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REVIEW

Digital transformation and financial education in post-pandemic higher education: A systematic review

Transformación digital y educación financiera en la Educación Superior post-pandemia: Una revisión sistemática

Pedro Luis Bracho-Fuenmayor[1], Neiba Yadira Echeagaray Solorza[2], Gabriel Alejandro Rivadeneira Fuel[3], Juan Manuel Quintero Ramírez[4]

[1]Universidad Tecnológica Metropolitana. Santiago de Chile. Chile.
[2]Institución, Universidad Autónoma de Sinaloa. Mazatlán. México.
[3]Universidad Internacional del Ecuador (UIDE). Quito. Ecuador.
[4]Secretaría de Ciencia, Humanidades, Tecnología e Innovación-Colegio de Postgraduados. Texcoco. México.

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Corresponding author: Pedro Luis Bracho-Fuenmayor

ABSTRACT

Introduction: financial education, intertwined with digital literacy, plays a crucial role in promoting financial resilience and inclusion. However, challenges such as low digital financial literacy and regional disparities persist.
Objective: this systematic review aims to analyze the strategies implemented by universities worldwide to integrate digital transformation into financial education, focusing on its impact on vulnerable student populations.
Method: the study followed the PRISMA guidelines for systematic reviews. A comprehensive search was conducted in Scopus using Boolean operators to identify relevant empirical studies and systematic reviews published between 2020 and 2024. Out of 359 initial articles, 15 met the inclusion criteria after a rigorous screening process. Thematic synthesis and quality assessment were performed using ATLAS.ti and the MERSQI tool.
Results: the findings highlight that digital transformation enhances financial literacy and inclusion, particularly through tools like fintech and biometric systems. However, disparities exist, with rural and low-income students facing greater challenges. Studies from BRICS countries and China demonstrated the potential of digital finance to reduce income gaps, while research in Mexico and Poland revealed barriers such as self-exclusion and digital fatigue.
Conclusions: digital financial literacy is essential for modern higher education, requiring curricular integration and institutional cultural shifts.

Keywords: Digital Transformation; Financial Education; Digital Financial Literacy; Higher Education; Systematic Review.

RESUMEN

Introducción: la educación financiera, entrelazada con la alfabetización digital, desempeña un papel crucial en la promoción de la resiliencia financiera y la inclusión. Sin embargo, persisten desafíos como la baja alfabetización financiera digital y las disparidades regionales.

Objetivo: esta revisión sistemática tiene como objetivo analizar las estrategias implementadas por universidades de todo el mundo para integrar la transformación digital en la educación financiera, con un enfoque en su impacto en poblaciones estudiantiles vulnerables.
Método: el estudio siguió las directrices PRISMA para revisiones sistemáticas. Se realizó una búsqueda exhaustiva en Scopus utilizando operadores booleanos para identificar estudios empíricos relevantes y revisiones sistemáticas publicadas entre 2020 y 2024. De 359 artículos iniciales, 15 cumplieron con los criterios de inclusión tras un riguroso proceso de selección. Se llevó a cabo una síntesis temática y una evaluación de calidad utilizando ATLAS.ti y la herramienta MERSQI.
Resultados: los hallazgos destacan que la transformación digital mejora la alfabetización financiera y la inclusión, particularmente a través de herramientas como fintech y sistemas biométricos. Sin embargo, existen disparidades, siendo los estudiantes rurales y de bajos ingresos quienes enfrentan mayores desafíos. Estudios de países BRICS y de China demostraron el potencial de las finanzas digitales para reducir las brechas de ingresos, mientras que investigaciones en México y Polonia revelaron barreras como la autoexclusión y la fatiga digital.
Conclusiones: la alfabetización financiera digital es esencial para la educación superior moderna, requiriendo una integración curricular y cambios culturales institucionales.

Palabras clave: Transformación Digital; Educación Financiera; Alfabetización Financiera Digital; Educación Superior; Revisión Sistemática.

INTRODUCTION

According to Surjawan et al.[1], digital transformation in higher education institutions improves operational efficiency and stakeholder engagement, enhancing educational quality and addressing challenges such as digital culture, leadership commitment, and resource allocation.[2] In this regard, authors such as Deroncele-Acosta et al.[3] assert that post-COVID-19 success in higher education in Latin America was driven by digital transformation and technological innovation, which can be shaped into an agenda for positive change.

Financial and digital literacy, as pointed out by Lyons et al.[4] are key factors in building financial inclusion and resilience, with heterogeneities between regions and genders. In this regard, digitization has been shown to impact financial literacy and individual capacity, with fintech (financial technology), financial behavior in digital environments, and behavioral interventions as key issues.[5]

In this case, financial technology has the potential to revolutionize personal financial planning, well-being, and social welfare, but financial education and responsible financial policies are crucial to improving overall well-being.[6] In this regard, Yadav and Benerki[7] warn that digital financial literacy is currently low, and a global agreement on definitions and measurements is needed to counteract the development of fintech and create effective training programs and policies.

In this regard, it is observed that digital transformation in financial management education in private universities is successful when driven by collaborative efforts from faculty and greater student engagement.[8,9] In turn, according to Hidayat-Ur-Rehman[10] digital trans and the adoption of fintech, with financial literacy as a key moderator, significantly improve sustainable performance in the banking sector.

Following this theoretical framework, this research aims to analyze the strategies implemented by universities in various contexts regarding financial education and its relationship with digital transformation. Likewise, as a cross-cutting theme, the side effects observed in vulnerable student populations will be discussed.

METHOD

The study was designed as a systematic review of the literature, a methodology that has become the standard for synthesizing scientific evidence with rigor and transparency, according to Siddaway et al.[11] The PRISMA guidelines were used to conduct the study.[12]

Inclusion criteria

The selection of documents was governed by strict parameters that balanced specificity and coverage. First, priority was given to studies focusing on digital pedagogies (e-learning, gamification, or simulators) applied to university financial education. Second, the time frame was limited to publications between 2020 and 2024, a critical period for analyzing educational adaptations following the pandemic. Only empirical articles and systematic reviews were included, excluding editorials or isolated case studies. Finally, given the international scope of the phenomenon, texts in English, Spanish, and Portuguese were accepted, as these languages account for the most relevant academic production in this field.

Search strategy, selection, and data extraction

The literature was collected in Scopus. The search equation combined key terms using Boolean operators: ("*financial literacy*" OR "*financial education*") AND ("*higher education*" OR "*university*") AND ("*digital pedagogy*" OR "e-learning" OR "*EdTech*"). This formula sought to maximize sensitivity without sacrificing precision, a difficult but essential balance to avoid bias in the initial sample. Data were extracted using a standardized template that captured variables such as methodological design, geographical context, and key findings (table 1), a process that required iterations to ensure inter-rater consistency.

The screening followed a two-phase protocol (figure 1). In the initial stage, 359 articles were identified using the general search formula. Subsequently, two researchers independently evaluated titles and abstracts, discarding documents that were clearly irrelevant due to duplication (68) or illegibility (54). The preselected texts (217) moved on to a comprehensive reading phase, where their alignment with the criteria was verified. These 227 texts were filtered by type of research, resulting in 108 scientific articles. These texts were then filtered to retain those that analyzed the relationship between digital transformation and financial education in post-pandemic higher education, resulting in 15 studies that made up the corpus of analysis for this study.

