

# The digital divide: Greek primary teachers' conceptualizations

Panagiotis Giavrimis <sup>1\*</sup> 

<sup>1</sup>Department of Sociology, University of the Aegean, Mytilene, GREECE

\*Corresponding Author: [giavrimis@soc.aegean.gr](mailto:giavrimis@soc.aegean.gr)

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## ABSTRACT

The present paper aims to reveal teachers' views on the digital divide. The research questions addressed teachers' perceptions of the digital divide, the causes of the intra-social digital divide, and the consequences of digital competence. The method of participant selection adopted was purposive sampling. In total, 29 primary school teachers were selected, 10 male and 19 female of various age groups. The findings revealed that the teachers of the study conceptualize the digital divide in education through their own experience and their social representations, distinguishing the users of ICT regarding it (direct or indirect, non-users, and deniers of the digital divide), as well as the implications (positive and negative) it has on teaching practices and the teacher's intrapersonal behavior. Intra-social factors (exogenous and endogenous), according to teachers, play a dynamic role in the formation of the digital divide.

**Keywords:** digital divide, teachers, Greek primary schools, educational policies

## INTRODUCTION

The COVID-19 pandemic, which rapidly spread globally since the first quarter of 2020, resulted in changes and transformations at the socioeconomic level of societies (Gautam & Hens, 2020) and at the micro-level of teaching practices (Schleicher, 2020; Zagkos et al., 2022). Educational practice transformations at the micro-level of teaching and in the conceptualizations of school community members regarding the newly emerging field of learning were challenging to predict and effectively address with older educational models (Giavrimis & Nikolaou, 2020). As a result, the learning acquired multifaceted dimensions and new cognitive tools (e.g., e-learning platforms) (Pokhrel & Chhetri, 2021; Schleicher, 2020; Zhao & Watterston, 2021). In this historical-political context, there were questions related to the quality of the education provided and to equality of accessibility in educational choices and opportunities, which emerged as projections in the context of the new dimensions of education. At the same time, the teacher's (e.g., competence, self-confidence, resistance to change) and the student's (motivation, gender, social and economic status of the family) characteristics continue to be mediating or influencing factors in the educational reality. The social inequalities of the contemporary era, presented as unequal possession of information and knowledge (Swain, 2005) and the marginalization of individuals and groups, are raised as topics for further reflection and policy formulation (Gounopoulos et al., 2020). In contrast, excluding the 'digitally

illiterate' for reasons associated with class, economic, geographical, and biological constraints (Toquero, 2020) frames the new context of the at-risk society and shapes new 'outcast' areas.

## THE DIGITAL DIVIDE

"Digital divide" is a term that is associated with the lack of skills to manage technological media (DiMaggio et al., 2001), unequal opportunities to access information and communication technologies (ICTs), and usage of the Internet for a wide range of activities of individuals, as well as of families, and geographical regions and nations (Karydas, 2007; OECD, 2001, p. 5). The digital divide is the outcome of economic, political, social, and cultural factors that dominate among the people of a society and between countries (Ballesta Pagán et al., 2018; Barzilai-Nahon, 2006, p. 273; OECD, 2001). Technology and social inclusion move beyond the limited perspective of ICT have-and-do nots and analyze the various forms of access to ICTs (Cisler, 2000; Warschauer, 2004).

The need to understand the 'social, cultural and psychological causes' of digital inequality related to information power through a more critical approach is thus developing (van Dijk, 2005). New forms of control, manipulation, and exclusion are applied to individuals and groups in a differentiated way for reasons that continue to be structural (Melucci, 2002), while knowledge continues to denote forms of power and simultaneously a field of social

struggle, imposition, and domination or social negotiation. Multimodality in the ICT approaches shapes new perspectives on participatory and deliberative democracy and the commitments this demands (Demertzis, 2017). The pervasiveness of ICTs in the postmodern environment as a mediating factor in social phenomena, as well as with the rituals involved, establishes new dynamics, perspectives, or constraints on the action and interactions of individuals. The derived rational approach to social events and life experiences by social subjects is based increasingly on the instrumentalization of automation and artificial intelligence (Schroeder & Ling, 2014). New technologies (e.g., ChatGPT) and the internet are colonially dominating the lives (social, professional) of individuals, turning them into “natives of the internet” and of digital reality.

