



Digital transformation under constraint: Access inequities, online assessment pressures, and teacher burnout in remote schooling during pandemic

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Abstract

The rapid and mandatory transition to digital education during the COVID-19 pandemic initiated a global paradigm shift, exposing both the transformative potential of distance learning and the inherent fragilities of existing educational systems. This research paper examines the multifaceted impact of emergency remote teaching within the Greek educational context, focusing on the convergence of access inequities, the technical and pedagogical pressures of online assessment, and the resulting professional burnout among educators. Drawing on data from 65 experienced teachers, the study analyzes the abrupt shift from traditional classrooms to digital environments and evaluates the psychological and structural toll of this adaptation. The results indicate that while the pandemic served as a catalyst for rapid digital literacy and professional development, it simultaneously highlighted a significant digital divide; 78.5% of participants reported infrastructure-related obstacles, while 83.1% identified online assessment validity as a major challenge. Furthermore, the intensified workload and the blurring of professional and personal boundaries led to substantial emotional exhaustion, with female educators appearing more vulnerable to these stressors. Beyond the immediate findings, the study implies that the long-term success of the digital transition depends less on technological availability and more on a fundamental systemic shift. These implications suggest that for a sustainable digital transformation, educational policy must prioritize the institutionalization of teacher well-being, treat high-speed connectivity as a non-negotiable public good, and transition from rigid evaluative models toward formative, process-oriented digital assessment. Ultimately, the research warns that without comprehensive institutional support and a robust framework for professional boundaries, digital tools risk exacerbating social inequalities and professional attrition rather than fostering educational innovation.

Keywords: Burnout; Distance learning; Electronic platforms; Pandemic; Teachers

1. Introduction

1.1 Transforming Education through Technology: Student-centered Approaches in Distance Learning

Distance education in the 21st century, often referred to as Open and Distance Learning, has evolved significantly, transforming into a mainstream educational model. It is characterized by its reliance on technology, flexibility in learning environments, and a focus on learner-centered approaches. This transformation has been influenced by developments in information and communication technologies, which have reshaped pedagogical practices and accessibility to education (Jaekel et al., 2023; Saykili, 2018; Tatlıoğlu, 2024). Distance education is generally described as a multifaceted process involving the provision of education over significant distances, facilitated primarily by educational technology. It is considered one of the “virtual environments” that remove the constraints of time and place, allowing for personalized learning styles (Tatlıoğlu, 2024). Distance education emphasizes student autonomy, with students taking a more active role in their education, while instructors act as mediators, fundamentally altering the traditional teacher-centered educational environment (Garrison, 2017).

Distance education includes many forms, all of which share the following characteristics: first, the student is separated from the teacher in space and/or time (Zhang & Gillespie, 2023); second, communication and information exchange take place through the use of some form of media and/or technology (Boukranaa et al., 2024). Media generally refers to printed material or one-way

mass transmission of information via radio or television (Riggs, 2020; UNESCO, 2020), while technology refers to the use of an educational platform, a videoconferencing platform, or social media. The most well-known and basic categories of distance education are synchronous, which is implemented in real time through a videoconferencing platform and allows the teacher and learner to interact with each other, and asynchronous, which is not implemented in real time and allows the student to use educational resources, such as video lessons or forums, to learn at his or her own pace (UNESCO, 2020). It is also worth mentioning blended or hybrid education, which combines face-to-face teaching with distance education (Zhang & Gillespie, 2023).

The advantages of distance learning are many. Learners are not bound by geography or time, and in modern times, all that is needed is an internet connection (Boukranaa et al., 2024). In many cases, it is more affordable than traditional teaching, either due to reduced tuition fees or lower costs of attendance. In addition, it allows learners to adapt the learning process to their needs, daily routines, and personal learning pace (Sadeghi, 2019). However, despite these positive characteristics, there are factors that make distance learning challenging or less attractive for some. One of the main challenges is the high level of motivation, self-discipline, and organization required of learners to achieve successful outcomes (Boukranaa et al., 2024; Bozkurt & Sharma, 2020). Additionally, the entire process depends on technology and internet connectivity, which can increase costs and make communication—and consequently learning—difficult if technical problems arise (UNESCO, 2020). Finally, the lack of interaction with instructors and peers can create communication barriers for some learners and reduce motivation to learn (Boukranaa et al., 2024; Stecula & Wolniak, 2022).

1.2 Reconfiguring Education in the Wake of COVID-19: Challenges, Psychosocial Impacts, and Prospects for Innovation

The COVID-19 pandemic has left its indelible mark on every aspect of our lives, hitting the education sector hard. Schools around the world have been forced to close, leaving millions of students without access to face-to-face instruction (Barik et al., 2022). The shift to distance learning, while necessitated by the emergency, has created a new landscape full of challenges and inequalities. It has also acted as a catalyst for educational transformation, highlighting both the weaknesses of the existing education system and the new possibilities for development (Nellisa et al., 2023). The psychological well-being of students and teachers has been put to the test, as the fabric of the school community has been instantly dismantled, putting socio-emotional development and mental health at risk. The imposition of social distancing measures, the restriction of social interaction and the uncertainty about the future triggered feelings of anxiety, fear and sadness in students and teachers. Isolation and the lack of face-to-face communication significantly affected the psychosocial development of students. The absence of the school community, a space for interaction, support and socialization, deprived children of valuable experiences and negatively affected their mental well-being. At the same time, the pandemic brought to the fore the critical importance of human contact and social interaction in the learning process. Distance education, although it served as a life-saving solution in emergency circumstances, could not fully replace the value of face-to-face teaching and teacher-student interaction (Brazauskaitė-Zubavičienė & Vintere, 2024; Irimie & Sandu, 2021). The psychological resilience of the educational community is an issue of paramount importance. Providing psychosocial support to students and teachers, strengthening their digital literacy and creating a supportive work environment should be a priority for addressing the consequences of the pandemic and safeguarding mental health in the field of education. Educational institutions in such cases should develop strategic plans to ensure resilience and continuity in education during future crises. This includes the creation of predefined action protocols that prioritize mental health and support for both students and teachers. In particular, these protocols must include immediate response procedures, such as the formation of a crisis management team, the development of reliable internal and external communication channels, and the creation of an incident recording and monitoring system. At the same time, educational institutions should implement mechanisms

for early detection of difficulties, socio-emotional learning interventions, access to counseling services, and referral procedures to specialized structures, where necessary (Elbedour et al., 2021; Lazaris, 2025).

Beyond the challenges, the pandemic has also created new opportunities. Distance learning, although adopted under pressure, has paved the way for the integration of digital technology into the educational process. The rapid adoption of digital technology in education has created new challenges for teachers. Preparing digital lessons, assessing students through digital platforms, providing technical support to students, and managing communication with parents and guardians have created a pressurizing work environment. The increased workload, lack of resources, and uncertainty about the future have led many teachers to intense anxiety, stress, and, in extreme cases, burnout (see Table 1). Research by Kotowski et al. (2022) indicates that online teaching is not inherently more demanding than traditional teaching. Instead, the primary cause of teacher stress was the abrupt transition to online instruction without adequate training. To effectively address the increased workload and stress caused by the abrupt digital transition, it is essential to adopt tiered models of teacher support. This approach goes beyond fragmented technical training by introducing a multi-level framework that includes ongoing mentoring, specialized technical support at the department level, and the institutionalization of communities of practice. Through these collaborative structures, the professional isolation of teachers can be overcome, strengthening their confidence in the face of technical challenges can be strengthened, while ensuring the quality of the learning process in distance learning environments (del Arco Bravo et al., 2022; Lemay et al., 2023; Palayoor & Mavoothu, 2025).

