Greek Kindergarten Teachers' Perceived Barriers in Using Touchscreen Tablets in the Post-pandemic Era: An Intersectional Study

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Abstract. The purpose of this work was to identify Greek kindergarten teachers' perceived barriers in using touchscreen tablets for educational purposes in the post-covid era through an intersectional lens. Twelve Greek kindergarten teachers participated in in-depth interviews. Thematic content analysis informed by intersectionality was adopted. Analysis revealed a range of first and second-order personal, professional and contextual barrier themes in the interrelationships of gender, class, family status and professional identity. First-order barrier themes included (1) "School barriers", (2) "Endless low-quality training", (3) "Lack of time and feelings of devaluation", (4) "Nomad life and low pay" and (5) "Parents' resentment". Second-order barriers included (1) "Screen guilt and Covid" and (2) "Preschoolers are experts". Findings suggest main post-covid barriers to integrating tablets in Greek kindergarten schools are the invisible ones and no longer focus on equipment or connectivity. Implications for educational policy, kindergarten teacher professional development and screen media integration are discussed in conjunction to limitations of the study.

Keywords: touchscreen tablets · barriers · kindergarten · teachers' perceptions · post-covid · intersectionality

1 Introduction

Extensive research prior to the Covid-19 pandemic [1–3] has shown Greek kindergarten teachers seem more hesitant in integrating technology-enhanced pedagogies as compared to their primary and secondary education counterparts. Major barriers reported in these works are related to poor funding, lack of equipment and connectivity, lack of teachers' training and teachers' beliefs regarding the importance of hands-on learning experiences in kindergarten. The emergence of the Covid-19 pandemic back in 2020 radically changed the Greek educational technology landscape as the then newly elected neoliberal Greek government invested substantial capitals on connectivity, equipment and particularly tablets which were distributed to all schools around the country, teachers' training and passed emergency legislation allowing online teaching and mobile

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devices use in K-12 which up until then was prohibited [4]. Despite the effort, the single post-pandemic work exploring tablet and mobile phone use barriers in K-12 [4] shows Greek kindergarten educators still lag in implementing technology-enhanced pedagogies and cite similar pro-covid concerns. Nikolopoulous' study [4] provides us with valuable information on Greek kindergarten teachers' perceived barriers in using mobile phones and tablets in the post-covid era yet its quantitative design fails to capture more fine-grained information on the underlying "whys" they still seem reluctant in integrating touchscreen devices in their teaching even though at least some of the pre-covid barriers have or should have been removed.

The present qualitative work sought to fill this current gap by identifying factors that Greek kindergarten teachers identify as barriers to implementing touchscreen-enhanced pedagogies through an intersectional lens [5]. Back in 1989, Crenshaw used the term intersectionality to explicate and analyze the multifaceted and hidden forms of marginality women of color experienced within the US legal system due to gender, class and race identity intersections. Since then, intersectionality has been employed as an analysis tool for exploring women's as well as other marginalized groups' experiences in multiple fields for diverse forms of hidden barriers in society. Intersectionality highlights the interaction of social identities that function within various social frameworks at the individual, relational, and institutional planes, which eventually emerge at the individual level [6]. Thus, research conducted from this standpoint may be able to shed light on the abstract intricacies of the intersections among barriers to technology integration, Greek kindergarten teachers' social identities, and diverse formulae of disguised barriers linked with the Greek kindergarten context that still hold teachers back even though some of the issues related to equipment, training and connectivity have now been resolved.

