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Use of digital tools in the academic motivation of university students

Grecia Beatriz Castro Jaime [1*] Gonzalo Alberto Narrea Revelo [1] Maria Guadalupe Orrillo Padilla [2] Ronald Horacio Tárraga Tower [3]

[1] Graduate School Students of César Vallejo University, Peru
[2] Graduate School of the National University of Education Enrique Guzmán y Valle, Peru
[3] Norbert Wiener University, Peru

* Correspondence contact: gcastroj@ucvvirtual.edu.pe

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Abstract: This study determined the relationship between digital tools and academic motivation in university students in Lima, 2025. **Objective:** To analyze this relationship using a quantitative methodology. **Methodology:** A questionnaire was administered to 52 students, evaluating three dimensions of digital tools and three types of motivation. **Results:** 45% of students use digital tools "almost always," with educational resources being the most prominent. The dimensions of purpose and autonomy showed the highest percentages (30%-45%) in academic motivation. **Conclusion:** A positive relationship exists between both variables, enhanced by active strategies such as gamification and digital portfolios, although better pedagogical alignment and personalized feedback are needed.
Keywords: Digital tools, academic motivation, higher education

Uso de herramientas digitales en la motivación académica de los estudiantes de una Universidad

Resumen: Este estudio determinó la relación entre herramientas digitales y motivación académica en estudiantes universitarios de Lima, 2025. **Objetivo:** Analizar esta relación mediante una metodología cuantitativa. **Metodología:** Se aplicó un cuestionario a 52 estudiantes evaluando tres dimensiones de herramientas digitales y tres tipos de motivación. **Resultados:** El 45% de estudiantes usa herramientas digitales "casi siempre", destacando los recursos educativos. Las dimensiones de propósito y autonomía mostraron los porcentajes más altos (30%-45%) en motivación académica. **Conclusión:** Existe una relación positiva entre ambas variables, potenciada con estrategias activas como gamificación y portafolios digitales, aunque se requiere mejor alineación pedagógica y retroalimentación personalizada.
Palabras clave: Herramientas digitales, motivación académica, educación superior

Uso de ferramentas digitais na motivação acadêmica dos estudantes de uma universidade

Resumo: É relevante analisar ferramentas digitais como fator motivacional no ambiente universitário. **Objetivo:** Determinar a relação entre ferramentas digitais e motivação acadêmica de estudantes em uma universidade de Lima em 2025. **Metodologia:** Enquete com 52 estudantes via questionário de 19 perguntas sobre três dimensões de ferramentas digitais (assíncronas, síncronas, recursos educativos) e três tipos de motivação (intrínseca, extrínseca, transcendental). **Resultados:** 45% enquadram-se em "quase sempre" no uso de ferramentas, especialmente recursos educativos; propósito e autonomia na motivação atingem 30-45%. **Contribuição:** Uso progressivo fortalece motivação, mas requer alinhamento pedagógico melhor, feedback personalizado e padrões internacionais. **Conclusão:** Maiores taxas entre estudantes que valorizam impacto positivo via estratégias como gamificação, simulações e portfólios digitais.
Palavras-chave: Ferramentas digitais, motivação acadêmica, ensino superior, universitários.

Utilisation des outils numériques dans la motivation académique des étudiants d'une université

Résumé : Il est pertinent d'analyser les outils numériques comme facteur de motivation universitaire. **Objectif:** Déterminer la relation entre outils numériques et motivation académique chez étudiants d'une université de Lima en 2025. **Méthodologie:** Enquête auprès de 52 étudiants via questionnaire de 19 questions sur trois dimensions d'outils numériques (asynchrones, synchrones, ressources éducatives) et trois types de motivation (intrinsèque, extrinsèque, transcendantale). **Résultats:** 45% se situent en "presque toujours" pour l'utilisation d'outils, surtout ressources éducatives; sens et autonomie en motivation atteignent 30-45%. **Apport:** Utilisation progressive renforce motivation mais nécessite alignement pédagogique amélioré, retour personnalisé et normes internationales. **Conclusion:** Taux plus élevés chez étudiants valorisant impact positif via stratégies comme ludification, simulations et portfolios numériques.
Mots-clés : Outils numériques, motivation académique, enseignement supérieur, universitaires