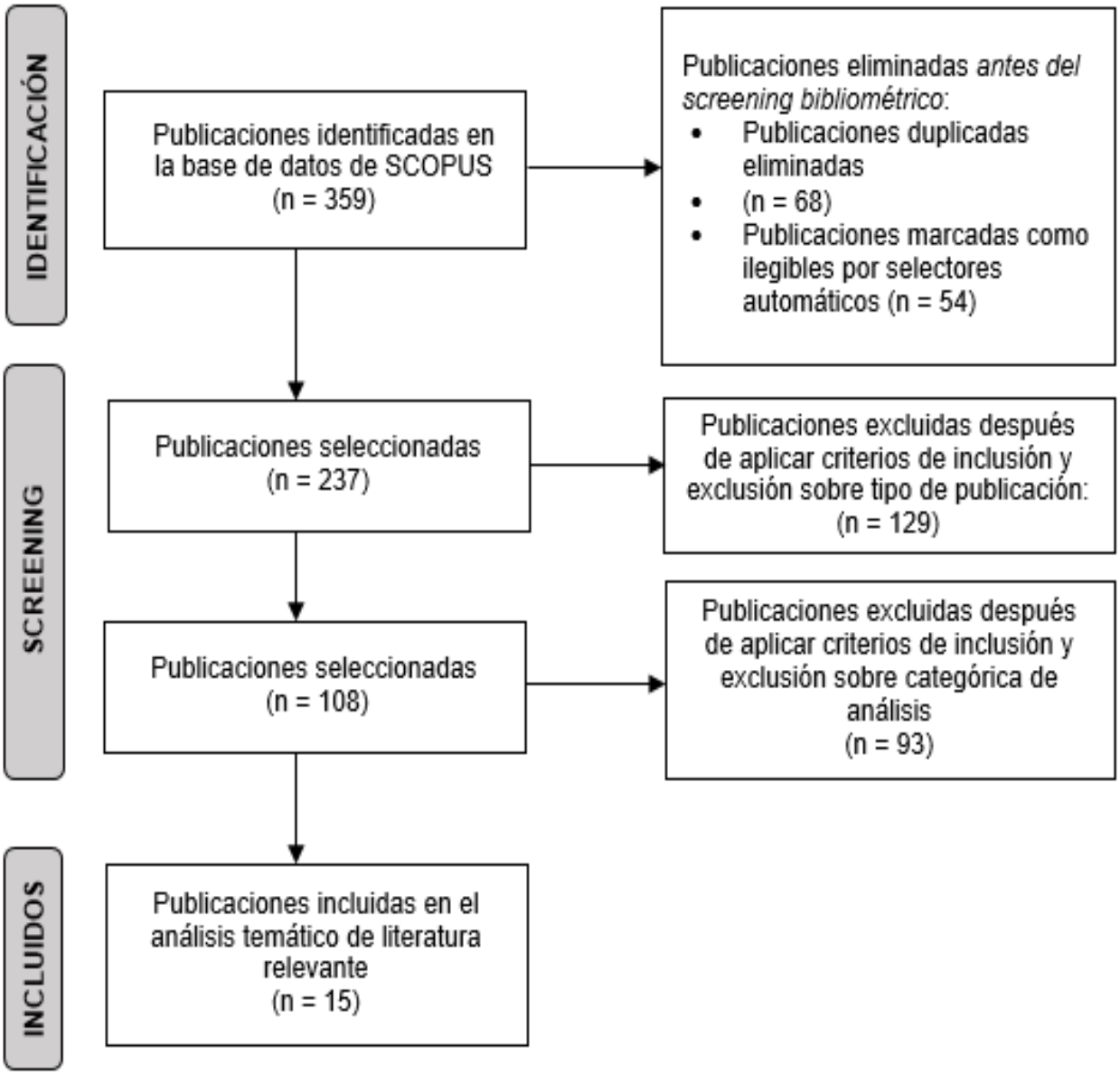

Figure 1. Flowchart for the inclusion of research

Table 1. General characteristics of the studies included

Code	Methodological design	Geographical context	Key findings
E_01[13]	Factor analysis and literature review	Spain (rural environment)	Financial literacy is lower in rural areas, with limited income and lower education levels. Digital transformation can break this vicious cycle.
E_02[14]	Partial linear functional model with panel data	BRICS countries (11 countries)	Fintech improves water productivity, especially in countries with high levels of education (index >2,3).
E_03[15]	Group interviews and thematic analysis (Atlas.ti 24 software)	Malaysia	Financial digital literacy is key to overcoming challenges such as limited access to banking services and digital risks.
E_04[16]	Bibliometric analysis (Scopus, WoS, VosViewer, Google Trends)	Global (emphasis on the US, UK, China)	Exponential growth in research since 2020. Four thematic clusters identified, highlighting innovation and socioeconomic challenges.
E_05[17]	Surveys and statistical analysis (SPSS 28,0)	South Korea (Busan and Gyeongnam)	Financial literacy and digital skills have a positive impact on entrepreneurial intention, with partial mediation by entrepreneurial spirit.
E_06[18]	Design and testing of a financial management system using biometric technology	China	Biometric system achieves high accuracy (ERR: 0,027) and efficiency (99,92 % authentication success rate), improving university financial management.
E_07[19]	Expert interviews and conference analysis	Global	Strategic education and phased implementation are key to CBDC adoption.
E_08[20]	Static panel model (Stata)	China (22 provinces)	Digital financial inclusion reduces the urban-rural income gap, with a greater impact in western regions.
E_09[21]	22 focus groups in educational institutions	Mexico	Young people perceive a need for digital financial education, but there is voluntary exclusion and gaps in public institutions. They prefer emerging technological resources.
E_10[22]	Text mining, IPCC method, and econometric models	China (manufacturing industry)	Digitization reduces carbon intensity, with mixed effects (greater impact with environmental regulation and advanced executive education).
E_11[23]	Telephone surveys and statistical analysis (Chi-square, ANOVA)	Czech Republic (330 SMEs)	Service SMEs show greater interest in digital literacy than manufacturing SMEs. There are no differences in digital transformation stages by size or sector.
E_12[24]	Endogenous change probability model (household surveys)	China (1,063 households)	Digital finance increases the adoption of eco-agricultural technology by 51,5 %, especially among older and less educated farmers.
E_13[25]	Student surveys (999 participants)	Poland	Advantages: time and cost savings. Disadvantages: loss of social ties and digital fatigue. Assessment varies depending on the mode of learning (hybrid vs. uniform).
E_14[26]	Regional data analysis and model development	Russia (Priyenisei region)	Need to increase functional literacy among students. A model is proposed that takes into account regional specificity and digital transformation.
E_15[27]	Regulatory analysis and chi-square test	Russia	Optimized educational standards and data protection are required for digital transformation in legal education. Online training improves digital skills.

Thematic analysis and synthesis

The evidence was examined using thematic synthesis assisted by ATLAS.ti, software that allowed for the coding of recurring patterns and emerging contradictions. Using this software, in accordance with the benefits reported by Soratto et al.[28], it was possible to construct code tables that facilitated the identification and development of the predominant thematic links in the contemporary scientific literature.

At the same time, an adaptation of the MERSQI (*Medical Education Research Study Quality Instrument*) was applied.[29] The aim was to evaluate the methodological quality of the included studies (table 2).

For the evaluation, a table was created with the results of each of the 15 studies and the scores obtained (table 3). The articles with the highest scores (E_02, E_04, E_06, E_08, E_10, E_12) stood out for their rigorous design, advanced analysis, and applicable results. The qualitative studies (E_03, E_07, E_09, E_15) had limitations in terms of the generalizability of the results, but they provided valuable data for the study.

