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DIGITAL TRANSFORMATION FROM TEACHERS' PERSPECTIVES: SKILLS, LEADERSHIP, BARRIERS, AND EQUITY IN EDUCATIONAL SETTINGS

La transformación digital desde las percepciones docentes: competencias, liderazgo, barreras y equidad en contextos educativos

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ABSTRACT

Digital transformation is one of the major processes of change in contemporary educational contexts, as it alters the ways in which educational institutions teach, learn, and are managed. The objective of this study was to analyze the perceptions of practicing teachers enrolled in graduate programs in Educational Management regarding digital competencies, institutional leadership, barriers to digital transformation, and educational equity. A quantitative, descriptive, and exploratory study was conducted using a Likert-scale questionnaire administered to 34 Ecuadorian teachers. The results show favorable perceptions regarding digital competencies and institutional leadership, along with recognition of barriers related to technological infrastructure, connectivity, and organizational conditions. Furthermore, digital equity emerges as a significant challenge for the consolidation of educational transformation processes. It is concluded that teachers construct an integrated representation of digital transformation in which individual capabilities, institutional conditions, and concerns related to inclusion and equity interact.

Keywords: digital transformation; teachers' perceptions; digital culture; educational leadership; digital competencies; digital equity.

RESUMEN

La transformación digital constituye uno de los principales procesos de cambio en los contextos educativos contemporáneos, al modificar las formas de enseñar, aprender y gestionar las instituciones educativas. El objetivo de este estudio fue analizar las percepciones de docentes en ejercicio que cursan estudios de posgrado en Gestión Educativa sobre las competencias digitales, el liderazgo institucional, las barreras para la transformación digital y la equidad educativa. Se desarrolló una investigación cuantitativa, descriptiva y exploratoria mediante la aplicación de un cuestionario tipo Likert a 34 docentes ecuatorianos. Los resultados muestran percepciones favorables respecto a las competencias digitales y al liderazgo institucional, junto con el reconocimiento de barreras relacionadas con la infraestructura tecnológica, la conectividad y las condiciones organizacionales. Asimismo, la equidad digital emerge como un desafío relevante para la consolidación de los procesos de transformación educativa. Se concluye que los docentes construyen una representación integrada de la transformación digital en la que interactúan capacidades individuales, condiciones institucionales y preocupaciones vinculadas con la inclusión y la equidad.

Palabras clave: transformación digital; percepciones docentes; cultura digital; liderazgo educativo; competencias digitales; equidad digital.

1. Introduction

In the contemporary context, the digital transformation of education manifests itself primarily as a shift in visual culture and in the ways knowledge is represented. Avendaño, León, Ortiz, and Isaac (2025) emphasize that for digital content to be effective and of high quality, it must be visually appealing, and they cite platforms such as Instagram and TikTok as examples—with their brief, visual approach—that

can be useful for presenting key concepts in an engaging and accessible way. Therefore, it can be said that classrooms are no longer spaces exclusively dedicated to linear printed text but have become hypermedia environments dominated by interactive images, iconic languages, and digital screens. As Sandoval Benavides (2023) posits, digital culture is not limited to the technical deployment of cables or devices, but rather establishes new dynamics of creation, consumption, and symbolic circulation that permeate the school environment. In this ecosystem, teachers and administrators no longer manage only schedules or administrative platforms; they act as cultural mediators in the face of a visual ecology saturated with screens.

Even amid the boom in emerging educational technologies (Álvarez, 2025; Adell & Castañeda, 2012), there remains a tendency to approach digitization from a purely instrumentalist or equipment-focused perspective. It is assumed that equipping an educational institution with screens or internet access automatically modernizes pedagogical practice. However, true transformation depends on how teachers interpret, decode, and reinterpret visual artifacts in their daily work. The incorporation of virtual platforms requires the development of critical visual literacy capable of guiding learning, structuring comprehensible interfaces, and preventing cognitive overload in students.

Furthermore, this proliferation of visual languages in the school's cyberspace exposes structural fractures: the lack of infrastructure and the digital divide (Warschauer, 2004; Selwyn, 2016) result in an asymmetry in access to contemporary visual culture. Students and teachers in contexts with poor connectivity or a lack of devices are marginalized from new forms of aesthetic and communicative knowledge production.

From the interdisciplinary perspective of Visual Culture Studies and Educational Management, this article analyzes the perceptions of 34 Ecuadorian teachers in postgraduate training regarding digital competencies, institutional leadership, contextual barriers, and equity. The aim is to unravel how teachers experience the transition toward screen culture, providing empirical evidence to build models of pedagogical leadership centered on inclusion, multimodal literacy, and visual justice in the contemporary classroom.

Digital Culture, Educational Transformation, and Teachers' Perceptions

The 21st century has witnessed the expansion of digital technologies, bringing about profound transformations in multiple spheres of social life. In general, these changes have altered the ways in which people communicate, access information, produce knowledge, and interact with one another. Above all, however, in this context— —education is the field that has been most profoundly impacted by digitization processes, as it incorporates new tools, languages, and dynamics that reshape both pedagogical practices and modes of institutional organization. Digital culture shapes environments characterized by connectivity, the constant flow of information, and the growing integration of technologies into various aspects of daily life.

The evolution of digital culture continues to follow a rapid process of innovation, a point argued by Sandoval Benavides (2023), who highlights that these developments

foster new dynamics of communication, interaction, coexistence, creation, production, and consumption of content and services, which permeate both the social and educational spheres.

Various authors agree that these changes go beyond the simple incorporation of technological devices or platforms. Digital transformation constitutes a cultural phenomenon that alters the way individuals construct learning experiences, produce meaning, and participate in increasingly interconnected environments. Consequently, contemporary education faces the challenge of adapting to new forms of knowledge creation, circulation, and appropriation, as well as to the changes resulting from the growing digitization of educational processes.