1. Introduction

The integration of digital tools in higher education has radically transformed teaching and learning processes, becoming a fundamental element for educational innovation in the 21st century. The convergence of technology and pedagogy redefines learning spaces and academic interactions. According to UNESCO (2020), the COVID-19 pandemic drastically accelerated the adoption of educational technologies, revealing both opportunities and significant challenges in their effective implementation, especially in developing countries where digital divides persist as significant barriers to equitable access to quality education. In the Peruvian context, specifically in Lima, this digital transition was marked by significant difficulties. Sevillano (2021) identified structural connectivity problems, critical deficiencies in technological skills among both teachers and students, and evident limitations in collaborative work that generated academic stress and negatively affected the overall educational experience. This complex situation highlighted a palpable gap between emerging virtual teaching and traditional face-to-face education, demanding an urgent adaptation of educational processes, as conceptualized by Hodges et al. (2020) By differentiating between emergency remote teaching implemented as a contingent response and genuine pedagogically planned online learning, academic motivation, understood from Ryan and Deci's (2000) Self-Determination Theory, is composed of intrinsic dimensions related to genuine interest in learning and personal satisfaction, extrinsic dimensions linked to external rewards and social recognition, and transcendental dimensions associated with higher purpose and social contribution, which can be positively influenced by the strategic use of educational technologies, as demonstrated by Pérez (2021) in comprehensive studies with nursing students where techno-pedagogical design showed differentiated impacts according to the students' prior motivational characteristics. Previous research in the Latin American context, such as that of Adanaqué (2021), has established consistent relationships between digital skills and academic motivation, while Tarazona (2022) identified substantial limitations in the effective pedagogical implementation of these tools, especially regarding teacher training and curriculum adaptation. Recent international studies, such as the Mosquera- Gende (2023) and Zhang and Crawford (2024) have demonstrated the specific potential of advanced digital tools such as gamification, augmented reality and digital formative assessments for enhancing student Motivation through immediate feedback mechanisms and personalized learning. Within this comprehensive conceptual framework, the present study seeks to answer the central question about the relationship between digital tools and academic motivation in university students in Lima during 2025 with specific objectives aimed at determining the differential impact on the three motivational dimensions considering the conceptual framework of Celis (2022) on digital tools classified as asynchronous, synchronous and educational resources, and Pariona (2025) on academic motivation, providing updated and contextualized evidence for the design of post-pandemic educational strategies that respond to the real needs of the contemporary Lima university environment.

2. Methodology

The information used for this study was collected based on the current curriculum design and the academic experiences of university students in Lima during the year 2025. A structured questionnaire based on the dimensions proposed by Celis (2022) and Pariona (2025) was administered. The instrument was validated through expert review by three specialists in curricular experiences related to the variables included in the research, ensuring the relevance and clarity of the questions. The survey was administered via Google Forms to students who voluntarily agreed to participate. A quantitative-descriptive approach was used, with a non-probabilistic purposive sample of 52 students from a university in Lima during the last week of September 2025. All responses were

weighted equally to analyze the perception of digital tools as a motivational factor in the academic environment.

The survey consisted of 19 questions; some were phrased affirmatively and others negatively to avoid bias in the responses; for each question there were five alternatives, some phrased affirmatively and others negatively by including the word "no" in the wording to avoid bias in the responses. The following alternatives were used, with their respective weightings:

NC = Never (weighting 1)

CN= Almost Never (weighting 2)

AV= A Times (weighting 3)

CS= Almost Always (weighting 4)

SE = Always (weighting 5)

The analysis of the results are he did according to three dimensions Tools for asynchronous interaction, Tools for synchronous interaction, Educational Resources obtained from Celis's research (2022) and the dimensions of Intrinsic Motivation, Extrinsic Motivation, Transcendental Motivation of Pariona (2025) using frequencies and percentages within descriptive statistics.
Furthermore, for inferential statistics, correlations were determined using Spearman's Rho correlation statistic because the variables were non-parametric, using Excel and SPSS version 20 and/or artificial intelligence to correlate the response values.

