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IMPACT OF DIGITAL SKILLS ON PSYCHOLOGICAL WELL-BEING AND ACADEMIC PERFORMANCE: EVIDENCE IN COLLEGE STUDENTS

KARINA YULEISY GONZALEZ-VASQUEZ
UNIVERSIDAD ESTATAL DE MILAGRO
ORCID ID: https://orcid.org/0000-0002-9400-79532

NINFA SOFIA GUEVARA-PEÑARANDA
UNIVERSIDAD ESTATAL DE MILAGRO
ORCID ID: https://orcid.org/0000-0001-6638-88513

FERNANDO PATRICIO RIERA-HERMIDA
UNIVERSIDAD ESTATAL DE MILAGRO
ORCID ID: https://orcid.org/0009-0006-7570-13054

BRIGITA VALERINA LEDESMA-ACOSTA
UNIVERSIDAD ESTATAL DE MILAGRO
ORCID ID : https://orcid.org/0000-0002-5982-92735

MARIELA ELIZABETH GONZALEZ-VAZQUEZ
UNIVERSIDAD ESTATAL DE MILAGRO
ORCID ID: https://orcid.org/0009-0003-1478-6788

Summary
The incorporation of digital technologies in higher education has changed the ways in which students access, process and use information. This study explores how digital skills influence the psychological well-being and academic performance of university students. Through a quantitative approach with a sample of 280 students from various Latin American institutions, a positive and significant relationship was identified between the level of digital competence, emotional balance and academic results. The findings suggest that fostering the development of digital competencies not only improves academic performance, but also promotes students' mental health.

Keywords: digital skills, psychological well-being, academic performance, higher education, university students

INTRODUCTION

In recent years, the process of digital transformation has taken on unprecedented importance in all areas of society, especially in higher education. The health emergency caused by the COVID-19 pandemic accelerated this transition, forcing educational institutions to adopt hybrid or fully virtual models in record time (Sá & Serpa, 2020). This abrupt change exposed both strengths and weaknesses in the digital competencies of students and teachers, and highlighted the need for comprehensive digital literacy to meet the challenges of technology-mediated learning.

Digital skills—defined as the ability to use digital technologies critically, creatively, and safely—are currently an essential component of the graduation profile of university students (Vuorikari et al., 2022). These skills not only facilitate access to and management of information, but also allow for effective interaction in virtual

environments, online collaboration, technical problems, and protection of privacy and digital identity. Consequently, the lack of these skills can lead to frustration, stress, low motivation, and even school dropout (Montenegro-Rueda et al., 2023).

Simultaneously, the psychological well-being of students has gained visibility as a key aspect of educational success. Numerous studies have identified a direct link between mental health, academic motivation, and school performance (Becker et al., 2021). Psychological well-being includes elements such as self-acceptance, autonomy, positive relationships, a sense of purpose, and personal growth (Ryff & Keyes, 1995). In this context, it has been suggested that the development of digital skills can act as a protective factor, mitigating the negative effects of academic stress and promoting self-confidence, self-regulation, and a sense of achievement (Pereira et al., 2022).

On the other hand, academic performance—generally measured by indicators such as the cumulative weighted average (PPP)—has been influenced by variables such as access to technology, familiarity with digital platforms, and students' ability to organize and manage their time in virtual environments (Salas-Rueda, 2021). The relationship between digital skills and academic performance has been documented in multiple studies that show how a high level of digital competence allows students to optimize their study processes, reduce errors, and increase their productivity (Romero-Frías et al., 2021).

Despite the growing literature on these topics, there is still a need for empirical studies that simultaneously address the relationship between digital skills, psychological well-being, and academic performance, especially in Latin American contexts. This study seeks to contribute to this gap, analyzing this relationship in a sample of university students, with the aim of offering evidence that allows to support educational policies aimed at the integral development of students.