Table 2. MERSQI rating by category

Criterion	Rating
Study design	1 = Survey/post-test 2 = Cross-sectional/qualitative study 3 = Longitudinal/experimental/systematic review
Sampling	1 = No description 2 = Non-random/intentional 3 = Random/representative
Data type	1 = Unstructured qualitative 2 = Simple quantitative/structured qualitative 3 = Longitudinal/experimental data
Validity of instruments	1 = Not reported 2 = Partially reported 3 = Demonstrated (e.g., technical/statistical tests)
Data analysis	1 = Descriptive 2 = Basic inferential/thematic 3 = Advanced models (e.g., econometric)
Results	1 = Few clear 2 = Relevant but limited 3 = Robust and applicable

Table 3. Results of the MERSQI evaluation

Code	Study Design	Sampling	Type of Data	Validity Instruments	Data Analysis	Results	Total
E_01	2 (Observational study)	2 (Non-random sample)	2 (Quantitative data)	1 (Validity not reported)	2 (Descriptive/ inferential analysis)	2 (Clear but limited results)	1
E_02	3 (Quasi-experimental study)	2 (Non-random sample)	3 (Longitudinal quantitative data)	2 (Partially reported validity)	3 (Advanced statistical analysis)	3 (Robust and applicable results)	16
E_03	2 (Qualitative study)	2 (Intentional sample)	2 (Qualitative data)	2 (Validity through triangulation)	2 (Thematic analysis)	2 (Relevant but subjective results)	1
E_04	3 (Systematic/ bibliometric review)	3 (Comprehensive sample)	3 (Quantitative secondary data)	2 (Validity of bibliometric tools)	3 (Statistical and network analysis)	3 (Well-structured results)	1
E_05	2 (Cross-sectional study)	2 (Non-random sample)	2 (Quantitative data)	2 (Questionnaire validity)	2 (Regression analysis)	2 (Clear but limited results)	12
E_06	3 (Technical experimental study)	2 (Non-random sample)	3 (r experimental quantitative data)	3 (Demonstrated technical validity)	3 (Statistical analysis and performance testing)	3 (Technically sound results and performance tests)	17
E_07	2 (Qualitative study)	2 (Expert sample)	2 (Qualitative data)	2 (Validity through consensus)	2 (Thematic analysis)	2 (Results applicable but not generalizable)	12
E_08	3 (Longitudinal study)	3 (Representative sample)	3 (Quantitative panel data)	2 (Validity of indicators)	3 (Econometric analysis)	3 (Robust and comparative results)	17
E_09	2 (Qualitative study)	2 (Intentional sample)	2 (Qualitative data)	2 (Validity through triangulation)	2 (Thematic analysis)	2 (Contextualized results)	1
E_10	3 (Econometric study)	3 (Representative sample)	3 (Quantitative data)	2 (Validity of metrics)	3 (Multivariate analysis)	3 (Results with policy implications)	17
E_11	2 (Cross-sectional study)	2 (Stratified sample)	2 (Quantitative data)	2 (Survey validity)	2 (ANOVA/Chi-square analysis)	2 (Sectoral results)	12
E_12	3 (Quasi-experimental study)	3 (Representative sample)	3 (Quantitative data)	2 (Model validity)	3 (Endogenous selection analysis)	3 (Results with practical impact)	17
E_13	2 (Cross-sectional study)	2 (Non-random sample)	2 (Quantitative data)	2 (Questionnaire validity)	2 (Descriptive analysis)	2 (Results limited to context)	12

E_14	2 (Descriptive study)	2 (Regional sample)	2 (Quantitative data)	1 (Validity unclear)	2 (Basic analysis)	2 (Results applicable regionally)	1
E_15	2 (Qualitative study)	2 (Institutional sample)	2 (Qualitative/ quantitative data)	2 (Partial validity)	2 (Basic statistical analysis)	2 (Results with recommendations)	1

RESULTS

General analysis

The landscape of digital transformation and financial education: a summary of findings

The analysis of the studies included in this research shows promising results in relation to how digital transformation, in all its aspects, is transforming financial education in higher education (figure 2). In this case, the analysis in rural settings presented in E_01 showed that low financial literacy is linked to lower income and access to education. However, it was striking that digitization was found to be a valuable tool for addressing these negative relationships in this study.

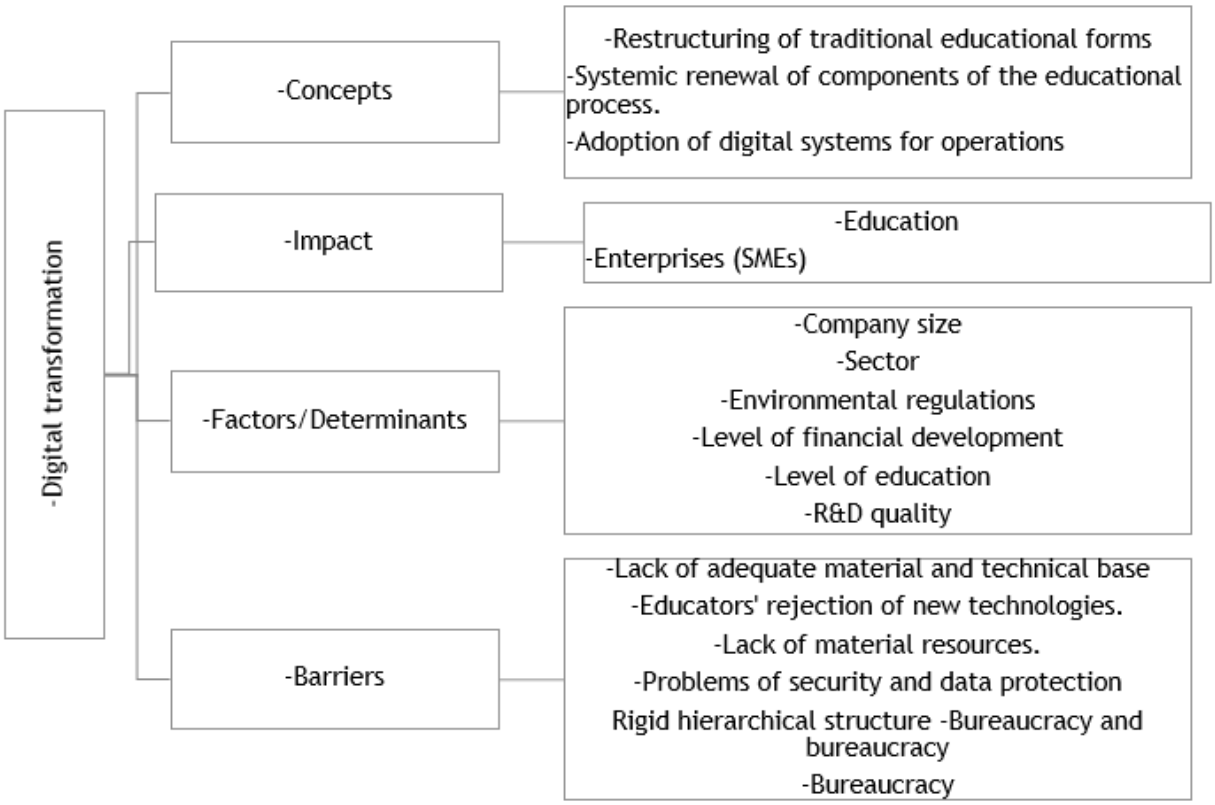

Figure 2. Characteristic aspects of digital transformation and financial education

Similarly, E_02 conducts an analysis in member countries of the BRICS group, emphasizing that the use of *fintech* improves water productivity, especially in regions with higher levels of education. This suggests that combining this technology with training in its use amplifies the economic benefits of its employability. In this line of analysis, the case of E_03 in Malaysia introduced an interesting finding: the lack of awareness of financial products in digital contexts limited their adoption in the sample studied. This, in line with the findings of E_02, points to the need to integrate financial education with digital skills.

Additionally, E_04 contributes to this topic with a global bibliometric analysis. Its results emphasize exponential growth in research since 2020. The authors link this growth to the pandemic, as well as to the growing demand for inclusive digital solutions.

Financial education in the digital age: challenges and emerging skills

In line with the international outlook presented in the previous section, the need for financial education was observed, especially in its two-way relationship with digital transformation (figures 3 and 4). In this regard, particularly in Mexico, E_09 finds that the young people surveyed perceive the need to understand financial and digital security concepts. However, they frequently face voluntary self-exclusion, which, combined with existing gaps between public and private institutions, hinders their inclusion.

