REVISTA INVECOM
ISSN en línea: 2739-0063

Digital competencies and research skills in university students in Trujillo, Peru

Competencias digitales y habilidades investigativas en estudiantes universitarios de Trujillo, Perú

Received: 01/07/2025 - **Accepted:** 25/09/2025

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Abstract

The main objective of the research entitled Digital Competencies and Research Skills in Students at a Public University in Trujillo, 2025 was to determine the relationship between digital competencies and research skills in university students. The methodology was basic, with a quantitative approach and a non-experimental, descriptive-correlational cross-sectional design. The census population consisted of 120 students, who were given two questionnaires: the first on digital skills and the second focused on research skills. Both instruments met the validity criteria through expert judgment and showed high levels of reliability. The method used was hypothetical-deductive, and Spearman's Rho coefficient was used for hypothesis testing. The results showed that digital skills are significantly related to research skills, with a very strong correlation (Rho = 0.856; p = 0.000). It is concluded that the greater the digital skills, the greater the research skills in students.

Keywords: skills, abilities, digital.

Resumen

La investigación titulada *Competencias digitales y habilidades investigativas en estudiantes de una universidad pública de Trujillo, 2025* tuvo como objetivo principal determinar la relación entre las competencias digitales y las habilidades investigativas en estudiantes universitarios. La metodología fue de tipo básica, con un enfoque cuantitativo y un diseño no experimental, descriptivo-correlacional de corte transversal. La población censal estuvo conformada por 120 estudiantes, a quienes se les aplicaron dos cuestionarios: el primero sobre competencias digitales y el segundo enfocado en las habilidades investigativas. Ambos instrumentos cumplieron con los criterios de validez mediante juicio de expertos y mostraron altos niveles de confiabilidad. El método utilizado fue el hipotético-deductivo, y para la prueba de hipótesis se empleó el coeficiente Rho de Spearman. Los resultados evidenciaron que las competencias digitales se relacionan significativamente con las habilidades

investigativas, presentando un nivel de correlación muy fuerte (Rho = 0.856; p = 0.000). Se concluye que, a mayores competencias digitales, mayores son las habilidades investigativas en los estudiantes.

Palabras clave: competencias, habilidades, digital.

Introduction

Current challenges require educational systems to promote the development of not only digital competencies but also research skills that contribute to the advancement of science and the improvement of educational quality (Hernández et al., 2021). Furthermore, the demands of contemporary society highlight the growing need to strengthen digital and research literacy among university students. These skills not only enable them to assimilate knowledge more deeply but also to adapt to the rapid changes brought about by globalization, which significantly influence the educational landscape. Enhancing learning and digital competencies has the potential to broaden the reach and applicability of educational systems, thereby increasing the professional opportunities for young people in ever-evolving digital economies.

Most students exhibit strong technological training; however, this has posed both an opportunity and a threat that affects the continuity of their learning. It is concerning that some students demonstrate a low level of digital competence, as they often utilize emerging technologies primarily for leisure and social interactions rather than for academic purposes (Chiecher, 2020b). Globally, four out of five young people (80%) aged 16 to 24 in the countries of the European Union possess fundamental digital skills; this figure is 24% higher than that of the age group from 16 to 74 (56%). Among EU member states, Croatia has the highest percentage of young people with basic or higher digital knowledge (97%), while Romania shows the lowest (56%). In Spain, 86% of young people possess basic or higher computer skills (Mena, 2020). To address the digital divide and promote rapid change in both public and private educational institutions, the United Nations leads a global project focused on learning and developing digital competencies among vulnerable youth (UNESCO, 2021).

In Peru, education holds a priority position. There is a constant effort to elevate the quality of the teaching-learning process, promoting freedom of expression and active student participation. Each year, the Ministry of Education, through the National Superintendence of Higher University Education (SUNEDU), evaluates student performance, emphasizing deficiencies and the impact of inadequate preparation in areas where fundamental capacities are not properly developed. In response to the demands of contemporary society, there is a recognized need to transform pedagogical approaches, processes, and knowledge to address situations, solve problems, and anticipate behaviors.

Locally, an issue has been identified among students at a public university in Trujillo, related to the lack of adequate research skills. This is evidenced by their limited ability to seek information, whether due to unawareness of sources or a lack of criteria for selecting them. Additionally, they face difficulties in conducting critical reflections on books, journals, or scientific articles, which limits their ability to integrate theories into their academic work.