Furthermore, many educators had to undertake distance teaching responsibilities while simultaneously managing their own mental and physical health, caring for vulnerable family members, and assisting with their children's home education. Compounding these challenges, teachers' uncertainty about the duration of school closures was exacerbated by constantly changing communications from local and national governments. The adoption of digital tools and the familiarization with new teaching and learning methods, even under extraordinary circumstances, can serve as the trigger for innovative practices and the modernization of the education system in the future (Calluso & Nicolò, 2023; Nikolopoulou, 2023; Raitz et al., 2023; Silva & Coutinho, 2024). Across a total of 77 articles published between 2020 and 2022, Chalkiadakis and Noguera's research (2024) showed that teachers perceived the pandemic as an opportunity to enhance their abilities to teach through digital tools and implement new educational strategies. In addition, they advanced their digital appropriation for assessment and interaction with students and colleagues. A large portion of the educational community considered the pandemic an opportunity for professional development in terms of creating new digital skills, despite the lack of necessary equipment and the psychological challenges that distance learning presents. In conclusion, the COVID-19 pandemic enabled teachers to expand their professional skills to meet the needs of future school education.

1.3 Challenges and Opportunities in the Digital Transformation of Education

The 21st century has witnessed a profound transformation in education, driven by the rapid advancement of digital technologies. This digital transition presents both significant opportunities and notable challenges for educational institutions, educators, and learners alike. It is reshaping how education is delivered, experienced, and conceptualized, necessitating a critical reassessment of traditional models and practices. The integration of digital tools and methodologies has the potential to enrich learning experiences, expand accessibility, and foster lifelong learning. However, it also highlights challenges such as ensuring equitable access, sustaining student engagement, and addressing the persistent digital divide. The digital technologies have revolutionized access to information and collaborative learning opportunities, making education more accessible and interactive. The digital transformation also encourages the adoption of innovative pedagogical approaches that depart from traditional practices, promoting active participation and personalized learning (Srivastava, 2023).

Table 1

Study table presenting the reconfiguration of education after COVID-19 with emphasis on challenges psychosocial impacts and prospects for innovation

<i>Categories and Key Points / Impacts</i>	<i>Details</i>
General Impact on Education	Millions of students without access to in-person instruction
Worldwide school closures	A new landscape full of challenges and inequalities
Shift to distance learning	Highlighting weaknesses and new possibilities for development
Catalyst for educational transformation	
Impact on Psychological Well-being	
Psychological well-being of students and teachers tested	Disintegration of the school community, risk to socio-emotional development and mental health
Triggering anxiety, fear, and sadness	Imposition of social distancing, restriction of social interaction, uncertainty about the future
Dramatic impact on psychosocial development	Isolation, lack of face-to-face communication
Negative impact on mental well-being	Absence of the school community (space for interaction, support, socialization)
Importance of Human Contact	
Critical importance of human contact and social interaction	Distance learning could not fully replace the value of in-person teaching and teacher-student interaction
Psychological Resilience & Priorities	
Psychological resilience of the educational community is paramount	Providing psychosocial support to students and teachers
	Strengthening digital literacy
	Creating a supportive work environment
	Priority for addressing pandemic consequences and safeguarding mental health
New Opportunities & Digital Technology	
Paving the way for the utilization of digital technology	Distance learning adopted under pressure
Challenges for Educators	
New challenges from the rapid adoption of digital technology	Preparing digital lessons, assessing via digital platforms, providing technical support, managing communication with parents/guardians
Pressurizing work environment	Increased workload, lack of resources, uncertainty about the future
Leading to anxiety, stress, and burnout	Impact on the psychological state of educators
Opportunities for the Future	
Catalyst for innovative practices and modernization	Adoption of digital tools, familiarization with new teaching and learning methods, even under extraordinary circumstances

The digital age has radically transformed the educational landscape, raising issues that require immediate attention, such as navigating digital ethics, cyberbullying, and online safety, while also highlighting opportunities to integrate character-building activities into digital learning. Undoubtedly, ensuring equal access to digital education remains a significant challenge, as bridging the digital divide is a fundamental prerequisite for the democratization of knowledge and the avoidance of new forms of social exclusion. Without a stable and accessible technological infrastructure, innovative pedagogical approaches risk widening existing social inequalities (Sarva & Purina-Biezā, 2023). By embracing innovative pedagogical approaches, leveraging data-driven decision-making, and promoting global collaboration, the education sector can address these challenges and fully realize the potential of digital technologies to transform education for the better. Alongside technological empowerment, the long-term well-being of teachers is emerging as a fundamental prerequisite for the sustainability of the educational system. Preventing burnout and protecting the mental health of teaching staff is not only a moral imperative but also a strategic investment that ensures the continuity and quality of instruction. Recognizing the teacher as a central driver of change requires the creation of a supportive work environment that promotes resilience and job satisfaction in the long term.

1.4. A Holistic Overview of the Impact of COVID-19 on Education: Teacher Burnout and Policy Reform

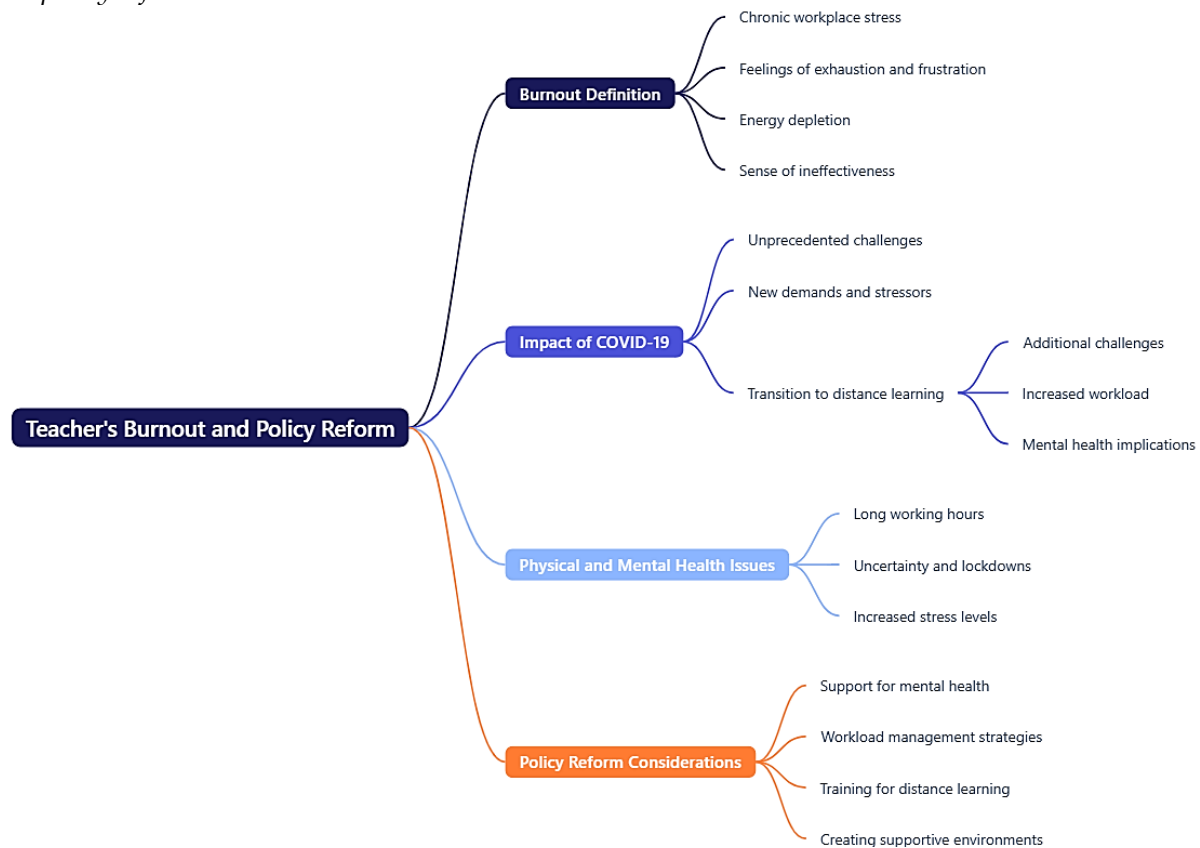
Burnout is a condition characterized by feelings of exhaustion and frustration caused by chronic workplace stress, energy depletion, and a sense of ineffectiveness (Khan et al., 2023; Weiss, 2023). There is no doubt that the teaching profession is highly stressful. However, the COVID-19 pandemic introduced unprecedented challenges, new demands, and stressors for teachers (Kupers et al., 2022). The necessity of transitioning from traditional teaching to distance learning platforms posed additional challenges, as teachers faced increased physical and mental health problems due to long working hours and the uncertainty associated with continuous lockdowns (Dayal, 2023).