According to OECD (2001), social inequalities outside the education system contribute to educational inequalities regarding access to education, opportunities for educational choices, the learning process, and its outcomes. People without ICT access or ICT skills are becoming less able to participate in the knowledge and artificial intelligence society and face the inequality produced by the digital divide (Zajda & Majhanovich, 2022). In addition, the instrumentalization of the production process and the commodification of knowledge increase the influence of market practices in education, producing unavoidable difficulties necessary for the school context to address (Castells, 2011; Lamnias et al., 2007; Moltó Egea, 2013).

The inequality in the accessibility and management of information and the global digital divide between individuals (DiMaggio et al., 2001) reinforces local, regional, and social inequalities, forming a globalized reality of powerful and weak nation-states (World Development Report, 2016). Moreover, social inequalities due to the heterogeneity of accessibility to ICTs and digital literacy are growing. At the same time, information overload does not support the enhancement of social reality since there are problems of confusion and understanding, as well as a centralization in the management and mastery of knowledge.

## THE TEACHER IN THE NEW ERA

The intense intrusiveness of digital technology for more effective teaching places educators in a vulnerable position regarding the management of teaching practices, as they are confronted with a fluid and dynamic network of knowledge, relationships, and practices. The teacher is called upon to develop skills in using pedagogical-digital educational materials by appropriately organizing the learning processes aimed at building knowledge in the most authentic environment while enhancing active learning (Armakolas et al., 2018, p. 21-26). The teacher's conceptualizations of the context, interaction with others, and generated meanings determine their perceptual schemas and social action.

According to Blumer (1986), symbolic interaction has three principles:

- (a) individuals act based on the meanings that they derive,

- (b) meanings emerge through their interaction with other social actors, and
- (c) these meanings are organized and transformed through an interpretive process used by individuals to approach reality. Individuals collectively form interpretive schemas, rituals of interaction, and social representations organizing their experiences (Collins, 2014; Schutz, 1970), e.g., student-teacher bonds.

In this framework of theoretical considerations, studies fall within the symbolic interaction approach school by emphasizing the action of teachers and students and the conceptualization of their behavior, motivations, beliefs, and the social environment (classroom, school, community, etc.). According to research, most teachers often use traditional teaching aids, and less than half prefer ICT (Lupu & Laurentiu, 2015). In the international literature, it is evident that the usage of ICT is related to teachers' beliefs about technology's role and value in the context of teaching, as well as the pedagogical practices they use (Mama & Hennessy, 2013; Mirzajani et al., 2015), with their readiness (training, motivation, anxiety, and effectiveness) (Demetriadis et al., 2003; Galanouli et al., 2004; Mama & Hennessy, 2013; Mirzajani et al., 2015; Nikolopoulou & Gialamas, 2016; Pelgrum, 2001; Scherer et al., 2014), the barriers they face (heavy workload, management of instructional time, inadequate administrative and technological support, low teacher confidence in using ICT (Butler & Sellbom, 2002; Guha, 2000; Slaouti & Barton, 2007) and the external determinants of learning, such as the social environment (van den Beemt & Diepstraten, 2015).

## ICT EDUCATION IN GREECE

In Greek education system, teaching of ICT started in 1980s in a fragmented way. Unified curriculum made introduction of ICT in education more systematic, while the interdisciplinary unified curriculum framework (DEPPS) (Greek Ministry of Education and Culture, 2003), in an innovative way, established objectives in compulsory education of the digital literacy of students and their contact with the various uses of the computer as a teaching aid, as a cognitive - exploratory tool and as a tool for communication and information retrieval in the context of daily school activities. At the same time, it emphasizes the development of social and critical skills, mainly following the holistic model in conventional schools (Greek Ministry of Education and Culture, 2003). However, the pragmatic model is applied in all-day primary schools based on the unified reformed educational program (Government Gazette 1139/2010). The new 2021 curriculum for ICT follows the interdisciplinary unified curriculum framework from the first year of primary school up to the Lyceum. Regarding the contents, there are unified thematic fields (e.g., algorithmic programming, computer systems, data analysis, and digital literacy). These practices are either focused on the learning discipline relevant to the interconnection of ICT with everyday activities or cross-cutting practices of authentic learning (IEP, 2021). Furthermore, in the past two decades in Greece, educational activities for the training of teachers in the rapidly changing ICT were developed by private educational

institutions and associations (EME, Greek Physics Association, etc.) and universities.

