



Original article

Digital competencies and attitude towards research in aspiring elementary school teachers

Competencias digitales y actitudes investigativas en futuros docentes de educación primaria

Competências digitais e atitudes investigativas em futuros professores do ensino primário

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ABSTRACT

The aim of the research was to identify the relationship between digital competencies and attitude towards research in students from the Faculty of Education of a public university in Lima. The research design was non-experimental, cross-sectional correlational. The sample consisted of 212 undergraduate students. The method used was survey plus two instruments to collect information: Students' Digital Competence Scale (SDiCoS), which consisted of 6 components (Tzafilkou and Perifanou, 2022) and the Attitude towards Research Scale (EACIN), consisting of 28 items grouped in three dimensions (Aldana, et al., 2020). The results showed that there is a statistically significant relationship between digital competencies and students' attitude towards research. Likewise, a direct and positive relationship was found between the dimensions "disinterest in research and search and storage of information" and "vocation for research and content creation". The research concluded that, while digital competencies are related to the attitude towards research, their development might be influenced by other factors such as initial research training, motivation and the use of materials and resources that allow students to value research more.

Keywords: investigative attitudes; digital competence; technological skills.

RESUMEN

En la actualidad, la investigación permite avanzar en el conocimiento e innovación en todas las áreas. Las universidades buscan desarrollar competencias investigativas en sus estudiantes para generar conocimientos, cultura investigativa y excelencia académica, que los preparan para su desempeño efectivo en un mundo complejo y diverso, contribuyendo a su desarrollo. El objetivo de este trabajo fue identificar la relación entre las competencias digitales y las actitudes investigativas de los estudiantes de la Facultad de Educación de una universidad pública de Lima. El diseño no experimental,

transversal correlacional. La muestra estuvo conformada por 212 estudiantes de pregrado. La técnica empleada fue la encuesta y, para recoger la información, se emplearon dos instrumentos: Escala de competencia digital de los estudiantes (SDiCoS), que constó de seis componentes (Tzafilkou y Perifanou, 2022); mientras que para medir las actitudes investigativas se aplicó el instrumento Escala de actitudes hacia la investigación (EACIN). Se demostró que existe una relación estadísticamente significativa entre las competencias digitales y las actitudes investigativas de los estudiantes. Asimismo, existe relación directa y positiva entre las dimensiones "desinterés por la investigación y búsqueda y almacenamiento de la información" y la dimensión "vocación por la investigación y la creación de contenidos". La investigación concluyó que, si bien las competencias digitales están relacionadas con las actitudes investigativas, en el desarrollo de estas pueden influir otros factores como la formación inicial hacia la investigación, la motivación y el empleo de materiales y recursos que permitan una mayor valoración de los estudiantes hacia la investigación.

Palabras clave: actitudes investigativas; competencia digital; competencias tecnológicas.

RESUMO

Atualmente, a investigação permite-nos avançar no conhecimento e na inovação em toda as áreas. As universidades buscam desenvolver em seus alunos competências de pesquisa para gerar conhecimento, cultura de pesquisa e excelência acadêmica, que os preparem para um desempenho efetivo em um mundo complexo e diverso, contribuindo para o seu desenvolvimento. O objetivo deste trabalho foi identificar a relação entre competências digitais e atitudes de pesquisa de estudantes da Faculdade de Educação de uma universidade pública de Lima. O desenho correlacional não experimental e transversal. A amostra foi composta por 212 estudantes de graduação. A técnica utilizada foi o

inquérito e, para recolher a informação, foram utilizados dois instrumentos: Escala de Competência Digital dos Estudantes (SDiCoS), que era composta por seis componentes (Tzafilkou e Perifanou, 2022); enquanto para medir as atitudes de pesquisa foi aplicado o instrumento Escala de Atitudes em relação à Pesquisa (EACIN). Foi demonstrado que existe uma relação estatisticamente significativa entre as habilidades digitais e as atitudes de pesquisa dos alunos. Da mesma forma, há uma relação direta e positiva entre as dimensões "desinteresse em pesquisar e buscar e armazenar informações" e a dimensão "vocação para pesquisa e criação de conteúdo". investigação, motivação e utilização de materiais e recursos que permitam aos alunos valorizar mais a investigação.