Digital competencies are defined as a set of skills and knowledge that enable the effective and safe use of information and communication technologies (ICT) in various contexts, including academic and professional settings (Chiecher, 2020a). These competencies are essential for social and professional integration. According to Torres (2023), digital competence involves the ability to use technology effectively, appropriately, safely, and critically to perform various tasks, solve problems, communicate, manage information, collaborate, and create and share content creatively, autonomously, and ethically. In this regard, Acosta (2022) notes that digital competencies encompass the ability to navigate digital environments using a variety of specialized knowledge.

Digital competencies are grounded in the theory of connectivism, proposed by Siemens, who suggests that knowledge is transferred through networked connections, particularly in learning contexts mediated by information and communication technologies (ICT). According to Aduvire (2022), this theoretical foundation allows students to recognize the behavioral and cognitive changes that arise from engagement with digital knowledge, which facilitates the development of research skills.

Regarding research skills, Rojas et al. (2019) assert that research constitutes a fundamental process in the university context and plays a key role in the labor environment by fostering a mode of critical and analytical thinking that prepares graduates to face the challenges of contemporary scientific and technological progress. Similarly, Oseda et al. (2021b) affirm that research skills are an essential component of higher education, as they strengthen students' inquiry and academic production capabilities. These skills are closely related to professional profiles and must adapt to the changing needs of society.

The development of research skills is theoretically supported by constructivism, which posits that learning is an integral process where understanding, analysis, and social context play a crucial role in the formation of skills, talents, and capacities (Aduvire, 2022). From this perspective, the student actively engages in a productive

and ongoing task that is intrinsically linked to their identity, in a process of meaning-making, action, and reflection that shapes their culture. According to Vygotsky (1962), knowledge arises from the interaction between the individual and their physical, social, and cultural environment. Saavedra (2023) complements this view by noting that students construct meaningful learning during their research process, attributing significance to concepts based on their prior experiences. Additionally, Bunge (2004) asserts that verifiable knowledge is based on the observation, measurement, systematization, explanation, and rigorous analysis of empirical facts.

Research skills constitute an essential component of university education and must align with labor market demands and the professional expectations of each discipline. These skills include the ability to formulate relevant research questions, plan and execute appropriate procedures, critically collect and analyze data, and communicate results effectively and convincingly.

Finally, the present study aimed to determine the relationship between digital competencies and research skills among students at a public university in Trujillo.

Methodology

This research employed a quantitative approach, indicating that data were collected and analyzed using numerical measures and statistical tools. Additionally, a descriptive scope was adopted, aimed at characterizing the phenomena, manifestations, and circumstances under analysis. According to Hadi et al. (2023), the quantitative approach is based on a rigorous scientific method that involves the application of pre-existing theories and the testing of previously formulated statistical hypotheses.

Furthermore, the study was classified as basic research, meaning it does not seek immediate application but aims to expand existing knowledge on the researched topic. According to Bernal (2016), this type of research primarily aims to increase and strengthen the body of scientific knowledge without pursuing immediate practical ends.

The research design was non-experimental due to the absence of variable manipulation and correlational, as the two analyzed variables are related (Hernández et al., 2018). Additionally, a cross-sectional design was adopted, allowing the analysis of data collected from a population at a specific moment in time. This type of design is characterized by minimal intervention from the researcher concerning the studied variables and, in some cases, the presence of control groups (Bernal, 2016).

The population consisted of 120 university students from a public university in Trujillo. According to Sánchez et al. (2018), the population is defined as the set of elements, individuals, or events that meet specific criteria and are located in the study region. Inclusion criteria included being a university student at the specified institution, while those not affiliated with the mentioned university were excluded.

Data collection utilized the survey technique, which involves posing standardized questions to a group of individuals, either in person, by phone, or online (Hadi et al., 2023). The instrument employed was a questionnaire, which, according to Ñaupas et al. (2018), is a type of survey that contains a structured set of written questions related to the research hypotheses, as well as the corresponding variables and indicators.