In the educational sphere, digital transformation manifests itself through the expansion of virtual learning environments, the development of digital competencies, the incorporation of emerging technologies, and the emergence of new forms of technology-mediated interaction. However, the specialized literature notes that the success of these processes does not depend exclusively on the availability of technological resources, but also on organizational, pedagogical, and human factors, among which institutional leadership, ongoing teacher training, and equitable conditions for access to and use of technologies stand out.

Despite the growing interest in digital transformation, much of the research conducted in this field has focused on aspects related to technological infrastructure, digital competencies, or the implementation of specific tools. In contrast, less attention has been paid to how teachers themselves interpret and experience these processes of change. From this perspective, teachers' perceptions provide a key pathway to understanding how the transformations associated with educational digitization are experienced and how dimensions related to innovation, institutional leadership, existing barriers, and digital equity are interconnected.

In this context, the present study takes digital transformation as the central framework for analyzing the perceptions of practicing teachers regarding four closely related dimensions: digital competencies, institutional leadership, barriers to digital transformation, and digital equity and inclusion. The purpose is to understand how these dimensions shape the representations that teachers construct regarding the digital transformation processes present in their educational contexts.

2. Objective

Therefore, the objective of this research is to analyze the perceptions of practicing teachers enrolled in graduate programs in Educational Management regarding digital competencies, institutional leadership, barriers to digital transformation, and educational equity, with the aim of understanding some of the challenges facing digital transformation in contemporary educational contexts.

3. Conceptual Framework

3.1. Digital Transformation and Contemporary Educational Culture

Digital transformation is one of the most significant phenomena in contemporary society due to its ability to transform systems of communication, knowledge production, and social interaction. From the perspective of the network society, Castells (2006) argues that digital technologies have given rise to new forms of social participation and organization based on connectivity and the constant exchange of information.

In educational contexts, this transformation entails changes that go beyond the mere incorporation of technological tools. Adell and Castañeda (2012) argue that emerging technologies foster the emergence of new forms of teaching and learning that require changes in institutional cultures and pedagogical practices. Complementarily, Siemens (2005) explains that contemporary learning unfolds through knowledge networks and multiple connections among people, resources, and information, shaping new scenarios for the construction of learning.

Álvarez (2025) highlights the presence of hybrid environments where artificial intelligence personalizes learning, augmented reality enriches teaching, and virtual platforms facilitate distance education. Above all, this author emphasizes that it is not merely a matter of changing tools, but of transforming the way teaching and learning are conceived.

From this perspective, digital transformation must be understood as a complex process that integrates technological, educational, organizational, and cultural dimensions. These characteristics make it possible to understand digital culture not only as the instrumental use of technologies but also as a symbolic, social, and material framework that shapes new practices of learning, teaching, and socialization (Henríquez and López, 2025).

3.1.1. The Virtual Learning Environment as a Visual Artifact

A Virtual Learning Environment (VLE) is not merely a technical platform, but a symbolic space where every visual element—typography, colors, icons, and the layout of activities—conveys a particular vision of learning. This idea is based on the notion that digital culture forms a material and symbolic framework that influences people's daily lives, such that the interface of a VLE actively participates in shaping that framework. (Mandiá, 2023; Sandoval Benavides, 2023)

From this perspective, the interface becomes a visual language that organizes the user's experience. Reyes (2022) emphasizes how the use of graphic methods to display and analyze information has become central due to the growing interest in digital culture and concepts such as big data, open data, data visualization, and "datification." It is not merely a matter of facilitating navigation, but of shaping the learner's affective and cognitive relationship with the environment. The selection of colors to highlight tasks, the iconography that guides actions, or the presence of instructional videos are not neutral decisions: they construct a visual syntax that shapes how information is perceived and how one participates in the educational process.

The graphical interface of a virtual classroom or educational platform is a visual and ideological artifact. As Henríquez and López (2025) explain, digital culture forms a material and symbolic framework that structures individuals' everyday experiences. Typographic layout, button iconography, the use of color to highlight assignments, and the integration of instructional videos are not incidental decisions; they constitute a visual syntax that determines ease of navigation and the learner's emotional engagement.

3.2. Digital Competencies and Teacher Professional Development

Digital competencies are one of the fundamental pillars for effective participation in digital transformation processes. International organizations such as UNESCO (2024) note that these competencies involve knowledge, skills, and attitudes that enable the meaningful integration of technologies into educational processes.

Área Moreira (2014) argues that digital literacy involves much more than technical mastery of tools, as it requires the development of competencies related to critical thinking, knowledge creation, and active participation in digital environments.

Iturralde et al. (2024), in their compilation of perspectives on the importance of teacher training in the use of educational technology, emphasize the importance of considering individual differences when developing training programs, as this helps reduce resistance to change and the generation gap, given the possibility of including diverse content such as time management, proficiency with digital tools, instructional design on online platforms, online assessment methods, and the creation of digital educational content, among others. Therefore, training can be flexible and adapted to teachers' needs and schedules.

Recent studies conducted by Panduro-Ramírez et al. (2026) and Rodríguez Revelo and Quinto Cedeño (2026) show that teachers recognize the importance of technology for educational innovation, although they continue to identify a need for professional development and ongoing training. Therefore, digital competencies must be understood as an essential prerequisite for actively participating in educational transformation processes.

3.3. Institutional Leadership and Management of Digital Transformation

The specialized literature agrees that digital transformation requires forms of leadership capable of guiding sustainable change processes. Fullan (2007) argues that educational leadership plays a key role in building institutional capacities for continuous improvement and innovation.

For their part, Leithwood et al. (2008) emphasize that educational leaders help create favorable conditions for learning by building shared visions, supporting teachers' work, and promoting institutional cultures oriented toward change. Furthermore, Bolívar (2010) emphasizes that educational management must transcend

administrative functions to become a form of leadership centered on learning and the improvement of pedagogical processes.

Recent research highlights the importance of institutional leadership, ongoing teacher training, and pedagogical innovation as essential elements for fostering sustainable processes of educational change.

