

## Digital competences in Latin American primary education teachers in the years 2018-2022

### *Competencias digitales en docentes latinoamericanos de educación primaria en los años del 2018-2022*

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#### Abstract

Education has undergone significant changes due to the social, economic and, above all, health upheaval caused by the Covid-19 pandemic. This event has forced those with the right conditions to make a temporary transition to a new way of receiving education. In this sense, the objective of this article is to: evaluate how teachers responded during remote education and their ability to adapt to this new model, through a documentary analysis of the last five years. The analytical method was used to know the level of preparation of teachers in digital skills in the Latin American context between 2019 and 2023, through a data collection, through an exhaustive review of the scientific literature available in repositories and libraries. . The focus of this study was qualitative and descriptive, based on specialized articles. As a main result, an urgent need was found to implement a training plan that addresses the needs of teachers in digital skills. In conclusion, it is essential that teachers interact and master technological tools to not only consume information and resources, but also to be producers of educational content.

**Keywords:** Documentary analysis, Teacher digital skills, Covid 19, Latin American teachers.

#### Resumen

La educación ha experimentado cambios significativos debido a la conmoción social, económica y, sobre todo, sanitaria causada por la pandemia de Covid-19. Este evento ha obligado a aquellos con las condiciones adecuadas a realizar una transición temporal hacia una nueva forma de recibir la educación. En este sentido, el presente artículo tiene como objetivo: evaluar cómo respondieron los docentes durante la educación remota y su capacidad para adaptarse a este nuevo modelo, a través de un análisis documental de los últimos cinco años. Se utilizó el método analítico, para conocer el nivel de preparación de los docentes en competencias digitales en el contexto latinoamericano entre los años 2019 y 2023, a través de una recopilación de datos, mediante una revisión exhaustiva de la literatura científica disponible en repositorios y bibliotecas. El enfoque de este estudio fue cualitativo y descriptivo, basado en artículos especializados. Como resultado principal, se encontró una necesidad urgente de implementar un plan de formación que aborde las necesidades de los docentes en competencias digitales. En conclusión, es esencial que los docentes interactúen y dominen las herramientas tecnológicas para no solo consumir información y recursos, sino también para ser productores de contenido educativo.

**Palabras claves:** Análisis documental, competencias digitales docentes, Covid 19, docentes Latinoamérica

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## Introduction

Since the outbreak and end of the COVID-19 pandemic, there has been a rupture in communicational paradigms that is still in the process of being shaped at a global level (NEMO, 2020). Creative, cultural, and leisure activities were redirected toward virtual environments, and in that process, one of the cultural institutions that underwent the greatest transformations was museums. In-person and virtual interactions began to show a complementary relationship, and the use of new digital technologies to improve the visitor experience began to become more common (Camacho & Pérez, 2021).

Thus, initially, the term digital literacy was used to describe people's skills in the basic use of computers, such as writing text documents, sending emails, and searching for basic information on the Internet (Cortés & Carrión, 2020). However, with technological advances, social dynamics have undergone changes, and reference is now also made to digital competencies. The emergence of Web 2.0 and 3.0 has radically transformed digital options, providing people with access to a universal consultation environment, various online services, and virtual experiences, as well as the possibility of connecting to social networks and using cloud storage services, among other options.

Along with this, the acquisition of digital competencies has become an important goal and a significant challenge for people, since it provides autonomy, culture, and democracy in the virtual environment, as pointed out by Cortés and Carrión (2020). Therefore, it is necessary to acquire them and to understand strategies that promote their development and strengthening, since these skills make it possible to interact in appropriate environments and foster comprehensive growth in an increasingly digitalized society. At present, the paradigm is centered on accessibility and the generation of information and knowledge, and information and communication technologies (ICTs) are present in all aspects of society. This has brought about a profound social transformation and has led to what is referred to as the information and knowledge society (IKS) (Castells, 2018).

