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Digital platforms and technologies in preschool education in Portugal: Perceptions of preschool teachers

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Abstract

This paper analyses the perceptions of Portuguese preschool teachers regarding the use of Digital Platforms and Technologies (DPTs) in preschool education, focusing on which DPTs are mostly used and with what aims, and on constraints felt in its use. The paper draws on data collected in a larger research project regarding the use of $DPTs^{1}$ in schools, using a survey questionnaire applied in schools from the Portuguese mainland during 2020, answered by 75 preschool teachers. Results show that preschool teachers mostly use Microsoft Office applications and communication platforms to communicate with peers and families, and for administrative and pedagogical tasks. The constraints felt are associated with the need for training which would allow these professionals to use DPTs more effectively, and the need to upgrade and ensure technical maintenance of the existing equipment.

Keywords: Digital Platforms and Technologies; Preschool Education; Preschool Teachers; Use of Digital Platforms and Technologies

Introduction

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In the last decades, we have seen the rise of incentives and initiatives for the development of the so-called 'digital economy' (OECD, 2015). Part of these initiatives regard the introduction of digital technologies in schools, as both a means for school management, as well as tool for improving teaching and learning processes, as recognized by Costa et al. (2015) who concluded that schools use digital tools to enhance (personalize) learning. Additionally, as digital competences are the key elements towards contributing to this new reality, the development of digital skills in educational professionals and students is also a priority, leading to the integration of digital technologies since the early years of schooling (Lomba et al., 2022). In this regard, we cannot forget the crucial role that preschool teachers can play in stimulating and supporting the creative potential of each and every child. In fact, since 2009, enhancing creativity and innovation at all levels of education and training has been one of the goals of the strategic framework for European cooperation (Council of the European Union, 2009).

In line with the promotion of digital literacy, in 2017, the European Commission published the Digital Competence Framework of Educators (DigCompEdu) (European Commission et al., 2017), organized around six areas: 1) professional engagement – ability to use digital technologies not only to communicate but for professional interactions; 2) digital resources – ability to research, create and share digital resources; 3) teaching and learning – ability to use and manage digital technologies when teaching and learning; 4) assessment – ability to use digital technologies when assessing students; 5) empowering learners – ability to use digital technologies to boost involvement and contribute to supporting classroom differentiation; and 6) learners' digital competence – facilitate students to use digital technologies in a creative and responsible way. It should be noted that, for each one of these areas, there are a series of indicators which allow the educator to assess his or her digital competence. Based on this framework, Dias-Trindade and Moreira (2018) identified levels of moderate digital proficiency in teachers in general, and in preschool teachers.

In the same study, Dias-Trindade and Moreira (2018) draw attention to the importance of promoting media literacy as soon as or as young as possible, corroborating the arguments from the OECD (2015).

In Portugal, preschool education encompasses children from 3 to 5/6 years old. It is not mandatory, but universal. In the school year 2021/22, approximately 95% of children

between 3 and 5/6 years of age were enrolled in preschool education. Out of these, 54,1% attended public preschools; 28,4% attended private establishments dependent on the State, and 17,4% attended private independent establishments (DGE, 2020-2021).

The Ministry of Education is responsible for ensuring the quality of teaching in preschool education. In order to enhance the quality and provide guidance in curriculum design and management, Curricular Guidelines for Preschool Education were developed, in 1997 (Silva, 1997). These guidelines were revised in 2016 (Silva et al., 2016). The Curricular Guidelines for Preschool Education (CGPE) (Silva et al., 2016), as general directives for the work of preschool teachers, advocate for the integration and use of Information and Communication Technology (ICT), considering that children are used to these tools, using them in a daily basis, as communication channels. They also recommend that the "use of technological means at this level of (education) can instigate diverse learning situations, enabling sensibility towards computer-based coding, ever so more necessary" (Silva et al., 2016, p.16) in society.