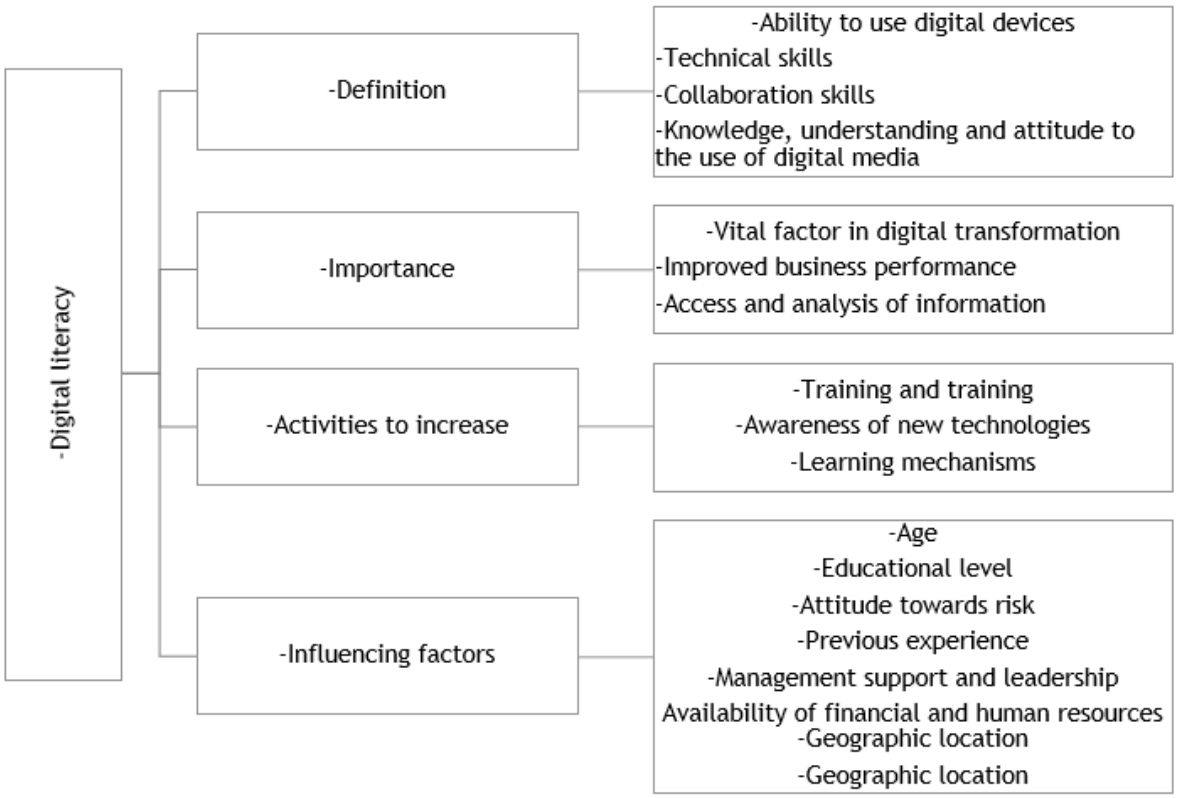

Figure 3. Characteristic aspects of digital literacy

This curiously widespread phenomenon is also repeated in South Korea (E_05). In this context, university students point out that financial literacy, combined with digital skills training, is an essential link for entrepreneurship. Similarly, E_04 in Russia showed that students with low levels of functional literacy demand the urgent adaptation of current educational models to the demands of the digital age.

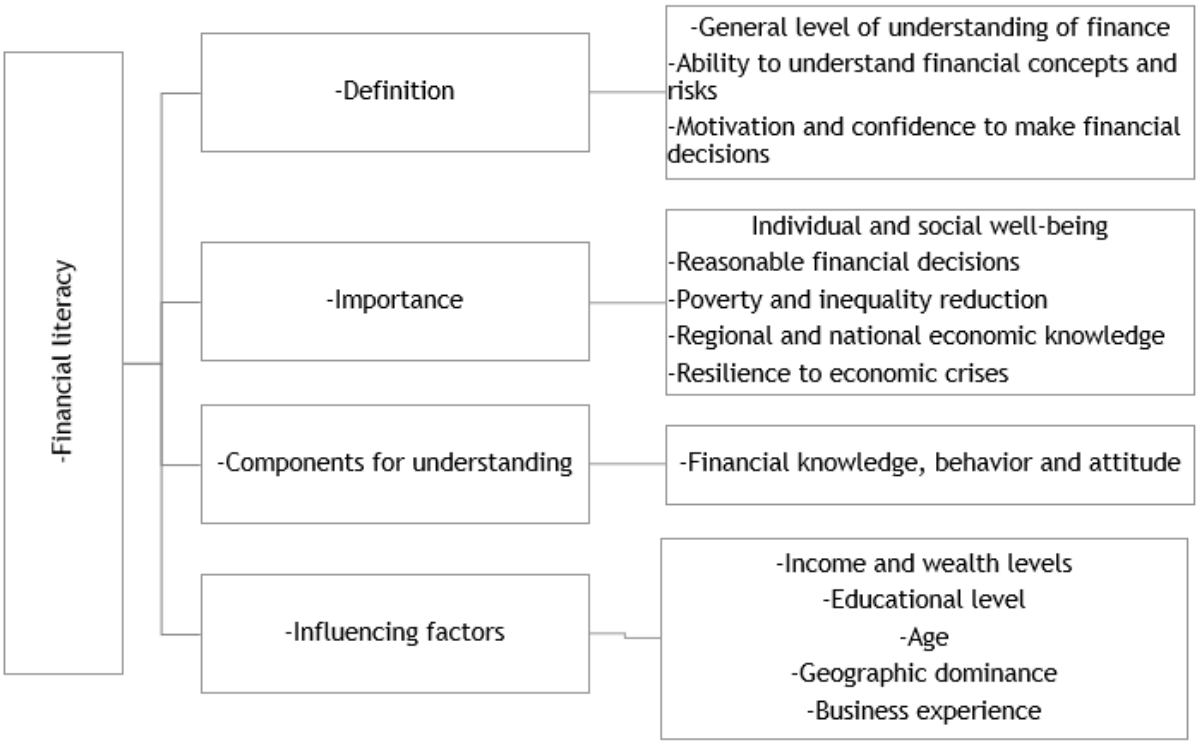

Figure 4. Characteristic aspects of financial literacy

In this regard, Poland (E_13) had a canonical experience, as the remote education model adopted during the pandemic brought benefits such as time savings. However, it was still associated with digital fatigue and loss of social interaction.

Innovation and digital tools in financial management and education

The integration of digital tools, particularly in education and its relationship with financial management, shows interesting results (figure 5). That said, the study on universities conducted in E_06 shows that biometric systems improved security and efficiency in financial management, with authentication success rates of 99,92 %. In China, the study conducted in E_10 concluded that the digitization of manufacturing companies reduced carbon emissions. This reinforces the idea that technological innovation influences sustainability, both economically and environmentally.

