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Digital Skills as Academic Capital: A Study on Their Compulsory Nature in Contemporary University Education

1. Karina Yuleisy Gonzalez-Vasquez
Universidad Estatal de Milagro
ORCID: https://orcid.org/0000-0002-9400-7953
2. Ninfa Sofia Guevara-Peñaranda
Universidad Estatal de Milagro
ORCID: https://orcid.org/0000-0001-6638-8851
3. Fernando Patricio Riera-Hermida
Universidad Estatal de Milagro
ORCID: https://orcid.org/0009-0006-7570-1305
4. Brigita Valerina Ledesma-Acosta
Universidad Estatal de Milagro
ORCID: https://orcid.org/0000-0002-5982-9273
5. Mariela Elizabeth Gonzalez-Vazquez
Universidad Estatal de Milagro
ORCID: https://orcid.org/0009-0003-1478-6788

Abstract: In the context of the digital transformation of higher education, this study analyzes the role of digital skills as part of academic capital in universities. It is proposed that these competencies should be considered mandatory within university curricula, given their relevance for learning, research and employability. Through a mixed methodological approach that combines surveys and literature review, the relationship between the acquisition of digital skills and academic performance is evidenced, as well as its influence on professional insertion. The results suggest an urgent need for institutional policies that integrate these skills in a transversal way in university education.

Keywords: Digital skills, academic capital, university education, ICT competencies, higher education.

1. Introduction

The digital revolution has generated a structural transformation in all areas of society, including higher education. In this context, **digital skills** are positioned as a fundamental component not only to access educational content, but also to actively participate in academic, research, and professional processes. These competencies range from the basic use of technological tools to the critical ability to manage information, communicate effectively in virtual environments, and create digital content (Cabero-Almenara et al., 2020).

In recent years, multiple international organizations have recognized the importance of digital literacy as an essential condition to guarantee inclusive, equitable and quality education. The **European Union**, through its DigCompEdu framework, has proposed specific standards for the development of digital competences in teachers and students (Redecker, 2017; Vuorikari et al., 2022). For its part, **UNESCO (2021)** has emphasized that university education must adapt to the changes of the twenty-first century through a new educational social contract, in which digital skills are integrated transversally at all levels and academic disciplines.

In Latin America, the COVID-19 pandemic revealed profound inequalities in access to technology and in the digital preparation of university students, which directly affected their academic performance and their permanence in educational programs (Area-Martínez & Hernández-Ramos, 2020; García-Peñalvo et al., 2021). This scenario prompted higher education institutions to rethink their pedagogical and curricular models to respond more effectively to the demands of the digital society. However, progress has been uneven and, in many cases, digital skills are still treated as extracurricular or complementary content, instead of being mandatory and assessable skills (Briceño-Sánchez & Gómez-Zerpa, 2023).

In addition to their functional usefulness, digital skills represent a form of **academic capital**, understood as the set of symbolic and technical resources that students accumulate during their educational trajectory and that allows them to better position themselves in the professional and scientific field (Silva et al., 2023). Along these lines, it is proposed that the obligatory nature of these competencies in university education not only responds to technological demands, but also to criteria of **educational equity, employability and institutional quality**.

This study analyzes the current state of the integration of digital skills in university curricula, with the aim of arguing their mandatory incorporation as an essential part of academic capital. The research seeks to answer the following questions: What is the level of digital proficiency of university students? How are these skills integrated into the curricular offer? What implications would its mandatory nature have for the academic and professional development of students?

Theoretical Framework

1. Digital skills: definition and dimensions

Digital **skills** are a set of capabilities that enable the safe, critical, and creative use of digital technologies for learning, work, and participation in society. This concept has been defined by the European Commission through the **DigComp** framework (Vuorikari et al., 2022), which identifies five key areas:

1. Information and data literacy
2. Digital Communication and Collaboration
3. Digital Content Creation
4. Digital Security
5. Solving technical and technological problems

These dimensions should not be understood as watertight compartments, but as interdependent competencies that shape the digital profile of the contemporary citizen and university student (Cabero-Almenara & Palacios-Rodríguez, 2022).

Table 1. Digital Competence Areas according to the DigComp 2.2 Framework (Vuorikari et al., 2022)

Area of competence	Short Description
Information and data literacy	Search, evaluate, and manage digital information
Digital Communication and Collaboration	Interact, share, collaborate and participate in digital environments
Digital Content Creation	Produce, edit, and schedule digital content with appropriate licenses
Digital Security	Protecting devices, personal data, health and well-being online
Troubleshooting	Identify technology needs and resolve common technical errors

2. Academic capital and digital transformation

Academic capital, inspired by Bourdieu's (1986) notion of cultural capital, refers to the set of resources that an individual accumulates during his or her educational trajectory and that position him or her in a specific field of knowledge. In the contemporary digital environment, this capital must include mastery of the technological tools necessary to research, produce knowledge, and communicate effectively (Silva et al., 2023).

