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Abstract

Research on early childhood teachers' perceptions of technology integration has been criticised for not paying enough attention to the unique pedagogical characteristics of early childhood education. This qualitative study contributes to resolving this need by scrutinising preservice teachers' perceptions of technology usage through the frames of education, socialisation, and care, which form a harmonious whole referred to as the EDUCARE approach. The findings suggest that an individual preservice teacher can be for or against technology usage depending on the frame they reflect on technology integration through. Children's ages and participants' beliefs about the children's access to technology at home were the most significant factors behind the variation in dynamics between and within the frames. The implications for future research are also discussed.

Keywords

Technology, preservice teacher, early childhood education, frame analysis, educare, pedagogy

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1. Introduction

Research on early childhood teachers' perceptions of technology¹ integration has been criticised for not paying enough attention to the unique pedagogical characteristics of early childhood education²

¹ In this study technology refers to digital devices (i.e. computers, tablets, smartphones) and products or outputs that are viewed, played, or created on these devices (i.e. applications, games, websites) (see Plowman, 2016). The term 'information and communication technology' (ICT) is used as a synonym for technology.

² In this paper, early childhood education refers to institutional education for children from 0 to 7 years old. Pre-primary education, in turn, is used when referring to the last year before children start primary school (6 year olds). The term preschool is used when discussing the premises where early childhood education is provided.

(Blackwell, et al., 2013; Edwards, 2016; Plumb & Kautz, 2015). For instance, Blackwell and her colleagues (2013) argued that there are important differences between early childhood teachers and school teachers and there is a need for ‘disaggregate findings for these two demographics’ (p. 318). One difference relates to the core tasks of early childhood education and school: whilst *education* – which here is understood as a process through which children construct knowledge and skills – is emphasised in school pedagogy, in early childhood education an equal weighting is given to *care*, which refers to providing physical care and having a caring attitude toward children. Together these two elements form a so called EDUCARE framework, which is most prevalent in the Nordic context and in Germany (e.g. Broström, 2006; Puroila, 2002; Jönsson, Sandell, & Talberg-Broman, 2012; Van Laere & Vandenbrock, 2016). The Finnish model also includes a third dimension, which is *socialisation*³. This refers to decisions on which cultural values, habits and norms should be transmitted through early childhood education and which should be shaped and regenerated (Broström, 2006; Niikko, 2004). Together, these three key tasks are understood to form a ‘harmonious whole’ that ‘allows a holistic approach to the child’s growth, development, and learning’ (Finnish National Board of Education [FNBoE] 2016, p. 21). In the present paper, this three-dimensional view is used as an analytical framework for exploring preservice teachers’⁴ perceptions of technology integration in early childhood education.

2. Education, socialisation, and care as frames through which to approach early childhood education and technology integration

In this article, education, socialisation, and care are conceptualised as frames through which teachers approach their work. The concept of a frame is drawn from Goffman’s (1974) seminal work on frame analysis theory, in which he described frames as mental orientations that organise perceptions and interpretations. According to Goffman, the frames through which people interpret and act in the world are always situational and these situations are fundamentally social by nature. Frames are also layered as people can simultaneously apply several frames. (Ibid.)

The situational and layered nature of frames allows this paper to move beyond the ‘for/against dichotomy’ that is prevalent in the early years technology integration research (e.g. Lindahl &

³ Other scholars have used different concepts to address the same topics. For example, Broström (2006) used the term ‘teaching’ to describe what here is referred to as ‘education’, and ‘upbringing’ to define what here is referred to as ‘socialisation’. The decision to use the terms ‘education’, ‘socialisation’, and ‘care’ in this paper draws from Niikko’s (2004) and Puroila’s (2002) studies, as well as from the feedback I have received when presenting earlier versions of the paper to international audiences.

⁴ ‘Preservice teacher’ refers here to trainee teachers who are going through their initial training. The terms ‘teacher student’ and ‘student’ are used as synonyms for preservice teacher.

Folkesson, 2012b; Palaiologou, 2016). For instance, in their paper on preservice teachers' views on technology integration, Lindahl & Folkesson (2012b) concluded that preservice teachers believe that preschool should either prepare for or protect against societal transformation and considered computers 'friends' or 'foes'. From a frame analytical perspective, protection and preparation are not mutually exclusive categories to sort teachers into. Puroila (2002), who has used frame analysis to study early childhood teachers' daily work, argues that 'talking about one single professional role or identity is misleading, as educators' have different roles and identities within different frames' (p. 36). Put another way, there are situations in which a teacher can consider computers, or digital technology in general, a 'friend', and there are situations in which the same teacher can consider digital technology a 'foe'.