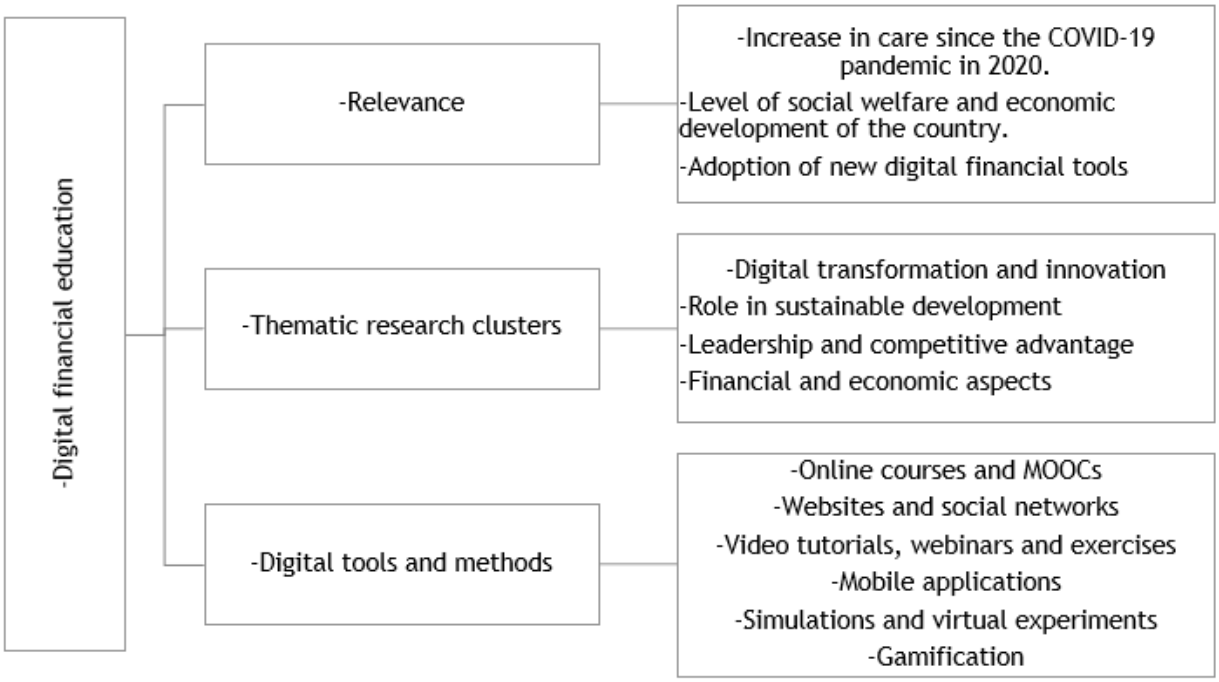

Figure 5. Characteristic aspects of digital financial education

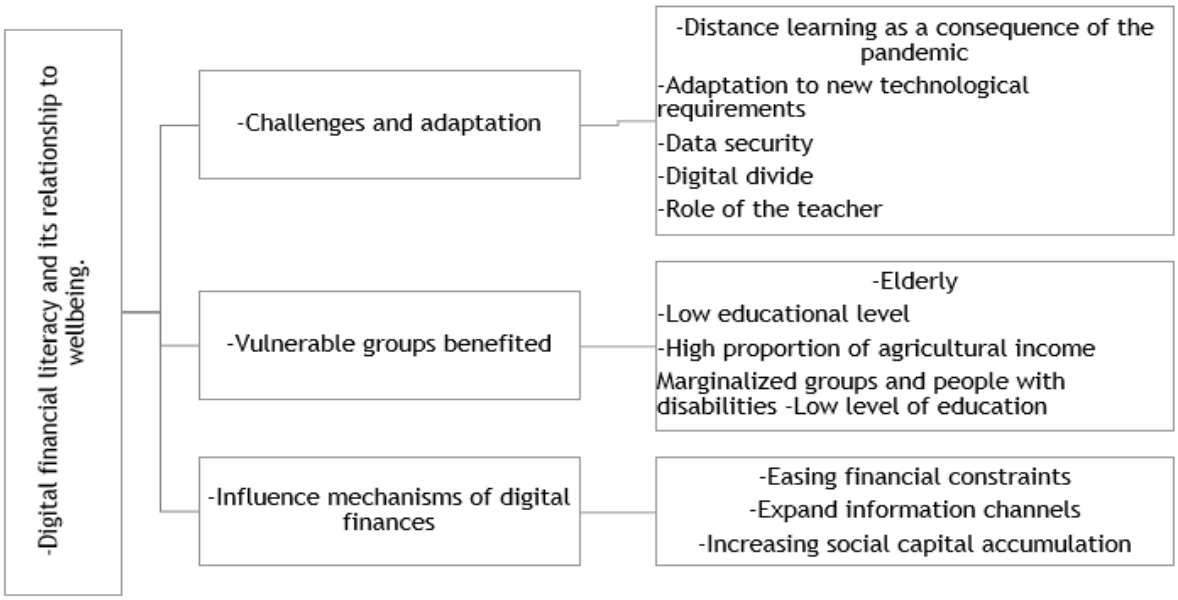

Figure 6. Characteristic aspects of digital financial education

Impact of digitization on financial inclusion and well-being

A significant body of research associates financial digitization with the economic well-being of users, in

this case in vulnerable populations (figure 6). In the context of China, study E_08 found that digital financial inclusion significantly reduces the income gap between urban and rural areas. Interestingly, this effect was more pronounced in less developed regions. In the same geographical context, this time among Chinese farmers (E_12), it was found that digital finance increased the adoption of eco-agricultural technologies by farmers by 51,5 %. This mainly benefited users with lower levels of education or predominant agricultural income.

The Chinese experience complements study E_07 on CBDCs and, together, they highlight the democratizing potential of digitalization. This was particularly evident in its ability to empower traditionally excluded groups. However, E_07 points out that the effective and efficient adoption of these technologies requires mainstreaming through education focused on financial management and risk management to avoid further exclusion.

Thematic analysis

Theme 1: Digital and financial literacy in higher education

The codes identified in the thematic analysis by ATLAS.ti are presented in table 4. In relation to these, the scientific literature consulted confirms that digitization in financial education in universities has the potential to increase financial resilience and well-being, but, as Velinova-Sokolova[30] points out, challenges must be addressed to effectively implement digital financial education initiatives. In this regard, evidence gathered by Dheepiga and Kumar[31] showed that digital financial literacy among university students needs to improve, as current levels of awareness highlight knowledge gaps and areas for improvement.

The solution to this, according to Fadiyah and Widodo[32], lies in the fact that financial technology and financial literacy improve students' financial management behavior, with digital literacy strengthening the effect of financial technology on financial behavior. Thus, integrating large language models into digital financial literacy education will improve students' financial inclusion literacy, transcending teacher limitations and time and space constraints.[33]

Table 4. Codes identified on digital and financial literacy in higher education

Category	Associated codes	Description
Student competencies	Financial literacy	It stands out as an essential skill for people to manage their finances effectively.
	Digital financial literacy	Defined as the ability to manage financial resources through technology and digital platforms
	Functional literacy	It is mentioned as a priority in education, as a country's level of social welfare and economic development depend on its level of functional literacy
	Entrepreneurial skills	These are identified as crucial skills for university students to adapt to new trends and promote new businesses in a rapidly changing work environment following COVID-19
Pedagogical and curricular challenges	Optimization of educational standards	The need to optimize educational standards for teaching digital skills to law students is highlighted
	Digital financial literacy gap	This gap was found to be more pronounced among young people in public educational institutions

The category Student Skills encompasses skills that go beyond the use of basic digital tools. This, according to Mykytyuk and Mykytyuk[34], is because financial technologies, such as artificial intelligence, blockchain, and decentralized finance, are revolutionizing the financial sector by making services more accessible, personalized, and efficient, while addressing regulatory challenges and ensuring financial inclusion.

However, Yudina et al.[35] point out that the implementation of digital technologies in financial management faces significant obstacles and limitations, highlighting the need for organizations to modify management models and adapt organizational elements for optimal use of digital tools. This aspect is corroborated in the study by Zuhro et al.[36], who state that digital platforms in financial management in educational institutions improve efficiency, transparency, and accuracy, but face challenges such as technological infrastructure, educator skills, and data security.[37]

Faced with these challenges, the category of pedagogical and curricular challenges reveals structural tensions. Financial literacy standards in schools often frame financial well-being as a personal endeavor, neglecting the broader social, economic, and political forces that influence financial outcomes.

