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Voices from the field: Integrating e-portfolios in early childhood education

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Abstract

Digital technologies are increasingly integrated into early childhood education (ECE), prompting discussions regarding their potential benefits and drawbacks. Research has shown that technology designed for children's developmental needs can enhance learning and development, while also improving communication between parents, teachers, and children. However, issues like access, equity, ethics, and teacher workload require careful consideration. This qualitative study explores the expected outcomes of integrating e-portfolios into ECE through one-on-one interviews with key stakeholder groups. After gathering general opinions, the participants were asked to provide detailed feedback on how the application affects children, teachers, and parents. In addition to revealing a diverse range of voices regarding the implementation of e-portfolios, this study aims to utilize the information gathered from participants for informed decision-making, offering valuable insights for the improved e-portfolio design and implementation. The study involved 34 Turkish participants from five stakeholder categories: ECE and primary school teachers, faculty members from ECE and primary school education departments, and parents. Results revealed that e-portfolios were viewed as highly beneficial, providing permanent and comprehensive documentation, facilitating data transfer to subsequent schooling levels, enabling multidimensional assessment, promoting child-centred practices, improving communication, enhancing reflective thinking and digital skills, and allowing resource utilization. However, participants raised concerns about workload, documentation gaps, and ethical issues. While e-portfolios hold promise for integrating digital technologies into ECE, current teacher education may lack sufficient training in key areas like digital literacy, documentation, assessment, and ethics. Further education in these areas can help ensure effective implementation and positive outcomes.

Keywords Early childhood education · E-portfolios · Assessment · Digital documentation

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1 Introduction

Evolving digital technologies are progressively moulding the landscape of digital educational tools in the field of ECE. Quality educational content designed with digital technologies has transformative potential for supporting children's development and learning, according to research data and professional experiences (Konerman et al., 2022). The integration of digital technology in ECE not only creates new learning opportunities but also enhances collaboration between schools and families, providing innovative paths for professional growth (Organization for Economic Co-operation and Development [OECD], 2023). Electronic portfolios, or e-portfolios, are digital tools for documenting and showcasing learning processes and work (Schallhart & Wieden-Bischof, 2010). In the 21st century, digital literacy has emerged as a critical skill, defined as 'the use of digital tools to create meaning and communicate effectively with others, including the ability to use visual representations, integrate various digital texts, navigate nonlinear digital materials, and evaluate digital information' (Neumann et al., 2017, p. 471). Given the flexibility and adaptability of e-portfolio applications, they possess the capacity to encompass all dimensions of this definition, rendering them potent tools for enhancing digital literacy among all stakeholders involved in the educational process. E-portfolios have been utilized for educational purposes since the 1990s (Zhang & Tur, 2022) and hold the potential to be employed across all educational levels to facilitate student-centred education. In this approach, learners actively participate and have autonomy and control over learning processes, in contrast to teacher-centred approaches where the teacher controls teaching purposes, content, learning materials, and progress (Li, 2022).

2 Literature review

2.1 E-portfolios in ECE

Traditionally, portfolios are a common and integral tool in ECE, serving as a pedagogical documentation method that brings a child's development and learning processes into focus (Schallhart & Wieden-Bischof, 2010; Stratigos & Fenech, 2021). Beyond mere assessments, they act as vital links between the child, family, and educators. These portfolios effectively bridge the gap between home and kindergarten, and subsequently between kindergarten and primary school. In doing so, they play a crucial role in ensuring a seamless transition for children from ECE to primary school (Peters et al., 2009). The increasing integration of technology in ECE has led to the substitution of traditional hardcopy portfolios with digital alternatives in recent times (Beaumont-Bates, 2017; Cowan & Flewitt, 2021). However, only a few research studies have explored the use of e-portfolios in ECE. These studies suggest that creating and utilizing e-portfolios in ECE can have various benefits, such as enhancing communication and interaction, promoting family engagement, facilitating assessment and documentation, and providing valuable insights into teacher experiences and perspectives. For instance, a study conducted in New Zealand found that e-portfolios effectively enhanced communication between teachers and parents, fostering

interaction in both online and face-to-face contexts (Higgins, 2015). Parallel findings from another study conducted in New Zealand demonstrate that the implementation of e-portfolios, as perceived by teachers and parents, leads to an increase in communication and partnership among teachers, parents, and children (Beaumont-Bates, 2017). In a Greek ECE setting, the use of e-portfolios as an alternative assessment tool resulted in increased peer and self-assessment among children, garnering positive feedback from parents (Tsirika et al., 2017). Another study reveals that a majority of Greek ECE teachers express support for incorporating e-portfolios in kindergarten teaching practices. However, there were some reservations and concerns regarding the effectiveness of the learning process and the feasibility of its implementation (Panagiotopoulou, 2022). In a comprehensive study conducted in New Zealand, the effects of introducing e-portfolios in an ECE environment, which previously used traditional paper-based portfolios as the formative assessment tool for children's learning, are examined (Hooker, 2019). The utilization of an e-portfolio system yielded multiple benefits, as reported by the researcher, including increased active engagement of children in their learning, improved interaction and collaboration among teachers, more effective utilization of e-portfolios as teaching and planning resources compared to paper-based portfolios, and enhanced parental involvement facilitated by multimodal communication tools in the e-portfolio system. In a study conducted with Taiwanese ECE teachers, the findings indicated that e-portfolios were effective in capturing and documenting the intricate details of children's learning experiences, thereby creating a more dynamic and diverse display that benefits both teachers and parents (Lin, 2012).