Early childhood education (ECE) is pertinent to intersectionality for a number of reasons. ECE educators as opposed to other teacher disciplines are almost exclusively women in Greece [7] and worldwide [8–10] yet relevant research on technology integration barriers hasn't taken this fact under consideration. Compared to other educational grades, teaching in kindergarten still is perceived as a feminized profession [11, 12] and teachers are often seen as "glorified babysitters" (:11) [13]. Their role in society is perceived as more relevant to providing children of this age with care and love and less to education, which in turn triggers feelings of devaluation [9, 14] and some would argue that this perception is translated into concrete systemic inequalities. For example, in Greece kindergarten teachers and headteachers have by law the longest weekly teaching hours compared to all other state teachers with no provision for breaks during their 8–13:00 classes [15]. This perception which views the kindergarten teacher as an expansion of the mother's role and less as a professional combined with Greek teachers' current financial struggles, their widespread internal migration for securing a teaching position and poor working condition issues in post-covid, post-crisis Greece may have implications on their use of technology in classroom. Accordingly, using qualitative accounts grounded in some of these teachers' experiences the present study aimed to obtain fine-grained data hidden in the interrelatedness of gender, family-status, social class, professional identity and teachers' perceived barriers in touchscreen tablet use within Greek kindergarten classroom settings. More specifically, the leading question of this interview-based study was:

What are Greek kindergarten teachers' perceived barriers in using touchscreen tablets for educational purposes in the post-covid era?

1.1 Barrier Categorization

Technology integration barriers refer to conditions that hinder the effective use of ICTs in educational settings [16]. Based on Ertmer [16] technology integration barriers can be categorized as first and second-order barriers. First-order barriers are linked to external obstacles teachers encounter in using technologies. Common first-order barriers based on relevant findings include issues in access, lack of resources, deficits in technology leadership and in technical support, insufficient training and time constraints [17–20]. Second-order barriers encompass teachers' attitudes and beliefs towards technology, their confidence in using it and willingness to change their teaching patterns and routines [17–22]. According to Ertmer [16, 17], first and second-order barriers are interrelated. A teacher who argues he/she doesn't use technology due to external obstacles (first-order barriers) such as lack of equipment or time pressure may actually hold negative beliefs on the appropriateness or effectiveness of technology. Likewise, a teacher who constantly finds ways to integrate technology, a teacher who devotes personal time and effort to resolve issues related to equipment or design technology-enhanced lessons may also hold strong beliefs on educational technology use.

First and second order barriers are influenced by other contextual factors such as rurality, school size and community. Teachers in remote rural schools often have limited access to technologies and make less use of technologies despite their positive attitudes and willingness [23]. Findings further suggest different perceived barriers and technology integration patterns among urban, suburban and rural school teachers with suburban teachers adopting a more active approach in using technology in their classrooms. Social class and the socioeconomic status of the area teachers work also generate different types of perceived barriers. Teachers from affluent suburb schools appear to be more confident in implementing sophisticated technology-based pedagogies compared to educators in disadvantaged areas. Age of students and different educational grades are also associated to different types of barriers. For example, compared to kindergarten, secondary education teachers hold more positive attitudes towards technology integration [24, 25].

2 Materials and Methods

2.1 Context

Teachers' wider cultural and social context significantly influences both their practices and perceptions regarding the use of technology in their classrooms [21]. Therefore, in order to grasp Greek kindergarten teachers' perceptions on the use of tablets in their classrooms, the wider Greek educational context must be taken under consideration. Greece is a country that has just overcome a painful decade of financial crisis and austerity measures which inevitably triggered negative effects in public education funding. Weekly teaching hours increased but teachers' salaries were cut around 30%, permanent teacher appointments froze from 2009 to 2019 and the system became largely dependent on substitute teachers with yearly contracts [26]. The crisis also had a significant impact on funding for technological equipment and teachers' training in state schools.

The Covid-19 pandemic which emerged right at the time when Greece was recovering from the crisis changed everything as state funding both for technological equipment and teacher training sharply increased. The pandemic also had an effect on official national-level ICT policies in education. The then newly elected neoliberal government Nea Dimokratia changed the previous legislation which prohibited mobile phone and tablet usage in K-12 classrooms and modified the curriculum which until then ignored mobile learning all together [4]. Online learning became obligatory for several months for K-12 classes across the country and the Ministry of Education distributed tablets to all schools both for teachers and students. State-school teachers received obligatory training on the use of mobile technologies. Simultaneously, the national-level recruitment legislation changed and national-level exams were replaced by a point system based on formal qualifications such as postgraduate diplomas and training certificates. This in turn prompted a sharp influx of literally hundreds of thousands of Greek teacher candidates obtaining qualifications, including ICT - related programs. In addition, in 2021 the government brought an Education Bill which included multiple evaluation and accountability measures for schools and teachers which in turn triggered union mobilization and conflict which continues until today [27]. One of the axes state teachers are evaluated is the integration of technologies in their teaching. Overall, Greek teachers have gone through intensive training on ICT by their own means in order to secure a teaching position in state schools or obligatory training by the Ministry of Education. They currently are under a lot of stress and pressure due to the new evaluation legislation and also because a large percentage of them work away from home, in remote areas of Greece such as islands struggling to make ends meet [27, 28].