With regard to leadership, Macías, Bermúdez, and Torres (2025) identify benefits for educational change in its ability to mobilize efforts toward continuous improvement, the development of effective competencies such as strategic vision, assertive communication, evidence-based decision-making, and collaborative work, as well as the necessary strategic direction of the curriculum and teachers' professional development—which emphasizes the leader's role as a guide for educational development, as opposed to traditional approaches centered on control or supervision.

Furthermore, in line with leadership development, Zhang & Chen (2025) identified the leadership strategies required to enhance ICT-mediated teaching practices in higher education institutions. They highlighted the influence of personal factors, such as a willingness to innovate and motivation, as well as external factors, including access to technological resources, professional development opportunities, the presence of a culture of collaboration, and funding to support these processes.

For their part, Medina and Vera (2025) emphasize the need to reconfigure the teaching role, in which faculty also develop pedagogical, technological, and socio-emotional competencies that enable them to respond to emerging challenges with flexibility, critical thinking, and creativity.

In this regard, digital transformation requires institutions capable of articulating a strategic vision, providing teacher support, and fostering ongoing innovation processes.

3.3.1. School Leadership and the Mediation of the Digital Perspective

Contemporary institutional leadership (Fullan, 2007; Leithwood et al., 2008; Bolívar, 2010) must incorporate the aesthetic and communicative dimensions. Educational leaders do not merely manage financial resources or school management platforms; they guide the institution's visual policy: they promote the adoption of open educational resources with high-quality graphics, prevent visual overload, and foster critical thinking among faculty to deconstruct the biases and hegemonic narratives circulating in digital media (Area Moreira, 2014).

3.4. Digital Equity and Inclusion Challenges

The expansion of digital technologies has created new educational opportunities, but it has also highlighted inequalities related to access to and use of technological resources. Warschauer (2004) argues that digital inclusion depends not only on connectivity or the availability of devices, but also on the skills necessary to participate meaningfully in digital environments.

Similarly, Selwyn (2016) warns that technologies can reproduce preexisting inequalities if policies are not developed to ensure equitable conditions for access, participation, and learning.

Therefore, digital equity is an essential criterion for evaluating the sustainability and relevance of educational transformation processes, especially in contexts characterized by technological gaps and persistent inequalities.

3.5. Teachers' Perceptions as an Interpretive Lens for Digital Transformation

Perceptions are constructions of meaning through which individuals interpret reality and attribute meaning to the experiences they have in specific contexts. In the educational sphere, teachers' perceptions provide insight into how teachers value and experience processes of institutional transformation.

Perines Véliz (2018) emphasizes that perceptions provide access to dimensions of professional practice that often remain invisible in analyses focused exclusively on quantitative indicators. Similarly, Torres Argumedo and Díaz Pérez (2020) show that teachers' perceptions help us understand processes of institutional improvement and educational transformation.

More recently, García-Martínez and Soto-Delgado (2026) note that perceptions constitute a relevant source for identifying strengths, limitations, and opportunities associated with the incorporation of technologies in educational contexts.

Consequently, teachers' perceptions become a key analytical category for understanding how digital transformation is experienced within educational institutions and how factors related to digital competencies, institutional leadership, existing barriers, and conditions of equity interact.

4. Methodology

4.1. Research Design

This research was conducted as a micro-local exploratory pilot study using purposive sampling. This design was chosen to identify and characterize the perceptions of practicing teachers regarding various components associated with digital transformation in education, without attempting to establish causal relationships between the variables analyzed.

The study employed a cross-sectional design, as data were collected at a single point in time, allowing for an assessment of teachers' perceptions regarding digital competencies, institutional leadership, barriers to digital transformation, and educational equity within the context of a specific educational setting.

Furthermore, the research is grounded in a descriptive perspective aimed at understanding how teachers interpret the digital transformation processes they experience in their professional and training contexts.

4.2. Participants

The sample consisted of 34 practicing Ecuadorian teachers who were pursuing graduate studies in the field of Educational Administration at the time the survey was administered.

The participants were engaged in teaching activities at various levels of the education system, including Early Childhood Education, General Basic Education, High School, Technical and Technological Education, and Higher Education. This diversity allowed for the collection of perceptions from different educational contexts and professional experiences.

Participants were selected using non-probabilistic convenience sampling, a method widely used in exploratory research when access to the population depends on the availability and voluntary participation of the subjects.

Participation was entirely voluntary, and responses were collected anonymously.

4.3. Data Collection Instrument

Data were collected using a questionnaire specifically designed for this study and administered via the Google Forms platform.

The instrument consisted of two sections.

- The first section collected sociodemographic information related to:
- age range;
- years of teaching experience;
- educational level and professional performance.

The second section consisted of sixteen items organized into four theoretical dimensions associated with digital transformation:

- Digital competencies
- perception of proficiency in and use of digital tools;
- integration of technologies into teaching practice;
- training opportunities to strengthen these competencies.
- Institutional leadership
- institutional support for innovation processes;
- promotion of the educational use of technologies;
- guidance in digital transformation processes.
- Barriers to Digital Transformation
- technological infrastructure;
- connectivity;
- access to resources;

- organizational conditions.
- Digital Equity and Inclusion
- equal access opportunities;
- technology-mediated educational inclusion;
- institutional conditions for equitable participation.

All items were rated using a five-point Likert scale:

1. Strongly disagree.
2. Disagree.
3. Neither agree nor disagree.
4. Agree.
5. Strongly agree.

4.4. Validity and Reliability

The questionnaire was developed based on a review of the specialized literature on digital transformation, teachers' digital competencies, educational leadership, digital equity, and teachers' perceptions.

Content validity was based on the alignment between the research objectives, the conceptual dimensions identified in the literature, and the items included in the instrument.

- Reliability of the Instrument

The internal consistency of the questionnaire was assessed using Cronbach's alpha coefficient, yielding an overall value of $\alpha = 0.973$, which indicates high internal consistency of the scale used. This result suggests a strong association among the items comprising the instrument and provides favorable evidence regarding its stability for data collection.

