Calidad Educativa (2019). *Modelo de acreditación para programas de estudios de educación superior universitaria*. SINEACE. <https://www.gob.pe/sineace>
- Piclín, J. (2008). Sarah Ysalgué Ysalgué: una figura de la ciencia y la pedagogía en Cuba. *EduSol*, 8(24), 47-55. <https://www.redalyc.org/articulo.oa?id=475748663007>
- Quezada, L., Moral, J. & Landero, R. (2019). Validación de la Escala de Actitud hacia la Investigación en Estudiantes Mexicanos de Psicología. *Revista Evaluar*, 19(1), 1–16. <https://doi.org/10.35670/1667-4545.v19.n1.23874>
- Ramos, L. (2019). Análisis psicométrico de una escala de actitudes hacia la investigación científica. *Revista de Psicología*, 9(2), 35-52. <https://revistas.ucsp.edu.pe/index.php/psicologia/article/view/513>
- Ríos, J. (2007). La vocación del investigador. *Contaduría y Administración*, 221, 3-6. <https://www.redalyc.org/pdf/395/39522101.pdf>
- Rojas, H., Méndez, R. & Rodríguez, A. (2012). Índice de actitud hacia la investigación en estudiantes del nivel de pregrado. *Entramado*, 8(2), 216-229. <https://dialnet.unirioja.es/servlet/articulo?codigo=4265852>

- Rojas-Solís, J., Espinoza-Guzmán, D., Espindola-Larios, M., & Hernández-Rosas, S. (2021). Actitud hacia la investigación en universitarios mexicanos: un análisis exploratorio. *Revista Dilemas Contemporáneos: Educación, Política y Valores*, 8, 1-25. <https://doi.org/10.46377/dilemas.v8i.2747>
- Ruiz, C. (2011). La investigación cualitativa en educación: crítica y prospectiva. *Télématique*, 10(1), 28-50. <https://www.redalyc.org/pdf/784/78419688002.pdf>
- Uriel, E. & Aldas, J. (2005). *Análisis Multivariante Aplicado* (1a ed.). Thomson/Paraninfo.

APPENDICE

Attitudes Towards Research Scale (EACIN-R): Evaluation of its psychometric properties in a Peruvian sample.

Below you will find a series of statements related to the research, please mark with an X the answer with which you feel more identified. Don't think too much about your answer, there are no right or wrong answers. The options are:

- | | |
|-------------------------------------|-------------------------|
| 0 Strongly disagree | 3 Agree |
| 1 Disagree | 4 Strongly agree |
| 2 Neither agree nor disagree | |

No.	ITEMS	0	1	2	3	4
1	At research events (congresses, meetings), I interact with people.					
2	In my opinion, research should not be taught at university.					
3	One of the things I enjoy the most is scientific conversations.					
4	Taking refresher courses is not for me.					
5	I think that consulting scientific information is a waste of time.					
6	I consider that I have the necessary patience to do research.					
7	All professionals should learn to do research.					
8	Most things make me curious.					
9	I almost always procrastinate when it comes to research.					
10	I keep my finger on the pulse of current issues.					
11	I like to train myself to acquire research skills.					
12	I believe that persistence contributes to achieving goals.					
13	I am accustomed to writing to delve deeper into topics of interest.					
14	Day-to-day activities do not inspire me with anything new.					
15	I often find myself consulting scientific information.					
16	Research is one of the things that I am interested in.					
17	I am orderly in my research activities.					
18	I find scientific conversations boring.					
19	Working with others in research helps us to achieve better results.					
20	I come up with innovative ideas about everyday problems.					
21	I believe that research helps to detect errors in science.					
22	I take every opportunity to publicize my work.					
23	I like to expedite work related to research.					
24	For me, in research, it is important to strengthen the ability to listen.					
25	The thought of doing research makes me feel discouraged.					
26	My research activities are a mess.					
27	In my opinion, research contributes to solving social problems.					
28	I am the last to know about current issues.					

REMARKS:

Characteristics of the Attitudes Towards Research Scale (EACIN-R): Evaluation of its psychometric properties in a Peruvian sample.

The Scale consisted of 28 items. Nine pertain to the subscale *Interest in research* with inverse scoring (2, 4, 5, 9, 14, 18, 25, 26, and 28), twelve to *Vocation for research* with direct scoring (1, 3, 6, 8, 10, 11, 13, 15, 16, 17, 22, 23) and seven to *Assessment of research* with direct scoring (7, 12, 16, 19, 20, 21, 24, 27). The response options are 0= Strongly disagree, 1= Disagree, 2= Neither agree nor disagree, 3 = Agree, and 4= Strongly agree.

The table contains the categories (attitude level), according to the minimum and maximum expected scores in the total scale and in each of the subscales, based on the response options.

Expected minimum and maximum scores by subscales and in the test total

CATEGORY	SUBSCALES						TEST TOTAL 28 items	
	Interest in research (9 items inverse scoring)		Vocation for research (12 items direct scoring)		Assessment of research (7 items direct scoring)		Minimum score (0)	Maximum score (112)
	Minimum score (0)	Maximum score (36)	Minimum score (0)	Maximum score (48)	Minimum score (0)	Maximum score (28)		
Very low	0	0	0	0	0	0	0	0
Response op. 0								
Low Response op. 1	1	9	1	12	1	7	1	28
Neutral Response op. 2	10	18	13	24	8	14	29	56
High Response op. 3	19	27	25	36	15	21	57	84
Very high Response op. 4	28	36	37	48	22	28	85	112

Source. Prepared by the author

High scores indicate a positive attitude toward research and low scores indicate an unfavorable attitude toward research. Based on the response options, the test total score is from 0 (zero) to 112. Whoever scores zero (0) on all items scores in the *very low* category. A score between 1 and 28 is in the *low* category, between 29 and 56 *neutral*, between 57 and 84 *high*, and between 85 and 112 *very high*.

Regarding the subscale scores, in *Interest in research* (after conversion) a score of 0 (zero) corresponds to the *very low* category, between 1 and 9 *low*, between 10 and 18 *neutral*, between 19 and 27 *high*, and between 28 and 36 *very high*. In *Vocation for research*, the *very low* category corresponds to a score of 0 (zero), *low* to a score between 1 and 12, *neutral* between 13 and 24; *high* between 25 and 36, and *very high* between 37 and 48. In *Assessment of research*, the *very low* category corresponds to a score of 0 (zero), *low* to a score between 1 and 7, *neutral* between 8 and 14, *high* between 15 and 21, and *very high* between 22 and 28.

Note

Remember that the items of the subscale *Interest in research* are reverse scored.

If the participant marked 0, it is equivalent to 4, 1 to 3, 2 to 2, 3 to 1, and 4 to 0.

0	1	2	3	4
4	3	2	1	0

Scoring example

Whoever scores 15 on *Interest* (after having made the conversion) is in the neutral category in that subscale because his/her score is between 10 and 18. If he/she scores 27 on *Vocation*, he/she is in the *high* category in that subscale because his/her score is between 25 and 36. If he/she scores 20 on *Valuation*, he/she is in the *high* category in that subscale because his/her score is between 15 and 21. So the participant obtained a total score of 62, indicating that the participant is in the high category in the teste total because his/her score is between 57 and 84.