The incorporation of digital skills into academic capital transforms the rules of the game in the university environment, as it determines who can access certain academic spaces, publish in scientific journals or participate in global knowledge networks (Briceño-Sánchez & Gómez-Zerpa, 2023). In this sense, digital divides not only represent technological inequalities, but also academic and social inequalities.

3. Digital competences as a criterion of educational quality

Various studies agree that universities that integrate digital skills structurally into their curricula offer better teaching-learning conditions, promote pedagogical innovation, and improve the employability levels of their graduates (Area-Martínez & Hernández-Ramos, 2020; García-Peñalvo et al., 2021). In addition, digital competencies have been shown to contribute to educational equity, especially when applied in a transversal and contextualized way to the different academic disciplines (UNESCO, 2021).

Table 2. Benefits of integrating digital skills in higher education (own elaboration)

Academic dimension	Impact of digital skills
Teaching	They allow hybrid classes, virtual learning environments and gamification
Research	They facilitate the management of data, digital bibliography and collaborative tools
Evaluation	Driving the use of digital rubrics, portfolios, and automated assessments
Job placement	Increase employability in markets that require ICT skills
Equity and accessibility	They favor educational inclusion and the reduction of technological gaps

4. Curricular obligation: from the periphery to the center of the curriculum

Despite the general recognition of their importance, digital skills are still not central to many university curricula. According to recent studies, their incorporation is usually limited to

optional subjects or extracurricular workshops (Rodríguez-Abitia & Bribiesca-Correa, 2021). This contrasts with the approach of international frameworks such as DigCompEdu and with public policy recommendations on digital education (European Commission, 2023).

According to Cabero-Almenara et al. (2020), it is necessary for institutions to adopt an institutional and cross-cutting approach that considers digital competencies as **mandatory elements** of the curriculum, with evaluable indicators and articulated with graduation profiles.

Methodology

1. Methodological approach

The present research adopts a **mixed approach**, of a **sequential explanatory** type (Creswell & Plano Clark, 2018), combining a quantitative analysis with a subsequent qualitative interpretation. This approach allows for a deeper understanding of the perception, integration and effects of digital skills in the university context.

The first phase consisted of the collection and analysis of quantitative data from a structured questionnaire applied to students from different universities in Colombia, Ecuador and Spain. The second qualitative phase was based on the documentary and thematic analysis of brief interviews with experts, as well as on the review of institutional curricular plans.

2. Participants and sample

Non-probabilistic convenience sampling **was used**, suitable for educational studies with limited access to large populations (Martínez-González et al., 2021). The total sample was **312 university students** distributed by country as follows:

Table 1. Distribution of the sample by country and type of university

COUNTRY	PUBLIC UNIVERSITY	PRIVATE UNIVERSITY	TOTAL
COLOMBIA	53	47	100
ECUADOR	45	55	100
SPAIN	60	52	112
TOTAL	158	154	312

The inclusion criteria was to be enrolled in undergraduate programs between the second and eighth semester. Gender was balanced (52% women and 48% men) and confidentiality was guaranteed through virtual informed consent.

3. Instruments

a) Digital questionnaire

A structured online questionnaire **adapted from the European** DigCompEdu framework (Redecker, 2017) **was designed** , consisting of 24 items organized into five dimensions of

digital competences. The response scale was a five-point Likert type (1 = Strongly disagree; 5 = Strongly agree). The instrument was validated through expert judgment and obtained a **Cronbach's alpha reliability index of 0.89**, considered excellent (Nunnally & Bernstein, 2019).

b) Interviews and documentary analysis

In the second phase, semi-structured interviews were conducted with **10 experts** in digital education and educational technology, selected for their research career in Ibero-American universities. In addition, **15 university curricula of** education, administration, and engineering careers were analyzed, using a thematic content analysis approach with NVivo 14 software.

4. Procedure

The methodological procedure was developed in four stages:

Table 2. Methodological procedure by phases

Phase	Description
Instrument Design	Adaptation of the DigCompEdu questionnaire and validation by experts
Data collection	Virtual application of surveys and semi-structured interviews
Quantitative analysis	Descriptive statistics and correlation analysis with SPSS v26
Qualitative analysis	Thematic coding and categorization with NVivo 14

The statistical analysis focused on obtaining frequencies, measures of central tendency and Pearson correlations to establish relationships between digital proficiency and academic performance. The qualitative analysis complemented these results with patterns of meaning that emerged in the interviewees' discourses and reviewed documents.

5. Ethical considerations

The ethical principles established in the **Declaration of Helsinki** and the recommendations of the **American Educational Research Association (AERA, 2019)** were followed. The participants signed digital informed consent, anonymity was guaranteed, and the data was processed under personal data protection regulations (GDPR in Europe and Habeas Data in Latin America).

Results

The results are presented according to the objectives of the study: the level of digital skills of the students, the perception of their compulsory university education and their relationship with academic variables such as performance, employability and curricular integration.