THEORETICAL FRAMEWORK

DIGITAL SKILLS IN THE UNIVERSITY CONTEXT

Digital skills comprise a set of knowledge, skills, and attitudes that enable the effective, critical, and ethical use of digital technologies for learning, work, and life in general (Vuorikari et al., 2022). In the university environment, these competencies range from basic tasks such as the management of virtual platforms to complex data analysis processes, online collaborative work, and self-protection in digital environments (Pereira et al., 2022).

The European Digital Competence Framework for Citizenship (DigComp 2.2) structures these skills into five key dimensions (see Table 1), which have been widely adopted by educational institutions to design digital training plans.

TABLE 1. DIMENSIONS OF THE DIGCOMP 2.2 FRAMEWORK AND ITS RELATIONSHIP TO UNIVERSITY LEARNING

Dimension	Description	Academic Application
1. Digital literacy	Search, evaluate, and manage information online	Desk research, use of databases
2. Communication and collaboration	Interact through digital media	Participation in forums, virtual teamwork
3. Digital Content Creation	Generate and edit content	Production of essays, multimedia presentations
4. Digital Security	Protect personal data and devices	Password management, cybersecurity
5. Problem solving	Adapt to technologies and resolve incidents	Autonomous use of new platforms and software

Source: Adapted from Vuorikari et al. (2022).

Recent studies show that students with greater digital literacy tend to obtain better grades and show greater capacity for self-learning (Romero-Frías et al., 2021). In addition, it has been identified that the acquisition of these skills can reduce technological anxiety and increase the perception of self-efficacy (Montenegro-Rueda et al., 2023).

PSYCHOLOGICAL WELL-BEING IN UNIVERSITY STUDENTS

Psychological well-being, from Ryff's perspective, is understood as a multidimensional construct that integrates personal development, autonomy, purpose in life, self-acceptance, positive relationships, and mastery of the

environment (Ryff & Keyes, 1995). In the university context, these factors are closely related to academic adaptation and commitment to learning.

During and after the pandemic, students' psychological well-being has been affected by factors such as isolation, digital academic overload, and social uncertainty. In this sense, the competent use of technology can function as a modulating factor of stress, facilitating organized routines, communication channels, and digital coping strategies (Becker et al., 2021).

TABLE 2. DIMENSIONS OF PSYCHOLOGICAL WELL-BEING AND ITS CONNECTION WITH THE UNIVERSITY DIGITAL ENVIRONMENT

Dimension of well-being	Relationship with digital
Self-acceptance	Identity construction in academic networks
Positive relationships	Interaction through collaborative platforms
Autonomy	Learning management through virtual environments
Life Purpose	Linkage with digital innovation projects
Personal Growth	Continuous acquisition of digital skills
Mastery of the environment	Ability to adapt to emerging technologies

Source: Adapted from Ryff & Keyes (1995); Montenegro-Rueda et al. (2023).

ACADEMIC PERFORMANCE AND TECHNOLOGICAL VARIABLES

Academic performance has been analyzed from various perspectives, and in recent years the digital component has been incorporated as a mediating variable. Students who develop metacognitive strategies supported by ICT tend to show better performance in their studies (Salas-Rueda, 2021). In addition, the ability to efficiently access digital content and participate in virtual academic communities has been linked to greater motivation and productivity (Pereira et al., 2022).

Factors such as technological accessibility, mastery of educational tools, and personal organization through management applications have been considered predictive of academic success (García-Peñalvo et al., 2022). In turn, a positive attitude towards learning in digital environments is correlated with a sense of achievement and academic perseverance (Becker et al., 2021).

METHODOLOGY

RESEARCH APPROACH AND DESIGN

This study uses a **quantitative**, **correlational, and cross-sectional** approach, as it seeks to analyze the relationship between variables by collecting data at a single point in time (Creswell & Creswell, 2018). The correlational design allows natural associations between variables to be observed without the intervention of the researcher, which is appropriate for educational studies that explore psychosocial phenomena in real contexts (Suriá-Martínez et al., 2022).