The obtained data were processed using descriptive statistics, generating tables and graphs organized by dimensions. Initially, the information was systematized in a data matrix created in Microsoft Excel and subsequently transferred to the statistical software SPSS version 25 to facilitate analysis and interpretation. Given the correlational nature of the study, the Spearman's Rho correlation coefficient was employed, allowing for statistical inferences and the testing of the proposed hypotheses.

Results

The proposed hypotheses, both general and specific, were tested using the Spearman's Rho correlation test.

General hypothesis

Hi: Digital competencies are related to research skills among students of a public university in Trujillo, 2025.

Ho: Digital competencies are not related to research skills among students of a public university in Trujillo, 2025.

Table 1

Correlation between digital competencies and research skills among students

Correlations				
			Digital competence	Research skills
Spearman's Rho	Digital competence	Correlation Coefficient	1.000	0.856**
		Sig. (two-tailed)	.	0.000
		N	120	120
	Research skills	Correlation Coefficient	0.856**	1.000
		Sig. (two-tailed)	0.000	.
		N	120	120

**. The correlation is significant at the 0.01 level (two-tailed).

Interpretation:

According to Table 1, the Spearman's Rho correlation coefficient was 0.856, with a significance value of p=0.000<0.05, leading to the acceptance of the alternative hypothesis and the rejection of the null hypothesis. Therefore, a very strong positive relationship between digital competencies and research skills among students of the Faculty of Social Sciences at the National University of Trujillo (2023) is evidenced. This result suggests that as digital competencies develop, research skills also increase.

Specific hypothesis 1

Hi: The dimension of information and digital literacy is related to research skills among students of a public university in Trujillo, 2025.

Ho: The dimension of information and digital literacy is not related to research skills among students of a public university in Trujillo, 2025.

Table 2

Correlation between the dimension of information and digital literacy and research skills among students

Correlations				
			Information and digital literacy	Research skills
Spearman's Rho	Information and digital literacy	Correlation Coefficient	1.000	0.647**
		Sig. (two-tailed)	.	0.000
		N	120	120
	Research skills	Correlation Coefficient	0.647**	1.000
		Sig. (two-tailed)	0.000	.
		N	120	120

**. The correlation is significant at the 0.01 level (two-tailed).

Interpretation:

According to Table 2, the significance level obtained was p=0.000, allowing for the acceptance of the alternative hypothesis. Consequently, there is a significant relationship between the dimension of information and digital literacy and research skills among students of the Faculty of Social Sciences at the National University of Trujillo (2023). The correlation degree was 0.647, indicating a considerable positive correlation between the two variables.

Specific hypothesis 2

Hi: The communication dimension is related to research skills among students of a public university in Trujillo, 2025.

Ho: The communication dimension is not related to research skills among students of a public university in Trujillo, 2025.

Table 3

Correlation between the communication dimension and research skills among students

Correlations

			Communication dimension	Research skills
Spearman's Rho	Communication dimension	Correlation Coefficient	1.000	0.718**
		Sig. (two-tailed)	.	0.000
		N	120	120
	Research skills	Correlation Coefficient	0.718**	1.000
		Sig. (two-tailed)	0.000	.
		N	120	120

**. The correlation is significant at the 0.01 level (two-tailed).

Interpretation:

According to Table 3, the significance level was p=0.000, allowing for the acceptance of the alternative hypothesis. Therefore, there is a significant relationship between the communication dimension and research skills among students of the Faculty of Social Sciences at the National University of Trujillo (2023). The obtained correlation coefficient was 0.718, reflecting a considerable positive correlation between the two variables.

Specific hypothesis 3

Hi: The dimension of digital content creation is related to research skills among students of a public university in Trujillo, 2025.

Ho: The dimension of digital content creation is not related to research skills among students of a public university in Trujillo, 2025.

Table 4

Correlation between the dimension of content creation and research skills among students

Correlations

			Digital Content Creation	Research skills
Spearman's Rho	Digital Content Creation	Correlation Coefficient	1.000	0.629**
		Sig. (two-tailed)	.	0.000
		N	120	120
	Research skills	Correlation Coefficient	0.629**	1.000
		Sig. (two-tailed)	0.000	.
		N	120	120

**. The correlation is significant at the 0.01 level (two-tailed).

Interpretation:

According to Table 4, the significance level was p=0.000, allowing for the acceptance of the alternative hypothesis. Consequently, there is a significant relationship between the dimension of digital content creation and the research skills of students at the Faculty of Social Sciences at the National University of Trujillo (2023). The correlation coefficient was 0.629, indicating a considerable positive correlation between both variables.