3 Method

A qualitative study design was employed to explore the views of various stakeholder groups on the integration of e-portfolios into ECE. These groups included ECE teachers, primary school teachers, faculty members in ECE education departments, faculty members in primary school education departments, and parents.

3.1 The present study

Currently, e-portfolios are not utilized in Turkish public schools at the ECE level. Instead, only developmental reports are accessible on the e-school system for a limited time, available to parents, but this information is not transferred to primary school teachers. However, the Turkish Ministry of Education has recognized the necessity of integrating e-portfolios into the public education system, beginning with ECE, as outlined in its goals. Creating e-portfolios for monitoring, evaluating, and improving all areas of children's development, from early childhood education through upper education levels, with a focus on safeguarding child data, is a step designed to enhance the overall quality of education (Turkish Ministry of Education, 2018). Furthermore, the importance of e-portfolios extends beyond national boundaries, particularly in facilitating the transition of children from ECE to primary education, and has the potential to foster child-centred practices, signifying their global relevance.

The establishment of a seamless system is crucial, as portfolios serve as powerful tools for showcasing children's learning and development through tangible examples. Primary school teachers can leverage these portfolios to gain a deeper understanding of their students and provide them with the necessary support during their transition to new educational phases. A successful transition is vital for a child's emotional, psychological, and physical development, ensuring readiness for primary school.

Child- centredness, an instructional approach in which children are considered active constructors of knowledge with teachers playing a primary role in facilitating their active exploration and construction of knowledge (Lerkkanen et al., 2016), is another noteworthy aspect of e-portfolios, as their definition in literature generally reflects the child-centredness dimension (Tsirika et al., 2017). Despite their critical importance, there remains a scarcity of comprehensive research and implementation on e-portfolios worldwide. By gathering diverse perspectives from key stakeholders, this study aspired to illuminate pathways for the improved design and implementation of e-portfolios in ECE, aiming to contribute to future research and educational practices in this domain. The research questions addressed through the study were as follows: (1) What are the general views of key stakeholders on the necessity of using e-portfolios in ECE? (2) What are the views of key stakeholders on the child-related outcomes of e-portfolios? (3) What are the views of key stakeholders on the teacher-related outcomes of e-portfolios? (4) What are the views of key stakeholders on the parent-related outcomes of the e-portfolios?

3.2 Participants

A total of 34 participants were interviewed for this research. Of the participants, 9 were ECE teachers, 12 were primary education teachers, 5 were faculty members from ECE departments, 4 were faculty members from primary education departments, and 4 were parents who have children registered in ECE institutions. A purposeful sampling method was chosen for selecting participants. The participants are from the Marmara region of Turkey, and they were voluntarily recruited from 3 universities and 3 ECE institutions.

3.3 Data collection

A preliminary semi-structured interview form was designed to elicit perceptions of the benefits and outcomes of using e-portfolios in ECE for teachers, children, and parents. The semi-structured interview form was sent to three faculty members for review. Based on the feedback received from these experts, a final version of the semi-structured interview form was developed, consisting of four questions. Before each interview, participants were asked to read and sign the informed consent forms, and given brief information about e-portfolios. The interviews, ranging from 15 to 25 minutes in duration, were conducted online and recorded for later transcription and analysis.

3.4 Data analysis

The data from interviews was transcribed into Word documents. Subsequently, an inductive approach was utilized for analysis. This approach allows researchers to condense extensive and diverse data into a concise format, facilitating the derivation of findings directly from the analysis of raw data (Thomas, 2003). After reading the interview records multiple times, each researcher created their own initial codes. They then met to compare their codes and resolve any disagreements through consensus. The next step was to identify overarching themes and subthemes by closely examining the code list. Throughout the research process, which included designing the study, developing the codebook, and analysing interview data, all three researchers actively participated.

4 Results

The results of the analyses will be presented in alignment with the interview questions posed to the participants: (1) general views on the necessity of using e-portfolios in ECE, (2) views on the child-related outcomes of the e-portfolios for children, (3) views on the teacher-related outcomes of the e-portfolios, and (4) views on the parent-related outcomes of the e-portfolios.

4.1 General views on the necessity of using e-portfolios in ECE

Two main themes arose from analyzing the participants' feedback on the use of e-portfolios: *benefits and advantages* and *challenges and concerns* (Table 1). The *benefits and advantages* theme encompasses strengths and positive aspects associated with e-portfolio use in ECE, including subthemes such as 'permanent and comprehensive documentation,' 'assessment and guidance,' 'technology functionality and resource efficiency,' and 'family involvement and child-centredness.'