In the late first decade of the 21st century, the implementation of a long-term program on the pedagogical usage of ICT in teaching, as well as training programs for trainers (B-level training course, "Training of teachers in information and communication technologies (ICT)," 2008-2014), started. The digital school ("Interactive School Books," ebooks.edu.gr) and digital platforms with educational materials (e.g., digital educational repository "Photodentro," "e-me" for teachers, "Kalyppos Depository" for books, the portal Openarchives.gr) for facilitating training and teaching have been considerably developed since 2010 (Megalou et al., 2016; Vagellatos & Panagiotopoulos, 2017), while the functionality of the Greek school network has also been improved. However, there are infrastructure barriers related to connectivity and up-to-date technology facilities. Thus,

- (a) there is insufficient infrastructure (PCs, learning platforms, learning programs, and interactive whiteboard) (Schleicher, 2018). Greece is ranked 25 out of 27 in the EU in educational expenditure,
- (b) only a proportion between 11-19% have high broadband speed (>100 Mbps) (European Commission [EC], 2019a, 2019b, 2019c),
- (c) the diffusion of broadband connections is on average lower than the European average,
- (d) many teachers lack basic skills,
- (e) both teachers' and students' confidence in their ICT skills is below EU means, and
- (f) teacher training is fragmented (EC, 2019a, 2019b, 2019c).

Finally, the implementation of "emergency remote education" in the pandemic period and the violent and dynamic transformation of educational events highlighted several aspects related to digital literacy such as:

- (a) the social and digital inequalities that digital technologies create for teachers and students (Giavrimis & Nikolaou, 2020) and especially for vulnerable groups (CSEE-ETUCE, 2021),
- (b) the exclusion of the "digitally illiterate" students, due to reasons mainly related to class, as well as economic, geographical and biological boundaries (Giavrimis & Ferentinou, 2021),
- (c) the concern about the changes regarding the role of teachers and the methodology of teaching practices, and
- (d) the exclusion of "digitally illiterate" teachers (Jimoyiannis et al., 2020a, 2020b).

The present paper aims to reveal teachers' views on the digital divide. The research questions addressed teachers' perceptions of the digital divide, the causes of the intra-social digital divide, and the consequences of digital competence.

**Table 1.** Demographic characteristics of participants

Characteristic	Value
Years of experience	
1-5 years	7
6-15 years	8
16-25 years	8
26 years & over	6
Age	
30-40 years old	14
40-50 years old	12
50 years and over	3
Primary education category	
PE70	23
PE11	3
PE06	3
Area	
Urban	20
Countryside	9
Work position	
Typical class	22
Educational priority zones	2
Integration class/parallel support	5

## METHOD

A qualitative research method was used. Qualitative research involves a naturalistic and interpretive approach to social phenomena, in their natural context, through the discourse of individuals and their interpretive schemas (Denzin & Lincoln, 2005). In addition, qualitative research approaches social phenomena by conceptualizing the acting subjects and their social action as a complex symbolic construction by adopting reflective processes (Tsiolis, 2014).

### Participants

The method of participant selection adopted was purposive sampling. This method selects subjects from a population, not randomly but according to specific criteria. It does not ensure representativeness with any specific methodology, but it is precious for examining various characteristic cases, which is considered necessary for conducting a qualitative survey (Kallas, 2006). In total, 29 primary school teachers were selected, ten males and 19 females of various age groups. The age of the participants ranged from 32 years old to 54 years old, with a mean of about 41.5 years. Years of service were between 1-36 years, with a mean of 13.5 years (Table 1).

### Tool of Research

In the present research, we used the interview as a tool for data collection and the semi-structured interview, distinguished by a relatively flexible question structure. It is a qualitative research tool that aims to organize a communicative relationship between the interviewer and the interviewee, for the former to obtain information from the latter by implementing the appropriate questions (Iosifidis, 2017). The interview guide included four thematic axes. The first thematic area concerned teachers' conceptualizations regarding the digital divide. Indicative questions were: "What does the digital divide mean to you?", "Can you give us an example of a digital divide through your experience in school?"

The second thematic area was related to the causes of the digital divide. Indicative questions were: "What are the causes of the digital divide?", "What explanation do you give for the existence of the digital divide in education." The third thematic area referred to the consequences of the digital divide. Indicative questions were: "What do you think are the consequences of the digital divide in your daily life?", "What do you think are the consequences of the digital divide in your instructional work?", "Who is most affected by the digital divide in the school context?" The fourth thematic area included questions about ways to address the digital divide. Indicative questions were: "In your opinion, to address the digital divide, what can you personally do?", "In your opinion, what can the education system do to address the digital divide?"