Palavras-chave: actitudes investigativas; competência digital; habilidades tecnológicas.

INTRODUCTION

Currently, research is a key element for development, as it allows us to advance knowledge and innovation in all areas. That is why universities increasingly seek to develop research skills in their students, with the aim of generating knowledge, research culture and academic excellence, which prepare them for effective performance in a world characterized by complexity, diversity and change, and allows them to contribute to its development.

Developing a positive attitude towards research and learning is one of the central objectives of professional training curricula. Yusuf Adebayo (2022) points out that the participation of university students in research must go beyond the mandatory thesis of the last year and must cover the entire training trajectory. For their part, Aldana *et al.* (2020) maintain that by cultivating these inclinations towards

research, it will facilitate the student to achieve a deeper understanding of the nature of the scientific process. This, in turn, will encourage a critical and organized approach to problem solving and allow the student to apply these attitudes in daily life situations.

Attitudes relate to the mental and emotional state of an individual that influences action towards subjects or objects. Attitude is a complex concept, the most prominent and influential model of attitudinal construct is the one that considers three dimensions: cognitive, affective and behavioral (Khine, 2015). These three dimensions are independent, but they are closely related and form a solid framework of attitudes toward science. For the present study, attitude is defined as the psychological disposition, acquired and organized, which guides people to respond in a certain preferred way. This response can generate positive or negative emotions and thoughts towards the object of the attitude, which can lead to its approval or rejection (García-Martínez *et al.*, 2020, Alonso, *et al.*, 2015). Attitudes are not innate, they are learned or acquired through socialization and vary between groups and individuals depending on different cultural factors and as a result of the experiences of each subject.

Candra *et al.*, (2023) studied attitudes towards science in Higher Education, offering a characterization of the dimensions: cognitive, affective and behavioral, which are explained below:

Cognitive: refers to the perceptions we have about science and its impact on humanity and society. It can also be interpreted as cognitive judgments that validate decisions, results, inferences or understanding of scientific concepts and phenomena. These cognitive evaluations arise from the process of evaluating scientific components. In this dimension, students can determine whether science has a positive or negative impact on their life and environment, and whether the progress and everyday application of science are relevant.

Affective: in relation to science, it encompasses both positive and negative emotions. Positive emotions, such as pleasure and confidence, are experienced through the enjoyment of science; while negative emotions, such as anxiety and challenges, arise from difficulties in learning science.

These emotional aspects are independent but interrelated components. Enthusiasm for science is associated with an internal state of well-being and joy, while anxiety manifests itself in states of discomfort that can cause negative feelings or rejection towards science.

Behavioral: in terms of behavior, it is the behavioral inclination in the evaluation of attitudes that indicates a disposition towards participation in scientific activities linked to the formal learning process, such as classroom learning and informal learning of science, through of recreational activities beyond the educational space. Various investigations (Nja *et al.*, 2022; Chen, 2022, García-Martínez *et al.*, 2021) have emphasized the importance of attitude toward learning in a specific subject as an affective factor that supports academic success.

Digital Competence (CD) is among the nine essential competencies that citizens need to actively participate in today's society. Specifically, in its 2018 report (p. 5), the European Commission details that digital competence involves the safe, reflective and ethical use of digital technologies for the purposes of learning, employment and participation in society, as well as the involvement active with these technologies.

There are varied reference frameworks on the definition of digital competence; However, there are also the converging points that define it, such as the safe use of Information and Communications Technologies (ICT) with an ethical and critical sense. The development of this competence implies knowledge, skills and actions necessary to get the most out of

ICT in varied contexts (Perdomo *et al.*, 2020).

The research process requires skills that encompass the effective use of online resources and various digital tools for the search, organization, analysis, dissemination and publication of information, and even to develop collaborative research in various disciplines.

University students are closely related to the use of technologies and this is an element that favors the development of knowledge, skills and investigative attitudes; However, such development requires that the teacher be a facilitator who proposes effective strategies that promote academic and scientific activities.

There are various studies that prove the benefits of using technology as a means to develop research skills in students and generate knowledge that responds to the demands of society.

For example, the study carried out by Sánchez (2020) confirms that investigative competencies favor the development of skills, attitudes and abilities, and also allow subjects to face the demands of 21st century society and learn to cope with better tools. and throughout life.