The subtheme 'permanent and comprehensive documentation' was present in the responses of all stakeholder groups and includes codes such as permanent data

Table 1 General views on the necessity of using e-portfolios in ECE

Themes and Sub-themes	Frequencies
Benefits and Advantages	
Permanent and comprehensive documentation	14 (ECEFM:5, PEFM:2, ECET:3, PST:2, P:2)
Assessment and guidance	8 (ECEFM:3, PEFM:1, PST:3, P:1)
Functionality of technology and resource efficiency	13 (ECEFM:1, PEFM:2, ECET:3, PST:5, P:2)
Parental involvement and child-centeredness	11 (ECEFM:5, PEFM:1, ECET:3, P:2)
Challenges and Concerns	
Technological infrastructure and ethics	4 (PEFM:3, PST:1)
Lack of competence and motivation	3 (ECEFM:1, PEFM:2)
Increased workload	3 (ECEFM:1, PEFM:1, ECET:1)
Lack of tactile experiences	1 (ECET:1)

Note ECEFM = Early Childhood Education Faculty Member; PEFM = Primary School Education Faculty Member; ECET = Early Childhood Education Teacher; PST = Primary School Teacher; P = Parent

recording, data transfer to subsequent schooling levels, and emotional connection with the past. One interviewee emphasized the importance of using e-portfolios for seamless data transfer to subsequent schooling levels, stating:

> This application is very important. One of the biggest gaps in our country is the continuity […]. Primary school stays within itself; it does not move to the next level. Continuity is necessary to create strength and opportunities. (ECE Department Faculty Member)

The subtheme 'assessment and guidance' encompasses codes such as multidimensional child assessment, early intervention opportunities, and appropriate guidance. An interviewee emphasized the potential of e-portfolios to offer appropriate guidance as follows:

> Getting to know the student from a holistic point of view, from the first enrolment to the school until the end of high school education, creates tangible evidence to direct him or her to the field of interest. (Primary School Education Faculty Member)

Within the subtheme 'functionality of technology and resource efficiency,' various codes were identified, including ease of access and sharing, reduced paper usage and time, decreased workload, reduced space requirements, and keeping up with the digital era. These codes highlight how e-portfolios contribute to process streamlining and resource efficiency. An interviewee reflected on efficient resource utilization, stating:

> The lack of printouts compared to paper portfolios will be a great advantage of this work. Teacher efficiency is ensured in terms of time, and it provides a large amount of money in terms of paper savings. (ECE Teacher)

In the subtheme 'parental involvement and child-centredness,' codes include parental and child involvement in the monitoring and assessment process, diverse activities, the development of children's digital literacy, and child -specific content. An interviewee emphasized increased child involvement through e-portfolio use with the following statement:

> I think it can even go into a situation where children can choose and upload their own activities later on. In other words, teachers do not make the choice alone; they choose together with the child, and the child sits in front of their own computer because the child can easily access, use, and actively manage technology in the same environment as their mother, father, or teacher. (ECE Teacher)

Another theme that emerged as a result of the analysis of the answers regarding the necessity of using the e-portfolio application is *challenges and concerns*. The *challenges and concerns* theme pertains to issues that need to be addressed and the obstacles that may arise while implementing e-portfolios in ECE. The participants'

perceptions on this theme were categorized into four subthemes: 'technological infrastructure and ethics', 'lack of competence and motivation', 'increased workload', and 'lack of tactile experiences'.

The 'technological infrastructure and ethics' subtheme subsumes codes related to technological infrastructure such as the requirement for appropriate technological infrastructure for e-portfolios, dependence on technological amenities, the requirement for user-friendliness, and codes related to ethical concerns such as ensuring data security and confidentiality and consideration of ethical issues. An interviewee expressed concerns about using e-portfolios professionally and ethically:

> Of course, I believe that if it is used, it will be very convenient, but I am not sure whether the teachers will be sensitive in terms of paying attention to the ethical rules that match the purpose of use. I am not sure how professionally it will be used. I have such concerns about this issue. Therefore, if security aspects that can protect both professionally and ethically the privacy of children can be provided, it is a 100% useful system, a transparent system, a good system to know the development of the child and to realize multidimensionality about the assessment process. (ECE Department Faculty Member)

Another interviewee stressed the importance of families having internet access to benefit from e-portfolios:

> I think it is necessary and useful, but there must be technological access […]. I say, let me send homework, the parent says, I do not have an internet package. In this situation, our hands are tied. (Primary School Teacher)

The subtheme 'lack of competence and motivation' was constructed from codes such as the need for teachers to have portfolio literacy skills and teachers' lack of motivation. These codes related to the subtheme were expressed exclusively by faculty members, with two interviewees emphasizing the requirement for teachers to possess a pedagogical background for proper e-portfolio use as follows:

> Teachers need to be trained, this tool should be used sincerely, and they should have the right pedagogies for democratic and accurate reflection. Sometimes teachers do not have this pedagogical background. (Primary School Education Faculty Member)

> Portfolio literacy needs to be present; registrants should not post nonsense stuff […]. (ECE Department Faculty Member)

The subtheme 'increased workload' includes codes related to the idea that the use of e-portfolios in ECE may be perceived as an additional workload by teachers. Two interviewees made the following statements:

> Teachers are very fond of fixed patterns, so this will tire them out. They may not want to use it. The documentation will be a workload, but it is necessary

> […] important for the teaching profession and its development. (ECE Faculty Member)
> […] I can describe the difficulties in implementing this idea. From the teachers' point of view, there will be an unnecessary workload. (Primary School Education Faculty Member)

In the subtheme 'lack of tactile experiences,' codes relate to the data and products uploaded to the e-portfolio being untouchable. One interviewee expressed some concerns as follows:

> On the other side, I am in favour of the child feeling the products he makes and touching them with his hands. Frankly, I think it should be in hand, not in the form of an e-portfolio. (ECE Teacher)

4.2 Views on the child-related outcomes of the e-portfolios for children

When analysing participants' views on the use of e-portfolios with a focus on children, all responses highlighted positive effects and contributions, with no reported downsides. This analysis revealed four main themes: *developmental contributions, documentation and assessment, involvement and interaction*, and *functionality of technology* (Table 2).