As these far-reaching changes take place in society, education must respond to these emerging needs, especially now that students who are digital natives are being educated (Cabrero et al., 2023). Since years before the context of COVID-19, attention had already been given to how teachers have been responding to this student need. This has been examined from the training plans promoted by universities to prepare future teachers (Gisbert, 2016), to the way in which teachers implement the technological tools available to them (Holguín et al., 2021). There being a greater interest in the production of scientific articles during and after the COVID-19 pandemic, especially in the European context (Toribio et al., 2023).

With regard to Latin America, Ramírez and Bernal (2022) conclude that, in the vast majority of the countries that make up the region, there is a deficit in digital competencies, driven by multiple factors, such as a lack of training processes aligned with the availability of the resources with which they work, a lack of economic incentives, among others. This, according to Domínguez and López (2021), could increase the risk of creating digital divides. This could possibly lead Latin American teachers to become merely consumers of information. In this regard, Sancho and Hernández (2018) make the point that teachers need to understand that the transformation education now requires goes beyond mere instrumentalization, that is, beyond simply using technology as such, and instead also involves the critical ability to know how to distinguish, validate, and contrast information.

From an educational perspective, Marza and Cruz (2018) state that competencies are considered useful tools for the development of attitudes, knowledge, and processes through which the individual acquires skills that facilitate the transfer of knowledge. Therefore, digital competence is understood as a person's ability to manage information appropriately, which implies searching for, analyzing, and selecting information, as well as organizing, using, and communicating it in an ethical and lawful manner (Espinosa et al., 2018).

Thus, the development of digital competencies requires the prior acquisition of knowledge related to the numerical, iconic, visual, and graphic language of digital environments. By acquiring competencies, individuals also acquire skills to search for information, use and manage ICTs, create and validate content, protect data, and solve problems.



For this reason, UNESCO (2019) indicates that teachers' digital competence is based on three basic principles: knowledge acquisition, knowledge deepening, and knowledge creation. This requires teachers to be in a process of initial, ongoing, and continuous training. UNESCO emphasizes that the success of the development of teachers' digital competencies will be materialized in actions. Some of these actions are cited below: when teachers create digital content and tools; encourage students to self-regulate their learning and create new technological tools; and propose reforms to their country's policies for the democratization of technologies.

Next, as a result of the analysis and bibliographic research, the main lines addressed by the largest number of articles on teachers' digital competencies are cited. These are: the educational level at which the teacher works; the contribution of ICTs to the inclusion of students with special educational needs; and digital competencies within the framework of the educational context of COVID-19

### **Educational level at which the teacher works**

The levels identified in the information search are: early childhood, primary, secondary, and university education. University education is the level most frequently subjected to analysis and research, especially in the training plans for future teachers and university lecturers (García et al., 2023). As for the early childhood level, it is the least explored; in the articles consulted, the main conclusion reached is that teachers possess a basic level of literacy (Gabarda, 2021). That is, they are limited to the use of video projection and interactive tools on the web, making them merely consumers of information. This reality is very similar at the primary level; however, in this regard it is more widely analyzed in the European context, whereas in the Latin American context it is more often the subject of thesis research for the completion of a master's or bachelor's degree..

### **Contribution of ICTs to the inclusion of students with special educational needs**

The development of teachers' competencies has been analyzed in terms of how it has contributed to responding to the needs that emerged during the pandemic. Armas and Alonso (2022) indicate that possessing digital competencies is fundamental and necessary to address the educational demands of students with Special Educational Needs, and they conclude that it is crucial to improve the skills of both teachers and students in the use of ICTs. Likewise, Kerexeta et al. (2022) highlight the importance of establishing inclusive educational policies at the global level that incorporate teachers' digital competencies and technological advancement in schools, with the aim of achieving the full and successful participation of all people, thus promoting educational inclusion.