Based on the review of the literature, the need to articulate the development of attitudes towards research with the development of digital competencies as means to contribute to the development of investigative competencies is evident. In the present study, it is recognized that the development of research competence in university students impacts their professional and social development and prepares them for a competent and globalized labor market George-Reyes and Salado Rodríguez (2019).

MATERIALS AND METHODS

The study corresponds to a non-experimental design, in which the study variables are measured at a specific time. It is transversal, correlational, non-causal and seeks to establish the relationships between the variables without specifying cause-effect relationships (Hernández *et al.*, 2018).

The research was carried out with 465 education students from a public university located in Metropolitan Lima in the year 2023.

Population and sample

The sample was probabilistic and consisted of 212 students from the Primary Education major. All participants had the same opportunity to be included in the sample (Otzen and Manterola, 2017).

The following inclusion criteria were applied:

- Students of the Faculty of Education.
- Be enrolled in the 2023 regular cycle

And the following exclusion criteria:

- Students who do not regularly attend classes.

Instruments

Two instruments were applied. The first was called the Students' Digital Competence Scale (SDiCoS), and consisted of six components (Tzafilkou and Perifanou, 2022); Meanwhile, to measure attitudes towards research, the instrument called Scale of Attitudes towards Research (EACIN) was applied, made up of 28 items grouped into three dimensions: disinterest in research; vocation for research and assessment of research (Aldana *et al.*, 2020). The instrument was previously validated by the authors and, in addition to

its reliability, it showed a good level of internal consistency.

RESULTS

The information obtained was processed, obtaining the results shown below:

Table 1- Levels of attitudes towards research according to sex

Sex	Low attitude	Good attitude	Very good attitude
Female	16%	84%	
Male	9%	89%	2%
Total	212	100.0	100.0

Table 1 presents the attitudes towards research according to sex of the students of the Professional School of Primary Education of the Faculty of Education. It was found that 89% of the male students and 84% of the female students showed a good attitude towards research. With this, it can be deduced that a good attitude towards research predominates in the sample.

Table 2- Attitude towards research according to the school of origin

Educational institution	Public	Private
Low attitude towards research	13%	18%
Good attitude towards research	86%	82%
Very good attitude towards research	1 %	0%

Table 2 shows the attitudes towards research according to the school of origin of the students of the Professional School of Primary Education. It was found that 86% of students who come from public educational institutions have a slightly better attitude towards research than 82%

of students who come from a private educational institution.

Table 3- Correlation between Digital Competencies and Attitudes towards research

Correlations			TCD	THI
Spearman's Rho	Digital skills	Correlation coefficient	1.0	.147*
			00	
		Next. (two-sided)	.	.033
		N	twenty-one	211
			1	
	Attitudes towards research	Correlation coefficient		.14
			7*	0
Next. (two-sided)			.03	.
		N	twenty-one	211
			1	
*. The correlation is significant at the 0.05 level (two-sided)				

To determine the correlation between the Digital Competencies and the Attitudes towards research of the participants in the study, (Table 3) Spearman's Rho test was used, which yielded 0.147, with a value of $p=0.03 < \alpha=0.05$, determining that there is a relationship direct and positive between both variables.

Likewise, the correlation was carried out between the previously mentioned variables, finding a direct and positive relationship in the following dimensions: disinterest in research and the search and storage of information with a value of Spearman's Rho = -0.196, $p = 0.04 < \alpha=0.05$. Additionally, between the vocation for research and content creation, a value was obtained in Spearman's Rho test of 0.132, with a value of $p=0.05$.

DISCUSSION

The results have allowed us to establish that there is a relationship between attitudes towards research and digital skills in students studying Primary Education.

These findings coincide with the research of Moncada and Moncada (2022), who concluded that there is a significant correlation between scientific research attitudes and the use of Information and Communications Technologies in master's students at the "San Pedro" University. - Chimbote"; and with those of Reyes *et al.* (2023), who maintain that there are significant differences in the attitude towards research in students from three Peruvian public universities, with students from the National University of Engineering (UNI) obtaining a better result, followed by the Universidad Nacional Mayor de San Marcos. (UNMSM) and, finally, from the National University "Santiago Antúnez de Mayolo".