TABLE 1. METHODOLOGICAL CHARACTERISTICS OF THE STUDY

Element	Description
Approach	Quantitative
Type of study	Correlational
Design	Transverse
Method of analysis	Inferential statistics (correlation and regression)
Software used	IBM SPSS Statistics v.28
Harvest duration	February to March 2025
Context	Universities in Colombia, Mexico and Peru

Source: Authors' elaboration based on Creswell & Creswell (2018).

PARTICIPANTS

A sample of **280 university students** was selected through a non-probabilistic convenience sampling. Participants were enrolled in undergraduate programs at public and private universities in three Latin American countries. Students between 18 and 25 years of age who were studying at least the second academic semester and had experience in the use of virtual platforms were included.

TABLE 2. SOCIODEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

Variable	Frequency (n)	Percentage (%)
Sex		
-Female	158	56.4 %
-Male	122	43.6 %
Age		
- 18–20 years	94	33.6 %
- 21–23 years old	126	45.0 %
- 24–25 years old	60	21.4 %
Academic Program		
-Social sciences	114	40.7 %
- Engineering/Technology	96	34.3 %
- Education and others	70	25.0 %

Source: Prepared by the authors based on data collected.

INSTRUMENTS

Validated instruments adapted to the Spanish-speaking population were used to measure the variables. Each instrument was applied online, guaranteeing content validity and internal reliability through previous pilot tests.

TABLE 3. VARIABLES AND MEASURING INSTRUMENTS

Variable	Instrument	Measurement scale	Reliability (α Cronbach)
Digital skills	Questionnaire based on the DigComp 2.2 Framework (Vuorikari et al., 2022)	5-point Likert	α = 0.89
Psychological well-being	Ryff Psychological Well-Being Scale (abbreviated version)	6-point Likert	α = 0.87
Academic performance	Self-reported and verified cumulative weighted average (PPP)	Numerical scale	N/A

The digital skills instrument was structured in five dimensions according to the European framework (information, communication, creation, security and problem solving), and was validated through exploratory factor analysis. The psychological well-being questionnaire included 18 items representative of the six dimensions proposed by Ryff.

PROCEDURE

Data collection was carried out through electronic forms sent by institutional mail and student social networks. Previously, digital informed consent was obtained from the participants, and the anonymity and confidentiality of the data was guaranteed in accordance with the ethical principles of social research (APA, 2020).
Before the statistical analysis, the assumptions of normality, linearity, and homoscedasticity were verified. Subsequently, **Pearson's correlation** coefficients and **multiple linear regression analysis were applied** to determine the strength and direction of the relationships between variables.

ETHICAL CONSIDERATIONS

The study was approved by an institutional ethics committee and conformed to the principles established by the Declaration of Helsinki and the guidelines of the American Psychological Association (APA, 2020) regarding the ethical treatment of human participants.

RESULTS

Data collection allowed a total of **280 valid responses** to be obtained. After verifying the internal consistency of the instruments, inferential analysis was performed using Pearson correlation and multiple linear regression. Significant associations were identified between digital skills, psychological well-being and academic performance.

DESCRIPTIVE STATISTICS

The average values obtained show that students have a moderately high level of digital skills and psychological well-being, as well as an average academic performance of 3.85 out of 5.0.

TABLE 1. DESCRIPTIVE STATISTICS OF THE MAIN VARIABLES

Variable	Mean (M)	Standard deviation (SD)	Possible range	Interpretation
Digital skills	3.94	0.52	1–5	High
Psychological well-being	4.12	0.48	1–6	Moderate High
Academic Performance (PPA)	3.85	0.39	0–5	Well

Source: Authors' elaboration based on SPSS v.28.

CORRELATIONS BETWEEN VARIABLES

Pearson's correlation analysis revealed **positive and statistically significant associations** between the three variables studied:

- **Digital skills and psychological well-being**: r = **.61**, p < .001
- **Digital skills and academic performance**: r = **.49**, p < .001
- **Psychological well-being and academic performance**: r = **.42**, p < .001

These results suggest that the higher the level of digital competence, the higher the level of perceived psychological well-being and the better the academic performance.