At the same time, there is political bias in curriculum programs. Robin Henager and colleagues[38] argue that personal finance education in US schools is influenced by national curriculum standards, state mandates, teacher training, and policies, with various organizations and resources assisting in implementation. The above raises an interesting question: if universities are unable to educate citizens capable of navigating digitalized economies, how relevant is their role in the post-pandemic society?

Topic 2: Impact of digital transformation on society and the economy

The codes identified in the thematic analysis by ATLAS.ti are presented in table 5. In relation to these, digital transformation has transcended its role as a mere technological facilitator to become a structuring axis of contemporary socioeconomic dynamics. In the Asian context, it can be observed that digital transformation in Chinese companies increases labor participation by alleviating financial constraints, benefiting state-owned, labor-intensive, and highly developed digital financial areas.[39]

In this regard, Wang et al.[40] identify that digital transformation improves the efficiency of corporate labor investment by reducing agency problems and mitigating financing constraints, with a more pronounced effect on non-labor-intensive industries, private companies, and those with more highly skilled labor. Digital technologies also contribute to the development of a digital labor market model and sustainable financing opportunities, allowing companies to integrate into global markets and access international financial markets.[41]

Even in the agricultural sector, digital transformation significantly improves financial performance in agricultural enterprises by reducing sales expenses, easing cost rigidity, and promoting disruptive innovation.[42] Despite this, although digital finance contributes to the digital transformation of agribusiness, Liu et al.[43] emphasize that limitations in financing and financial risk hinder its effectiveness, with effective financial regulation reducing these negative impacts.

Table 5. Codes identified on the impact of digital transformation on society and the economy

Category	Associated codes	Description
Inclusion and equity	Fintech and financial inclusion	The role of financial technology in reducing income disparities between urban and rural areas is highlighted.
	Access to financial services	Digital finance facilitates access to banking services, which is essential in a cashless society
	Adaptation to digital finance	The need for specific educational efforts to facilitate the adoption of central bank digital currencies (CBDCs) is emphasized
Innovation and economic development	Adoption of agricultural technologies	Digital finance improves farmers' ability to adopt sustainable agricultural technologies
	Digital infrastructure	A biometric university financial management system can support the infrastructure for biotechnology education
	Educational technologies	The implementation of a unified digital platform and the use of artificial intelligence are key directions for the digitization of legal education

The specialized literature corroborates the equalizing potential of digitization, albeit with revealing nuances. The study by Anton and Nacu[44] showed that digital financial inclusion has a positive impact on banking stability, with a greater impact in low-risk countries and through operational efficiency transmission channels.

In this way, digital banking has contributed significantly to financial inclusion in both the United States and Nigeria, but success varies due to differences in economic development, regulatory environments, and technological infrastructure.[45] It should also be emphasized, as described earlier in this study, that financial technology (fintech) positively impacts economic growth in developing countries through improved digital payment systems, while traditional financial inclusion can negatively impact growth.[46]

The second dimension reveals applications that challenge conventional narratives on innovation and economic development. In agriculture, Liu et al.[24] suggest that digital finance significantly promotes the adoption of eco-agricultural technology by farmers, especially among older, vulnerable, and less educated farmers. As a result, digital, rural, and financial agriculture in China have a close symbiotic relationship, driving rural revitalization and agricultural modernization.[47]

Theme 3: Change management and risks associated with digitization

The codes identified in the thematic analysis by ATLAS.ti are presented in table 6. They indicate that digital transformation poses complex challenges that require adaptive strategies at both the institutional and individual levels. For this very reason, Brunetti et al.[48] emphasize that digital transformation in regional innovation systems requires a multifaceted set of strategic actions, including digital education, talent and culture, digital infrastructure, artificial intelligence, and investments in the ecosystem. However, while digital transformation strategies offer opportunities to improve customer experience, business processes, and strategic renewal, they face challenges such as financial weakness, misalignment, and cyber threats.[49]

Table 6. Codes identified for change management and risks associated with digitization

Category	Associated codes	Description
Institutional and strategic management	University financial management	Explores the integration of biometric grid systems for the digital transformation of university financial management
	Educator training	The creation of a unit in Russian universities to deal with online education issues is recommended. The importance of training educators for the implementation of digitization is also highlighted
	Implementation strategy	The need for phased implementation and prudent risk management for the successful adoption of CBDCs is emphasized
Risks and digital security	Risk protection	It is highlighted that digital financial literacy is vital for people to protect themselves from online fraud, identity theft, and other risks associated with digital financial transactions

Educational institutions face the challenge of integrating disruptive technologies without compromising their core functions. According to Yang and Zhang[50], smart financial systems for universities address current financial management issues by improving efficiency and communication between approvers and reimbursement staff.

However, technology alone does not guarantee success; teacher training is essential. Higher education support units contribute to digital transformation by providing open digital platforms, pedagogy, and support for the production of online courses, but the lack of supportive leadership can hinder successful transformation.[51]

The other side of digitization lies in its vulnerabilities. Financial literacy can provide protection against online fraud, as basic financial knowledge reduces the likelihood of being scammed online, and overconfidence increases the likelihood of fraud, even in contexts of high online exposure such as the Covid-19 pandemic.[52]

DISCUSSION

The digital transformation in higher education institutions aims to develop more advanced and effective methods and practices, while addressing the challenges these institutions face in the pursuit of digital transformation, according to Surjawan et al.[1] The COVID-19 pandemic accelerated this already ongoing process.

This phenomenon, however, transcends its frequent reduction in the literature as a mere technological adoption event. As Golden and Cordie[53] have shown, digital financial literacy is crucial for adult learners to make better financial decisions using digital devices, as it is as important as reading, writing, and arithmetic in today's digital economy. However, while digital finance increases financial inclusion, it requires tailored financial education programs and robust regulatory frameworks to effectively manage digital banking.[54]

It should also be noted that this study provides a seminal point of analysis, as it corroborated the findings of Azim and Jowarder[55] , where successful digital initiatives in financial services require the integration of emerging technologies, agile organizational structures, and strong leadership to foster innovation, customer engagement, and sustainable growth. Therefore, it can be said that digital transformation is crucial for effective business financial management, as traditional methods no longer meet modern business needs.[56]

Latin America is no stranger to this trend, although its pace of adoption is slower than in other regions. For García[57], digital skills training, access to innovative technologies, and support networks improve the competitiveness and sustainability of women's businesses in Latin America. Although these digital technologies can revolutionize teaching and learn Latin America, Okoye et al.[58] make it clear that they also face barriers such as lack of training, infrastructure, and internet access.

Hence, although digitization has the potential to improve the lives of vulnerable populations in Latin America, it requires specific needs to advance development and consider cultural and situational factors. This ultimately points to the need for financial education. According to Fornero and Lo Prete[60], this improves personal finances and citizenship by reducing financial fragility, increasing economic independence, and influencing electoral behavior, economic reforms, policy outcomes, and democratic functioning.

CONCLUSIONS

Digital financial literacy is no longer a complementary part of education but has become an essential component of contemporary higher education. Unlike traditional financial education, which focuses on static concepts, this skill requires dynamic abilities, management and resources on digital platforms, as well as the ability to discern cyber risks and adapt to constantly evolving technological environments. The findings are clear: without these skills, future professionals will face not only employment disadvantages but also practical vulnerabilities, from fraud to identity theft. Integrating it into curricula is no longer a pedagogical debate; it is a condition for educational relevance in digitized economies. That is why the role of universities is decisive here. As the studies analyzed point out, successful digital transformation requires more than just hardware and software; it requires institutional cultural change. Therefore, teachers are needed who are trained not only in the use of tools, but also in their critique, who have flexible educational standards and a change management approach that prioritizes sustainability over technological fads. Curiously, the literature agrees on a key point:

institutions that manage to integrate digital technology organically are those that understand technology not as an end in itself, but as a means to rethink pedagogy itself.