Positive attitudes towards research are related to digital skills. Therefore, it is recommended that universities promote training and updating in technologies for all those involved (students, teachers, administration and service staff), both in formal and non-formal environments, promoting self-assessment and permanent and directed learning.

In contrast, university students' disinterest in research and the search for and storage of information are related. This could be interpreted as the absence of the importance that students give to research, making it necessary for the university to implement improvements by creating new strategies to foster a positive attitude towards research, in order to motivate students more. What was discussed coincides with the findings of Cruz *et al.* (2021), who point out that the attitude of university students, both men and women, towards research is neutral.

On the other hand, the results of the dimensions "vocation for research" and

"content creation" determined that there is a relationship between them. That is, students who have a greater interest in research have developed skills for creating content, preparing texts, articles, images, among others; The presentation of information and the use of common academic writing standards proposed by the APA Standards are important.

These findings coincide with the study by Reyes *et al.* (2023), in which the majority of students demonstrated greater ability to use the APA format, flexibility of thinking, and promotion of their creativity. On the contrary, among the difficulties presented, they considered the lack of knowledge, and a large percentage said that it is not important for their profession, but is only necessary to carry out their theses.

Likewise, it was found that male students have a better attitude towards research than female students. However, these results differ from those of Reyes *et al.* (2023), in which no significant differences were found according to sex.

Additionally, a greater inclination towards research was also found among students from public schools. This could be due to the fact that the Ministry of Education of Peru, through FONDEP, has been promoting research and innovation through the La Escuela program, whose purpose is to implement participatory action research processes in the educational field (FONDEP, 2019). It could also be associated with initiatives of the CONCYTEC and the MINEDU, who, through their decentralized bodies, promote the development of inquiry and technology in the students of the public and private IIEE of Regular Basic Education, based on the competencies in the scientific and technological inquiry and literacy approach, as well as the Personal Development and Active Citizenship approaches proposed in the CNEB (MINEDU, 2016).

Finally, the results of this research can be the beginning of future experimental

research or comparative studies between universities.

centrados en el docente y la motivación académica y conductas de aprendizaje de los estudiantes de secundaria en China). *Journal for the Study of Education and Development*, 45(4), 906-938.
<https://doi.org/10.1080/02103702.2022.2096299>

BIBLIOGRAPHIC REFERENCES

- Adebisi, Y. (2022). Undergraduate students' involvement in research: Values, benefits, barriers and recommendations. *Annals of Medicine & Surgery*, 81, DOI: [10.1016/j.amsu.2022.104384](https://doi.org/10.1016/j.amsu.2022.104384)
- Aldana, G., Babativa, D., Caraballo, G. & Rey, C. (2020). Escala de actitudes hacia la investigación (EACIN): evaluación de sus propiedades psicométricas en una muestra colombiana. *CES Psicología*, 13(1), 89-103.
<https://doi.org/10.21615/cesp.13.1.6>
- Antúñez, A. & Veytia, M. (2020). Desarrollo de competencias investigativas y uso de herramientas tecnológicas en la gestión de información. *Conrado*, 16(72), 96-102.
http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S199086442020000100096&lng=es&tlng=es
- Candra, A., Erszsebet, K. (2023). Attitudes towards science in higher education: Validation of questionnaire among science teacher candidates and engineering students in Indonesia. *Heliyon*, 9, <https://doi.org/10.1016/j.heliyon.2023.e20023>
- Cheng, H. & Chen, L. (2022). Investigating how student-centered and teacher-centered teaching paradigms relate to the academic motivation and learning behaviors of secondary school students in China (Explorando las relaciones entre los modelos pedagógicos centrados en el estudiante y
- Chu, S., Chow, K., Tse, S.K. & Collier, C. (2008). Grade Students Development of Research Skills Through Inquiry-Based Learning Projects. *School Libraries Worldwide*, 14(1), 10-37
<https://bit.ly/3OQCICU>
- Cruz T., Pinedo Z. & Lescano C. (2021). Actitud hacia la investigación: un análisis afectivo, cognoscitivo y conductual en estudiantes universitarios. *Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología*, (29) 20-26, 2021. doi: [10.24215/18509959.29.e2](https://doi.org/10.24215/18509959.29.e2)
- García-Martínez, J., Fuentes-Abeledo, E., Rodríguez-Machado, E., (2021). Attitudes towards the Use of ICT in Costa Rican University Students: The Influence of Sex, Academic Performance, and Training in Technology. *Sustainability*, 13(1), 282.
<https://doi.org/10.3390/su13010282>
- George, C. & Ramírez, A. (2019). Competencias investigativas y saberes digitales de estudiantes de Posgrado en la modalidad virtual. *Certiuni Journal*, 0(5), 6578.
<http://uajournals.com/ojs/index.php/certiunijournal/article/view/605>
- González, Y. (2017). ¿Cómo evaluar la competencia investigativa desde la responsabilidad social universitaria? *Revista Cubana de Educación Superior*, 36, (2), 4-13.
<https://revistas.uh.cu/rces/article/view/3247>