In this context of encouragement for the introduction of digital technologies in education, including preschool education, and promotion of digital proficiency in teachers and students, it is important to gather, explore and understand the perspective of the educational professionals in the center of the process. This study stems from this acknowledgement, being aiming to answer the following questions: 1) which Digital Platforms and Technologies are more frequently used by preschool teachers in their daily practices; 2), which aims are pursued when using DPTs? 3) which constraints are felt by preschool teachers when using DPTs?

To do this, the study relies on the analysis of the perceptions of Portuguese preschool teachers on the use of Digital Platforms and Technologies.

Literature Review

The Digital Technologies in Preschool Education

Research has underlined the unquestionable importance of how attending preschool education, considering it crucial in all domains of child development (Blanden et al., 2022;

Brito et al. 2021; García et al., 2022; Morgan, 2019; OECD, 2017).

Likewise, it is acknowledged in the literature the relevance of digital technology as a tool to be incorporated and integrated into the pedagogical practices of preschool teachers (Undheim & Margrethe, 2020) towards the improvement of children learning (Johnston, 2019). However, the increasing use of digital technology, facilitated by the multiplicity of gadgets (e.g., smartphones, tablets, laptops) and the simplified access by younger children (Kabali et al., 2015; Palaiologou, 2016), set new challenges for preschool teachers (Donogue, 2015; Holloway et al., 2013). One of those challenges is in convincing the more skeptic preschool teachers of the benefits of digital technologies in child development (Horeau et al., 2021). Another challenge refers to the importance of preschool teachers gaining further abilities and increasing their "digital knowledge" (Pacheco, 2014) in order to boost educational situations, which promote child digital citizenship (Johnston et al., 2020).

Besides the benefits for children, literature has pointed out that the use of digital technologies allows preschool teachers to access a diverse array of resources, which can contribute to improve the quality of pedagogical practices (Donohue, 2015) and foster collaborative work with their peers, promoting their professional development. Considering that they boost learning not only for children, but for professionals, as well (Dias & Brito, 2021; Mantilla & Edwards, 2019; Palailogou, 2016), it is expected that preschool teachers include ICT in their pedagogical practices (Dong, 2018), challenging themselves in the construction of more innovative educational projects.

Within this scope, the important role of the preschool teacher is recognized in the promotion of educational environments which are rich in diverse experiences boosting child curiosity and their ability to think and act while discovering new learnings (Delgado, 2017).

In the Curricular Guidelines for Preschool Education (CGPE) (Silva et al., 2016) ICT is integrated into the area of World Knowledge, enhancing learning, communicating, and registering details of day-to-day activities (Silva et al., 2016).

Some authors pinpoint the development of child digital competences, as well as the development of formative assessment processes and greater communication and sharing of information to families (Cardona et al., 2021; Edwards & Bird, 2017; Mata & Pedro, 2021; Schriever, 2021). Other authors highlight the facilitation of communication amongst preschool teachers (Prestrige et al., 2019), among parents and teachers (Oinas et al., 2017)

and the support of Digital Platform Technologies towards autonomous learning (Urías et al., 2017; Walsh et al., 2014).

Silva et al. (2016) identify other contributions of digital technologies, namely at the level of artistic expression and written language. According to the authors, used for these purposes, technologies can increase children in interest and motivation, and promote the development of logical reasoning, emotional consciousness, and information collection, as well as problem solving (Silva et al., 2016). In the same line of thought, Chen et al. (2019) recognize that resorting to diverse learning activities can, in fact, contribute to the development of digital literacy paired with other competences such as language, phonetic understanding and consciousness, symbol and image text recognition, reading and writing skills.

Despite the identified contributions of using digital technologies in early childhood, there are still some uncertainties in relation to the contributions it can have for the professional development of preschool teachers and for the development of children at a very early age. Above all some authors alert to the importance of whether these professionals possess a level of digital proficiency, which is linked with their training, which allows them to use DPTs more efficiently in their pedagogical practices, therefore broadening child learning (Donohue & Schomburg, 2015; European Commission et al., 2017).