However, given the exploratory nature of the study and the size of the available sample ($n = 34$), the coefficient was calculated for the complete scale used in the research. Future applications of the instrument with larger samples will allow for a more in-depth psychometric analysis by estimating specific reliability coefficients for each dimension evaluated.

4.5. Procedure

The questionnaire was administered online via Google Forms. The link to the instrument was distributed to faculty members enrolled in a graduate program in Educational Management. Before responding, participants received information about the research objectives, the academic nature of the study, the voluntary nature of participation, and the guarantee of anonymity for their responses.

The questionnaire remained available for several days, during which time the 34 responses that make up the database used in the study were collected.

4.6. Data Analysis

Once data collection was complete, the data were exported for processing and analysis.

Descriptive statistics were used to examine the responses obtained. Specifically, absolute frequencies and percentages were calculated for the sociodemographic variables and for the items corresponding to each dimension analyzed.

Subsequently, the results were organized according to the study's four dimensions in order to identify predominant trends in teachers' perceptions related to digital transformation.

Finally, the findings were interpreted in light of the conceptual framework built around digital transformation, digital competencies, institutional leadership, educational equity, and teachers' perceptions.

5. Results

5.1. Participant Profile

Table 1.

Participant Profile

Variable	*Category*	*Frequency (n)*	*Percentage (%)*
Age	Under 30 years old	5	14.7
	30 to 39 years old	13	38.2
	Ages 40–49	7	20.6
	50 to 59 years old	6	17.6
	60 years or older	3	8.8
Years of teaching experience	Less than 5 years	11	32.4
	Between 5 and 10 years	7	20.6
	Ages 11–15	6	17.6
	Ages 16–20	3	8.8
	Over 20 years	7	20.6
Educational level of performance	Early Childhood Education	7	20.6
	Basic General Education	13	38.2
	High School	6	17.6
	Technical or Vocational Education	3	8.8
	Higher Education	3	8.8
	More than one educational level	2	5.9

Source: Compiled by the author based on data obtained from a questionnaire administered to practicing teachers enrolled in graduate programs in Educational Administration.

The sample consisted of 34 practicing teachers enrolled in graduate programs in Educational Management. Participants aged 30 to 39 years old were the largest group (38.2%), followed by those aged 40 to 49 years old (20.6%). In terms of professional experience, the largest group consisted of teachers with less than five years of experience (32.4%), although there was also a significant proportion of participants with more than twenty years of teaching experience (20.6%). Regarding the level of education taught, the largest proportion was in General Basic Education (38.2%), followed by Early Childhood Education (20.6%) and High School (17.6%), which brings a diversity of educational contexts to the perceptions analyzed.

5.2. Teachers' Perceptions of Digital Transformation

The results show that teachers' perceptions of digital transformation are not concentrated in a single dimension but are distributed across aspects related to digital competencies, institutional leadership, perceived barriers, and conditions of digital equity and inclusion. Taken together, these dimensions offer a broad view of how participants interpret the digital transformation processes present in their educational contexts.

Table 2

Descriptive statistics for the analyzed dimensions

Dimension	M	SD
Digital Competencies	3.89	1.18
Institutional Leadership	3.62	1.23
Barriers to Digital Transformation	3.56	1.29
Digital Equity and Inclusion	3.47	1.31

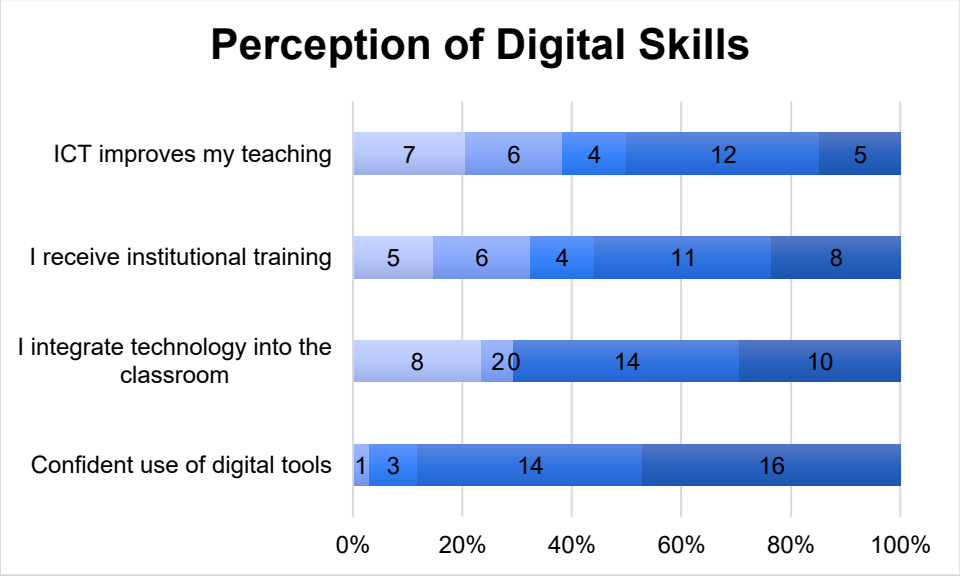
Source: Author's own calculations.

To complement the descriptive analysis of frequencies and percentages, measures of central tendency and dispersion were calculated for each dimension studied. Digital competencies had the highest mean (M = 3.89), followed by institutional leadership (M = 3.62). The dimensions related to barriers to digital transformation (M = 3.56) and digital equity and inclusion (M = 3.47) show moderately favorable perceptions and greater dispersion among participants, as reflected in their standard deviation values.

5.2.1. Digital Competencies

Figure 1.

Perceptions of Digital Competencies



Source: Prepared by the authors based on data obtained from a questionnaire administered to practicing teachers enrolled in graduate programs in Educational Management.