Structure wise, the Greek education system is highly centralized, in fact the Ministry of Education regulates everything related to schools from curriculum and budgeting to teacher recruitment procedures and textbooks. School autonomy is essentially non-existent and schools are obliged to comply with directives issued by the ministry's regional directorates [29]. In terms of curriculum, one of the ministry's scientific agencies, the Institute of Educational Policy (IEP) issues detailed curriculums for K-12. Regarding ICT in the kindergarten, IEP issued a new curriculum in 2021 [30] based on which teachers should design and implement technology-enhanced pedagogies regularly in order to help their students develop into digitally literate citizens. The new curriculum includes three long, distinct yet theoretical sections on preschoolers' familiarization with ICTs, the use of ICTs for research, discovery, problem solving, programming and digital creativity.

2.2 Participants and Procedure

Twelve female state kindergarten teachers participated in the study. Participants' ages ranged from 30–41 years old. Their teaching experience ranged between 4–9 years. All participants had a bachelor's in ECE from a Greek state university, a master's degree and one of them a PhD. Nine of them were married with one child or more, one of them was a single mother. Four of them had just gained a permanent teaching position while the rest were substitute teachers. At the time, seven participants worked away from their hometowns in three Greek islands, two of them worked in Athens and the other three at smaller towns in northern Greece. Participants were recruited via purposive

sampling and the snowball sampling procedure. The researcher who also was their tutor during their online postgraduate degree at the Hellenic Open University contacted two of her ex-students and then through them contacted other kindergarten teachers. Recruitment continued until the desired number of participants were recruited for the study. Informed consent was obtained in writing from all participants and the significance of maintaining anonymity and confidentiality was highlighted. To ensure participants' anonymity, numbers are used throughout this paper (e.g., P1, P2).

Interviews were conducted via Zoom and ranged in length from one to two hours. They had the form of an open conversation nonetheless they focused on the same topics with each teacher. These included (i) their perceptions of first and second order barriers in using touchscreen devices in their classrooms; (ii) the relevance of their identities (e.g., woman, mother, state kindergarten teacher, Greek) to their experiences of barriers in implementing touchscreen-informed pedagogies.

2.3 Data Analysis

This work employed content thematic analysis [31] in order to analyze interview data. Analysis further aimed to recognize barriers at the intersections of participants' social identities simultaneously but also separately [6]. Initially transcribed interviews were repeatedly read and early themes were acknowledged for each participant's perceived barriers in integrating touchscreen tablets in their teaching. Data were subsequently refined and categorized under first and second order barriers. First -order barriers themes include (1) "School barriers"; (2) "Endless, low-quality training" (3) "Nomad life and low pay", (4) "Lack of time and feelings of devaluation" and (4) "Parents' resentment". Second-order barriers include (1) "Screen guilt and Covid" and (2) "Preschoolers are experts".

3 Results

3.1 First-Order Barriers

First-order barriers in the current work are defined as participants' perceived obstacles in using touchscreen tablets in their classrooms. These barriers refer to perceived problems created by school, lack of time, national-level policies, parents and gender/class intersections. By contrast, second-order barriers derive from teachers' internal beliefs and attitudes towards touchscreen tablets.