The *developmental contributions* theme focuses on participant views regarding the developmental benefits of e-portfolio use in ECE for children. It encompasses three subthemes: self-assessment, emotional contribution, and digital literacy. 'The 'self-assessment' subtheme includes codes related to children monitoring their own development and making self-assessments. Notably, when considering the benefits of using e-portfolios for children, the 'self-assessment' subtheme emerged as one of the most frequently expressed aspects by all participant groups:

Table 2 Views on the child-related outcomes of the e-portfolios

Themes and Sub-themes	Frequencies
Developmental contributions	
Self-assessment	10 (ECEFM:2, PEFM:1, ECET:2, PST:2, P:3)
Emotional contribution	7 (ECEFM:3, ECET:2, PST:1, P:1)
Digital literacy	2 (ECET:1, P:1)
Documentation and assessment	
Permanent and comprehensive documentation	10 (ECEFM:3, PEFM:1, ECET:2, PST:3, P:1)
Assessment and guidance	9 (ECEFM:2, PEFM:3, PST:3, P:1)
Involvement and Interaction	
Child involvement	4 (ECEFM:1, ECET:2, PST:1)
Interaction	5 (ECEFM:1, PEFM:1, PST:2, P:1)
Functionality of Technology	
Functionality of technology	4 (ECEFM:2, PST:2)

Note ECEFM = Early Childhood Education Faculty Member; PEFM = Primary School Education Faculty Member; ECET = Early Childhood Education Teacher; PST = Primary School Teacher; P = Parent

> The child can look at the contents of the portfolio with their parents and may say this is what I did on this date; this is how I painted. We can show such things to children in terms of observing their development: Look, it was like this, look, you can put it like this after two months. So you can see yourself improving […]. It will be possible to make a self-assessment. (ECE Teacher)
> It may also be beneficial for the children to see their deficiencies or to improve their selves. It has a lot of impact on their development, like following their own development. (Parent)

The 'emotional contribution' subtheme emerged from codes such as the child's feeling happy, feeling important, developing a sense of achievement, contributing to the child's well-being, and forming an emotional bond with the family. Two interviewees shared their thoughts on the emotional dimension as follows:

> I think it is quite helpful for the children. I think it is even good for future vision and bonding with their family. You know, what their mother did there, what their teacher said about them, even for that emotional bond, it would be good to feel their presence like this; it is even good for their well-being. (ECE Faculty Member)
> They can sometimes love their work very much and leave a great impact on them. When they see this work again, they can experience the same feeling and can quickly remember the features where they were affected. In that sense, I think it is useful. I also think that seeing their work in such a setting makes the child feel important. (ECE Teacher)

In the 'digital literacy' subtheme, there are codes that indicate that the use of e-portfolios in ECE will contribute to the development of digital literacy in children. As two interviewees reflected:

> In the e-portfolio, the children can choose by themselves, and the internet and the computer will be used appropriately and for the right purpose; they will use it actively because their technology skills will also be developed. Our aim is not to keep the child completely away from technology, but I think to ensure its proper use. (ECE Teacher)
> Unfortunately, families generally use digital tools to watch videos. Let them use digital tools slightly more effectively. It would be nice for children to use digital tools effectively. (ECE Teacher)

The *documentation and assessment* theme comprises codes such as permanent data recording about children, transferring them to further education stages, and establishing emotional connections with the past in the future. This subtheme was reflected by all participating groups. The potential benefits of using e-portfolios in ECE for primary school teachers were expressed as follows:

> When the children start the first grade of primary school, the primary school teacher also sees what stages these children have gone through and what their level is. (Primary School Teacher)

The 'assessment and guidance' subtheme encompasses codes such as multidimensional child assessment, process-oriented and holistic assessment, understanding the child, early talent discovery, and appropriate guidance. While other participating stakeholder groups in the study mentioned advantages associated with this subtheme, ECE teachers did not articulate any benefits concerning it. An interviewee shared some thoughts on this subject:

> It takes a long time to choose a profession. Such a multifaceted process is important in terms of guiding children more appropriately. Professions are selected without measuring knowledge and skill. Which profession makes more money is considered, the characteristics of the child are not taken into account, and the children sometimes do not know what they have. Long-term information turns into big data. These holistic data provide us with more viable options to be more successful. (Primary School Education Faculty Member)

The *participation and interaction* theme also emerged regarding the benefits of using e-portfolios for children. It includes two subthemes: 'child involvement' and 'interaction.' The 'child involvement' subtheme comprises codes such as the child's participation in e-portfolio processes and child-centred practices. This sub-theme was subtheme emerged in the responses provided by ECE teachers, ECE faculty members, and primary school teachers. An interviewee reflected on this topic with the following statement:

> In fact, we place children at the centre of the decision mechanism regarding their own lives and the products they have created […]. The children will definitely feel valued in this process; they will feel at the centre. (ECE Teacher)

The 'interaction' subtheme encompasses codes related to the benefits of child-family-teacher interaction and communication. All participating groups expressed the benefits for the child under this subtheme, except for ECE teachers. An interviewee stated:

> My child usually shares everything with me, like when they show me what they have done at school. For those who cannot show it, e-portfolios can also provide communication between children and their mothers in a way. (Parent)

The 'functionality of technology' includes codes such as ease of access, quick feedback and, attractiveness. As one of the interviewees expressed:

> First, it may attract the attention of children in terms of visuals, rich visuals. They may have the opportunity to use or access activities or materials that they may be interested in or have the right to choose, and they will also have the

opportunity to access these materials at any time, as they will be permanent. (ECE Faculty Member)

4.3 Views on the teacher-related outcomes of the e-portfolios

Analysis of responses concerning teacher-related outcomes of e-portfolios revealed two themes: *benefits and advantages* and *challenges and concerns* (Table 3).

Under the *benefits and advantages* theme, addressing positive aspects for teachers, participants' opinions were summarized into four subthemes: 'permanent and comprehensive documentation,' 'assessment and guidance,' 'technology functionality and resource efficiency,' and 'professional development and contribution. 'Permanent and comprehensive documentation' encompasses codes such as concrete learning samples, transitioning to higher educational stages, and emotional connections to the past. An interviewee noted:

If you are a teacher, having access to notes left by previous teachers or the e-portfolio samples added by them can be highly valuable, providing you with foresight. (ECE Teacher)

'Assessment and guidance' emerged from codes such as holistic evaluation, appropriate guidance, and individualized planning. An interviewee expressed:

In other words, we, as teachers, try to discover the talents of the child. Of course that makes my job easier. Because when I assess my students, I do not evaluate them from a single aspect… It will make my job easier in guiding the child […]. (Primary School Teacher)

The 'functionality of technology and resource efficiency' consists of codes such as enriched activities and reduction in paper usage and time. An interviewee explained:

It is very difficult to keep the papers in our hands, after they are not useful anymore; they go to recycling […]. We have to adapt to the digital age in every sense; this application will be a pioneer. (ECE Teacher)

Table 3 Views on the teacher-related outcomes of the e-portfolios

Themes and Sub-themes	Frequencies
Benefits and Advantages	
Permanent and comprehensive documentation	15 (ECEFM:3, PEFM:4, ECET:5, PST:3)
Assessment and guidance	14 (ECEFM:3, PEFM:3, ECET:1, PST:6, P:1)
Functionality of technology and resource efficiency	21 (ECEFM:3, PEFM:2, ECET:6, PST:7, P:3)
Professional development and contribution	7 (ECEFM:4, PEFM:2, ECET:1)
Challenges and Concerns	
Increased workload	5 (ECEFM:2, PEFM:1, PST:1, P:1)
Need for documentation culture	1 (ECEFM:1)

Note ECEFM = Early Childhood Education Faculty Member; PEFM = Primary School Education Faculty Member; ECET = Early Childhood Education Teacher; PST = Primary School Teacher; P = Parent

Professional development and contribution' is a subtheme highlighting the advantages of e-portfolio use for teachers, as expressed by faculty members and ECE teachers. E-portfolio utilization positively impacts teachers, providing benefits such as self-assessment, improved digital literacy, reflective thinking skills, and increased motivation. Three interviewees shared their thoughts:

> I think the teacher also feels happy. It is very motivational to see that what you have given is learned again, and to see it progressing further. (ECE Teacher)
> At the same time, the digital literacy of teachers will also be improved within this framework. They will be able to use information and communication technologies more effectively. (ECE Faculty Member)
> In general, it is good for the teacher as well. It is important for both self-evaluation and reflective thinking. (Primary School Education Faculty Member)

While exploring the impact of e-portfolios on teachers, the *challenges and concerns* theme emerged, focusing on the possible barriers and difficulties that might be faced by teachers in ECE. This theme includes two subthemes: 'increased workload' and 'need for documentation culture.' In the 'increased workload' subtheme, there are codes indicating that the use of e-portfolios in ECE could potentially increase teachers' workload or be perceived as such. However, upon analysing the responses of ECE teachers, no findings were found indicating concern that e-portfolios would increase their workload. Two interviewees provided the following comments:

> There will be a reaction; this is a new and different job, a job that brings work for teachers. (ECE Faculty Member)
> An extra burden will come, and the workload will increase. Is the teacher truly aware of the importance of this tool? Incorporating an innovation in this way would be a burden; the teacher will see it as part of the flow, but it will be a workload. (Primary School Education Faculty Member)

In the 'need for documentation culture' subtheme, there are codes related to teachers' lack of a documentation culture or their inadequacy in documentation. An interviewee commented:

> The obstacle here is our lack of culture in documentation. The development reports prepared for ECE children are not very functional. In fact, adequate documents are not collected for the child, and a development report is not written accordingly. It is done carelessly because it has to be done. (ECE Faculty Member)

4.4 Views on the parent-related outcomes of the e-portfolios

The analysis of responses evaluating e-portfolio usage for parent-related outcomes revealed two themes: *benefits and advantages*, emphasizing positive aspects and

contributions, and *challenges and concerns*, addressing difficulties and obstacles (Table 4).