Examining the impact of the COVID-19 pandemic on teachers' mental health and well-being, it was found that uncertainty, workload, negative perceptions of the profession, concern for the well-being of others, health problems, and multiple roles contributed negatively to teachers' mental health and, consequently, led to professional burnout. In contrast, social support, job autonomy, and coping strategies contributed positively to their well-being. However, teachers remain extremely concerned about the most vulnerable students and call for more coherent governmental strategies to effectively support them (Kim et al., 2021). Teacher burnout syndrome can be defined as a condition in which teachers experience emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment due to chronic work stress (Caruso, 2019; Čopková, 2021). This syndrome can have a negative impact on the educational environment, hindering the achievement of pedagogical goals. Research also indicates that it can lead to distraction, dehumanization, and apathy among teachers, which may ultimately result in health problems and an increased desire to leave the profession. The pandemic has exposed the inequalities and weaknesses of existing education systems, raising questions about their effectiveness, flexibility, and adaptability in emergency situations. The sudden decision by education policymakers to implement distance learning without adequate system readiness left educators unprepared. Curriculum development was hampered by its lack of alignment with distance learning requirements, while the rapid coordination of online teaching posed significant challenges. Despite educators' enthusiasm for the transition, they lacked the necessary online expertise, resources, and technological infrastructure for Educational Technology (EdTech). Teachers in primary and secondary education reported feeling vulnerable, as they had not received clear guidelines for planning learning from home (Jordan et al., 2021). Teachers were forced, in a very short period and due to the unpredictability of events, to discover and integrate new educational methods and strategies into the learning process to facilitate the transition from face-to-face to online learning. The successful implementation of these modifications depended significantly on their pre-existing readiness, as well as their perspectives and experiences in navigating Information and

Communication Technologies [ICT] (Onyema et al., 2020). They also faced outdated technological resources within educational institutions. The majority of educational facilities were equipped with computers lacking basic features such as cameras, speakers, and microphones, which are essential for remote teaching. The unpreparedness of many educational systems for implementing distance learning resulted in the interruption of the educational process. In some cases, teaching time was reduced significantly over the academic year (Figure 1). The interruption of in-person teaching and the shift towards distance learning highlighted gaps and inequalities related to both infrastructure and pedagogical approaches (Zizikova et al., 2023).

Figure 1

Diagrammatic representation of the impact of COVID-19 on education with emphasis on teacher burnout and policy reform



1.5. Importance, Purpose and Research Hypotheses of the Study

This research paper focuses on investigating the multidimensional impact of distance learning, which was adopted exceptionally due to the COVID-19 pandemic, on the educational process and on teachers' professional burnout. Its purpose is to examine teachers' self-confidence, autonomy, and job satisfaction, and to collect data and opinions on best practices in distance learning and teachers' support needs. Additionally, it aims to document the theoretical concepts and research findings on distance learning, the digital transition in education, and teachers' professional identity, as well as to propose suggestions for supporting teachers in adopting distance learning and enhancing their professional development and growth.

The central premise is that the emergency transition to distance learning during the COVID-19 pandemic served as a catalyst for profound shifts in both pedagogical delivery and the broader professional experience of educators. The transition to digital learning environments fundamentally transformed the organization and implementation of teaching, highlighting new opportunities but also considerable challenges. At the same time, distance learning requires adjustments in pedagogical practices and methods, decisively influencing teachers' autonomy, self-confidence, and professional satisfaction. Furthermore, this experience is associated with

increased levels of professional burnout, while simultaneously creating a need for the cultivation of new knowledge and skills. Finally, the effective implementation of distance learning necessitates targeted support measures for teachers to enhance both their teaching effectiveness and professional self-efficacy.

Beyond its immediate pandemic context, this study contributes to the broader discourse on sustainable education and long-term digital transformation. By examining how emergency distance learning reshaped pedagogical practices, professional identity, and teacher well-being, the research provides empirical insights into the structural conditions required for resilient and inclusive educational systems. The findings inform strategies for integrating digital technologies in ways that promote equity, institutional adaptability, and continuous professional development, thereby supporting a sustainable model of education capable of responding effectively to future societal and technological disruptions.

2. Method

2.1. Research Design

This study employs a descriptive-correlational research design using a mixed-methods approach. It is structured as a survey-based investigation rather than a single case study, aiming to identify broader trends regarding the impact of distance learning on the educational process and teacher burnout. The research was conducted in four distinct phases, ranging from sample selection and instrument determination to data collection and final statistical processing.

2.2. Teachers Participating in the Research

In the context of this research, teachers from Primary (26 people) and Secondary Education (39 people) participated. They come from various regions of Greece, covering a wide range of geographical and socio-cultural characteristics (Lefkada, Athens, Ioannina, Thessaloniki, Rodopi, and Rethymno). The age range of the teaching population extends from 34 to 64 years. The common characteristic of all participating teachers is that they voluntarily chose to participate in the research, indicating an interest in the study topic and a willing attitude to explore ways in which technology and digital platforms can improve teaching and learning.

This study was conducted with the participation of 65 teachers, comprising 51 females (78.5%) and 14 males (21.5%). A wide range of ages was observed among the participating teachers, ranging from 30 to 65 years. In all age groups, the number of women was higher than that of men. The largest concentration of participants was recorded in the age group 55–59, with women significantly outnumbering men. Lower participation rates were found among teachers in the younger groups (30–34 and 35–39) as well as in the older group (60–64). Regarding family status, the majority of participating teachers (64.6%) are married, while a significant proportion (27.7%) are single. Divorced and widowed teachers represent smaller groups, accounting for 7.7% and 0%, respectively. Most teachers in the sample have either no children or two children, each at a rate of 36.9%. A very small percentage come from larger families (3%), while a larger proportion of teachers have between one and three children. In addition, the majority of teachers work in urban centers (67.7%), while a significant proportion are employed in rural areas (20%), and a smaller share in towns (12.3%). Table 2 presents the demographic properties of the participants.

2.4. Academic and Professional Development of Teachers Participating in the Study

The survey included teachers from 14 different specialties, two of which are in Primary Education (teachers and kindergarten teachers), while the remaining specialties are in Secondary Education. Most participating teachers (67.7%) see teaching as a very important part of their job. Nearly one in ten (9.2%) who have a second basic qualification seek to gain broader knowledge and skills beyond their main subject. Many teachers hold a postgraduate qualification (38.5%) and a doctoral degree (4.6%). This shows their commitment to professional growth and academic progress (see Figure 2).