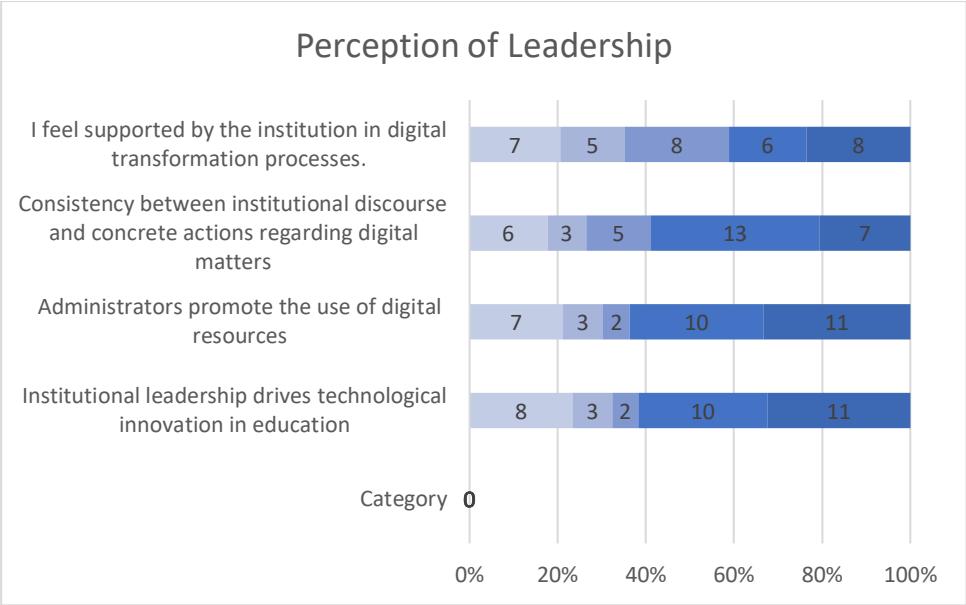
Note: Five-point Likert scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

Figure 1 shows a predominantly favorable trend regarding digital competencies. Responses indicating "agree" and "strongly agree" predominate, reflecting recognition of the potential of ICT to support teaching processes. However, the responses also reveal differences in the perception of the training- y support received to strengthen these competencies, an aspect that shows a more heterogeneous distribution.

5.2.2. Institutional Leadership

Figure 2

Perception of Institutional Leadership



Source: Prepared by the authors based on data obtained from a questionnaire administered to practicing teachers enrolled in graduate programs in Educational Management.

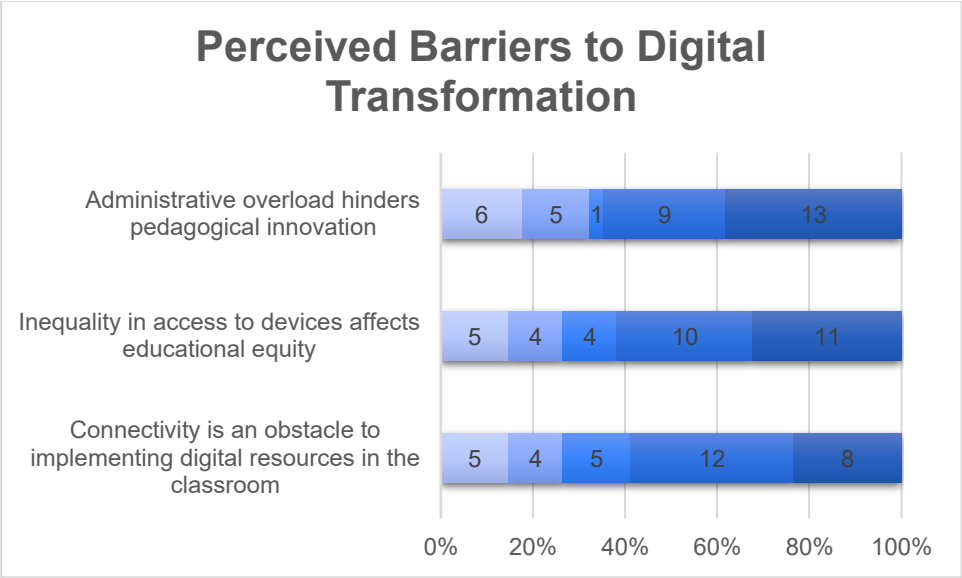
Note: Five-point Likert scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

The results regarding institutional leadership show mostly positive assessments of actions aimed at promoting technological innovation and the educational use of digital resources. However, the distribution of responses shows greater variability in the indicators related to institutional support and the consistency between institutional approaches and their practical implementation.

5.2.3. Barriers to Digital Transformation

Figure 3

Perception of Barriers to Digital Transformation



Source: Prepared by the authors based on data obtained from a questionnaire administered to practicing teachers enrolled in graduate programs in Educational Management.

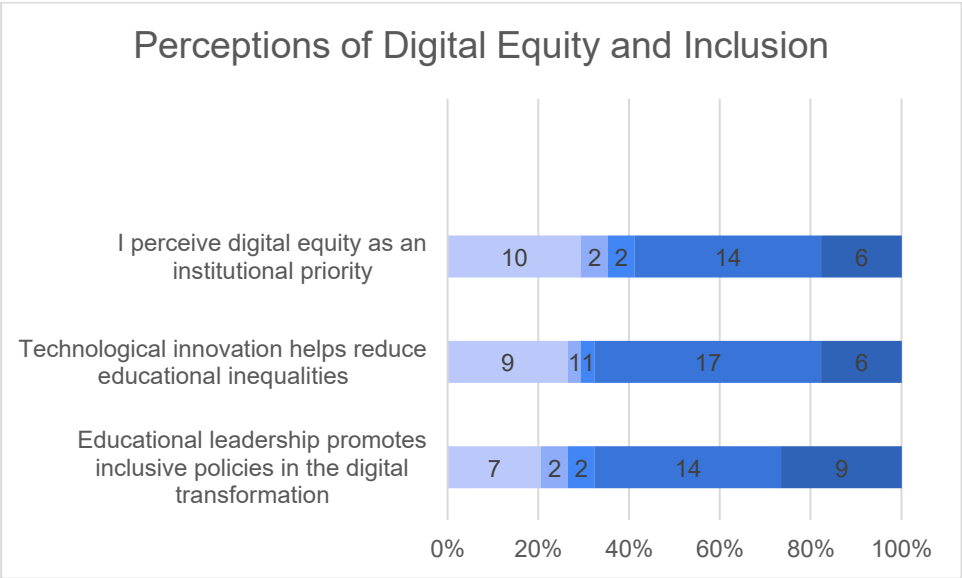
Note: Five-point Likert scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

Figure 3 shows widespread recognition of obstacles that continue to hinder digital transformation processes. Participants identified difficulties related to technological infrastructure, connectivity, resource availability, and organizational conditions. These perceptions appear consistently across the various indicators analyzed.