REFERENCES

1. Surjawan D, Langi A, Imbar R. Digital Transformation for Institution Operations in Higher Education: A Literature Review. IEEE Access. 2025;13:61457-68. https://doi.org/10.1109/ACCESS.2025.3557446

2. Bracho-Fuenmayor PL. Estado fallido. Un análisis desde la perspectiva de Rotberg. Encuentros. Revista de Ciencias Humanas, Teoría Social y Pensamiento Crítico. 2025;23:228-44. https://doi.org/10.5281/zenodo.14268859

3. Deroncele-Acosta Á, Palacios-Núñez M, Toribio-López A. Digital Transformation and Technological Innovation on Higher Education Post-COVID-19. Sustainability. 2023;15(3):2466. https://doi.org/10.3390/su15032466

4. Lyons A, Kass-Hanna J, Liu F, Greenlee A, Zeng L. Building Financial Resilience Through Financial and Digital Literacy in South Asia and Sub-Saharan Africa. Financial Literacy eJournal. 2020. https://doi.org/10.2139/ssrn.3496562

5. Koskelainen T, Kalmi P, Scornavacca E, Vartiainen T. Financial literacy in the digital age – A research agenda. Journal of Consumer Affairs. 2023;57(1):507-28. https://doi.org/10.1111/joca.12510

6. Panos G, Wilson J. Financial literacy and responsible finance in the FinTech era: capabilities and challenges. The European Journal of Finance. 2020;26(4):297-301. https://doi.org/10.1080/1351847X.2020.1717569

7. Yadav M, Banerji P. Systematic literature review on Digital Financial Literacy. SN Business & Economics. 2024;4:142. https://doi.org/10.1007/s43546-024-00738-y

8. Jiang C, Bin X, Li T. Practices and Insights of Digital Transformation in Financial Management Education at Private Universities. World Journal of Education and Humanities. 2023. https://doi.org/10.22158/wjeh.v5n3p134

9. Bracho-Fuenmayor PL. Diálogo de saberes como método disruptivo en enseñanza-aprendizaje y evaluación del derecho a través de la investigación. Revista Pedagogía Universitaria y Didáctica del Derecho. 2025;12(1):139-54. https://doi.org/10.5354/0719-5885.2025.75475

10. Hidayat-Ur-Rehman I. The role of financial literacy in enhancing firm's sustainable performance through Fintech adoption: a moderated mediation analysis. International Journal of Innovation Science. 2024. https://doi.org/10.1108/ijis-03-2024-0056

11. Siddaway A, Wood A, Hedges L. How to Do a Systematic Review: A Best Practice Guide for Conducting and Reporting Narrative Reviews, Meta-Analyses, and Meta-Syntheses. Annual Review of Psychology. 2019;70:747-70. https://doi.org/10.1146/annurev-psych-010418-102803

12. Rethlefsen ML, Kirtley S, Waffenschmidt S, et al. PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. Systematic Reviews. 2021;10(1). https://doi.org/10.1186/s13643-020-01542-z

13. Gallego-Losada MJ, Montero-Navarro A, Gallego-Losada R, Rodríguez-Sánchez JL. Measuring financial divide in the rural environment: The potential role of the digital transformation of finance. International Entrepreneurship and Management Journal. 2024;20:2791–810. https://doi.org/10.1007/s11365-024-00992-4

14. Işık C, Han J, Zhang W, Muhammad A, Pinzon S, Jabeen G. Sustainable Development Goals (SDGs): The nexus of fintech and water productivity in 11 BRICS countries. Journal of Environmental Management. 2024;372:123405. https://doi.org/10.1016/j.jenvman.2024.123405

15. Kamarudin NS. Addressing financial challenges in Malaysia and enhancing digital financial literacy: Insights from practitioners. The Malaysian Journal of Qualitative Research. 2024;10(2):100204. https://doi.org/10.61211/mjqr100204

16. Rahmanov F, Neymatova L, Hashimova A, Aghazada T. Quantitative appraisal and scientometric

exploration into the digitization of education. Financial and Credit Activity Problems of Theory and Practice. 2024;2(55):588–606. https://doi.org/10.55643/fcaptp.2.55.2024.4385

17. Kang GL, Park CW, Jang SH. A Study on the Impact of Financial Literacy and Digital Capabilities on Entrepreneurial Intention: Mediating Effect of Entrepreneurship. Behavioral Sciences. 2024;14(2):121. https://doi.org/10.3390/bs14020121

18. Xie Q. Biometric grid systems in university financial management: Driving digital transformation to support biotechnology innovation. Journal of Commercial Biotechnology. 2024;29(4). https://commercialbiotechnology.com/article-detail/?id=1935

19. Horváth D. Money in the digital age: Exploring the potential of central bank digital currency with a focus on social adaptation and education. Sustainable Futures. 2023;6:100136. https://doi.org/10.1016/j.sftr.2023.100136

20. Liu J, Puah CH, Arip MA, Jong MC. Impacts of digital financial inclusion on urban-rural income disparity: A comparative research of the eastern and western regions in China. Economies. 2023;11(11):282. https://doi.org/10.3390/economies11110282

21. Buenestado-Fernández M, Ramírez-Montoya MS, Ibarra-Vazquez G, Patiño A. Digital competency as a key to the financial inclusion of young people in complex scenarios: A focus groups study. Citizenship, Social and Economics Education. 2023;22(1):48-62. https://doi.org/10.1177/14788047231170083

22. Yang G, Wang F, Deng F, Xiang X. Impact of Digital Transformation on Enterprise Carbon Intensity: The Moderating Role of Digital Information Resources. International Journal of Environmental Research and Public Health. 2023;20(3):2178. https://doi.org/10.3390/ijerph20032178

23. Krajčík V, Novotný O, Civelek M, Semrádová Zvolánková S. Digital Literacy and Digital Transformation Activities of Service and Manufacturing SMEs. Journal of Tourism and Services. 2023;14(26):242-62. https://doi.org/10.29036/jots.v14i26.551

24. Liu Z, Qi Z, Tian Q, Clark JS, Zhang Z. The Impact of Digital Finance on Farmers' Adoption of Eco-Agricultural Technology: Evidence from Rice-Crayfish Co-Cultivation Technology in China. Agriculture. 2024;14(4):611. https://doi.org/10.3390/agriculture14040611

25. Ober J, Kochmańska A. Remote Learning in Higher Education: Evidence from Poland. International Journal of Environmental Research and Public Health. 2022;19(21):14479. https://doi.org/10.3390/ijerph192114479

26. Khramova LN, Lobanova OB, Basalaeva NV, Firer AV, Kirgizova EV. The model of formation of functional literacy of students in the conditions of digital transformation taking into account regional specificity. Journal of Siberian Federal University. Humanities & Social Sciences. 2022;15(10):1394-403. https://doi.org/10.17516/1997-1370-0773

27. Demchenko MV, Gulieva ME, Larina TV, Simaeva EP. Digital transformation of legal education: Problems, risks and prospects. European Journal of Contemporary Education. 2021;10(2):297-307. https://eric.ed.gov/?id=EJ1311537

28. Soratto J, Pires D, Friese S. Thematic content analysis using ATLAS.ti software: Potentialities for researchs in health. Revista Brasileira de Enfermagem. 2020;73(3):e20190250. https://doi.org/10.1590/0034-7167-2019-0250

29. Jaros S, Dallaghan G. Medical education research study quality instrument: an objective instrument susceptible to subjectivity. Medical Education Online. 2024;29(1). https://doi.org/10.1080/10872981.2024.2308359