Besides the lack of pedagogical training (Masoumi, 2021; Ramírez-Rueda et al., 2021), literature has also proven other critical factors in relation to the use of DPTs in preschool education, such as: possible negative effects in terms of child safety, health and well-being (Palaiologou, 2016); social development threat, due to a decrease in other childhood activities, such as the possibility of playing outdoors (Hernwall, 2016).

It is in this context that health authorities, at a global level, have alerted to the excessive use of digital technologies in early childhood, presenting concerns regarding the possible negative effects on a child's physical, cognitive, emotional and social well-being (Straker et al., 2018). This is particularly relevant with technologies which include screen time, and when the recommended screen time limit for small children is exceeded (Wilkinson et al., 2021).

Therefore, if preschools have the pedagogical resources and diverse playful activities, the possibility that children and educators actively explore these resources by including digital technologies, will depend, among other factors, on the analysis of the context and of the level

of use and effectiveness that Digital Platforms and Technologies have, notwithstanding the constraints that they encounter in daily lives.

Bearing in mind the arguments and knowledge explored above, this paper and the underlying study, aim to further explore the presence and use of digital technologies in preschool education, giving voice to preschool teachers. The study relies on their experience, their daily routines and the struggles they face while responding, on the one hand, to the movement of DPTs integration, and on the other hand, to balance this integration with the particularities of educating young children.

Method

This study is part of a national broader project with the main aim of understand the means and aims for DPTs use in Portuguese school clusters. The research targeted four groups of participants: school leaders, teachers, non-teaching staff and students. The present study focuses on a specific subset of teachers, the preschool teachers.

Participants

The participants are preschool teachers from the five geographical areas of the Portuguese mainland, as contemplated in the Nomenclature of Territorial Units for Statistics (NUTS) II (North, Centre, Metropolitan Area of Lisbon, Alentejo and Algarve). A formal invitation was sent via email to all school clusters directors in Portugal (n=809), requesting their cooperation in encouraging teachers to participate in the study. Despite our intention of establishing a nationally representative sample, only 75 (9,27%) Portuguese preschool teachers replied to the study (38 (13,10%) from the North, 27 (18,37%) from the Center, 6 (2,29%) from the Metropolitan Area of Lisbon, 18 (25,71%) from Alentejo, and 5 (12,5%) from the Algarve). Participation in the study was voluntary and did not involve any form of compensation.

Table 1 depicts the characteristics of the 75 preschool teachers that participated in the study regarding gender, academic qualifications, age, region of the country in which they work and number of years in the profession.

Table 1. Sociodemographic Characteristics of the Participants

Baseline characteristic	n	%
Gender		
Female	75	100
Male	0	
Academic Qualifications		
University Degree	60	80%
Master's	9	11%
Other	6	8%
Age		
Minimum	35	
Maximum	63	
Mean	56	
Region		
North	47	63%
Alentejo	16	21%
Centre	6	8%
Lisbon	2	3%
Algarve	4	5%
Years in the profession		
Minimum	2	
Maximum	42	
Mean	30	

The absence of male participants in the study is unsurprising, given the predominant representation of women among Portuguese preschool teacher. In the school year 2020/21, an overwhelming 99.03% of preschool teachers were women (DGE, 2021-2022).

The distribution of participants across the five geographical areas was influenced by the participation of school clusters from each region in the study. For instance, despite the fact that only 8,15% of Portuguese preschool teachers work in Alentejo, 21% of the participants work in this region.

Instrument

A questionnaire designed and developed within the scope of a larger research project (Valadas et al., 2022) was used.

Besides the sociodemographic characteristics of the respondents (block 1, frequencies presented in Table 1), the questionnaire included five sets of questions with different possibilities of answers related to the use of Digital Platforms and Technologies (e.g. use in the context of school work, average presented in Figure 1), to what ends and aims they are used (e.g. articulation and teaching collaboration, internal and external communication, student management, staff management), and advantages/constraints found in their use (absolute frequencies presented in Table 2).