### **Digital competencies within the framework of the educational context of COVID-19**

This aspect has been the most explored, particularly with regard to the strategies and tools used by teachers. Some of the findings identified are presented below: There is an evident digital divide in Latin American contexts, and this may have influenced the way in which the strategies implemented in the classroom were carried out (Díaz & Loyola, 2021). Added to this, they point out that it must also be considered that students need to develop their digital competencies, since the fact of being digital natives does not guarantee the development of such competencies.

On the other hand, Domínguez and López (2021) indicate that during the COVID-19 pandemic, teachers were faced with challenges greater than merely using technology as such; they had to find ways to maintain connectivity with those living in rural communities, where the digital divide is very wide. As for an analysis of the tools most commonly used: WhatsApp, Google Meet, and Zoom for videoconferences and virtual classes. Likewise, the use of platforms such as Google Classroom and Moodle as learning tools is highlighted (Hurtado et al., 2022).

## **Methodology**

This study was carried out through a review of the existing scientific literature in repositories and libraries. The approach of this study is qualitative and descriptive, based on specialized articles on digital competencies among Latin American primary education teachers. The analysis was structured in four phases: 1) inclusion and exclusion criteria, 2) application of filters, 3) selection of information, and 4) findings identified. The following explains what each of these phases consists of:



- a. Regarding the inclusion criteria, at the time of conducting the research, the following aspects were taken into consideration: a) publications issued in the last five years—2023, 2022, 2021, 2020, 2019; b) journals with scientific rigor, that is, indexed journals; 3) the population under analysis must be teachers from the Latin American context; 4) the educational level at which the individuals under study work must correspond to primary education; 5) Spanish language; 6) area of research. Meanwhile, the exclusion criteria are: 1) non-scientific literature, 2) teachers from higher education levels, and 3) literature dated prior to 2019.
- b. Application of filters involved the use of various filters in information search engines to reduce the amount of data obtained. These filters included selection by year, language, and topic. In addition, exclusion was carried out through an analysis of the abstracts of the research results, specifically review articles. A total of 48 articles were found, corresponding exclusively to digital competencies among primary school teachers; however, most of them correspond to the European context, which reduces the number to 12 articles from the Latin American context
- c. Selection of information: greater relevance was given to the articles that conducted research in practice within the parameters mentioned in the inclusion criteria.
- d. Findings identified: Table 1 presents the search equation used.

## Results

In this section, the results of this research will be analyzed in order to understand them and draw meaningful conclusions. In particular, attention to the data presented in Tables 1 and 2 is essential, since these tables provide qualitative and descriptive information on the key aspects of the study. These results may offer a clearer and more objective view of the patterns, trends, and relationships present in the data collected.

Table 1 shows the results of the bibliographic search carried out in various academic sources on teachers' digital competence. It can be observed that most of the articles found focus on the European context, specifically Spain, and that the predominant educational level is higher education. In addition, the scarcity of information on the Latin American context and, in particular, on the primary level is highlighted.

On the other hand, Table 2 presents a selection of studies related to teachers' digital competencies in different countries. Each study addresses the topic through different methodologies and yields relevant results. For example, the importance of developing a teacher digital competence training plan in Ecuador is highlighted, as well as the relationship between TDCs and professional development among Peruvian teachers, and the limited capacity of Mexican teachers to actively engage students in educational settings supported by technologies.

**Table 1**

*Search equation.*

Number	Search equations	Source	Articles found
1	Teacher digital competence	Google Scholar	175
2	Development of teachers' digital competencies in primary education	Redalyc	145
3	Digital competencies in the teaching profession	Google Scholar	120
4	Teachers' digital competencies during the pandemic	UNAE Repository	75



It is worth mentioning that the vast majority of the results found correspond to the European context, specifically Spain, while the educational level with the greatest number of articles corresponds to higher education. There is little information on the Latin American context, and even less at the primary level. The studies with the greatest presence are these submitted for the completion of bachelor's or master's degrees