Table 2

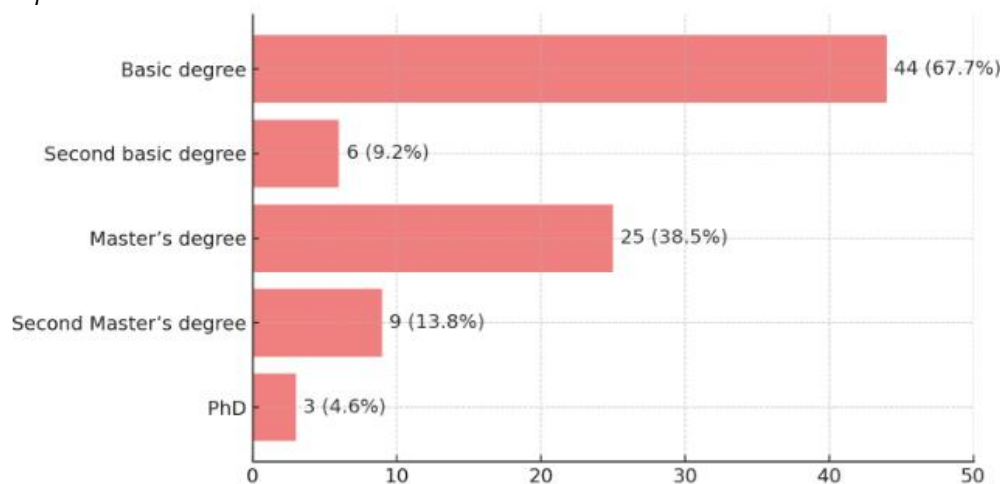
Demographic characteristics of participants by age group, gender, marital status and number of children

Age group	Gender	Single (N)	Married (N)	Divorced (N)	Total number of participants (N)	Total number of children	Mean number of children
30-34	Men	0	0	0	0	0	0.0
	Women	0	1	0	1	1	1.0
35-39	Men	1	0	0	1	1	1.0
	Women	2	3	0	5	4	0.8
40-44	Men	1	1	0	2	2	1.0
	Women	4	4	1	9	8	0.9
45-49	Men	4	1	0	5	2	0.4
	Women	0	4	1	5	8	1.6
50-54	Men	0	0	0	0	0	0.0
	Women	2	8	1	11	17	1.5
55-59	Men	2	3	1	6	4	0.7
	Women	1	14	0	15	35	2.3
60-64	Men	0	0	0	0	0	0.0
	Women	2	3	0	5	6	1.2

Note. Some age categories contain no participants and are presented for completeness of the age classification. To determine the reproductive profile of the sample, the mean number of children was calculated for each age group and gender category. The calculation was performed using the following formula: Mean number of children = Total number of children / Total number of participants.

Figure 2

Frequency of occurrence of academic qualifications or their combination of participating teachers in the sample



The sample of participating teachers, based on their previous service, reveals a teaching staff with substantial experience, combined with a dynamic flow of new professionals and a degree of relative stability (see Table 3).

Table 3

Distribution of participating teachers according to years of teaching experience, highlighting the balance between experienced staff and new entrants into the profession

Years of seniority	Percentage (%)	Characteristics
1-5	20%	A dynamic influx of new professionals in the field.
6-20	>60% (approx. 68.5%)	The majority of educators, indicating a relatively experienced staff.
21 and over	11.5%	A small number, possibly due to retirements or departures from the field.
Total	100%	-

2.5. Measurement Instruments

To investigate the influence of distance learning on the educational process and teacher burnout, a sample survey was implemented with the participation of active teachers from different employment statuses, such as hourly, substitute, and permanent. During the design of the research study, a twenty-question evaluation questionnaire was used as a tool to investigate the effects of distance learning on the educational process and teacher burnout. In this specific tool, the questions were divided into: (a) the demographic data of the teachers, (b) the professional data, (c) the degree of experience in distance learning, (d) the parameters that influenced the implementation of distance learning, and (e) the degree of burnout (see Table 4).

Table 4

Structure of the evaluation questionnaire in sections

<i>Sections of the evaluation questionnaire</i>	<i>Teacher Reference Data</i>
(a) Demographic data	Gender Age (years) Marital Status Number of Children Teacher Specialization Academic Background
(b) Professional Data	Education Level Years of Experience Place of Work Professional (Employment) Status
c) Experience in distance education	Frequency, types of platforms, evaluation of experience
(d) Factors affecting digital infrastructure and distance learning implementation	Internet access and proper use, technological infrastructure, disruption of personal life, inexperience, ability to communicate with students, etc.
(e) Degree of Professional Burnout During the Pandemic	Mental and Physical Exhaustion

2.6. Data Analysis

The data analysis was carried out in two successive stages. The aim was to systematically process the data and draw reliable conclusions from the participants' responses. Initially, the data were collected through a digital questionnaire designed using the Google Forms platform. The questionnaire included closed-ended questions and categorized variables regarding teachers' demographics, professional characteristics, experience in distance education, factors influencing its implementation, and the degree of professional burnout during the pandemic. In the first stage of processing, the initial organization and filtering of the responses were carried out through the built-in analysis tools of the Google Forms platform, which allowed the extraction of basic descriptive data and the creation of initial frequency tables. Subsequently, the data were extracted and imported into the statistical program SPSS (Statistical Package for the Social Sciences), where more specialized statistical analysis was performed. During data processing, a distinction was made between quantitative and categorical variables. For quantitative variables, descriptive statistical analysis (calculation of frequencies, percentages, means, and standard deviations) was applied to capture the demographic and professional profile of the participants, as well as the main characteristics of their experience in distance education. Tables and diagrams were also used to graphically display the results. To investigate differences between variables before and after the pandemic, a paired samples t-test was applied to examine whether statistically significant changes occurred in factors such as access to the internet, ability to use it, knowledge of communication tools, and the impact of distance education on teachers' personal lives. At the same time, a

correlation analysis (Pearson correlation) was performed to identify possible relationships between the variables under examination.

The combined use of descriptive and inferential statistics allows our research to better interpret the data and explore the study's research hypotheses. It also contributes to understanding how distance learning during the pandemic affected the educational process and teachers' professional experience.

3. Results

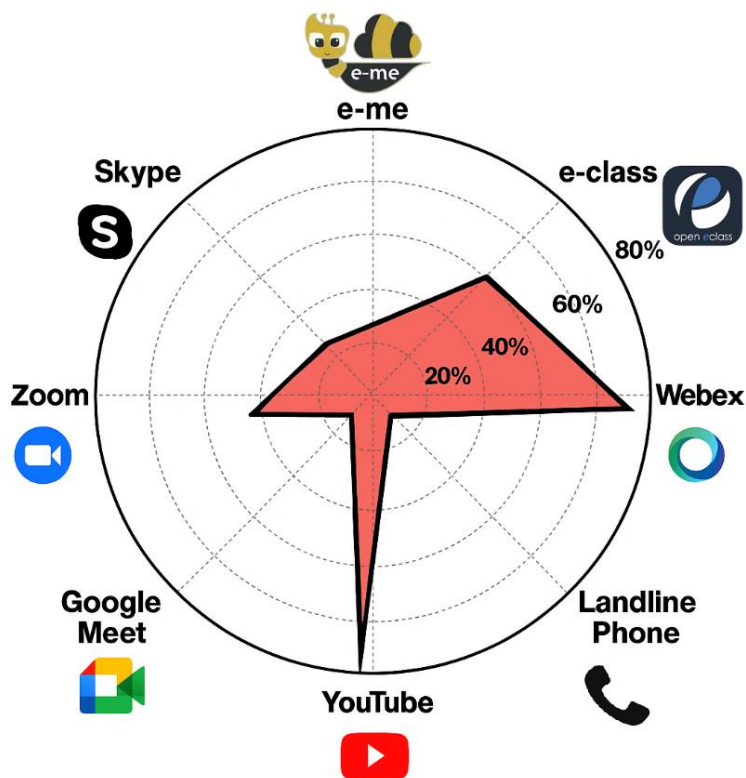
3.1. Digital Platforms, Pedagogical Barriers, and Professional Burnout: Evidence from Teachers' Use of Distance Learning during the Pandemic

The results of the survey revealed that distance learning was widely adopted by teachers during the COVID-19 pandemic. The vast majority (93.8%) of teachers used distance learning at least occasionally. Nearly half (52.3%) reported using it often or always, indicating that it played a crucial role in the educational process. Only a small percentage (6.2%) used distance learning rarely or occasionally.