No.	Questions	Alternatives				
1	Do you use asynchronous digital tools to improve virtual platforms?	NC	CN	av	CS	HE
2	The tools Do asynchronous digital tools allow them to improve their learning?	NC	CN	av	CS	HE
3	Do you believe that asynchronous digital tools enable the achievement of meaningful learning?	NC	CN	av	CS	HE
4	Do you use video platforms like Zoom, Google Meet, or Microsoft Teams to conduct your synchronous consultations?	NC	CN	av	CS	HE
5	Do you consider the tools Synchronous digital tools to facilitate real-time learning?	NC	CN	av	CS	HE
6	Do synchronous video conferences using Zoom and Meet allow for active participation in classes?	NC	CN	av	CS	HE
7	educational resources in class sessions ?	NC	CN	av	CS	HE

8	Do you find it easier to carry out your activities using educational resources?	NC	CN	av	CS	HE
9	Do you prefer to use educational resources to carry out your activities?	NC	CN	av	CS	HE
10	Did I always have a reason to want to learn about the professional career?	NC	CN	av	CS	HE
11	I am convinced that studying is not only necessary to meet life's needs.	NC	CN	av	CS	HE
12	I enjoy academic activities that involve challenges and obstacles to overcome.	NC	CN	av	CS	HE
13	I consider myself a person with leadership qualities	NC	CN	av	CS	HE
14	I am fully committed to strengthening and improving the institutional climate.	NC	CN	av	CS	HE
15	I get involved in the activities that are planned at the institution.	NC	CN	av	CS	HE
16	I believe that student counseling activities inspire students to become better students.	NC	CN	av	CS	HE
17	I believe that teachers provide guidance and support to students.	NC	CN	av	CS	HE
18	Do I believe that the use of technological resources strengthens the teaching process?	NC	CN	av	CS	HE
19	I believe that in collaborative work each member demonstrates their abilities.	NC	CN	av	CS	HE

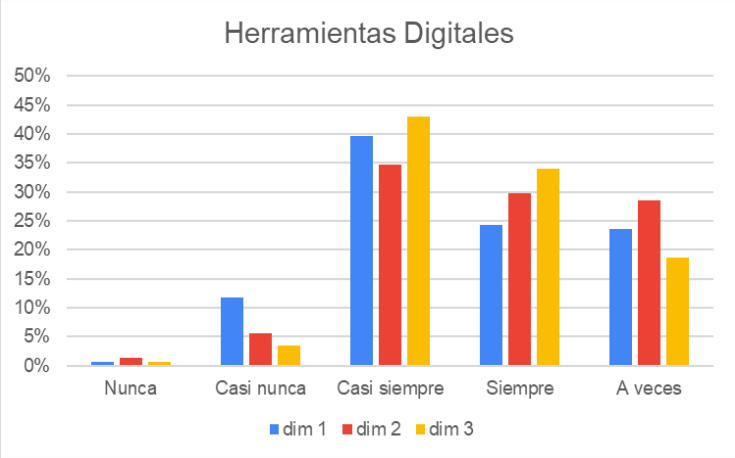
3. Results

3.1. Descriptive statistics.

The results presented are based on the responses provided according to the Digital Tools variable.

Figure 1

Variable 01: Digital Tools



Analysis of the *Digital Tools variable* reveals that the largest percentage of students falls into the *Almost Always category* , particularly in dimension 3, reaching approximately 45%. This result suggests a significant presence of digital tools in the academic experience, although not necessarily constant or fully integrated. The *Always* and *Sometimes categories* also show relevant percentages (between 25% and 30%), indicating a moderate frequency of use, but with variability across dimensions.

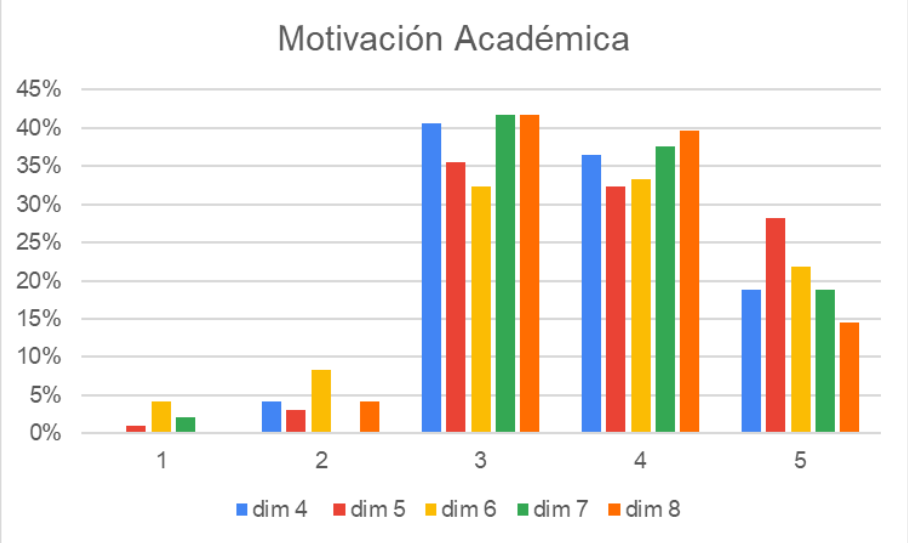
Despite this presence, limitations have been identified regarding the pedagogical alignment of digital use. While the tools facilitate access to content and the organization of tasks, they do not always translate into sustained motivational strategies. Dimension 1, for example, shows lower participation in the *"Never"* and *"Almost never" categories* , which could reflect a lack of significant integration in certain aspects of the learning process.