The range of answers was varied. The *5-point likert scale* was used (1=never to 5= always), where the purpose was to assess the participants' perception, through their level of agreement, in relation to a set of premises whose assessment results are presented in means (e.g., questions about how often they use DPTs):

- multiple choice scales, where respondents were asked to check which set of possibilities best related to their situation in particular (here they could select more than one answer) and whose results were represented in absolute values (e.g., questions about the aims of the use of DPTs);
- dichotomous scales (Yes/No) where respondents were asked to position themselves in a determined aspect (here they could only choose one answer).

Procedures for data collection and analysis

The application of the questionnaire was authorized by the Directorate-General for Education (DGE) of the Portuguese Ministry of Education and Science. The data collection was done at a national level between March and June of 2020. Participants were invited to participate in the study by email which clarified the goals of the study and the methodological procedures to follow and requested their informed consent. All ethical aspects were safeguarded, namely the anonymity of the institutions and data confidentiality. The questionnaires were made available on the *Lime Survey* platform.

Because of the nature of the study and the variables considered, data analysis was mainly descriptive. Descriptive statistics (mean) were employed for the analysis of the DPTs primarily used by educators. Frequencies were utilized to explore the dataset concerning the aims of DPTs usage, as well as constraints identified while using them. The analysis was done resorting to the SPSS programme (2021, version 26).

Results

The presentation of the results follows the three previously mentioned dimensions: most used platforms by preschool teachers; aims of the use of DPTs and identified constraints while using them.

Most used platforms by preschool teachers

Regarding the first dimension, figure 1 presents the most used DPTs by respondents.



Figure 1. Digital platforms and technologies used by the respondents

The results show a high level of use of *Office*, with a 3.65 average. Following this, *email* has a 3.64 average use. *Social networks* are also referred (M=3.44), *Microsoft Teams*

(M=3.12) and the *school website* (M=3.08). These results could be related with the period in which the data was collected, since schools were closed due to the pandemic COVID-19, relying heavily on digital means to communicate with peers, students and families, and to ensure the continuity of pedagogical activities.

The lowest average items were the *students' digital booklet* (M=1.13), the Massive Open Online Courses (MOOC) (M=1.16) and the *learning management system* (LMS) (M=1.91). This low usage may be related to the fact that, on one hand, these forms of communication are closer to the in-school system and, on the other hand, due to communication with parents being commonly done via other platforms (such as e-mail). The results of both MOOC and LMS are related to the fact that these platforms are used at levels of education which comprise formative content and learning approaches.

Aims of DPTs use

Regarding the aims of the use of DPTs by the respondents, table 2 allows us to understand the different ends to which they are associated.

The results show that the main use for DPTs is email correspondence (N=71), followed by external communication focused mainly on parents and guardians (N=65), on peers (N=65) and community agents (N=54). Communication with the General Board is indicated by very few preschool teachers (N=5), which may indicate a disengagement of these professionals with this management body.

The items relating to teacher work organization and planning also reveal a significant number of responses, visible in the items *material exchange between colleagues* (N=64), *activity preparation* (N=52) and *submission and consultation of class plans, summaries and attendance* (N=51). The item with the least incidence was *digital content management,* nevertheless selected by 34 respondents.