### Research Procedure

In the present study, the method of analysis was selected. Essentially it is a method that identifies patterns within the data allowing the researcher to understand the research data in depth. Thematic analysis is valuable for studying data collected from open-ended research questions such as focus group discussions or interviews. In this research, coding was then carried out after the data was collected through semi-structured interviews. Coding is a technique for identifying paragraphs and concepts in the text and finding relationships between them. The central unit of analysis was the sentences, paragraphs, or the whole interview text (Kyriazi, 2002, p. 238238). In addition, coding was guided by concepts drawn from existing literature and theory. The next step was categorizing the data into multiple categories and sometimes subcategories. In the end, the processing of existing ideas and concepts was conducted.

## RESULTS

### Digital Divide Conceptualizations

Research participants referred to the definition of the digital divide, highlighting the gap between individuals or groups who have the skills to use new technologies and can benefit from their use and those who do not have these skills due to social and economic factors. Four groups are identified: users, those who are not users because they do not have the know-how, indirect users (through others or those who, while they can, do not have the means), and deniers. Teachers characteristically mentioned:

"I think it refers to people who use new technologies to accomplish their everyday tasks, simple to complicated, and those people who do not use them and struggle" (E2).

"... is the difference between a teacher who can use new technologies in their school and someone who has the knowledge but does not have the means" (E4).

In the 29 teachers' samples, one interviewer doubted that the digital divide exists, claiming that it is a social construction that promotes discrimination between teachers, a concept based on artificial differences. Characteristically he points out:

"I know it, but it means nothing to me. Personally, what I notice about the teachers is the way they educate children and not their knowledge of new technologies. Therefore, I do not perceive any digital gap ... Instead, they want to establish a gap between teachers" (E11).

### Reasons for the Existence of a Digital Inter-Social Divide

Human rights and equality of social resources in a society, as documented in various institutional texts, everyone should be able to access ICT. At the applied level, however, several social groups are excluded from them due to the intra-social gap mediated by exogenous and endogenous factors (Paraskevas, 2015).

#### Exogenous factors

**Rapid changes in the digital field:** The rapid evolution of ICT and the dynamic transformation of the knowledge and skills that individuals need to acquire is shaping new contexts of demands in the various fields of application.

"New technologies, even though they are a beneficial tool nowadays. Hmmm ... However, they are evolving so rapidly that we constantly need to update our knowledge in order to be able to meet them" (E19).

"In contemporary times, there is a causality of technology. We are living in the age of technolog" (E8).

**Vulnerability:** The teachers in our study associated the digital divide with vulnerable social groups, such as people experiencing poverty, disabled people, and older people, believing that they are the most affected because they hardly struggle to meet the new digital demands of contemporary literacy, mainly because they have to cope with the digital divide. As a result, social inequalities are exacerbated, while feelings of marginalization and stigmatization experienced by these people are dominant.

"In the information society, inequalities are exacerbated, marginalizing vulnerable groups even further and widening the digital divide" (E3).

"I believe that groups with a disability are most affected ..." (E17).

"The unemployed, those who do not have the means to acquire the knowledge due to economic poverty" (E8).

"Okay, obviously the Roma ... Of course, there have been many programs for them. In the past, laptops were also given to them" (E22).

#### Socio-economic family characteristics

**Social class and low economic level:** Most teachers stated that the lower socioeconomic classes are affected because they cannot afford the necessary equipment. However, two teachers considered that the internet, which almost everyone has, mitigates digital inequalities.

"The upper class of society has learned to use ICT more easily. They also used to buy computers more easily, which in the past were more expensive" (E3).

“I believe that the lower social groups are affected by the digital divide ... they do not prioritize, e.g., acquiring a computer and generally being involved with new technologies” (E11).

“Students from poor families cannot keep up with other students” (E20).

“The economically weaker groups are always affected by the digital divide” (E25).

“... social class does not play an important role, since even groups considered lower social class or marginalized, such as the Roma, are familiar with new technologies or the internet” (E9).

**The educational level of parents:** Furthermore, teachers report that parents’ educational level plays an important role. Parents with a high level of education are more aware of their children’s digital needs and deal with them more effectively.

“Of course, if the parents have a high educational level, they will realize that the child needs to be involved in the development of technology so that they will encourage the child in that direction, and as an adult, he/she will acquire the appropriate knowledge. On the other hand, if the parent’s educational level is low and believes the child does not need the technology, they will leave the child in the dark” (E2).