5.2.4. Digital Equity and Inclusion

Figure 4

Perceptions of Digital Equity and Inclusion



Source: Prepared by the authors based on data obtained from a questionnaire administered to practicing teachers enrolled in graduate programs in Educational Management.

Note: Five-point Likert scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

The results regarding digital equity and inclusion show a favorable assessment of the potential of digital transformation to expand educational opportunities. However, there are also responses that reflect concerns regarding the current conditions for ensuring equitable participation and equal access to the benefits derived from the use of digital technologies.

5.3. Perceptual Framework of Digital Transformation

Taken together, the four dimensions analyzed reveal a perceptual framework characterized by the coexistence of strengths and challenges associated with digital transformation.

On the one hand, favorable assessments predominate regarding digital competencies and the role played by institutions in promoting technological innovation processes. On the other hand, participants acknowledge the persistence of structural and organizational barriers that limit the full realization of the opportunities associated with educational digitization.

Furthermore, although digital equity is perceived as a key objective of educational transformation, the responses reveal concerns regarding the conditions necessary to ensure inclusive and equitable participation in digital environments.

Overall, the results show that digital transformation is perceived as a current and significant process in the educational contexts represented by the participating , although its development appears to be conditioned by institutional, training-related, and structural factors that continue to influence the teaching experience.

6. Discussion

6.1. Digital Transformation from the Teachers' Perspectives

A joint analysis of the results reveals that the participating teachers do not perceive digital transformation as an exclusively technological phenomenon. On the contrary, the responses obtained demonstrate a multidimensional understanding in which personal capabilities, institutional dynamics, contextual conditions, and concerns related to educational equity interact. This perspective aligns with contemporary approaches that view digital transformation as a cultural and organizational process that goes beyond the mere adoption of technological tools.

The findings of the pilot study show that the surveyed teachers do not experience digital transformation as a mechanical phenomenon, but rather as a culturally complex process fraught with perceptual tensions. The high ratings recorded in the digital

competencies dimension (where the vast majority of teachers report feeling confident integrating digital resources) reflect a familiarity with the screen-based environment. However, the observed heterogeneity regarding the training received indicates that teachers are calling for training that goes beyond technical software skills and focuses on the creation of meaningful visual content and interactive instructional design (Panduro-Ramírez et al., 2026; Rodríguez Revelo & Quinto Cedeño, 2026).

In this regard, the findings support the arguments of Castells (2006), who maintains that the expansion of digital technologies is part of broader transformations in the ways we communicate, produce knowledge, and interact socially. From this perspective, digital transformation cannot be reduced to the adoption of technological resources; rather, it involves changes in the practices, relationships, and meanings constructed by the actors participating in these processes.

The results show that teachers' perceptions are organized around a meaningful sequence. At the first level, favorable assessments of digital competencies predominate, suggesting that participants recognize the importance of technologies and express confidence in their ability to use them in educational processes. This finding aligns with recent research identifying a growing appreciation for the development of digital competencies as a necessary condition for meeting the demands of contemporary educational environments.

However, the perceptions observed are not limited to the individual level. The positive assessment of institut al leadership indicates that teachers recognize the importance of educational institutions in promoting processes of innovation and digital transformation. This assessment is consistent with the arguments of Fullan (2007) and Leithwood et al. (2008), who emphasize that processes of educational institut al change require leadership capable of fostering shared visions, creating favorable conditions for innovation, and strengthening organizational capacities.

However, this favorable perception of digital competencies and institutional leadership coexists with the identification of barriers related to technological infrastructure, connectivity, and organizational conditions. This finding is particularly relevant because it shows that teachers do not view digital transformation as a linear process or one free of difficulties. On the contrary, they recognize the existence of structural factors that limit the actual possibilities for incorporating and leveraging technologies in educational contexts.

Finally, the dimension related to digital equity adds an element of particular relevance to the interpretation of the results. Participants not only value the potential benefits of digital transformation but also express concern about the conditions necessary to ensure inclusive and equitable participation in digital environments. This aspect aligns with the views of Warschauer (2004) and Selwyn (2016), who caution that technologies can expand educational opportunities but can also reproduce inequalities when adequate conditions for access and use are lacking.

From this perspective, the results suggest that teachers construct an integrated representation of digital transformation in which digital competencies, institutional

leadership, contextual barriers, and equity emerge as interdependent dimensions. Rather than perceiving isolated elements, participants seem to interpret digital transformation as a complex process whose consolidation depends simultaneously on the development of individual capacities, institutional support, and the existence of conditions that foster equitable participation.

Consequently, the main contribution of this study lies in demonstrating that teachers' perceptions provide insight into digital transformation from the perspective of those directly involved in it. The responses obtained show that teachers do not reduce educational digitization to a technological issue but rather understand it as a phenomenon involving innovation, leadership, inclusion, and professional development opportunities. This perspective offers valuable insights into the challenges accompanying digital transformation processes in contemporary educational contexts.

6.2. Digital Competencies and Teacher Professional Development

The results show that participants generally hold a favorable view of their digital competencies, recognizing both the usefulness of technologies and their potential to enrich teaching and learning processes. This assessment is consistent with UNESCO's (2024) framework, which identifies digital competencies as one of the essential elements for fostering educational processes capable of responding to the challenges of the digital society.