School Barriers

The number of students per class emerged as a major obstacle for participants to make use of tablets in their classrooms. Variations in students' number per class was related to school location with urban preschools having 20–23 students with no teaching assistants. Participants expressed frustration and sometimes anger for the fact that both legislators and parents are unable or unwilling to comprehend the difficulties and peculiarities of having so many preschoolers instead of older children in class. For many participants, the number one priority in the classroom is ensuring preschoolers' safety and not integrating technology:

My priority is to hand them back to their parents safely […]. I've heard of a lot of stories with colleagues having ended up at court or listen to threats when something happens. […]. Two -three months ago, I had given them the tablets, I was concentrated on the screen to show them how the game works, in front of my eyes, one of them takes the tablet out of another girl's hands, knocks her down and throughs the tablet on the floor. (P2)

Lack of technology leadership and support was another school-related barrier mentioned by participants which often discouraged them from using technology in their teaching. Most participants attributed this leadership deficit to systemic ECE barriers in Greece. Greek kindergarten teaching stuff includes by law only preschool teachers and as a result the headteacher of every school is usually in charge both for equipment and contacting the corresponding municipality if there is a technical difficulty. There are no ICT teachers like in primary and secondary education schools and the actual number of teachers is usually smaller. To make things worse, kindergarten headteachers in Greece are also the only administrators in Greek education who have all the responsibilities of managing a school but have no reduction in their weekly teaching hours:

To be fair, they can't really support us because they have more serious things to do, like teaching their own class for 24 hours a week, deal with parents, do the administrative work, so they prioritize, a broken tablet for example or the WiFi can't be their number one priority when they have to deal with students' who have serious family issues, do budgeting and so on. (P1)

Other participants encountered headteachers who were intrusive and they themselves resented the use of touchscreen devices due to their belief that teachers who use them are lazy or due to parents' interreference or their own lack of knowledge and skills in touchscreen technologies. P7 painted a rather cynic picture of the multiple concealed barriers created by lack of technology leadership in Greek kindergartens:

Some of them (headteachers) don't care, some of them think it's a sign of laziness, some of them don't know how to use them cause they are older and some of them don't want us to use them because parents don't want us to use them […] and since we are their babysitters we do as they tell us. (P7)

Participants' reflections indicated that post-covid external barriers related to the existence of devices and connectivity decreased yet they didn't vanish. These difficulties were related less to the absence of technological means and mostly to insufficient maintenance of the existing equipment. They stated that these difficulties are in some cases an inhibitory factor for using technology yet they pointed that post-covid problems related specifically to tablet shortages lessened. Most participants' worries as kindergarten teachers were school infrastructures in terms of space and run-down buildings which are not appropriate for preschoolers rather than the technological equipment:

Educational technology is just a buzzword in Greece right now […] the ministry is obsessed with technology and tablets and interactive whiteboards but for me the

real problem is our students don't have space to run and play, many kindergartens are in dark depressive buildings with ceilings leaking in the first rain [...]. (P11)

Endless, Low-Quality Training

Although the majority of participants had qualifications related to educational technologies and attended numerous training programs provided both by the agencies of the Ministry of Education and universities, some of them did not succeed in gaining concrete creative skills for designing touchscreen-enhanced lessons. The quality of the majority of these programs was heavily criticized due to two main reasons. The first reason was related to relevance, as the majority of ICT training programs failed to respond to kindergarten teachers' specific needs and the second one was related to poor design. Most of these programs were asynchronous MOOCs with pdfs, videos and multiple-choice quizzes. The few programs which comprised synchronous learning modes included large numbers of participants, with switched-off cameras and a trainer presenting a PowerPoint with theoretical knowledge that could not easily be implemented in realistic settings:

We have had endless training on technologies, we did it during Covid, we do it now but we do not have the time to self-reflect and practice what we learn, if we learn something, that is. Everything is really fast-paced. (P6)

I can tell you with certainty that the problem is not lack of training but the quality of training, we have all had hundreds of hours of training for educational technologies, we have all done countless quizzes, listened to the same and same theoretical stuff we cannot really apply in our classrooms because most of them are not even related to kindergarten. (P4)

Other than the perceived low-quality of training there also was resentment regarding the endless training courses some participants had to attend both before, during and after covid on the use of educational technologies as well as other subjects. Once again, intersections of gender and social class emerged as participants reflected on their constant daily struggles to cope with online training, workload, housework and childcare:

The word training has lost its meaning in this country. Yes, I have had training on ICTs. We do online training non-stop, nobody pays attention any more, it's just papers for extra points. I have three children, I have downloaded Teams, Zoom, Webex on my phone, I drive my kids to their swimming classes, I do laundry, I cook and I'm on the phone for training. It's frustrating and ridiculous. They probably think we have nannies, servants, drivers like them at home. (P11)

Nomad Life and Low Pay

Another barrier that emerged was job insecurity and lack of feelings of belonging in the school especially from participants who work as substitute teachers. In Greece, substitute teacher contracts are terminated in June and teachers usually spend a stressful summer waiting till they are hired back again most probably not at the school they were and often not at the same city, municipality or even island. This constant insecurity triggers

feelings of resentment for P3 who felt that it really wasn't worth it to invest capital at her school since she really wouldn't be a part of it in a couple of months:

> *Every year, a different school, you never know what you'll find here, what equipment, headteachers, other teachers, parents […]. In the beginning I remember I used to devote time and energy to fix my classroom, I had arguments with headteachers asking for equipment, then I would leave and felt like all my work was wasted, I had to start all over again.* (P3)

P10 a young substitute teacher who this year moved to the touristic island of Crete due to scarcity of teaching positions in Athens, mentioned time and financial struggles:

> *I borrow from my parents to be here, I make almost 850 euros, my rent is 450[…]. I also work at a restaurant in the evenings because if I didn't, I literally wouldn't be able to fill my gas tank […]. It's not that we are lazy, we are burnt out and poor, teachers in Greece used to be middle-class, not anymore.*

Other participants also reflected on their economic hardships and the low salaries in relation to the workload and the level of education required in order to become a kindergarten teacher in Greece. All of the participants had a master's degree and one of them had a doctoral degree. P7 talked about the cost of acquiring advanced degrees and the lack of associated financial reward:

> *Greek teachers make peanuts; it didn't use to be like that but the crisis changed everything […]. I went to school for close to 6 years to get my bachelor's and my master's because that's the minimum requirement for state teachers in Greece and I spent a lot of money to be here and teach because I love it but now I have to work a second job as a private tutor every single afternoon in order to be able to survive and I end up being exhausted[…].I don't have the energy or the time to design lessons, I return home at nine o'clock at night because I need to pay rent, it's as simple as that.*

Lack of Time and Feelings of Devaluation

Lack of time was mentioned by all participants as the main obstacle in integrating technology in their teaching. Most participants appeared confident in using touchscreen devices for personal purposes but not as confident when integrating it with very young children for educational purposes. They exhibited heightened awareness regarding educational technologies and clearly distinguished between their ability to use phones and tablets or giving their students an application to occupy them for a bit as opposed to designing a proper technology-enhanced lesson incorporating developmentally appropriate activities with specific learning outcomes. As P1 noted*: Integrating technology in our lesson sure isn't handing them a tablet to play a stupid game or watch a video to shush them, it requires a lot of time and preparation.*

Burdensome directives and bureaucratic procedures that take up valuable time of teaching emerged as an extra barrier. Recent reforms and policies related to state teachers' evaluation and accountability voted by the Greek neoliberal government [27] were

mentioned by several participants who seemed frustrated and upset by the lack of respect and trust towards their profession. Four participants referred to the current government's effort to copy paste punitive teacher evaluation systems similar to the ones in the US and the UK but as P4 commented: *just the accountability systems-not the salaries.* On top of bureaucratic procedures related to the new education bill, kindergarten teachers in particular also have to deal with issues related to students' cyber and physical safety and parents' aggressiveness:

> *Imagine having twenty five-year olds all alone with no break, imagine you aren't allowed even to go to the toilet if the colleague next door can't cover for you. Imagine having constant anxiety if one of them gets hurt and you end up in court […]. On top of this, imagine having endless paperwork for meaningless administrative procedures for your evaluation after seven years of teaching, please tell me if you were in my position would using tablets and games be your number one priority?* (P2)