Bearing in mind the exceptional period in which the data was collected, within the pedagogical services, *participation in audio and video conferences within different work communities and tutorials* (N=49), as well as the *participation in school forums, subjects and work communities* (N=42), both stand out. This data falls in line with the results from the studies of Coppi et al. (2022) and of Bergdahl and Nouri (2021) about digital transition,

	Item	n
	Course/Module/Test Development	
Teacher collaboration	Use of planning and follow-up tools	
	Use of collaborative work tools	
	With parents and guardians	65
External communication	With community educational agents	
	With the Board	5
	With the central administration (DGERT, MEC, etc.)	
Internal communication	With students	
	With leaders	
	With teachers	
Document management	For legislation	46
	For archiving and documents	43
	For processes	
	For forms	37
	Consultation of student <i>e-portfolios</i>	7
Pedagogical services	Creation, maintenance and personalization of a personal work area that allows management of work tools and personal documents (for example a personal page)	19
	School calendar management	25
	Participation in school forums, subjects and work communities	42
	Participation in audio or video conferences within different work communities or tutorials	
	Consultation and email correspondence	71
	Change and consultation of student electronic booklets	1
	Submission of assessment correction and student grades	1
	Classroom and equipment	
Academic services	Consultation of school timetable	
	Submission of student work and tasks	
	Submission for leave and holiday requests	11
	Consultation of attendance with the possibility of notification in advance and grounds of absence	14
	Introduction and modification of biographical data	25
Administrative services	Management of teacher assessment process, self-assessment, etc.	31
	Access to contract conditions and pay slips	38
	Access to DGRHE placement site	44
	Creation of software and educational resources	20
Teachers' work organization and planning	Management of digital content	34
	Production of content	46
	Submission and consultation of class plans, summaries and attendance	51
	Class preparation	52
	Material exchange between colleagues	64

Table 2. Aims of the Use of Digital Platforms and Technologies

where they maintain that there was an increased effort from teachers to find solutions for alternative digital communication, collaboration amongst peers and didactic material exchange.

The academic services included the changes and consultation of student electronic booklets and submission of assessment correction and student grades, both referred by only one respondent. These results, in line with the mentioned arguments, can be justified as being items which are more directed towards the context of school, namely in the case of submission of assessment correction which, according to the indications given by the Curricular Guidelines for Preschool Education (Silva et al, 2016), is qualitative and must "be done through observation of what children do, say and how they interact and learn" (p.15).

Constraints identified in the use of DPTs

Regarding the constraints in the use of DPTs table 3 systematizes the results, presented in absolute frequency where the number of respondents marked each option in accordance with the constraint felt.

Table 3.	Constraints in the	Use of Digital	l Platforms and	<i>Technologies</i>	identified by	the Respondents
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Item	п
Insufficient equipment (e.g., video projectors, computers)	40
Insufficient training in the use of some platforms and/or technologies	40
Insufficient knowledge as a user	36
Poor access to the school's internet service	36
Insufficient technological equipment	36
Obsolete/antiquated computers	32
Inexistence of rooms with integrated technological hardware and software systems	23
Functioning of the platform(s)	21
Failure in some platforms and technologies	19
Lack of technical support from the school	15
Too much bureaucracy	14

According to the participants, the main constraints regard to two fundamental aspects: professionals' training (N=40) and the school digital equipment (N=36).

Knowing that the implementation of DPTs in Portuguese schools has been the constant

challenge of the European initiative, these constraints can indicate insufficient or unsuitable training also in the many other existing platforms. On the other hand, insufficient knowledge, from a user's point of view, can indicate a 'one-off use' of the existing DPTs, less familiarity and, therefore, less proficiency when it comes to their use at a phase when they became necessary due to the pandemic.

The constraints relating to the conditions of equipment and digital structures are, predominantly, represented by the items "Insufficient equipment (e.g., video projectors, computers)", "Insufficient technological equipment" and "Poor access to the school's internet service".

These results bring to the surface questions regarding whether the investment in equipping schools with DPTs are achieving their purposes, and to what extent this equipment is regularly maintained to ensure its functioning. Moreover, this issue with the existing DPTs may have gained weight given the period in which the data was collected, again, during the pandemic, in which teachers of all levels of education had increase the use digital means, therefore facing additional difficulties. The need to resort to DPTs in order to assure communication with the children, families and peers, may have led to overloading the existing structures and multiplying the amount of equipment necessary in order to carry out the activities and tasks.