**Table 2**

*Studies selected for the review.*

Research title	Author(s)	Methodology	Country studied	Main results
Methodological strategy for strengthening teachers' digital competencies	Alcivar y Navarrete. (2023)	Descriptive research	Ecuador	Highlights the importance of digital competence, to the extent that the development of a teacher digital competence training plan is needed.
Digital competencies and professional development among teachers in Public Institutions in Peru	Valqui et al. (2023)	Deductive research in practice	Perú	TDCs are significantly related to teachers' professional development. In addition, the development of TDCs allows teachers not only to master technological tools, but also to evaluate and create teaching materials.
Technological appropriation in the management of digital competencies by teachers in teacher training schools in Mexico	Lizárraga et al. (2020)	Non-experimental study, descriptive approach	Mexico	The level of competence in the design and implementation of educational settings supported by technologies was low, implying a limited capacity to actively engage students.
Digital competence of English teachers in primary education in southeastern Mexico	Quiñonez (2020)	Quantitative approach with descriptive scope	Mexico	81% of teachers in the English area have a low level of digital competence.
Digital competencies among principals and teachers in the context of remote education in 2020	Álvarez et al. (2021)	Positivist method; the type of study is non-experimental	Perú	Teachers show a higher level of TDC than principals, especially in communication and collaboration skills, as well as in the creation of digital resources.
Digital competencies and teaching performance in schools in Latin America	Alcántara (2022)	Documentary analysis	Perú	Teachers in Latin America face difficulties in the implementation of TDCs. It does not meet the needs and expectations of society.
Teaching performance and training in digital competencies in non-face-to-face classes during the COVID-19 pandemic	Picón et al. (2021)	Research in practice	Paraguay	Of the total, 56% of the participants had received training in the use of information and communication technologies (ICTs) applied to education. Of that group, 49% considered that this training was useful for its application in distance classes.
Teachers' perspectives for a critical agenda in education mediated by post-COVID-19. Comparative study in Latin America	Mateus et al. (2022)	Documentary analysis and focus group with participants		Analysis of the strategies implemented in the countries of Argentina, Ecuador, Chile, and Peru. It identifies deficiencies in the level of TDC, and participants indicate that this is due to the lack of instrumentalization of devices and the limited training received.



## Discussion

Discussion plays a fundamental role in qualitative and descriptive research, since it allows for a deeper examination of the findings and for the information to be contrasted among the authors and their selected publications. It is through discussion that a more complete understanding of the results is achieved and meaningful conclusions are drawn.

First, it allows the findings obtained by different authors in their research to be compared and contrasted. This provides a broader and more enriching perspective on the topics studied, since similarities, differences, and emerging patterns can be identified. In addition, by contrasting the information, possible contradictions or limitations in the existing studies can be identified, which provides opportunities for future research. Furthermore, authors may provide alternative interpretations, theories, or explanations that help make sense of the findings and offer a more complete view of the phenomena studied.

For this reason, this scientific discussion will address the main findings identified in the studies selected for the review on digital competencies, the use of ICTs, and the ongoing training of teachers following the boom generated by the COVID-19 pandemic, focusing on the importance of teachers' digital competencies and their relationship with the professional development of educators in Latin America. The main results of each study will be cited and analyzed, highlighting their methodology and the country investigated.

According to the results of the studies, a variety of methodological approaches used to assess teachers' digital competencies can be observed. Some studies, such as that of Alcivar and Navarrete (2023) in Ecuador, highlight the importance of digital competence and the need for a training plan to strengthen these competencies. In the case of Peru, Valqui et al. (2023) found a significant relationship between teachers' digital competencies and teachers' professional development, highlighting the importance of mastering technological tools and creating teaching materials. Thus, ongoing teacher training is an area that must be addressed so that it does not become a barrier in twenty-first-century education in Latin American countries such as those mentioned above.