Teachers used a variety of distance learning platforms and tools, indicating that their needs and preferences differed. The popularity of Webex, e-class, Skype, Zoom, and YouTube may be attributed to their ease of use and wide availability. E-me, Skype, and even landline phones appear to have been used as supplementary tools, particularly for communicating with students who lacked access to other platforms. The survey also revealed that Google Meet was not used by any of the 65 participating teachers, possibly because they preferred platforms that integrated more seamlessly with tools and services they were already familiar with, such as e-class or Skype (see Figure 3).

Figure 3

Frequency of use of online platforms or educational tools by teachers in distance learning during the COVID-19 pandemic

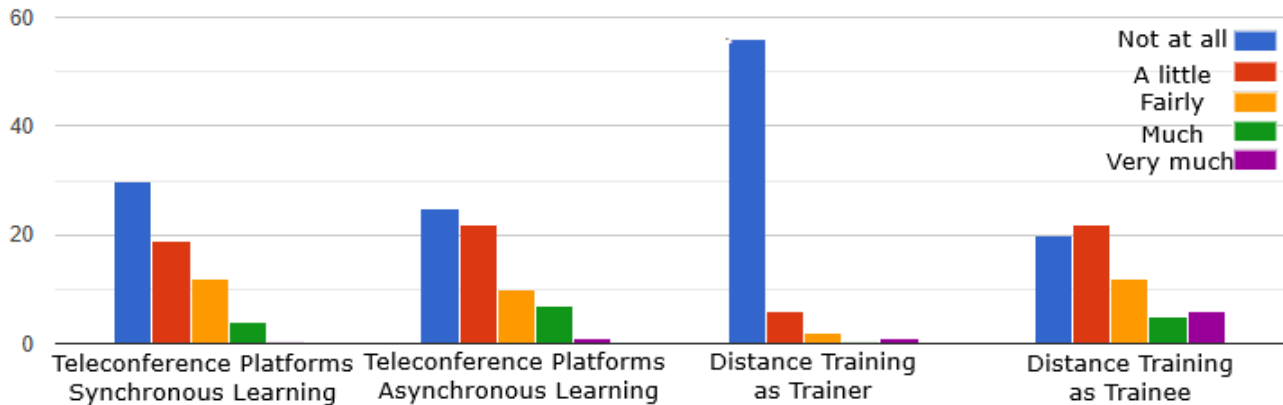


Our results indicated that the majority of teachers were not familiar with distance learning technologies prior to the COVID-19 pandemic. Most teachers had not used videoconferencing or asynchronous learning platforms, nor had they participated in distance learning either as

instructors or as learners. The use of asynchronous learning platforms was slightly higher than that of synchronous learning platforms. Moreover, the use of distance learning in the role of instructor was considerably lower than its use in the role of learner (see Figure 4).

Figure 4

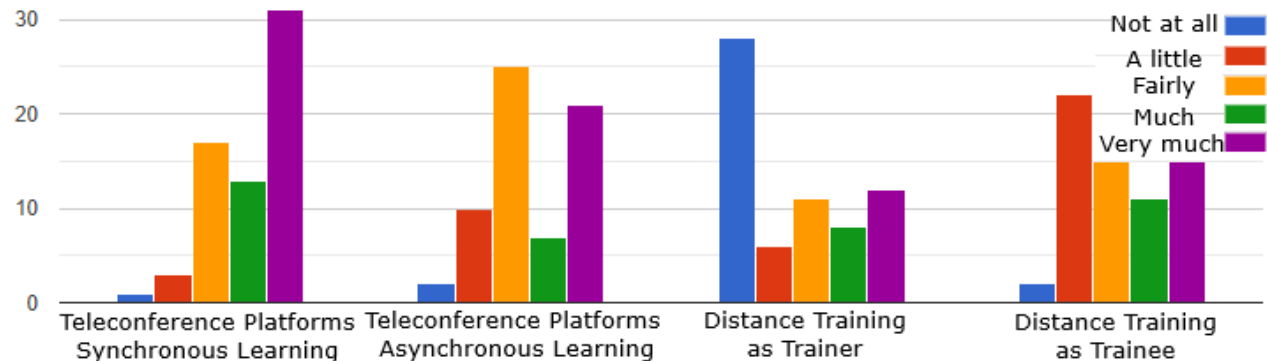
Frequency (number of teachers in axon y) of use of electronic platforms for synchronous and asynchronous distance education by teachers before the COVID-19 pandemic



However, during the pandemic, teachers relied more on modern educational platforms and less on asynchronous ones. As learners (trainee), they demonstrated a slight preference for distance learning platforms, while as trainees they also showed a mild tendency to favor such platforms (see Figure 5).

Figure 5

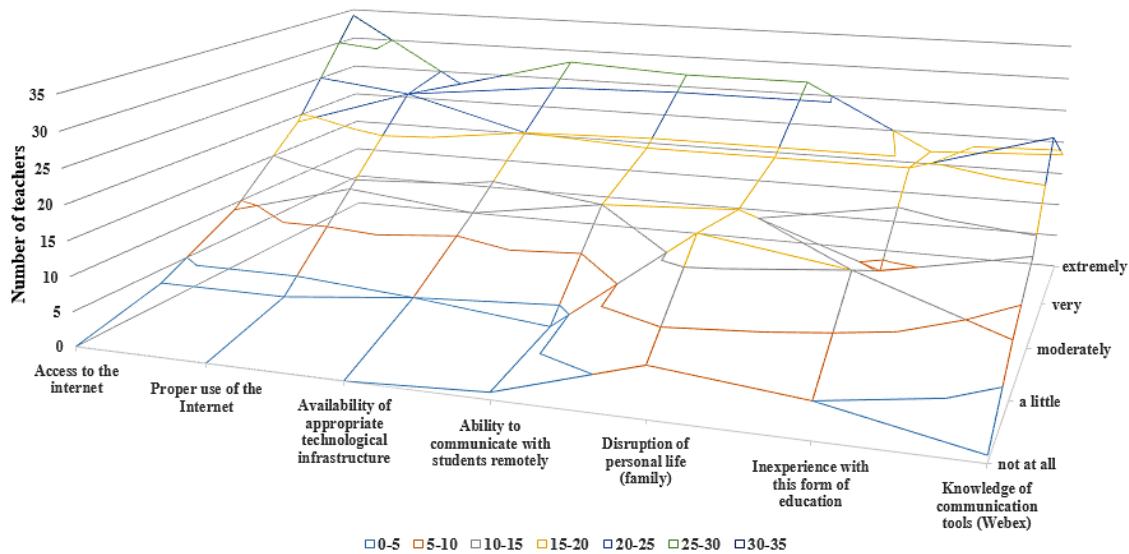
Frequency (number of teachers in axon y) of use of electronic platforms for synchronous and asynchronous education by teachers in distance learning after the COVID-19 pandemic



Based on our research data, distance education, although it offers new possibilities, is accompanied by significant challenges that affect both the professional and personal lives of teachers. One of the most significant factors is the disruption of personal life, as 27 individuals reported being "very" affected by having work in their family space. At the same time, inexperience in distance education emerged as another inhibiting factor. It becomes clear that many teachers are in a transitional stage, trying to adapt to a new educational reality, highlighting the need for systematic training at both a technical and pedagogical level. On the other hand, the knowledge of using videoconferencing tools, such as Webex, seems to be quite widespread in the regions of Greece. The majority of participants indicated that they were "very" or "quite" familiar with these tools, which indicates that the technological side of distance learning has been largely integrated into daily practice (see Figure 6).