Discussion

Regarding the general hypothesis, the results demonstrated that digital competencies are related to research skills, with a very strong positive correlation (Rho = 0.856, p = 0.000). In this context, Oseda et al. (2021b) support the notion that the balanced and appropriate use of digital competencies can provide a variety of opportunities and resources that contribute to the development of research skills in students. Similarly, Cadillo (2022) found a significant positive correlation between both variables, suggesting that students with strong digital competencies tend to possess better research skills. These results are encouraging, as they reflect a mutual

strengthening of digital competencies and research skills, highlighting the crucial role of technological tools as catalysts for autonomous and critical learning. This relationship also contrasts with the information society paradigm—focused on mere data accumulation—against the knowledge society, which promotes the transformation of information into resources for innovation and the social construction of knowledge.

In terms of specific hypothesis 1, a considerable positive correlation was observed between information and digital literacy and research skills (Rho = 0.647, p = 0.000). This finding aligns with the study by Panta (2023), who reported a direct and significant relationship between digital literacy and research skills among university students in Piura. Additionally, Popayán and Salvador (2022) demonstrated that students with higher levels of digital literacy show a more developed capacity to identify, locate, and manage various information sources, critically analyzing their content and formulating well-founded opinions. This assertion is reinforced by Vargas (2019), who emphasizes the need for students to develop information literacy that enables them to generate critical knowledge from reliable and pertinent sources.

Regarding specific hypothesis 2, the results indicated a significant positive correlation between the communication dimension and research skills (Rho = 0.718, p = 0.000). Panta (2023) concurs with this finding by noting that strengthening digital communication skills enhances the development of research competencies, particularly in collaborative contexts. Complementarily, the study by Popayán and Salvador (2022) evidenced that students actively use digital communication applications and environments to participate in group projects, disseminate information, and create an impact in their communities. This finding is theoretically supported by Vargas (2019), who highlights the importance of using technological media for teamwork, managing shared information, and co-creating knowledge in virtual environments.

Finally, concerning specific hypothesis 3, a considerable positive correlation was identified between the dimension of digital content creation and research skills (Rho = 0.629, p = 0.000). This result aligns with the findings of Cadillo (2022), who reported a moderate positive correlation between both variables, indicating that a greater mastery of digital content creation is associated with a deeper understanding of research processes. Similarly, Chiecher (2020b) argues that a digitally competent student can design multimedia materials, program, reformulate prior knowledge, and apply ethical and legal principles, such as respecting copyright and usage licenses. These assertions are grounded in Vargas (2019), who maintains that the comprehensive development of digital competency involves not only the creation of new content but also the capacity to improve, adapt, and collaboratively share it, thus strengthening research skills and critical thinking.

Conclusions

Regarding the general hypothesis, a very strong positive correlation was established between digital competencies and research skills, with a Spearman correlation coefficient (Rho = 0.856, p = 0.000). This result suggests that a higher level of digital competence is associated with a more robust development of research skills among university students, highlighting the importance of technological literacy as a foundation for scientific and academic training.

Concerning specific hypothesis 1, a considerable positive correlation was confirmed between the dimension of information and digital literacy and research skills (Rho = 0.647, p = 0.000). These findings indicate that the ability to search, select, and evaluate digital information directly influences the quality of the research process, enhancing students' autonomy and critical thinking.

With respect to specific hypothesis 2, a significant positive correlation was verified between the dimension of digital communication and research skills (Rho = 0.718, p = 0.000). This result suggests that effective communication in digital environments promotes academic collaboration and knowledge exchange, essential aspects for the development of research competencies in the university context.

Finally, regarding specific hypothesis 3, a considerable positive correlation was identified between the dimension of digital content creation and research skills (Rho = 0.629, p = 0.000). This finding evidences that the ability to produce, adapt, and share digital content significantly contributes to strengthening research skills, as it enhances creativity, analytical thinking, and a critical appropriation of knowledge.

Overall, the results demonstrate that digital competencies are an essential component of university education, as they enhance research capabilities and promote a more relevant education in response to the demands of the knowledge society and current technological transformation.

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