Discussion

Convening the research purposes in its relationship with the theoretical framework mobilized and the results presented above, some final reflections are now woven.

Which Digital Platforms and Technologies are more frequently used by preschool teachers in their daily practices?

The data demonstrate that there is a multiplicity of tools frequently used by educators. The plurality of DPTs seems to indicate that they are now a part of the daily work of educators, in line with the goals outlined by the European Union (Council of the European Union, 2009),

and as recommended in the Curricular Guidelines for Preschool Education (Silva et al., 2016). These platforms have also become a part of the pedagogical practices and administrative tasks performed by early childhood educators (Dong, 2018), thus corroborating the importance gained by these platforms in the educational context (Undheim & Margrethe, 2020). However, this may be a two-fold process. If, on the one hand, the integration of DPTs is in line with the transnational and national guidelines, on the other hand, the high number of existing platforms may be overwhelming and a result of what some authors call platformism, referred to by some as platform capitalism (Srnicek, 2018), which has assumed a role in the creation of mechanisms and instruments for educational management and control (Decuypere, 2021). This is a phenomenon that has been discussed by authors (Khlaif et al., 2023; Ngao et al., 2022; Taser, 2022; Thyagu, 2021) which account for the excessive number of platforms available, and which use is recommended or encouraged, which can overload teachers work and students learning experience. This, in turn, can subvert the potential recognized in the use of DPTs, and pose as a sort of threat to the educational process. The results regarding the use of DPTs by preschool teachers, and the idea that children are encountering digital technologies at an increasingly early age, are in line with the study carried out by Brito (2010).

Which aims are pursued when using DPTs?

Regarding the purposes for using DPTs, and to answer the question *Which aims are pursued when using DPTs*?, the results showed that the educators use DPTs to plan activities and communicate with other educators and children's families, as well as to carry out activities with the children. This is in line with the platforms mostly used. These results are in line with the findings of Ramírez-Rueda et al. (2021), Perregil et al. (2020) and Prestrige et al. (2019), when they refer that there is a large percentage of educators who use ICT in their daily professional activities.

In fact, previous studies already showed a prevalence of DPTs use for communication purposes, as showed by Silva et al. (2016), Edwards & Bird (2017), Cardona et al. (2021), Mata & Pedro (2021) and Schriever (2021). Our findings corroborate the idea that the integration of DPTs in educational settings can enhance communicational processes, whether

these are between peers (Prestrige et al., 2019), or between educators and parents and guardians (Oinas et al., 2017).

As for the use of DPTs to carry out activities with children, the results corroborate the study developed by Costa et al. (2015) and the emphasis on the importance of using tools, resources and other digital means to personalize learning. This seems to make evident the increasingly early contact of children with digital technologies and their role in the achievement of diversified learning. These results are supported by Laranjeiro et al. (2017), whose study revealed that educators provided technological devices (computer, camera, mobile phone and printer) for children to explore, while using digital applications and content and didactic software, drawing and painting programs, writing programs, PowerPoint/Prezi, games and digital stories, to develop their work.

Which constraints are felt by preschool teachers when using DPTs?

Regarding constraints, the participants recognize that one main aspect is their level of digital proficiency, which hinders the good use of DPTs, and could be overcome by an investment in training (Donohue & Schomburg, 2015; European Commission et al., 2017). This constraint has been documented in several studies that point out that the lack of DPTs knowledge by educators hinders the creation of educational environments promoting diverse experiences, in which the digital medium is assumed as the main tool (Brito, 2011; Perregil et al., 2020; Undheim & Margrethe, 2020). In the same sense, Ramírez-Rueda et al. (2021) state that it is necessary for educators to develop digital skills to produce new digital content. These results are also validated by the recommendations of the Council of the European Union (OECD, 2015) when highlighting the importance of educators exploring the potential of cooperation with the open-source software user community regarding innovative educational tools, digital creativity, ability to innovate and create new products appropriate to the age level and learning needs.