It is recommended to strengthen the use of digital tools through interactive platforms, multimedia resources, and collaborative environments that promote autonomy and academic interest. It is also suggested to incorporate digital portfolios and motivational rubrics that allow for demonstrating individual progress and encourage self-assessment.

Although students value access to digital resources, they express a need for greater personalization and feedback options that directly impact their motivation. The increasing use of digital tools still lacks alignment with international standards for academic motivation, which limits their comparability and effectiveness.

Finally, although the results obtained can guide curricular adjustments and institutional decisions, the implementation process is often bureaucratic and slow, which hinders the timely incorporation of technological and pedagogical improvements (Hodges et al., 2020).

Figure 2
Variable 02: Academic Motivation



The analysis of the *Academic Motivation variable* shows a diverse distribution across the five dimensions evaluated (dimensions 4 to 8), with a predominance in categories 3 and 4 of the graph, which concentrate the highest percentages (between 30% and 45%). Dimension 7 (green) and dimension 8 (light blue) stand out for their consistent presence in the upper categories, suggesting that certain motivational factors—such as recognition, autonomy, or academic purpose—are being activated more frequently.

However, categories 1 and 2 show low percentages (below 15%), indicating that some students still experience limited levels of motivation, possibly linked to unstimulating environments or methodologies that do not connect with their interests. Dimension 4 (blue), for example, shows lower participation in the higher categories, which could reflect weaknesses in emotional support or clarity of academic goals.

It is recommended to strengthen motivational factors through pedagogical strategies that integrate digital tools for educational purposes, such as simulators, gamification, and collaborative environments. These tools can enhance intrinsic motivation by allowing students to actively engage in their learning process.

Although students value their progress, there is a clear demand for greater flexibility, personalized feedback, and opportunities for reassessment that recognize effort and continuous improvement. While academic motivation is increasing, it still lacks alignment with international frameworks that would allow for comparison and structural improvement.

Finally, the results obtained can guide adjustments in educational management, but they require less bureaucratic and more agile processes to implement significant changes in the student experience (Hodges et al., 2020).

3.2. Inferential Statistics

It was determined by correlations using Spearman's Rho correlation statistic because the variables were non-parametric, all correlations were significant and the summary of these correlations is presented in the following table.

Table 02 : Correlation values between the dimensions of the variables

	Variable 01: Digital Tools			Variable 02: Academic Motivation		
	Tools for asynchronous interaction (HIA)	Tools for synchronous interaction (HIS)	Educational Resources (ER)	Intrinsic Motivation (IM)	Extrinsic motivation (ME)	Transcendental Motivation (TM)
(HIA)	1.00	0.75	0.79	0.65	0.87	0.82
(HIS)	0.75	1	0.79	0.65	0.87	0.82
(RE)	0.79	0.71	1.00	0.79	0.76	0.81
(MY)	0.65	0.58	0.79	1.00	0.72	0.68
(ME)	0.87	0.69	0.76	0.72	1.00	0.84
(MT)	0.82	0.73	0.81	0.68	0.84	1.00

Spearman's rank correlation analysis reveals positive and statistically significant relationships among all the dimensions studied. Particularly strong correlations, considered high (rho > 0.75), were identified between Asynchronous Interaction Tools (AIT) and Extrinsic Motivation (EM) with a coefficient of 0.87, as well as between AIT and Transcendental Motivation (TM) with 0.82. Similarly, Educational Resources (ER) showed a high correlation with both Intrinsic Motivation (IM) at 0.79 and TM at 0.81. On the other hand, the correlations between the Synchronous Tools (SWT) dimension and the different motivations fell within a moderate range (between 0.58 and 0.73). This pattern suggests that the flexibility of asynchronous tools and the richness of digital educational resources have a stronger association with the different types of academic motivation in students.