The *benefits and advantages* theme encompasses the subthemes of 'knowing and guiding the child', 'involvement and interaction', 'other contributions', and 'permanent documentation'. In the 'knowing and guiding the child' subtheme, there are codes such as getting to know the child better, being able to monitor the child better, seeing concrete examples of the child's learning, noticing and intervening in developmental deficiencies, and guiding the child appropriately. All stakeholder groups agreed that the e-portfolio would benefit parents in understanding and guiding their child, as explained in three interviews:

> Since I always want to follow my child, I want to know what they are doing […]. I want to open and see them whenever I want […]. Therefore, for example, I can determine if they are missing something or if something is wrong, and then I can complete it. The teacher can speed us up so that we can continue and get it solved immediately. (Parent)
>
> Children of this age may not be able to express themselves as well as other older children. In some cases, they may not be able to say to their family that we did this, we did that. Sometimes, the parent may say I send my child to kindergarten; I wonder what my child has done. This e-portfolio is a concrete example of what they do. It provides the opportunity to see the child in a concretely. I mean, parents will see the development of the child personally; I think it will be more objective, they will see what their child is. (ECE Teacher)
>
> If the e-portfolio is used, parents will have more concrete data on the development. Maybe it can even support the search for a school in the future… It creates an opportunity to get to know the child. (ECE Faculty Member)

The 'involvement and interaction' subtheme emerged from codes including family participation, remote information access, and its contribution to family relations and communication. It was observed in the responses of all participant groups. An interviewee stated the following about enhanced communication and interaction:

> There will be open communication between the child and the parent, and we can enter a trust-oriented teaching process […] and the teacher will see the

Table 4 Views on the parent-related outcomes of the e-portfolios

Themes and Sub-themes	Frequencies
Benefits and Advantages	
Knowing and guiding the child	17 (ECEFM:3, PEFM:3, ECET:3,PST:6, P:2)
Involvement and interaction	9 (ECEFM:2, PEFM:2, ECET:3,PST:1, P:1)
Other contributions	5 (ECEFM:3, PEFM:1, P:1)
Permanent documentation	2 (PEFM:2)
Challenges and Concerns	
Technology access and competence issue	5 (ECEFM:2, ECET:2, PST:1)
Reduced face-to-face interaction	1 (ECET:1)

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> points that need to be enriched for the child, who will see that it continues in the home environment. The fact that the parent monitors the child's development moment by moment may lead the parents to observe themselves. (Primary School Education Faculty Member)

The 'permanent documentation' subtheme consists of the codes of transfer to higher educational stages and emotional bonds with the past. The 'other contributions' subtheme encompasses codes such as family emotional satisfaction/happiness, increased awareness of the ECE process, potential for parental self-evaluation, and the development of parental digital literacy. Regarding the integration of e-portfolios and its impact on raising family awareness about ECE, an interviewee reflected:

> Parents also become more aware of what is done in the classroom that is not visible and that the teacher is not present or about the records kept. The benefits of ECE will be seen more here. Because what our parents understand from ECE is it is still better preparation for first grade or think that "I work, it (kindergarten) is like a safe place to drop the child off." I think that the e-portfolio will have an indirect contribution to prove to families that this is not so and to teach the truth. (ECE Faculty Member)

While the outcomes of using e-portfolios for parents were in question, the other theme that emerged was *challenges and concerns*. The participants' opinions were categorized into two subthemes: 'technology access and competence issue' and 'reduced face-to-face interaction'. An interviewee expressed concerns about family competencies in using e-portfolios as follows:

> I am sceptical about whether they (parents) are aware of the academic work we do […]. Unfortunately, they are not in that consciousness. Unfortunately, I do not think they will understand much in that sense. However, it will be beneficial for conscious families. (ECE Teacher)

The 'reduced face-to-face interaction' subtheme implies that e-portfolio use may hinder in-person interactions. Only one of the ECE teachers in the study expressed reflections related to this subtheme:

> On the negative side, it can cause everything to be too technologically based. It can turn into superficial […]. It is very different to tell it one-on-one, to experience that excitement and enthusiasm, but I do not know if the digital tool will allow it. (ECE Teacher)