- Hernández, R., Fernández, C. & Batista, P. (2014) *Metodología de la investigación*. Mc Graw Hill.
<http://www.rces.uh.cu/index.php/RCES/article/view/178/222>
- Hernández-Sampieri, R. & Mendoza, C. (2018). *Metodología de la investigación. La Rutas cuantitativa, cualitativa y mixta*. Editorial Mc Graw Hill Education.
- Khine, M. S. (Ed.). (2015). Attitude measurements in science education: Classic and contemporary approaches. IAP.
- Mena, M. & Lizenberg, N. (2013). Desarrollo de competencias investigadoras en la sociedad red. *RED Revista de Educación a Distancia*, (38).
<https://www.um.es/ead/red/38/>
- Perdomo, B., González, O. & Barrutia I. (2020). *Competencias digitales en docentes universitarios: una revisión sistemática de la literatura EDMETIC*, 9(2), 92-115.
<https://doi.org/10.21071/edmetic.v9i2.12796>
- Reyes, S., Valderrama, O., Atoché, R., Reyes, R. & Arotoma, M. (2023). Actitudes de los estudiantes de universidades públicas hacia la investigación. *Comuni@cción: Revista de Investigación en Comunicación y Desarrollo*, 14(2), 137-147.
<https://doi.org/10.33595/2226-1478.14.2.847>
- Reyes P., Cárdenas, M. & Gaviláñez, T. (2020). Desarrollo de competencias investigativas mediadas por tecnologías en estudiantes de la carrera de Agronomía. *Revista Conrado*, 16(73), 108-113.
<https://conrado.ucf.edu.cu/index.php/conrado/article/view/1278>
- Rubio, M., Torrado, M.; Quirós, C.; Valls, R. (2018). Autopercepción de las competencias investigativas en estudiantes de último curso de Pedagogía de la Universidad de Barcelona para desarrollar su Trabajo de Fin de Grado. *Revista Complutense de Educación*, 29(2), 335-354.
<https://doi.org/10.5209/RCED.52443>
- Rojas, N. (2019). Enseñanza de la competencia investigativa: percepciones y evidencias de los estudiantes universitarios. *Revista Espacios*, 40(41).
<https://www.revistaespacios.com/a19v40n41/a19v40n41p26.pdf>
- Otzen, T. & Manterola, C. (2017). Técnicas de muestreo sobre una población a estudio. *Int. J. Morphol.*, 35(1):227-232, 2017.
<http://dx.doi.org/10.4067/S0717-95022017000100037>
- Obi, C., Ekonesi, R., Amba, H., Okpa, J., Edet, U., & Anari, M. (2022). Students' attitude and academic achievement in a flipped classroom. *Heliyon* 8(2022).
<https://doi.org/10.1016/j.heliyon.2022.e08792>
- Tzafilkou, K., Perifanou, M. & Economides, A. Development, and validation of students' digital competence scale (SDiCoS). *International Journal of Educational Technology in Higher Education* (2022) 19, 30.
<https://doi.org/10.1186/s41239-022-00330-0>
- Comisión Europea (2018). *Propuesta de recomendación del consejo sobre competencias para el aprendizaje a lo largo de la vida*.
<https://ec.europa.eu/education/sites/education/files/annex-recommendation-key-competences-lifelong-learning.pdf>

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The authors declare not to have any interest conflicts.

Authors' contribution:

The authors participated in the design and writing of the article, in the search and analysis of the information contained in the consulted bibliography.

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