However, the findings suggest that a positive perception of one's own technological abilities does not imply a sense of complete preparedness. On the contrary, responses regarding the training received show that teachers continue to place importance on ongoing professional development as a necessary condition for addressing the changes associated with digital transformation. This situation aligns with the views of Area Moreira, who argues that digital literacy goes beyond the instrumental mastery of tools and requires skills in analysis, creation, communication, and active participation in digital environments.

The importance participants place on continuing education is also supported by recent research conducted in Latin American contexts. Studies such as those by Panduro-Ramírez and colleagues, as well as those by Rodríguez Revelo and Quinto Cedeño, show that teachers recognize the value of technologies for innovating educational processes, but at the same time identify ongoing needs for professional development to achieve truly meaningful pedagogical integration.

From the perspective of digital transformation, this finding takes on particular significance. The participating teachers do not seem to view digital competencies as a static set of knowledge, but rather as capabilities in constant development that must adapt to changing technological and educational scenarios. This perception is particularly consistent with the logic of contemporary digital culture, characterized by continuous processes of innovation and technological renewal.

Consequently, the results suggest that digital competencies constitute the gateway to the digital transformation as perceived by teachers. However, this transformation is not based solely on technical mastery of tools, but also on the ability to access ongoing opportunities for learning, professional development, and skill enhancement. From this perspective, continuing education emerges as a strategic component for consolidating sustainable digital transformation processes in educational contexts.

6.3. Leadership and Innovation in Contexts of Digital Transformation

With regard to institutional leadership, the responses reveal a notable dichotomy: while the administrative discourse promoting innovation is acknowledged, a gap is perceived in actual pedagogical support. As Macías et al. (2025) and Zhang & Chen (2025) point out, digital transformation fails if institutions limit themselves to purchasing technology without fostering a culture of visual and pedagogical collaboration. Leadership must become a framework that guides how to narrate, teach, and communicate through new technologies.

The results show that teachers attribute significant importance to institutional leadership within digital transformation processes. The favorable assessments recorded in this dimension suggest that participants recognize the efforts made by institutions to promote initiatives related to technological innovation and the incorporation of digital resources into educational processes.

This finding aligns with the views of Fullan (2007), who argues that educational transformation processes require leaders capable of mobilizing people, building organizational capacities, and fostering institutional cultures oriented toward continuous improvement. From this perspective, digital transformation does not depend exclusively on individual decisions made by teachers, but also on institutional conditions that facilitate innovation and lifelong learning.

Similarly, Leithwood et al. (2008) note that effective educational leadership helps create contexts conducive to change by building shared visions and strengthening teachers' professional capacities. The results obtained appear to support this idea by showing that participants recognize the role of institutions in promoting digital transformation and in driving initiatives related to the educational use of technologies.

However, the greater heterogeneity observed in this dimension is particularly significant. Although positive assessments predominate, the responses regarding institutional support and the alignment between promoted policies and implemented actions show a wider dispersion than that recorded in the digital competencies dimension. This suggests that perceptions of leadership do not depend solely on the existence of institutional initiatives, but also on how teachers experience these initiatives in their daily practice.

In this regard, the findings align with the arguments of Bolívar (2010), who maintains that educational leadership transcends administrative functions and must be oriented toward creating conditions that foster learning, participation, and collective commitment. From this perspective, leadership associated with digital transformation

requires more than simply incorporating technologies; it involves creating environments that foster collaboration, innovation, and the professional development of educational stakeholders.

The results are also consistent with recent research highlighting the relationship between leadership and educational innovation. Authors such as Macías, Bermúdez, and Torres (2025) and Zhang and Chen (2025) point out that digital transformation processes require institutions capable of articulating a strategic vision, providing pedagogical support, and offering ongoing opportunities for professional development. These conditions help create environments that are more conducive to the adoption and meaningful use of technologies in educational contexts.

Based on the interpretive framework that emerges from this study, institutional leadership appears as the second component of the representation that teachers construct regarding digital transformation. While digital competencies serve as the starting point related to individual capabilities, leadership represents the organizational dimension that enables these capabilities to be transformed into effective processes of educational innovation.

Consequently, the results suggest that teachers perceive digital transformation as a process shared among stakeholders and institutions. While individual digital competencies are important, their transformative potential seems to depend largely on the existence of leaders capable of guiding, supporting, and sustaining processes of change in educational contexts.

6.4. Barriers, Equity, and Sustainability of Digital Transformation

The findings reveal that a favorable perception of digital competencies and institutional leadership does not eliminate the difficulties associated with digital transformation processes. On the contrary, participating teachers identify various obstacles that continue to hinder the development of technology-mediated educational innovation initiatives. This situation highlights that digital transformation is perceived as a complex process whose progress depends simultaneously on individual, institutional, and contextual factors.

Barriers related to technological infrastructure, connectivity, and the availability of resources appear consistently in the analyzed responses. This finding aligns with research conducted in Latin America that points to the persistence of structural limitations hindering the consolidation of sustainable educational digitization processes. In this regard, the results support the idea that technological innovation does not depend exclusively on the will of educational stakeholders or the existence of institutional projects, but also on material conditions that enable its effective implementation.

From a broader perspective, the barriers identified by the participants help us understand that digital transformation remains an uneven process. Although technologies offer new opportunities for teaching, learning, and communicating, access to these opportunities continues to be conditioned by economic, organizational,

and territorial factors. This interpretation is consistent with the arguments of Warschauer (2004), who maintains that digital inclusion cannot be reduced to the mere availability of devices or connectivity, but rather depends on social, cultural, and educational conditions that allow for the meaningful use of technologies.

Likewise, perceptions regarding digital equity provide a particularly relevant element for understanding digital transformation. The participating teachers recognize the potential of technologies to expand educational opportunities and promote inclusion; however, they also express concern regarding the conditions necessary to ensure that these benefits effectively reach all students and educational communities.