4. Discussion

The results obtained confirm and expand upon previous findings reported in the specialized literature, such as those of Adanaqué (2021), who established significant positive relationships between digital skills and academic motivation in specific Peruvian educational contexts, although with samples of different demographic characteristics. The high correlation between asynchronous tools and extrinsic motivation (rho = 0.87) conceptually coincides with that reported by Ryan and Deci (2000) in their Self-Determination Theory, where the temporal flexibility and management autonomy provided by these tools satisfy basic psychological needs for autonomy and competence, favoring self-determined motivation, especially in students with a high academic workload or simultaneous work responsibilities. The strong association between digital educational resources and intrinsic motivation (rho = 0.79) finds empirical support in recent international research, such as that of Hellín et al. (2023) and Camacho-Sánchez et al. (2022) who demonstrated through experimental designs that gamified elements , interactive resources, and immersive environments substantially increase student engagement and intrinsic motivation through mechanisms of intellectual curiosity and appropriate cognitive challenge. However, significant challenges persist, as identified in our study, such as the consistent gap in the emotional support dimension. This aligns with Huamán's (2024) observation regarding the critical need for educational personalization and individualized follow-up that transcends technological automation. Peña's (2025) findings on the structural disconnect between instrumental technological use and deep pedagogical standards are also reflected in our results. Despite the frequent and widespread use of digital tools, there is limited integration with deep motivational strategies and the development of higher-order thinking skills. These structural limitations explain why, according to Tarazona (2022), mere technological availability and instrumental access do not, by themselves, guarantee significant motivational improvements without adequate intentional pedagogical mediation and evidence-based instructional

design, the systemic integration of reflective digital portfolios, and systems. Personalized formative feedback, as suggested by Tejada and Pozos (2018), emerges as a promising alternative to strengthen this essential connection between technology and motivation through metacognitive processes and authentic assessment. Our study provides updated and contextualized evidence on these complex relationships in the Peruvian post-pandemic context, where, according to UNESCO (2020), it is necessary to strategically rethink technological integration beyond the health emergency towards sustainable hybrid models that take advantage of the lessons learned during the crisis. Additionally, the findings on the three identified clusters suggest the need for differentiated approaches according to students' techno-motivational profiles, avoiding uniform solutions that ignore the diversity of learning needs and preferences in the contemporary university population.

5. Conclusions

The study established, through robust statistical analysis, a positive and statistically significant relationship between the use of digital tools and academic motivation in university students in Lima during 2025. Correlations ranged from moderate to strong depending on the specific dimensions analyzed, revealing differential patterns of association. Asynchronous tools showed the strongest association with extrinsic motivation (rho=0.87), while educational resources showed a greater link with intrinsic motivation (rho=0.79). Synchronous tools presented more modest but significant correlations with all motivational dimensions. Significant gaps were identified in the dimension of emotional support and in the deep pedagogical integration of digital tools, suggesting the need to develop comprehensive institutional strategies that transcend basic technological access towards transformative pedagogical appropriations. As immediate practical implications, the implementation of specific teacher training programs in digital pedagogical design with a motivational focus and the development of integrated virtual mentoring systems are recommended. that strengthen personalized emotional and academic support, and the deliberate integration of active strategies such as adaptive gamification, contextualized simulations and authentic project-based learning with robust technological support, future longitudinal research should explore the moderating role of institutional variables such as prior teacher training, differentiated technological access and organizational cultures in this dynamic relationship, as well as design specific techno-pedagogical interventions that allow establishing more definitive causal relationships between the use of digital tools and the different types of academic motivation through quasi-experimental designs in the context of Peruvian higher education, finally the findings suggest the convenience of developing institutional digital education policies that explicitly integrate motivational dimensions in educational development plans ensuring the sustainability of technological innovations beyond specific projects.

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Grecia Beatriz Castro Jaime (25%): Conceptualization, Data Curation, Formal Analysis
Gonzalo Alberto Narrea Revelo (25%): Validation, Visualization, Resources. Randall
Maria Guadalupe Orrillo Padilla (25%): Methodology, Software, Supervision,
Ronald Horacio Tárraga Torre (25%): Writing – original draft, Writing – revision and editing.

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