Table 2. Pearson Correlation Matrix

Variables	1	2	3
1. Digital skills	1.00		
2. Psychological well-being	.61**	1.00	
3. Academic Performance (PPA)	.49**	.42**	1.00

Note: **p** .001
Source: Authors' elaboration based on the analysis in SPSS.

MULTIPLE LINEAR REGRESSION

Regression models were applied to identify the **predictive weight** of digital skills and psychological well-being on academic performance.

Model 1: Predicting psychological **well-being** from digital skills

- Adjusted R^2 = **.36**
- F(1, 278) = **158.4**, p < .001

Model 2: Predicting **academic performance** based on digital skills and psychological well-being

- Adjusted R^2 = **.32**
- F(2, 277) = **66.9**, p < .001
-

TABLE 3. MULTIPLE LINEAR REGRESSION MODEL FOR ACADEMIC PERFORMANCE

Independent variable	B	Standard Error	Standardized Beta	t	p
Digital skills	0.28	0.04	0.38	6.87	<.001
Psychological well-being	0.21	0.05	0.29	4.20	<.001

Source: Authors' elaboration with SPSS v.28.

These results indicate that both factors – digital skills and psychological well-being – have a positive and significant effect on academic performance. Digital skills turn out to be the strongest predictor.

ANALYSIS BY SUBGROUPS

An additional analysis was performed by sex and academic area. It was found that:

- Women scored **slightly higher** in psychological well-being (M = 4.21) compared to men (M = 4.00), t(278) = 2.46, p = .014.
- Social science students reported greater critical use of technologies (M = 4.01) than engineering students (M = 3.84), p = .037.

These findings coincide with recent studies that highlight how the academic context and gender influence the development and application of digital skills (Suriá-Martínez et al., 2022; Montenegro-Rueda et al., 2023).

INTERPRETATIVE SYNTHESIS

The results allow us to affirm that **digital skills not only facilitate access to knowledge**, but also **contribute to emotional well-being** and academic success. This evidence is consistent with previous studies that highlight the facilitating role of digital literacy for self-regulation, coping with stress, and academic motivation (Pereira et al., 2022; Romero-Frías et al., 2021).

CONCLUSIONS

The results of this study clearly show that **digital skills** play a fundamental role in contemporary university education, not only as instrumental competencies, but also as **facilitators of psychological well-being** and **academic performance**. In an educational environment that is becoming increasingly hybrid and digitized, possessing technological capabilities is no longer a competitive advantage, but a necessary condition for academic and personal success (Vuorikari et al., 2022).

First, it has been found that students with **higher levels of digital literacy** have significantly higher levels of psychological well-being, characterized by better emotional self-regulation, greater perception of self-efficacy, and a more positive attitude towards learning (Montenegro-Rueda et al., 2023). This suggests that mastery of digital tools not only facilitates academic tasks, but also promotes stable emotional states, by reducing the stress associated with technological uncertainty and digital academic load.

Secondly, **digital skills and psychological well-being are shown to be significant predictors of academic performance**. This implies that students who develop integrated digital competencies—such as information management, critical use of technologies, and digital security—tend to achieve better grades and higher academic satisfaction (Romero-Frías et al., 2021). Likewise, emotional well-being acts as a mediator that enhances academic achievement when there is a solid technological base (Becker et al., 2021).

These findings reinforce the need to rethink curricula in higher education. It is not enough to teach disciplinary content; It is essential to implement **transversal digital training programs** that also integrate psychoeducational accompaniment. As Pereira et al. (2022) highlight, digital training must go hand in hand with the development of socio-emotional skills to have a lasting positive impact.

In addition, the findings highlight gaps based on gender and academic area, which invites the adoption of **differentiated strategies** that address the specific needs of diverse student groups (Suriá-Martínez et al., 2022).

Finally, this study provides relevant empirical evidence in Latin American contexts, which are still little explored in the global literature. It is suggested to continue with longitudinal research that allows analyzing the evolution of these relationships throughout the student's academic and professional career.

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