From this perspective, equity emerges as a prerequisite for the sustainability of digital transformation. This finding aligns with the arguments of Selwyn (2016), who notes that educational technologies can contribute to both reducing and reproducing inequalities, depending on the conditions under which they are implemented. The concern expressed by the participants suggests that teachers perceive digital equity not as an automatic result of technology adoption, but as a challenge that requires specific policies, resources, and institutional strategies.

This allows us to interpret that barriers and equity constitute two closely linked dimensions within the representation that teachers construct of digital transformation. Barriers reflect the limits and difficulties that constrain processes of change, while equity represents the goal toward which these processes should be directed. Consequently, both dimensions complement the perspective offered by digital competencies and institutional leadership, shaping a broader and more complex understanding of digital transformation in educational contexts.

Furthermore, the density of barriers identified in Figure 3—where inadequate infrastructure, poor connectivity, and administrative overload limit teaching practice—demonstrates the persistence of a material inequality that fractures contemporary visual culture. As Warschauer (2004) and Selwyn (2016) warn, there can be no full digital inclusion if schools lack the technical support to enable their students to interact seamlessly with interactive visual environments. Digital equity (Figure 4) is no longer just a slogan but has become an ethical imperative: democratizing the digital transformation means ensuring that all learners, regardless of their socioeconomic status, have access to the languages, images, and products of contemporary cyberspace.

Taken together, the results suggest that teachers perceive digital transformation as a process with broad possibilities for innovation, but one whose consolidation depends on the ability to overcome structural obstacles and ensure conditions for inclusive participation. Thus, the sustainability of digital transformation appears to be linked not only to the incorporation of technologies but also to the creation of educational environments capable of reducing inequalities and promoting learning opportunities for all stakeholders.

6.5. Contributions and Limitations of the Study

The main contribution of this research lies in addressing digital transformation from the perspective of teachers' perceptions, recognizing these as a valid source of knowledge for understanding how processes of change are experienced in educational contexts. Unlike studies focused exclusively on technological indicators, levels of equipment, or specific competencies, this study explored how teachers construct an integrated understanding of digital transformation based on their professional experiences.

The results show that teachers' perceptions are not organized around isolated factors but rather integrate digital competencies, institutional leadership, contextual barriers, and digital equity within a single understanding of the phenomenon. This perspective offers a broader view of digital transformation by demonstrating how personal, organizational, and social dimensions are closely intertwined in the contemporary educational experience.

Furthermore, the study helps highlight the value of perceptions as an analytical tool for interpreting phenomena associated with digital culture. From this perspective, digital transformation emerges not only as a technological process but also as a cultural transformation that alters practices, expectations, and forms of participation within educational institutions. The findings suggest that understanding how teachers interpret these changes can provide relevant information for designing more context-specific, inclusive, and sustainable institutional strategies.

Another significant contribution is the identification of a perceptual sequence that helps us understand how teachers organize their interpretation of digital transformation. The results suggest that this representation is structured around the assessment of digital competencies, the recognition of institutional leadership, the identification of barriers to change, and concerns regarding digital equity and inclusion. This framework offers an integrated understanding of the challenges accompanying educational digitization processes.

However, the results must be analyzed with certain limitations in mind. First, the research was conducted with a small sample of Ecuadorian teachers pursuing graduate studies in Educational Management, which limits the ability to generalize the findings to other educational contexts or teacher populations. Second, the descriptive and cross-sectional design allows for the identification of perceptual trends at a specific point in time but does not enable the establishment of causal relationships among the dimensions analyzed or the observation of potential changes over time.

Furthermore, as this is a perception-based study, the results reflect interpretations constructed by the participants based on their particular experiences and contexts. While this characteristic is a strength for understanding the subjective dimension of digital transformation, it also implies recognizing that other methodological approaches could complement our understanding of the phenomenon through direct observations, interviews, or comparative studies across different educational contexts.

Consequently, future research could expand the sample, incorporate mixed-methods or longitudinal approaches, and explore the relationships between digital

competencies, institutional leadership, equity, and digital transformation at different educational levels. These lines of inquiry would allow for a deeper understanding of the processes of change that characterize contemporary educational environments.

7. Conclusions

This study analyzed the perceptions of practicing teachers enrolled in graduate programs in Educational Management regarding digital competencies, institutional leadership, barriers to digital transformation, and educational equity, thereby achieving the study's proposed objective.

The results show that participants perceive digital transformation as a significant process that is present in contemporary educational contexts. However, the perceptions gathered indicate that this phenomenon is not understood exclusively from a technological perspective, but rather through the interplay of multiple dimensions linked to teachers' capabilities, institutional conditions, and the challenges of inclusion present in educational settings.

One of the study's main conclusions is that teachers construct an integrated representation of digital transformation. This representation is shaped by a positive assessment of digital competencies and recognition of institutional efforts aimed at promoting educational innovation, but it also incorporates the identification of barriers related to structural, organizational, and access factors that continue to shape processes of change.

Furthermore, the findings show that digital equity is a central concern for teachers. Participants recognize the potential of technology to expand educational opportunities, although they believe it is necessary to strengthen the conditions that will ensure more inclusive and equitable participation in digital transformation processes.

From this perspective, digital transformation emerges as a multidimensional phenomenon whose consolidation depends simultaneously on the development of digital competencies, the strengthening of institutional leadership, the reduction of contextual barriers, and the creation of conditions that promote educational equity. The results suggest that these dimensions do not operate independently but rather form part of an integrated experience through which teachers interpret the changes associated with contemporary digital culture.

As its main contribution, the study highlights the value of teachers' perceptions in understanding digital transformation processes from the perspective of those directly involved in them. Beyond measuring technological resources or competency levels, these perceptions help identify how teachers interpret the opportunities, tensions, and challenges that accompany the integration of technologies into educational contexts.

Finally, the results lead to the conclusion that digital transformation constitutes an educational, institutional, and cultural process that is constantly evolving. Understanding how teachers perceive this process can contribute to the design of more

context-specific and sustainable strategies capable of strengthening educational innovation and fostering more inclusive forms of participation in digital environments.

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