However, there is a certain dissonance between some of the results of this study, namely when educators indicate as a constraint the lack of skills/training for the use of DPTs, and the findings of the study of Brito et al. (2021), when they report that educators perceive themselves as "competent" in digital use. One aspect that may explain this disparity of results

is perhaps related to the sample of both studies, recognizing that the results we have reached must always be interpreted within the framework of the number of participants - which is not representative of the universe of Portuguese educators -, although, as mentioned before, educators from the five geographical areas of mainland Portugal have participated. It is also interesting to notice that the data does not point to a commonly identified constraint in literature, associated with attitudes of resistance from educators in the use of DPTs, and the need for awareness and convincing (Hoareau et al., 2021) on the added value of these devices in the organization and development of their work. On the contrary, the data from our study does not corroborate this and reveals that preschool teachers do use DPTs.

The other main constraint regards to the equipment itself, either its quantity or the conditions. The fact that this is recognized as a constraint is somewhat alarming, considering the strong investment made, at a European level and in Portugal, in providing schools and education and teaching institutions with equipment and digital infrastructures such as computers, internet network, interactive whiteboards and others (OECD, 2015). The awareness of this aspect has led to reflections that relate to the continuity of the support given to schools in the maintenance and updating of these same equipment (Brito et al., 2021).

This investment, in Portugal, has been made under the Digital Transition Action Plan (Portugal, 2020), more specifically pillar 1, "Empowerment and Digital Inclusion of People", organized around three sub-pillars - Digital education, Vocational training and requalification, Inclusion and digital literacy - which have as their first measure the Digitization Program for Schools (Coppi et al, 2022). This measure, underway since April 2020, includes actions such as the provision of individual equipment to students and teachers, the guarantee of free mobile connectivity for students and teachers, access to quality digital educational resources and a strong investment in a digital training plan for teachers.

Despite all the investment made, both in infrastructures and in the training of educators/teachers, the results reveal other aspects related to the potential negative impact that the obsolescence of the equipment brings to the integration of DPTs in daily educational work (Dong, 2018; Donohue, 2015; Johnston, 2019). This can thus limit the possibilities for preschool teachers to make use of their "digital knowledge" capital for the benefit of children's digital development (Johnston et al., 2020), due to the lack of adequate and operative resources. An opposite impact can be inferred to that argued in the literature, which

points to the benefit of DPTs in creating challenging, motivating and diverse educational environments (Johnston, 2019), capable of fostering the children's development of various skills (Chen et al., 2019; Costa et al., 2015; Mantilla & Edwards, 2019; Palailogou, 2016; Silva et al., 2016).

Similarly, being widely recognized that the use of DPTs can contribute to logics of cooperative work and sharing (Donohue, 2015), and to increase communication with various educational actors (Oinas et al., 2017; Prestrige et al., 2019), it is important to consider that the lack of adequate knowledge and resources compromises this use, limiting the positive potential they can bring to schoolwork. Also, the management of educational processes can, in this scenario, be impacted, as it becomes difficult to use DPTs for this type of work, a use that has been widely accepted and valued (Cardona et al., 2021; Edwards & Bird, 2017; Schriever, 2021). This issue is worthy of reflection, especially if we consider the participants' answers about the purposes of using DPTs, in which the work of managing the educational process and collaborative work have prominence.

Although we recognize limitations to this study, particularly regarding the sample size, we believe that the results obtained offer a perspective of the participants regarding the realities to which they report on the use, purposes and constraints of PTD in their daily practices.

The results reinforce the need to, on the one hand, promote the literacy and proficiency of preschool teachers in the use of DPTs (Donohue & Schomburg, 2015; European Commission et al., 2017) and, on the other hand, to ensure the good condition and quantity of available equipment, not to limit the professionals in their use (Brito et al., 2021). These aspects are worthy of consideration and deserve the attention of policy-makers responsible for the measures and guidelines on DPTs in education.

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