Accordingly, it can be observed that teacher training was not geared toward settings immersed in technology and innovation. For this reason, challenges are identified in the development of digital competencies in the training of new teachers. The study by Lizárraga et al. (2020) in Mexico shows a low level of competence in the design and implementation of educational settings supported by technologies among teachers in teacher training schools.

the eastern Mexico have a low level of digital competence. Therefore, it is necessary for the State in the different countries to take a position on this issue and to link the educational process with technological innovation in order to develop digital competencies in situ.

(Teacher training and capacity-building in digital competencies during the pandemic has also been the subject of research. The study by Picón et al. (2021) in Paraguay indicates that 56% of the participants received training in the use of information and communication technologies (ICTs) applied to education, and most considered that this training was useful for distance teaching. On the other hand, the study by Álvarez et al. (2021) in Peru highlights that teachers show a higher level of TDC than school administrators, especially in communication and collaboration skills, as well as in the creation of digital resources.

In addition, the study by Quiñonez (2020) reveals that 81% of English teachers in primary education in sou The analysis of the studies selected in relation to the theoretical framework reveals the importance of digital competencies in the context of the information and knowledge society. Information and communication technologies have had a significant impact on all aspects of society, including education. The acquisition of digital competencies is considered fundamental for interacting and growing in an increasingly digitalized society. Finally, the comparative study conducted by Mateus et al. (2022) in Argentina, Ecuador, Chile, and Peru, using documentary analysis and focus groups, finds deficiencies in the level of teachers' digital competencies in these countries. The participants indicated that this is due to the lack of instrumentalization of devices and the limited training received.

However, the development of digital competencies involves not only instrumental skills, but also skills to manage information, use ICTs in an ethical and lawful manner, create content, and solve problems. In other words, these competencies must be acquired in order to position the educational process at high levels in accordance with the demands of society and, in this way, avoid educational biases that tend to propose outdated solutions for the contexts experienced today. In addition to this, the importance of a holistic perspective is highlighted, one that considers both knowledge and technology, as well as the fundamental component of pedagogy, this process that links the teacher's knowledge with the educational resource so that learning objectives can be achieved inside and outside the classroom. Along with this, the support of a functional digital literacy network is indispensable in the educational context, but it must be supported by public policy that allows teachers to remain in permanent contact with technological resources, the Internet, and new ways of teaching so that this can yield results.

## Conclusions

The studies reviewed highlight the importance of teachers' digital competencies in the professional development of educators in Latin America, but above all, they reveal the need to strengthen them through specific training plans. In countries such as Mexico, Ecuador, and Peru, the importance of digital competence and the need to implement a training plan to improve these skills are emphasized, and a significant relationship was found between teachers' digital competencies and teachers' professional development, underscoring the importance of mastering technological tools and creating teaching materials.

In this sense, digital competencies are constituted as those skills necessary for the articulation of knowledge in the new educational contexts that have been implemented as a result of the COVID-19 pandemic; however, their emergence was not caused by this pandemic, but rather has antecedents that long predate this global event. Thus, it is important to indicate that conditions at the educational level changed because of the pandemic, but this was not their genesis.

However, challenges are identified in the development of digital competencies in the training of new teachers in Latin America. The importance of acquiring digital competencies in the context of the information and knowledge society is also recognized, since these have had a significant impact on all aspects of society, including education, and are considered fundamental for interacting and growing in an increasingly digitalized society. Thus, the path is set for both teachers and students with regard to the acquisition of these skills, which are linked to the proper use of technology in the educational context.

As a recommendation for future articles, lines of research could be established on the level of training received by in-service public primary school teachers and on how operational these are in the classroom. This is because most educational systems in Latin American countries have a free online training program. For example, Ecuador, through its MECAPACITO platform, offers courses to public school teachers on a monthly basis. However, some questions remain unanswered: What classroom actions demonstrate the acquisition of TDCs? In what way did training contribute to the acquisition of TDCs? These are questions that can be answered through new lines of research on the topic.

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## Author Contribution

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