Figure 6

Diagrammatic representation of the frequency of the main obstacles and challenges reported by teachers in distance education



The implementation of asynchronous distance learning was greatly affected by various parameters, both technological and personal (see Table 5).

Table 5

Key Parameters of asynchronous distance learning during the COVID-19 pandemic

Category	Key Difficulties & Challenges	Positive Aspects & Opportunities
Technological Factors	• Lack of Internet access • Lack of suitable technological infrastructure	• Served as a useful tool for supporting learning during a period of crisis
Personal & Cognitive Factors	• Lack of skills in proper Internet use • Lack of knowledge on how to use electronic platforms • Lack of experience with asynchronous distance learning	• Accelerated the adoption of distance learning
Social & Psychological Factors	• Disruption of personal life	• Promotes accessibility to education • Promotes inclusive learning

Furthermore, during the implementation of distance learning, teachers faced a wide range of challenges that extended beyond the technological domain to include pedagogical and personal dimensions. This complexity underscored the need for adaptability and the acquisition of new skills in an environment that was unprecedented for many teachers (see Table 6).

Before the outbreak of the COVID-19 pandemic, distance education (DE) did not constitute a dominant educational model. Its implementation was relatively limited and, in most cases, had a supplementary character. The analysis of the paired samples correlations and paired samples test tables shows that the variables before and after the epidemic present positive and statistically significant correlations. Specifically, internet access shows a moderate correlation ($r = .430, p < .001$), as do the proper use of the internet ($r = .550, p < .001$) and knowledge of the use of communication tools ($r = .461, p < .001$), while the strongest correlation is observed in the disruption of personal life ($r = .802, p < .001$). Furthermore, the t-test for dependent samples indicates statistically significant differences in internet access ($t(64) = 2.528, p = .014$), in the proper use of the internet ($t(64) = 2.084, p = .041$), in the disruption of personal life ($t(64) = 2.931, p = .005$), and in knowledge of the use of communication tools ($t(64) = 2.585, p = .012$). In contrast,

Table 6

Challenges faced by teachers in implementing asynchronous distance learning during the COVID-19 pandemic: Evidence from research

Category of Challenges	Challenge	Percentage of Teachers
Technological Challenges	Lack of student access to technology and unstable internet connection.	78.5%
	Difficulty for students to focus in a digital environment (due to noise, distractions, lack of motivation).	73.8%
	Low internet speeds, affecting the smooth flow of instruction.	1.5%
Pedagogical Challenges	Difficulty in effectively assessing student learning in a digital environment (lack of direct contact).	83.1%
	Reduced interaction among students and with teachers.	1.5%
Personal Challenges	Increased workload for teachers (lesson preparation, technical issues).	75.4%
	Lack of sufficient support from school administration (e.g., guidelines, technical support).	25.2%

the existence of appropriate technological infrastructure does not show a statistically significant change ($t(64) = 0.845$, $p = .401$) (see Table 7). The prevailing perception among educators was that DE could serve either as a tool to enhance face-to-face teaching or as an alternative solution for students who faced objective difficulties in being physically present in the classroom. This approach reflected the educational system's limited familiarity with the potential of fully digital learning.

Table 7

Comparative analysis of the impact of the pandemic on educational technology proficiency and teachers' personal well-being

Variable	M	SD	t	df	p	95% CI Lower	95% CI Upper
Internet Access	0.338	1.079	2.528	64	.014	0.071	0.606
Proper use of the internet	0.246	0.952	2.084	64	.041	0.010	0.482
Existence of appropriate technological infrastructure	0.138	1.321	0.845	64	.401	-0.189	0.466
Disruption of personal life (family)	0.308	0.846	2.931	64	.005	0.098	0.517
Knowledge of using communication tools (Webex)	0.400	1.247	2.585	64	.012	0.091	0.709

According to this research, it appears that distance learning in the context of the COVID-19 pandemic significantly affected the level of professional burnout among teachers. A large percentage of teachers (over 40%) reported feeling mentally exhausted from teaching, waking up already exhausted in the morning to face a day of work, and feeling that they were working too hard for their school. About 20% of teachers stated that they often felt exhausted from their work, that they were at the limits of their endurance, and "empty" at the end of a school day. A smaller percentage of teachers (less than 10%) felt that they could easily understand how their students were feeling. It is important to note that the graphs do not only show how many teachers experienced the various symptoms of burnout, but also how often they experienced them. For example, 40% of teachers felt mentally exhausted from teaching "every day," while only 25% felt exhausted from their job "every day" (see Table 8).

Table 8
Distribution of teachers' responses regarding the frequency of burnout symptoms, perceived professional efficacy, and attitudes toward students during distance education in the COVID-19 pandemic

Statement	A few times a week	Every day	A few times a month	Never	A few times a year	Once a week	Once a month
I felt emotionally exhausted from teaching	16 (24.60%)	15 (23.10%)	10 (15.40%)	10 (15.40%)	7 (10.80%)	5 (7.70%)	2 (3.10%)
I felt exhausted when I woke up in the morning and had to face another day of work	16 (24.60%)	11 (16.90%)	6 (9.20%)	14 (21.50%)	6 (9.20%)	8 (12.3%)	4 (6.20%)
It was very tiring for me to work with students through distance education	18 (27.70%)	16 (24.60%)	7 (10.80%)	9 (13.80%)	6 (9.20%)	4 (6.20%)	5 (7.70%)
I felt worn out by my work	21 (32.30%)	16 (24.60%)	7 (10.80%)	9 (13.80%)	4 (6.20%)	4 (6.20%)	4 (6.20%)
I felt frustrated by my work	10 (15.40%)	12 (18.50%)	10 (15.40%)	13 (20.0%)	7 (10.80%)	6 (9.20%)	7 (10.80%)
I felt that I was working too hard for school	12 (18.50%)	16 (24.60%)	11 (16.90%)	10 (15.40%)	5 (7.70%)	12 (18.50%)	5 (7.70%)
I felt that I was at the end of my rope	11 (16.90%)	13 (20.0%)	7 (10.80%)	12 (18.50%)	8 (12.3%)	6 (9.20%)	8 (12.3%)
I felt "empty" at the end of a school day	14 (21.50%)	14 (21.50%)	7 (10.80%)	12 (18.50%)	9 (13.80%)	4 (6.20%)	5 (7.70%)
I could easily understand how my students feel	18 (27.70%)	20 (30.80%)	2 (3.10%)	2 (3.10%)	9 (13.80%)	9 (13.80%)	5 (7.70%)
I dealt with student problems very effectively	19 (29.20%)	7 (10.80%)	10 (15.40%)	3 (4.60%)	9 (13.80%)	12 (18.50%)	5 (7.70%)
I feel that through my work I positively influence the lives of my students	18 (27.70%)	13 (20.0%)	4 (6.20%)	4 (6.20%)	11 (16.90%)	8 (12.30%)	4 (6.20%)
I felt full of energy	13 (20.0%)	9 (13.80%)	10 (15.40%)	12 (18.50%)	7 (10.80%)	8 (12.30%)	6 (9.20%)
I could create a comfortable atmosphere with my students	16 (24.60%)	13 (20.0%)	8 (12.30%)	2 (3.10%)	12 (18.50%)	8 (12.30%)	6 (9.20%)
I had achieved many worthwhile things in distance education	13 (20.0%)	15 (23.10%)	8 (12.30%)	4 (6.20%)	9 (13.80%)	11 (16.90%)	5 (7.70%)