Mother-participants' reflections regarding time were even more intense. Combined with motherhood, unbending work arrangements, exhaustion, extreme difficulties in arranging childcare especially for those working away from their hometowns dominated their accounts. Three participants stated that household work and childcare were divided equally with their partners and husbands, but the rest described doing more than their share. P5 a mother of two toddlers, at the junction of having no other family support for childcare and a husband working long hours stated:

> *Greece is no Sweden, it's a bit better than the previous generations but women still do almost everything at home and there's no support from the state. I feel tired all the time, other mothers I know say they actually relax at work, I have fifteen preschoolers at work all alone, then I go home and I have two toddlers, again all alone, when exactly am I gonna find the time to sit at my computer and do lesson planning and find apps and games for school?*

Parents' Resentment

Parental concerns regarding young children's technology use especially after the pandemic emerged as a major first-order barrier. According to participants, Covid-19 created new behaviors and habits for young children and their parents who used mobile phones and tablets as a babysitting device to survive long shutdowns. These habits didn't vanish after Covid and parents still use screen media in order to wind their children down but at the same time they feel guilty about their parenting and worry about their children's well-being. Participants reported they often have parents talking to them about children's tantrums at home or confessing fears they may have developed mobile phone addiction in order to convince them not to use screen media at school:

> *They give children their phones watching all sort of garbage UTube videos to keep them busy when they do housework, they use them for making them eat breakfast quickly, they use them when they are out for coffee to keep them quiet but they don't want them to spend any screen time here. (*P9)

Some participants suggested social class and educational background positioning influence parents' views on the use of touchscreen technologies in the classroom. The higher the education level of parents, the bigger the resentment of using screen-media at school. Participants from two urban kindergartens in affluent areas encountered multiple parental interventions and prescriptions regarding the use of tablets and videos in the classrooms. Parents' negative attitudes were underpinned by stereotypes of public sector employees and especially teachers being lazy and using technology in order to avoid interactive engagement in the classroom:

> *Doctors, engineers, lawyers are the worst […]. Constantly intervening, complaining to the headteacher, gossiping on Viber with other parents, treating us like we are their employees, implying we are lazy […]. Because they are educated and have money they think they know everything and because they work long hours and their children are constantly in front of a screen at home they don't want them to use tablets here. But it's not the same thing is it? We are educators and we use tablets and specific applications for specific reasons. They don't get that*. (P8)

3.2 Second-Order Barriers

Screen Guilt and Covid

Second-order barriers identified in the current study were linked to participants' negative beliefs regarding the use of technologies and screen time for young children. They all alleged educational technologies are useful and necessary for preschoolers to evolve into digital citizens but thought this post-pandemic generation of young children spends extraordinary amounts of time in front of a screen which in turn may harm their cognitive and socioemotional development. Mother-participants in particular, stated they often experience feelings of guilt when their own children use tablets and phones at home yet they considered these devices as a "necessary evil". Their accounts revealed their roles as mothers and teachers overlapped and combined with the negative memoirs from the long pandemic shutdowns, they sketched a picture full of worries, fears and guilt for the consequences of long screen time for both their students and their own children. Similarly to parents at their schools, these mothers were concerned about issues like screen addiction and the overall effect the past three years have had on their children's well-being. P1, a single mother with two young children felt guilty as she believed that touchscreen devices are really just a way of "parking" children and keeping them quiet even for applications she thought were of high-quality and developmentally appropriate for her students:

> *Kindergarten is about hands-on experiences, no matter how good quality apps and games we are using this generation is deprived of real playtime, playing with their peers, getting their hands dirty with mud. Covid left us with bad habits, I also let my kids use my phone to get work done at home for example but I do feel guilty […] four-year olds shouldn't be using tablets and phones 24/7.* (P1)