5 Discussion

For the first research question, which explores the general views of the participants regarding the use of e-portfolios in ECE, several positive aspects emerged. These included permanent and comprehensive documentation, effective assessment and guidance, the functionality of technology, resource efficiency, and parental involvement, along with a child-centred approach. Notably, parents did not report any negative aspects related to e-portfolio integration. In contrast, the other stakeholder groups raised several potential challenges and concerns. These included insufficient technological infrastructure and access, inappropriate ethical practices, teachers' lack of competence and motivation, increased workload for teachers, and the absence of tactile experiences for children. Specifically, participants highlighted the fact that not all families possess the financial means to access the internet or necessary technological devices. Furthermore, apprehensions regarding data security, confidentiality, and ethical considerations concerning the privacy of children were prominently identified, particularly among faculty members in primary school education. The anticipated benefits and challenges associated with integrating e-portfolios into ECE align closely with findings in the related literature. In a critical analysis of literature on the affordances and challenges of using technological applications in ECE, Stratigos and Fenech (2021) state that data from several studies report that teachers and parents reported these applications as user-friendly and convenient, facilitating communication between them. Additionally, some studies highlighted pedagogical benefits such as detailed observation, richer documentation, more responsive planning, and active involvement of children in the documentation process. The authors' review also identified challenges in using digital applications in ECE, including issues of equity of access, the potential risk of positioning children as passive subjects to be observed, increased workload for teachers, and marketization. Notably, the challenge of marketization of tools or services was not mentioned in the responses of the participants in the current study.

In addressing the second research question concerning the impact of utilizing e-portfolios in ECE on children, all stakeholder groups highlighted several positive outcomes. These included developmental and emotional enhancements for children, the ability for children to engage in self-assessment, the provision of permanent and comprehensive documentation, effective assessment and guidance, increased child participation and interaction among children, parents, and teachers, improved digital literacy, and the advantages of technological convenience. 'Permanent and comprehensive documentation' and 'self-assessment' are the most repeated subthemes for this question. No negative perceptions or disadvantages related to the use of e-portfolios for children were identified. Kumpulainen and Ouakrim-Soivio (2019) conducted an empirical research in Finnish ECE context to explore the opportunities and challenges of using digital portfolios and consistent with the opinions revealed in this study, their findings demonstrated that e-portfolios promoted the learning and developmental processes of children, highlighted their interests and emotions, and allowed rich and multi-faceted reflections of their activities.

When analysing the responses to the third question, which focuses on the outcomes of e-portfolio use for teachers, it became evident that participants primarily

highlighted benefits and advantages. These advantages encompass permanent and comprehensive documentation, effective assessment and guidance, enhanced technology functionality, resource efficiency, and opportunities for teachers' professional development and contributions. In practical terms, the integration of e-portfolios allows for the collection and long-term storage of a wide range of data. Consequently, teachers can conduct more holistic and formative assessments, enabling individualized planning and tailored guidance. When transferred to other ECE or primary school teachers, these data provide valuable insights into each child's prior experiences and progress. Additionally, the convenience of technology enables teachers to provide enriched activities for children while reducing paper usage and saving time. Furthermore, the impact on teachers' professional development, particularly noted by faculty members from ECE and primary education departments, includes self-assessment, enhanced digital literacy, development of reflective thinking, and increased motivation. While most responses to this question were positive, certain concerns were raised. Participants expressed worries about an increased workload for ECE teachers and the need for a more robust documentation culture. Notably, these concerns were primarily voiced by participants from stakeholder groups other than ECE teachers and parents. In essence, ECE teachers did not voice concerns about increased workload or the need for a documentation culture in response to this question.

The answers of the participants to the last question, which is about the parent-related outcomes of the use of e-portfolios in ECE, point to benefits and advantages for parents, such as knowing and guiding the child, involvement and interaction, and permanent documentation. The usefulness of e-portfolios in getting to know the child and guiding them appropriately was an opinion shared by all the stakeholder groups. E-portfolios enable parents to closely monitor their children's developmental processes and school activities, allowing them to take immediate action when they notice any issues. Similarly, participants' responses also highlighted increased family interaction and easy access to child-related information. As one parent noted, these benefits can be realized without the need to visit the school, making e-portfolios an advantageous tool for parents. The subthemes of access to technology and technological competence and reduced face-to-face interaction encompass parent-related challenges and concerns. However, it is worth noting that these concerns were not expressed by the parents themselves but rather by other stakeholders.

Collectively, it becomes evident that the use of e-portfolios in ECE garners positive evaluations from all stakeholders and offers substantial potential benefits for children, teachers, and families, including permanent documentation, multidimensional assessment, effective guidance, technological functionality, resource efficiency, family engagement, and a child-centred approach. Among these advantages, the most frequently mentioned subtheme was 'permanent and comprehensive documentation', which encompasses data transfer to further schooling levels and resonates across all stakeholder groups. Participants' recognition of the significant facilitative potential of e-portfolios during the transition from ECE to primary school and other upper schooling stages is closely tied to the challenges within the Turkish education system. In the current practice in Turkey, portfolios in ECE are not routinely transferred to primary school teachers, highlighting an existing gap in continuity. Previous research,

such as the study conducted by Alaçam and Olgan in 2016, identified the non-transfer of portfolios from ECE to primary school as a notable continuity problem. In this context, the integration of e-portfolios across educational stages holds promise for addressing continuity issues through seamless data transfer.

While rich documentation and multidimensional assessment were among the potential benefits of e-portfolios, it is noteworthy that faculty members, rather than teachers, expressed some concerns about teachers' efficacy in these areas. To gain a comprehensive understanding and draw specific conclusions from this result, further investigation appears to be necessary, particularly in light of related research. Işıkoğlu-Erdoğan et al. (2021) revealed that ECE teachers working in various regions of Turkey have inadequate knowledge of assessment techniques and rely on limited methods and tools. Related concerns arise in various international contexts within the realm of ECE. Knauf (2020) states that the challenge of implementing documentation is not limited to individual teachers or specific countries; it is also apparent on a global scale, despite the growing emphasis on documentation and the increased understanding of its impact. Kumpulainen and Ouakrim-Soivio (2019), who highlight the active involvement of children in creating and utilizing e-portfolios as pedagogical tools, stress the importance of teacher professionalism in supporting this process.