Table 8 continued

<i>Statement</i>	<i>A few times a week</i>	<i>Every day</i>	<i>A few times a month</i>	<i>Never</i>	<i>A few times a year</i>	<i>Once a week</i>	<i>Once a month</i>
I dealt calmly with problems that arose	16 (24.60%)	16 (24.60%)	10 (15.40%)	1 (1.50%)	4 (6.20%)	10 (15.40%)	8 (12.30%)
I felt refreshed after working with my students	16 (24.60%)	11 (16.90%)	6 (9.20%)	7 (10.80%)	11 (16.90%)	9 (13.80%)	5 (7.70%)
I feel that I treat some of my students impersonally, as if they were objects	12 (18.50%)	2 (3.10%)	8 (12.30%)	22 (33.80%)	7 (10.80%)	10 (15.40%)	4 (6.20%)
I have become harsher with people since I started distance teaching	4 (6.20%)	0 (0.0%)	3 (4.60%)	41 (63.10%)	12 (18.50%)	3 (4.60%)	2 (3.10%)
I worry that this job is making me harsher with people	3 (4.60%)	0 (0.0%)	4 (6.20%)	49 (75.40%)	5 (7.70%)	0 (0.0%)	4 (6.20%)
I felt that my students blamed me for some of their problems	2 (3.10%)	0 (0.0%)	3 (4.60%)	51 (78.50%)	6 (9.20%)	0 (0.0%)	3 (4.60%)
In reality, I didn't care what happens to some of my students	1 (1.50%)	1 (1.50%)	2 (3.10%)	46 (70.80%)	7 (10.80%)	1 (1.50%)	7 (10.80%)

The technical problems that arise during the distance learning process (73.8%), combined with the limited or even non-existent experience of a significant percentage of teachers (53.8%) in using the relevant tools, constitute factors which, as shown by our research, may substantially hinder their effective utilization. For a large part of the teaching staff, the transition and adaptation to a different way of teaching—requiring familiarization with new technological applications, alternative pedagogical methodologies, and flexibility in managing the learning process—may prove particularly demanding. In addition, the lack of appropriate and sufficient logistical equipment (21.5%) is not only a problem for teachers themselves but also for students, as it limits opportunities for participation, interaction, and equal access to the learning process (see Table 9).

Table 9

Main difficulties reported by teachers during the implementation of distance learning, presented with corresponding percentages and numbers of participants affected

<i>Challenge</i>	<i>% of Teachers Affected</i>	<i>Number of Teachers Affected</i>	<i>Notes</i>
Technical problems	73.8%	48	This was the most frequent issue reported.
Lack of experience	53.8%	35	A significant challenge for teachers.
Access issues	52.3%	34	Challenges related to students' inability to access digital platforms and tools.
Adapting to a different teaching method	64.6%	42	A major difficulty for a large number of educators.
Lack of proper equipment	21.5%	14	Affected both teachers and students.
Lack of fast internet connection	43.1%	28	An important technical barrier.
No problems at all	6.2%	4	A small percentage of teachers reported no issues.
Communicating with a black box on the screen	1.5%	1	This refers to a specific communication issue.
Lack of equipment and access from students	1.5%	1	A problem on the student's side.
Heavy workload in front of a computer	1.5%	1	A significant personal difficulty.
No ready-made material	1.5%	1	This caused the teacher to have to create new materials every day.

The data analysis highlights a clear differentiation in the extent to which various digital tools were adopted by teachers for the continuation of distance education. As noted, the vast majority of teachers—approximately 80% (specifically 86.2% when excluding those who selected “none of the above”)—express their intention to continue using digital tools, although their preferences are unevenly distributed across categories. More specifically, the use of asynchronous platforms, such as electronic classrooms, emerges as the most prevalent choice, adopted by the majority of respondents (61.5%). This is followed by Open Educational Resource (OER) repositories, selected by a considerable proportion of teachers (37 participants, 56.9%), reflecting the growing acceptance of practices that foster autonomy and broaden access to educational materials. In contrast, the adoption of modern platforms (40%) and social networks (41.5%) is relatively lower, though still represents a substantial share of participants. These findings confirm the gradual but

steady adoption of digital tools, accompanied by distinct preferences among teachers. Finally, a smaller percentage (13.8%) report that they do not intend to continue using any of the aforementioned tools.

3.2. Demographic and Social Factors as Determinants of Professional Resilience and Burnout of Teachers in Distance Education

The selection of variables (age, gender, marital status, and number of children) was based on the fact that they are important demographic and social factors which, according to the literature, influence teachers' professional experience, psychological resilience, and levels of professional burnout. The correlation between age and years of professional experience was expected, as professional career development is directly linked to age progression; the finding of a strong correlation ($r = .754$) reinforces the reliability of the sample in terms of its demographic characteristics. At the same time, the significant relationship between gender and endurance limits ($r = .404$) highlights the differences in the way men and women experience professional pressure, a phenomenon linked to the multiple roles that women often assume in both work and family life. Furthermore, marital status ($r = .338$) and number of children ($r = .318$) were found to be positively associated with burnout, suggesting that family obligations and increased caregiving responsibilities for family members contribute to psychological and work-related fatigue. Therefore, the selection of these variables allows for an in-depth investigation of how demographic and social characteristics influence teacher resilience and burnout in the context of distance learning during the pandemic (see Table 10).

Table 10

Correlations between demographic and social characteristics and parameters of professional resilience and burnout

Variable A	Variable B	Pearson Correlation	p-value
Age	Years of professional experience	0.754**	<.0001
Gender	Endurance limits	0.404**	.0008
Marital status	Burnout	0.338**	.0058
Number of children	Burnout	0.318**	.0098

Note. **. Correlation is significant at the .01 level (2-tailed).

Teachers' workplace is statistically significantly associated with the frequency of use of distance learning ($r = .258$, $p < .05$), suggesting that the educational environment may influence the integration of digital tools into the educational process. Teachers working in schools with greater technological infrastructure or a stronger culture of innovation appear to use distance learning more frequently. A strong positive correlation was also observed between teachers' experience in asynchronous education before the pandemic and their experience in modern education during the same period ($r = .743$, $p < .01$). This strong positive correlation indicates that teachers who had developed higher levels of experience in asynchronous education before the pandemic also tended to report higher levels of experience in modern education.

Age does not constitute a strong determinant in the use of distance learning platforms; however, there are indications of variation in the willingness to engage in training processes, particularly in the role of the learner. The findings indicate that, prior to the pandemic, age was not significantly correlated with experience in the use of either synchronous ($r = -.029$) or asynchronous ($r = .022$) education platforms. Likewise, no significant association was observed with the role of trainer ($r = -.159$) or learner ($r = .134$). During the pandemic, however, notable differences emerged: older teachers were negatively associated with participation in distance training as learners ($r = -.258$, $p < .05$), a finding that may be interpreted as a reduced inclination to engage in new forms of professional development. In addition, the negative, albeit statistically non-significant, correlation with involvement as instructors ($r = -.216$) suggests a possible trend toward lower levels of active utilization of platforms among older teachers.