### **Geopolitical factors**

Through the interviewees’ discourse, it emerged that the people’s residence also varies their accessibility to ICT. For example, individuals living closer to decision-making centers have better accessibility to digital resources. On the other hand, students in remote and isolated areas are exposed to the adverse effects of the digital divide.

“In the city center, they had interactive computers, while most schools in the province had just one computer” (E4).

“People who live in remote areas, I think, have little access to new technologies ... and the Internet” (E15).

“In remote areas, children, even if their parents want to educate them and attend technology courses, they cannot, due to adverse conditions, remoteness and therefore they are falling behind, and digital divide occurs” (E6).

### **Endogenous Factors Creating a Digital Divide Among Teachers**

#### **Teachers’ age and years of experience**

According to the study, age was one of the most crucial factors in establishing the gap. Older teachers face more difficulties managing and integrating ICT in school. On the other hand, younger teachers are more familiar with new technologies while at the same time having more frequent use of these technologies.

“... the older ones do the same thing they do all across the public sector, which is I do not know, I do not engage, and they put aside their obligations” (E1).

“There is an issue among colleagues because new technologies cannot be understood by people aged 45-50 and over who do not want to deal with them in school ...” (E19).

Teachers in our survey also referred to years of service, mentioning that this functions inversely with knowledge and interest in integrating ICT into the learning process. A teacher mentioned:

“Uh, it affects teachers with many years of service, the older teachers ... okay, they are at an old age waiting to retire, they do not want to learn about new technologies ...” (E23).

### **Gender**

Most teachers said that gender does not play a significant role in the digital divide as much as the perception of the need to use ICT or interest in new technologies. Teachers referred:

“I know both men and women who are or are not familiar with the new technologies ...” (E28).

and

“In terms of gender, I think it does not matter” (E5).

### **Motivation-interest in professional development**

According to teachers, building internal motivation and a particular culture towards ICT is beneficial for themselves and their involvement with the new technologies and for their practical and empirical application in the classroom and other activities in the school and other settings. Teachers pointed out:

“It is related to the interest of someone to get involved in new technologies” (E7).

and

“That is mainly because I think that if someone wants to learn, he/she will seek and find opportunities to do so” (E14).

### **School culture/ personal attitude**

Teachers, through their discourse, highlighted traditional and stereotypical perceptions inherent in societies and contexts, such as schools, regarding new technologies, which prevent their involvement in the new cognitive tools.

“Why would I need to learn ICT, new technologies, since the whole school culture in Greece has not changed? It is already a traditional school, and it remains traditional as we know it, so why should I make the effort, the process, the expense of learning something new that I cannot use” (E20).

“Uh yes, maybe it is a defense that people subconsciously hold towards new technology, that they perceive it as a threat, or something alien to them somehow? That is how I could rationalize it” (E6).

“Some people even today refuse to learn to use new technologies” (E27).

### Consequences of Digital Literacy for Teachers

Most teachers in our study referred to the positive effects of digital literacy on teaching practices, establishing a climate of cooperation and emotional closeness between student and teacher and maintaining a network of information on teaching practices between schools. Teachers characteristically mentioned:

#### Using different teaching methods:

“I think a teacher who is familiar with technology and can handle it can teach the same issue in many different ways, with comparisons ...” (E11).

#### Engagement-learner agency:

“With new technologies, students who are not so proficient in their oral skills can be more involved, as well as in writing, let us say, in grammar too ...” (E24).

#### Increasing emotional closeness with teacher:

“And they feel closer to the teacher, it is true” (E8).

#### Building an information network between schools:

“... with some other schools in Greece about the same subject how they teach it, to provide children with additional information” (E18).

According to the teachers in our research, the negative consequences are related to the low usage of ICT in teaching practice due to a lack of skills or defective equipment. Also, learning inequalities are increasing due to the lack of possession of the necessary skills by students, while there is a stigmatization of schools that cannot exploit ICT. Teachers characteristically pointed out:

#### Inadequate usage of ICT in teaching practice:

“Regarding teachers, of course, some of them may not use digital media so often to plan their teaching” (E4).

and

“It is the teachers who do not sufficiently use them” (E3).

#### Adverse learning outcomes for students caused by teacher inefficiency:

“Of course, students who have a teacher who does not know are affected negatively” (E12)

and

“Children are affected more, their teachers’ stimuli may be insufficient. Also, the opportunities to deal with

some digital media, such as the computer, are reduced” (E12).