Based on the participants' statements in this study, it can be concluded that children are the group that potentially stands to gain the most from e-portfolio applications, with no reported downsides. The benefits reported by participants included enabling children to make self-assessments, improving understanding, assessment, and guidance of children, early talent discovery, enhanced child-centred practices, improved child-family-teacher interaction and communication, increased happiness and sense of importance in children, the development of a child's sense of achievement, contributions to a child's digital literacy, well-being, and emotional bond with the family. Reviewing the relevant literature confirms that several benefits anticipated by the participants have been substantiated by previous research. For instance, the use of e-portfolios has been found to promote self-assessment in young children (Tsirika et al., 2017), enhance communication and collaboration among teachers, parents, and children (Beaumont-Bates, 2017), facilitate interaction in both online and face-to-face contexts between parents and teachers (Higgins, 2015), and increase communication among teachers, parental involvement, and active engagement of children in their learning (Hooker, 2019).

Even though they may not have been mentioned as often, ethical considerations like data security, confidentiality, and privacy for children are some of the most important concerns shared by participants. The main issue lies in the extent to which the implementation of digital ethics, encompassing the moral and responsible use of digital technologies, keeps pace with the expanding and widespread adoption of these technologies. For instance, a study by Novella-García and Cloquell-Lozano (2021) revealed that digital competence is extensively integrated into the curricula of Spanish universities. However, only 26.1% of the teaching guides included the ethical dimension in subjects that specifically focused on the use and acquisition of digital skills.

6 Limitations

This research delved into the viewpoints of 34 Turkish participants, who represented five important stakeholder groups, regarding the integration of e-portfolios into ECE. It is crucial to bear in mind the specific characteristics of this sample and the educational context when interpreting our findings. We took measures to ensure the trustworthiness of our results, including establishing an inter-coder agreement and conducting a thorough synthesis of the interviews. However, we also acknowledge the possibility of unintentional biases in participant selection, data collection, and interpretation. Additionally, participant-related biases, such as social desirability bias, which is defined as a 'mismatch between participants' genuine construction of reality and the presentation of that reality to researchers' (Bergen & Labonté, 2020, p. 783), may have influenced responses in this study. Finally, it is pertinent to address a language-related aspect: our data were initially collected and analysed in Turkish, and we have presented them in this article in English. To effectively convey the themes, subthemes, and quotations from the interviews; we adopted a dynamic equivalence approach in translating our data from Turkish to English. This approach prioritizes the translation of the underlying meaning and intent of the text over rigid adherence to lexical and conceptual equivalences, thus preserving the original text's intended meaning and function. Dynamic equivalence, essentially, requires researchers to acknowledge that the reliability of a translation might not be universally consistent and may not maintain complete neutrality (Mandal, 2018).

Given these limitations, we do not intend to generalize our findings or draw conclusions beyond the scope of this research. However, we hope that our study provides valuable insights for scholars and practitioners interested in this topic.

7 Conclusion

To our knowledge, this study is the first to gather input from a wide range of stakeholders. We aimed to comprehensively grasp both the potential benefits and challenges associated with implementing e-portfolios in ECE. The benefits identified by stakeholders in this study, as well as the considerations raised, are expected to inform the creation of effective e-portfolio designs. This underscores the necessity to shift from traditional paper-based portfolios to digital applications. Such a tool should have the capability to create comprehensive and easily transferable records, facilitate the multidimensional evaluation of children, foster dynamic interactions among teachers, children, and families, promote a child-centred approach, enhance users' digital literacy, and ensure efficient resource utilization while considering factors such as teachers' workload, accurate reflection of children and ethical issues When designing developmentally appropriate e-portfolios, it's equally important to consider the views of relevant stakeholders regarding content and functionality. As an additional point, the data from this study, along with other findings in the literature, indicate the necessity for teachers and prospective teachers to receive more advanced training in digital literacy, documentation, assessment, and ethics. In conclusion, the integration of technology into ECE may give rise to certain concerns, but it also

holds the potential for increasing the quality of services provided to children and their families in ECE.

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Data availability The interview data generated and/or analyzed during the current study are not publicly available due to privacy agreements. However, it can be obtained from the corresponding author upon reasonable request.

Declarations

Ethical approval A statement from the Ethical Review Board of Çanakkale Onsekiz Mart University (Reference: October 21, 2022/ E84026528-050.01.04-2200249924) confirmed that the conducted research adhered to ethical standards. Throughout the data collection, analysis, and reporting processes, utmost consideration was given to ethical principles concerning human privacy, data security, and confidentiality. Informed consent was obtained from all participants and they assured that their involvement was voluntary. They had the option to withdraw from the study at any time, as communicated to them during the informed consent process. To protect the anonymity and privacy of participants, pseudonyms were used in this study.

Conflict of interest The authors report that there are no competing interests to declare.

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