30. Velinova-Sokolova N. Digitalization in Financial Education in The Universities. Yearbook of UNWE. 2022;2:05. https://doi.org/10.37075/yb.2022.2.05

31. Dheepiga S, Kumar N. Exploring digital financial literacy and services knowledge: A comprehensive study

amongst college student. ShodhKosh: Journal of Visual and Performing Arts. 2024;5(1):839-50. https://doi.org/10.29121/shodhkosh.v5.i1.2024.2203

32. Fadiyah N, Widodo H. Financial technology and literacy shaping students' financial management with digital literacy. Indonesian Journal of Law and Economics Review. 2024;19(4). https://doi.org/10.21070/ijler.v19i4.1160

33. Chen Y. Research on the application of large language model to financial digital literacy education. Proceedings of the 2024 2nd International Conference on Information Education and Artificial Intelligence. 2024;748-52. https://doi.org/10.1145/3724504.3724627

34. Mykytyuk P, Mykytyuk V. Financial technologies in money management, investments and financial services. Herald of Economics. 2025;1:65-78. https://doi.org/10.35774/visnyk2025.01.065

35. Yudina S, Lysa O, Razumova H, Oskoma O, Halahanov V. Management and administration of financial resources using digital technologies. Scientific Bulletin of Mukachevo State University Series "Economics". 2024;11(1):92-102. https://doi.org/10.52566/msu-econ1.2024.92

36. Zuhro S, Taufik I, Rahmawati I, H. The use of digital platforms in financing management in primary schools. International Journal of Economic Integration and Regional Competitiveness. 2024;1(6):1-12. https://doi.org/10.61796/ijeirc.v1i4.100

37. Soroko A. Buying into dominant ideas about wealth and poverty: An examination of U.S. and Canadian financial literacy standards. Teachers College Record: The Voice of Scholarship in Education. 2020;122:1-50. https://doi.org/10.1177/016146812012200301

38. Henager R, Kabaci M. Financial education in schools. The Routledge Handbook of Financial Literacy. 2021;17. https://doi.org/10.4324/9781003025221-18

39. Li C, Huo P, Wang Z, Zhang W, Liang F, Mardani A. Digitalization generates equality? Enterprises' digital transformation, financing constraints, and labor share in China. Journal of Business Research. 2023;163:113924. https://doi.org/10.1016/j.jbusres.2023.113924

40. Wang S, Wen W, Niu Y, Li X. Digital transformation and corporate labor investment efficiency. Emerging Markets Review. 2024;59:101109. https://doi.org/10.1016/j.ememar.2024.101109

41. Ciobanu G, Dinu M, Iacob O, Constantinescu V. Digital labour market model and financial opportunities in the context of sustainable development in the EU countries. European Journal of Sustainable Development. 2022;11(3):15. https://doi.org/10.14207/ejsd.2022.v11n3p15

42. Yuan Y, Wu H, Shen Y. Achieve sustainable operation of agricultural enterprises: improving agribusiness performance through digital transformation. Frontiers in Sustainable Food Systems. 2025;9:1547358. https://doi.org/10.3389/fsufs.2025.1547358

43. Liu X, Wang X, Yu W. Opportunity or challenge? Research on the influence of digital finance on digital transformation of agribusiness. Sustainability. 2023;15(2):1072. https://doi.org/10.3390/su15021072

44. Anton S, Nucu A. The impact of digital finance and financial inclusion on banking stability: International evidence. Oeconomia Copernicana. 2024;15(2):563-93. https://doi.org/10.24136/oc.3046

45. Nnaomah U, Aderemi S, Olutimehin D, Orieno O, Ogundipe D. Digital banking and financial inclusion: a review of practices in the USA and Nigeria. Finance & Accounting Research Journal. 2024;6(3):971. https://doi.org/10.51594/farj.v6i3.971

46. Azmeh C, Al-Raeei M. Exploring the dual relationship between fintech and financial inclusion in developing countries and their impact on economic growth: Supplement or substitute? PLOS ONE. 2024;19(12):e0315174. https://doi.org/10.1371/journal.pone.0315174

47. Yang X, Liu K, Li W. Symbiotic relationship and attribution analysis of digitalization in agriculture,

rural, and finance: evidence from China. Frontiers in Sustainable Food Systems. 2025;9:1545548. https://doi.org/10.3389/fsufs.2025.1545548

48. Brunetti F, Matt D, Bonfanti A, De Longhi A, Pedrini G, Orzes G. Digital transformation challenges: strategies emerging from a multi-stakeholder approach. The TQM Journal. 2020;32(4):697-724. https://doi.org/10.1108/tqm-12-2019-0309

49. Khoshroo M, Talari M. Discovery and analysis of global studies trend on digital transformation strategy: exploring challenges and opportunities. Kybernetes. 2024. https://doi.org/10.1108/k-12-2023-2643

50. Yang G, Zhang Y. Design of smart financial system for digital campus in higher education institutions. Journal of Computers. 2025;36(1):221-37. https://doi.org/10.63367/19911599202502360101 5

51. Langseth I, Jacobsen D, Haugsbakken H. The role of support units in digital transformation: How institutional entrepreneurs build capacity for online learning in higher education. Technology, Knowledge and Learning. 2022;28:1745-782. https://doi.org/10.1007/s10758-022-09620-y

52. Isaia E, Oggero N, Sandretto D. Is financial literacy a protection tool from online fraud in the digital era? SSRN Electronic Journal. 2023. https://doi.org/10.2139/ssrn.4390532

53. Golden W, Cordie L. Digital financial literacy. Adult Literacy Education: The International Journal of Literacy, Language, and Numeracy. 2022. https://doi.org/10.35847/wgolden.lcordie.4.3.20

54. Tabassum T, Ali M. Financial literacy in the age of digital finance: A global perspective. Academic Journal on Business Administration, Innovation & Sustainability. 2024;12(5):3. https://doi.org/10.69593/ajbais.v4i3.79

55. Azim R, Jowarder R. Navigating digital transformation in financial services: Strategic management: concepts and cases for sustainable growth and innovation. World Journal of Advanced Engineering Technology and Sciences. 2024;13(01):319-29. https://doi.org/10.30574/wjaets.2024.13.1.0420

56. Xu X, Zhang H. Analysis of enterprise financial management under the background of digital transformation. SHS Web of Conferences. 2024;181(02030):5. https://doi.org/10.1051/shsconf/202418102030

57. García E. Habilidades digitales y el empoderamiento femenino: análisis del impacto en la sostenibilidad empresarial de América Latina. Revista Multidisciplinar Epistemología de las Ciencias. 2025;2(2):197-207. https://doi.org/10.71112/mw9sbg90

58. Okoye K, Hussein H, Arrona-Palacios A, et al. Impact of digital technologies upon teaching and learning in higher education in Latin America: an outlook on the reach, barriers, and bottlenecks. Education and Information Technologies. 2022; 28:2291-360. https://doi.org/10.1007/s10639-022-11214-1

59. Zárate Z, Trujillo C, Plaza-De-La-Hoz J. Digitalization in vulnerable populations: A systematic review in Latin America. Social Indicators Research. 2023;170:1183-207. https://doi.org/10.1007/s11205-023-03239-x

60. Fornero E, Lo Prete A. Financial education: From better personal finance to improved citizenship. Journal of Financial Literacy and Wellbeing. 2023;1(1):12-27. https://doi.org/10.1017/flw.2023.7

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AUTHOR CONTRIBUTION

Conceptualization: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Data curation: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Formal analysis: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Research: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Methodology: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Project management: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Resources: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Software: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Supervision: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Validation: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Visualization: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Writing – original draft: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

Editing – review and editing: Pedro Luis Bracho-Fuenmayor, Neiba Yadira Echeagaray Solorza, Gabriel Alejandro Rivadeneira Fuel, Juan Manuel Quintero Ramírez.

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