#### Building learning inequality:

“... I do understand that to a certain limit ..., anyone who does not conform will be left behind... in other words, the one who does not have internet and computer is staying behind” (E26).

#### Stigmatization of schools:

“... there are also social implications to the extent that some schools are marginalized and stigmatized compared to other schools with a better infrastructure regarding new technologies” (E2).

## DISCUSSION

Teachers and their conceptualizations of the growing inequalities in the educational context are influential factors mediating the practices implemented in the school context (Blackledge & Hunt, 2004). The purpose of this study is to present teachers’ views on the digital divide among teachers. Research participants referred to the definition of the digital divide, stressing the gap between individuals or groups with the skills to use new technologies and can benefit from using them and those without. Four groups of individuals are distinguished: users, those who are not users because they do not know, indirect users (through others or those who, while they can, do not have the means), and deniers. Teachers’ conceptualizations categorize their life experiences and facilitate the construction of social representations and rituals associated with rapid technological and scientific developments. Their actions and behavior, their attitudes and feelings about ICT, and their competence are performances reflecting their organization and interpretation of their experience.

Most teachers mentioned unequal opportunities to access ICT due to lacking skills. According to the participants, the reasons for the intra-social gap are mediated by both exogenous (rapid ICT growth, socio-economic level, vulnerable groups, geopolitical conditions, school culture) and endogenous factors (gender, age, interest, motivation). In addition, human rights and equality of social resources within a society, as enshrined in various institutional texts, should be accessible to all. However, at the practical level, several social groups are excluded from them because of the intra-social divide.

Although, according to the majority of the teachers in our research, ICT can support teaching practices by fostering a climate of collaboration and emotional closeness between student and teacher, as well as the development of an information network for teaching activities between schools, several teachers emphasized the low usage of ICT in teaching and learning practice, the inadequacy of teachers and students regarding digital skills, the lack of material and technical equipment, and the stigmatization of schools. For implementing ICT in education, the teachers’ conceptualization of their effectiveness in the educational

process, the possibility of avoiding problems, and the level of control they can have over the ICT play a dominant role (Demetriadis et al., 2003). Teachers with more traditional orientations concerning the educational process are less likely to adopt ICT as a tool for transmitting information but adhere to the classical learner-teacher and learner-object interaction paradigm (Tondeur et al., 2010). The digital context of the educational reality is saturated with meaning and meaningful categories, and the teacher's action responds to these. The teachers do not simply interact with ICT; their interaction is associated with the derived web of meaningful relations by transforming their specialized experience into social action (Ragnedda & Muschert, 2017). The treatment of technological tools determines a special cultural status and identity and are manifestations of power and relative dominance (Demertzis, 2017).

The digital divide drives social groups to marginalization (Zahou & Stathiras, 2008) and the reproduction of educational inequalities (Ragnedda & Muschert, 2013; Zajda & Majhanovich, 2022). Digital inequalities and teachers' conceptualizations of these reproduce institutionalized social inequalities across social contexts and are attributed to the privileged of the necessary accessibility to social resources (Schroeder & Ling, 2014; Witte & Mannon, 2010; van Deursen et al., 2015). Digital literacy differentiates individuals' actions in knowledge accessibility since problems of conceptual confusion and issues of knowledge control are observed (Castells, 2011). According to this approach, the accessibility to ICT and the possession of ICT skills generate social inequalities by shaping conditions of unequal distribution of status, economic prosperity, and, consequently, the social position of individuals.

In conclusion, the teachers of the study conceptualize the digital divide in education through their own experience and their social representations, distinguishing the users of ICT regarding it (direct or indirect, non-users, deniers of the digital divide), as well as the implications (positive and negative) it has on teaching practices and the teacher's intrapersonal behavior. Intra-social factors (exogenous and endogenous), according to teachers, play a dynamic role in the formation of the digital divide. Therefore, for an education that aims to establish conditions of digital equity (Zapata et al., 2017), it is essential to adapt teachers' primary education and in-service training in the application of ICT in teaching practice to the new technological demands, as well as to develop their digital literacy. Furthermore, factors such as teachers' culture change and the development of internal motivation, changes and modernization of schools' logistical infrastructure, as well as the inclusion in the design of intervention programs factors such as gender, socio-economic level, and educational level of the participants in those programs (Acilar & Sæbø, 2023. Chetty et al., 2017; van Dijk, 2017) are crucial in shaping a democratic learning environment and eliminating the effects of the digital divide.

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