Preschoolers are Experts

All participants portrayed the majority of Greek preschoolers as capable technology users

who can effortlessly and autonomously use technologies, especially mobile touchscreen devices. Their view of Greek preschoolers as digital natives existed even before the pandemic but post-covid this perception was further reinforced. This assumption seemed to act as an internal barrier as some of them explicitly underestimated their role in helping their students developing digital skills at school. Three participants further reflected on colleagues and headteachers of older age who actually experienced challenges in keeping up with their students' digital skills in class as P2 jokingly remarked: *Sometimes it's the other way around, four-year olds give the teachers instructions.*

4 Discussion

This work aimed to gain a deeper understanding of the barriers in using tablets for educational purposes among Greek kindergarten teachers in the post-covid era using an intersectional lens. Data analysis suggests teachers' perceived first-order barriers are related to their heightened awareness of the complexity of implementing high quality technology-enhanced pedagogies rather than to quantity of equipment or connectivity. The shift of first-order barrier focus from quantity to quality in relation to technology use is in line with the few post-covid works in the relevant literature across educational grades [32]. The pandemic prompted a series of radical changes in educational technology use as governments around the world provided both equipment and training to teachers in order for them to cope with the sudden switch to remote education. Regarding availability of equipment and access, participants painted a quite different picture of the Greek kindergarten landscape [1] compared to pro-covid works which described teachers struggling to share one desktop computer, usually slow with preschoolers ending up getting bored. Current findings are also in contrast to more recent findings from Greek primary and secondary education [3] which suggested legal barriers hindered the use of mobile technologies including tablets yet these studies were conducted prior to the pandemic and the change of Greek legislation on touchscreen devices use.

First-order barriers associated to overcrowded run-down schools and large classes, preschoolers' challenging behaviors and disruption in class are in line with findings across K-12 in Greece [1–4] but in the current study fear of damaging equipment and most importantly teachers' anxiety for ensuring students' physical safety, even fear of parents taking legal action in case a student had an accident in class arose as major impediments in using tablets. This finding is also related to national-level policies and systemic barriers as in mainstream classes there is no provision for teaching assistants or support teachers except for the cases where a student has been diagnosed with a disability [33].

An unexpected outcome was the power of Greek parents' interference on teachers' practices related to technology. It seems that the pandemic strengthened parents' beliefs extended screen time hampers young children's health and as a result their explicit resentment to tablet use puts pressure and discourages even the teachers who are willing to devote time and effort to implement technology-enhanced pedagogies. This finding is also related to the profession's feminization and devaluation and agrees with findings in other contexts [34] but it hadn't emerged in studies in Greece previously. Findings related to feelings of depreciation and frustration also emerged towards policymakers

and the neoliberal government which has just implemented its new educational bill [27] on teachers' evaluation which also assesses ICT integration. Participants feel that the government not only fails to appreciate their problematic working conditions but intentionally attempts to depict them as lazy state school teachers [35] and as a result they exhibit a negative attitude towards devoting personal time on designing technology-enhanced lessons.

In line with previous works in the Greek K-12 [1–4] lack of time emerged as one of the most dominant barriers in integrating technologies however in the current study it seemed to be even more valuable due to participants' intersections of gender and social class. Participants described current Greek state teachers as belonging to lower rather than middle class due to the cuts in their salaries during the crisis [26] and the extreme rise of living costs especially in the capital Athens and the touristic Greek islands. These financial difficulties force them to find additive employment elsewhere and combined with their motherhood and household obligations render out-of-school engagement related to technology integration prohibitive. In fact, most of the teachers in the current study seemed confident and familiar with the principles of pedagogical design and methods of evaluating and using educational technologies appropriate for kindergarten settings, yet their accounts clearly described draining daily routines which simply are incompatible with time-consuming procedures such as creating appropriate materials or assessing and adapting of existing materials to the needs of their students.

Barriers related to lack of time also emerged in relation to the endless low-quality, low-relevance ICT training participants have received during the past three years. This finding agrees with previous works within the ECE context both in the pre and post-covid era [21, 22, 36] which suggest that kindergarten teachers' main concerns related to training is that these courses often take place after school hours which can affect their family life and usually do not correspond to their professional needs.