The correlation analysis also revealed that teachers' experience in synchronous education was positively and strongly correlated with their experience in asynchronous education ($r = .690$, $p < .01$), indicating that skills and familiarity with the two distance education models are mutually reinforcing. In addition, the frequency of use of distance education was positively correlated with both burnout ($r = .264$, $p < .05$) and students' problem-solving ability ($r = .250$, $p < .05$). Furthermore, burnout was positively associated with the perception of hard work ($r = .393$, $p < .01$) and with the feeling of "emptiness" at the end of the school day ($r = .283$, $p < .05$), while frustration was positively associated with this same sense of emptiness ($r = .293$, $p < .05$). These findings demonstrate that increased use and engagement with distance learning platforms are linked not only to positive learning experiences but also to higher levels of professional fatigue.

4. Discussion

This study indicates that teachers' experience of distance learning during the COVID-19 period should be interpreted not simply as a technological shift, but as a broader pedagogical and organizational transition. For the teachers in this study, the move to remote instruction required rapid adaptation to unfamiliar digital environments, the redesign of teaching routines, and the management of instructional uncertainty under emergency conditions. In this respect, the findings are consistent with research showing that teachers entered emergency remote teaching with uneven readiness, limited prior preparation, and mixed beliefs about the pedagogical value of online teaching, particularly in contexts where the transition was sudden rather than strategically planned (Jimoyiannis & Koukis, 2023; Klusmann et al., 2022; Tondeur et al., 2023). The pattern related to teachers' academic qualifications should be interpreted cautiously. While teachers with postgraduate qualifications may appear more open to distance learning as an educational possibility, this does not necessarily translate into more intensive or more frequent use of learning platforms. Rather than assuming a simple linear relationship between academic degree and digital engagement, the findings suggest that pedagogical openness, technological confidence, and actual platform use may represent distinct dimensions of professional practice. For that reason, the mismatch in this part of the results is better discussed as a nuanced finding requiring careful interpretation rather than as evidence of a straightforward contradiction.

A particularly important contribution of the study concerns preparedness and infrastructure. Since most participants reported no prior experience with distance learning platforms, the pandemic appears to have functioned as an accelerator of digital adoption rather than the endpoint of a gradual institutional transition. The high proportions of teachers reporting technological infrastructure and access problems, together with substantial difficulties in evaluating students' learning, suggest that the main barriers were structural and pedagogical, not merely individual. This interpretation is in line with studies showing that emergency online teaching exposed weaknesses in digital access, assessment design, and teachers' capacity to conduct fair and manageable online evaluation (Gupta et al., 2023; Slade et al., 2022; Zou et al., 2021). Accordingly, the present findings support the argument that sustainable digital transformation requires more than temporary platform access; it depends on stable infrastructure, equitable participation, and assessment models that remain pedagogically valid under digitally mediated conditions. The reported increase in workload should also be understood within this broader systemic frame. Teachers were not merely transferring existing lessons to an online format; they were simultaneously learning new technologies, redesigning materials, maintaining communication with students and families, and monitoring participation under altered classroom conditions. This helps explain why distance learning was experienced not only as an instructional challenge but also as an organizational and emotional burden. Existing research similarly shows that emergency remote teaching intensified teachers' professional demands, while post-pandemic analyses emphasize that professional development in digital pedagogy must be treated as a sustained institutional priority rather than a short-term crisis response (González et al., 2023; Huang et al., 2024; Klusmann et al., 2022). In this sense, the present findings point to the need for long-term

investment in teacher learning, not only in technical skills but also in online pedagogy, assessment literacy, and adaptive instructional design.

The findings also suggest that the pandemic may have led to a selective institutionalization of digital practices. The fact that many teachers appear willing to continue using at least some distance learning tools after the pandemic does not necessarily mean that online education will replace face-to-face teaching. Rather, it suggests that some digital practices have become educationally meaningful enough to remain part of teachers' repertoires beyond the emergency period. This interpretation is supported by large-scale evidence showing that teachers' post-pandemic intention to continue online teaching is shaped by perceived usefulness, digital competence, and pedagogical beliefs, rather than by emergency conditions alone (Khong et al., 2023). It is also consistent with research arguing that one of the key lessons of the pandemic is the need to carry forward those digital practices that genuinely improved course design, flexibility, and interaction, while avoiding the assumption that all emergency innovations are inherently sustainable (González et al., 2023).

Another major strength of the findings lies in their attention to teachers' emotional and psychological experiences. Reports of hard work, frustration, and end-of-day exhaustion suggest that the demands of distance education extended far beyond technical adaptation. The findings align with research showing that teachers' emotional exhaustion increased during the pandemic and that workload was positively associated with exhaustion, whereas social support functioned as a protective factor (Klusmann et al., 2023). They also resonate with evidence that teachers' sense of self-efficacy was challenged during pandemic teaching, indicating that rapid shifts in instructional conditions may undermine professional confidence when adequate support is lacking (Pressley & Ha, 2021). Thus, the burnout-related dimensions identified in the present study should not be reduced to individual coping deficits; rather, they point to the importance of school-level and system-level support structures, including clearer expectations, administrative coordination, collegial support, and boundaries that protect work-life balance.

The gender-related findings should likewise be discussed with caution but without minimizing their significance. In this sample, female teachers appeared to experience heavier pressures across several burnout-related indicators. Although this pattern should not be generalized beyond the scope of the present study, it does suggest that digital teaching burdens may intersect with pre-existing inequalities in care responsibilities, emotional labor, and domestic workload. This finding also indicates that the pressures associated with distance teaching may not be distributed evenly across teachers, but may instead reflect broader social and domestic inequalities that shape professional experience. Moreover, the present study shows that the educational value and long-term viability of distance learning depend on the alignment of infrastructure, pedagogy, assessment, institutional support, and teacher well-being.

5. Conclusion

The findings of the present study demonstrate that the digital transformation of education should not be regarded as a transient technical adjustment, but as a profound systemic change. More specifically, the results suggest that the sustainability of digitally mediated education depends not only on technological functionality or continuity of instruction, but also on equitable access, pedagogically appropriate assessment, sustained institutional support, and attention to the human costs of implementation. In this respect, the study contributes to current discussions on sustainable education and digital transformation by showing that the success of distance learning depends on the alignment of infrastructure, pedagogy, assessment, institutional support, and teacher well-being.

To ensure the sustainability and equitable distribution of the benefits of digital learning, the following strategic recommendations are proposed: (a) teachers' professional development must be transformed from a voluntary action into a permanent systemic requirement. It is proposed to integrate training in digital humanities and alternative pedagogical methods within official working hours, ensuring that every educator possesses the necessary tools to meet modern

demands, (b) policy leadership must treat internet connectivity and modern equipment as a public good. A long-term plan is required for the provision of free or subsidized devices and high-speed access to all students and teachers, aiming to definitively bridge the digital divide and promote educational equity, (c) a transition from traditional examination methods to sustainable models of digitally mediated assessment is essential. This practice should emphasize formative assessment, the use of digital portfolios (e-portfolios), and the utilization of learning analytics for the personalized support of students, (d) to prevent burnout, the legal and institutional consolidation of the 'right to disconnect' is required. School units must develop internal protocols for managing digital workload and provide systematic psychosocial support to their staff, recognizing mental health as a prerequisite for educational quality & (e) the practice of distance education can become sustainable through the creation of national repositories for open educational resources and digital learning communities. Encouraging teachers to share best practices reduces individual preparation time and strengthens the collective resilience of the educational system.

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