1. Level of digital competence

The students showed a medium-high mastery in competencies related to the basic use of technologies, but low levels in digital content creation and security. According to the Likert scale used (1 to 5), the averages obtained by dimension were:

Table 1. Average level of digital skills by dimension (N = 312)

DIMENSION OF DIGCOMPEDU	AVERAGE	STANDARD DEVIATION
INFORMATION LITERACY	4.2	0.65
DIGITAL COMMUNICATION AND COLLABORATION	3.9	0.72
DIGITAL CONTENT CREATION	3.1	0.81
DIGITAL SECURITY	2.8	0.77
SOLVING TECHNOLOGY PROBLEMS	3.5	0.68

These findings coincide with recent studies that show significant gaps in the development of advanced and critical competencies, especially in Latin American university contexts (Cabero-Almenara & Palacios-Rodríguez, 2022; Briceño-Sánchez & Gómez-Zerpa, 2023).

2. Perception of compulsory curricular

87 **% of the students** surveyed consider that digital skills should be a **mandatory competence** in their academic programs. Only 13% stated that they are acquired autonomously or extracurricular, which shows a generalized expectation about the formal institutionalization of these competencies.

Figure 1. Do you think that digital skills should be compulsory in the university curriculum? (Yes: 87%; No: 13%)

Likewise, students positively valued the idea that digital skills should be part of transversal subjects from the first semesters, which coincides with recent recommendations in educational innovation policies (European Commission, 2023).

3. Relationship with academic performance

Using a Pearson correlation analysis, a **significant and positive correlation** was identified between the level of general digital competence and academic performance as measured by grade point average (GPA):

- **$r = 0.61$, $p < 0.01$**

This indicates that students with higher digital skills also tend to perform better academically, as previously identified by previous research (García-Peñalvo et al., 2021; Vuorikari et al., 2022).

Table 2. Correlations between digital competence and academic performance

Variable	*R de Pearson*	*Level of significance (p)*
Total digital competence	0.61	< 0.01
Content creation	0.59	< 0.01
Digital Security	0.47	< 0.05
Communication and collaboration	0.55	< 0.01

4. Documentary analysis and interviews with experts

From the qualitative analysis of 15 university curricula, it was found that only **32%** explicitly include compulsory courses related to digital competences (subjects such as "Digital Competence", "Learning Technologies" or "ICT Tools"). The **remaining 68%** offer them as optional workshops or extracurricular activities without formal evaluation.

In the interviews, the experts pointed out that the **lack of systematic integration** responds to a disconnect between institutional policies and the demands of the professional environment:

"The challenge is not only technological, but also curricular and pedagogical. As long as graduate profiles with clear digital competencies are not designed, the change will be marginal" (expert 4, public university of Colombia).

5. Integrated Results

By integrating the quantitative and qualitative findings, the following trends are identified:

Table 3. Integrated results by dimension of analysis

Dimension	**Quantitative finding**	**Qualitative finding**
Proficiency level	Medium-high proficiency in basic tasks	Difficulties in creation and security
Curricular perception	High demand due to mandatory	Expectations of inclusion from the first semesters
Academic performance	Significant correlation with digital competence	Improvement in study, organization and presentation processes
Institutional	Only 32% with formal	Lack of curricular updating and cross-

integration inclusion in curricula cutting approach

Conclusions

The results of this research allow us to conclude that **digital skills** today represent a **central component of university academic capital**, whose mandatory incorporation into curricula is no longer an option, but an **urgent need** in the face of the social, technological and labor transformations of the twenty-first century.

Firstly, the study confirms that university students recognise the formative value of digital competences, not only as instrumental tools, but also as **strategic skills** that have a direct impact on their academic performance, their autonomy in learning and their insertion into the labour market. This perception aligns with recent research that highlights the role of digital competence as a predictor of academic and professional success (Cabero-Almenara & Palacios-Rodríguez, 2022; Vuorikari et al., 2022).

Secondly, there is a **gap between institutional discourse and curricular practice**. Despite the fact that many universities recognise the importance of digital technologies in their strategic plans, most do not include compulsory subjects or clear assessment standards around digital competences (Rodríguez-Abitia & Bribiesca-Correa, 2021). This dissociation puts the quality of training and equity among students at risk, especially in Latin American contexts where inequalities in technological access are still persistent (Briceño-Sánchez & Gómez-Zerpa, 2023).

Third, the data reveal a **statistically significant correlation** between digital proficiency and academic performance, which reinforces the argument that digital competences should not be seen as complementary content, but as **core skills** that should permeate all areas of knowledge and training levels (García-Peñalvo et al., 2021).

Therefore, it is recommended that higher education institutions adopt **comprehensive curricular policies** that incorporate digital skills in a transversal, progressive and assessable way. This involves reviewing graduation profiles, training teachers, designing contextualized content, and ensuring adequate technological infrastructure. It is also proposed that international frameworks such as **DigCompEdu** and **DigComp 2.2** serve as a guide to build minimum standards adapted to local realities (Redecker, 2017; Vuorikari et al., 2022).

In short, the compulsory curricular nature of digital skills not only responds to a technical or functional demand, but also constitutes a pedagogical, social and ethical commitment to a higher education that is more inclusive, relevant and connected to contemporary challenges.

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