Findings associated to time concerns may also be related to the wider Greek socio-cultural context and the professional identity of Greek kindergarten teachers. Results from studies on pre-service kindergarten teachers' identities in Greece has shown that one of the main reasons they opted to become teachers is the wider perception in Greek society that the specific profession is "suitable" for women who at some point will become mothers due to child-friendly working hours, lack of anxiety and stress [7]. The latest changes however in the post-crisis Greek society and the Greek ECE landscape seem to have canceled these expectations.

Second-order barrier findings revealed how the complex and multifaceted intersections of participants' gender and teacher identities in the post-covid era function as barriers in using screen media technologies with young children. Covid-19 seems to have nurtured even more preexisting feelings of guilt among kindergarten teachers many of whom are also mothers for the consequences of extended screen time on this generation of preschoolers. The global contradiction between educational policies pushing for technology integration in ECE and public health agencies fiercely advocating for minimizing screen time due to its negative effects on young children's cognitive, emotional, social and physical health [37, 38] is at the heart of this internal conflict and even though it is by no means new, current work findings suggest it has been magnified in the post-covid era. Similarly to previous works in other kindergarten contexts [22, 39], some

of the participants in the current study clearly felt an urge to "protect" their students' health because despite their educational technology formal qualifications they still conceptualize traditional play-based pedagogies as healthy whereas they see screen-time as harmful. Moreover, participants' view of their students as "digital natives" who sometimes are even better than the teachers' themselves is in agreement with previous findings within the ECE field [21] and the wider misconception of policymakers, researchers, teachers and parents that contemporary preschoolers are all confident and skillful users of technology [40].

4.1 Implications

Findings suggest Greek policymakers should legislate the provision of teaching assistants or support teachers in mainstream kindergartens in order for educators to be able to cope with the demands of the specific context and the highly-demanding age-group of preschoolers. Providing extra support will contribute in technology integration and it will also contribute in improving the quality of ECE offered. Greek legislators should also form conditions whereby kindergarten teachers work and receive training within school hours without taking it home. In addition, the Greek Ministry of Education should implement bottom-up reforms that will reduce weekly teaching hours at the national level and design a more structured technology-enhanced curriculum which will lessen kindergarten teachers' burdens and leave them more time to be with their families since women still constitute the main providers of primary childcare and household work in Greek society [41, 42].

Reducing weekly teaching hours for teachers and legislating breaks equivalent to other state teachers is not only a matter of safety for preschoolers, it is also is a way to lessen kindergarten teachers' feelings of devaluation. Headteachers weekly teaching hours should also be reduced to the level of primary and secondary education administrators and principals in order for them to be able to develop technology leadership and actively support technology integration. Regarding ICT training, teachers in the ECE context need continuing professional development which can be in the form of formal courses or informal learning from colleagues or mentors but these courses have to be adjusted to their specific needs and include educational technology models and approaches that can be translated into practical classroom strategies linked to preschoolers' development [43]. Training courses targeted to parents at the national level are also required in order to raise their awareness on the differences between educational uses of touchscreen media as opposed to their use as an alternative babysitting mode. Kindergarten teachers themselves are also parents and current work findings clearly indicate that the pandemic influenced their attitudes and beliefs on screen time effects on young children's well-being. Kindergarten teaching as a profession both in Greece and globally should attempt to overcome the wide post-covid supposition of screen-media technologies as being "harmful" yet this demands top-down and bottom-up educational policies that will take under consideration the needs of teachers, parents and preschoolers holistically.

4.2 Limitations

Small sample size, purposive sampling and lack of triangulation limit the generalizability of findings to a larger population of kindergarten teachers in Greece. Future works in the post-pandemic ECE landscape should explore types and frequency of barriers in relation to socioeconomic status of schools, parents, students and teachers at the national level. The Covid-19 pandemic acted as a catalyst for barriers related to equipment and connectivity yet other barriers related to kindergarten teachers' working conditions, family/work balance and negative personal beliefs and attitudes got deeper. Future studies must investigate the underlying reasons Greece's investment on educational technologies during the pandemic does not translate into innovation in kindergarten classrooms in the post-covid era.

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