Due the social nature of the situations, whom the teachers interact with plays a central role in determining through which frames they interpret the situation and their role in it (Puroila 2002). Naturally, children are the most important agents in terms of shaping the situations: they are, as stated by Niikko and Ugaste (2012, p. 489) 'at the heart of pre-school teacher's work'. The children's age appears to be one factor that shapes teachers' perceptions of technology integration: there are a few studies suggesting that both in-service and preservice teachers consider technology a 'friend' when they approach the topic with older (5–7 years old) children in mind, but as a 'foe' when the topic is approached from perspective of the needs of younger children (Dong & Newman, 2016; Lindahl & Folkesson, 2012a). These differing views seems to relate to the ways in which teachers are orientated towards working with children of different ages. According to Ylitapio-Mäntylä (2009), care is a salient frame when teachers are working with the youngest children (0–2 years old), while education is emphasised when working with the older children, especially with those in pre-primary education (6 years old). However, this does not mean that teachers working with the youngest children orientate themselves towards their work within the caring frame alone, nor that those working with pre-primary aged children focus exclusively on education. Instead, it tells us about the situational dynamics between the frames. This is supported by a study by Puroila and Haho (2016). The teachers in this study seldom planned any educational activities for Mondays because they felt that after the weekend some children tended to be restless and tearful. In Germany, this phenomenon is commonly known as 'Monday syndrome', and it is argued that the reason for the children's restlessness is having spent the weekends in front of the television and not doing any activities requiring physical effort (Friedrich-Liesenkötter 2015). According to Puroila and Haho (2016), the decision not to include any educational activities was based on an 'inclination to promote children's "good" on a situational basis'. In other words, the teachers are not claiming that care is unequivocally more important than

education, but that to be able to provide education they have first take the children's care-related needs into account. Similarly, teachers in Einarsdottir's (2003) study felt that caregiving must precede teaching, as if the children do not feel well they are not able learn anything.

It seems that technology is a 'friend' when it is approached through an educational frame, but a 'foe' when it is approached through a caring frame. This dichotomy has a notable resemblance to the competing public discourses concerning children and digital technologies: the importance of technology integration is commonly justified with its educational benefits. For instance, Ingleby (2015) has argued that successive UK governments have been propagating a pro-technology ideology that 'e is best' for learning, and that this hegemonic dogma is embraced by early childhood teachers. Another core argument behind the promotion of technology integration is that is that without it, early childhood education fails to meet children's changing educational needs, which are to a notable extent caused by the digitalisation of society. This standpoint is well captured in Hernwall's (2016) statement that 'the changed conditions for children in their life-world calls for a change in the "professional content" of the preschool, if the preschool is to be a contemporary professional practice of relevance' (p. 7). By my understanding, Hernwall is suggesting here that the cultural values, habits, and norms that are transmitted in early childhood education in its current form are outdated, and in need of major reform. Then again, it is common that children's increasing use of technology at home is represented as causing problems for their physical and mental health – both of which are care-related concerns – in the media (Plowman, McPake, & Stephen, 2010; Mertala & Salomaa, 2016). These examples illustrate well how the situationality of frames is not restricted solely to immediate social interactions but that instead frames also act as an interface between individuals (micro-level) and the larger societal and cultural (macro-level) community (Goffman, 1974; Puroila, 2002).

3. Preservice early childhood teachers and technology integration

Preservice teachers' perceptions of the role of digital technologies has been the subject of a moderate amount of scientific interest. According to previous research, many preservice teachers think technology can support children's learning (Brown, Englehardt & Mathers, 2016; Istenic Starčič, Cotic, Solomonides & Volk, 2016, Izumi-Taylor, Ito & Gibbons, 2010 Lindahl & Folkesson, 2012a, 2012b). The benefit of using technology is often justified as children's increased motivation and engagement (Brown et al., 2016; Istenic Starčič et al., 2016), and tablet computers, multimedia presentations, and instructional games in particular are praised for their motivational aspects (Istenic Starčič et al., 2016; Lindahl & Folkesson, 2012a).

In addition, there are those who regard technology usage in early childhood education as necessary to prepare children for the changing society in which they live (Lindahl & Folkesson, 2012a; Friedrichs-Liesenkötter, 2015; Izumi-Taylor et al. 2010). The role of early childhood education is also seen as a transmitter and protector of traditional culture, and preservice teachers have reported that technology integration threatens traditional and imaginary play and hinders children's social interactions (Izumi-Taylor et al. 2010; Istenic Starčič et al., 2016; Lindahl & Folkesson 2012a), all of which are aspects that are held in high value in early childhood education (e.g. Mertala, 2017a; Palaiologou, 2016). Some concerns are more care-related: ICT use is thought to cause restlessness as well as problems for children's physical posture and motor development (Friedrichs-Liesenkötter, 2015; Izumi-Taylor et al., 2010). These views were often linked with beliefs that children use technology at home for prolonged periods (Friedrichs-Liesenkötter, 2015; Istenic Starčič et al., 2016) and preservice teachers have explicitly stated that early childhood education should offer an alternative and technology-free environment for the children (Friedrichs-Liesenkötter, 2015, Lindahl & Folkesson, 2012a).

While previous preservice teacher research has provided important and useful information, one major shortcoming can be identified: it appears that one important sub-group within preservice teachers has been neglected— first year teacher students who have just begun their initial training. The value of studying this particular group lies in that perceptions that have arisen before training are found to play a substantial role in determining whether preservice teachers adopt or reject new information and practices during their training (Levin, 2015), because people tend to assimilate new information based on their existing beliefs (Nespor, 1987).

4. Aim of the research and research question

The present study has two aims: the first is to contribute to the theoretical grounding of early years technology integration research, and the second is to explore the kinds of perceptions preservice teachers hold in relation to technology integration when they start their initial training. The first objective is addressed by exploring the possibilities of frame analysis theory in understanding preservice teachers' perceptions of the role of digital technologies in early childhood education through the frames of education, socialisation, and care. The second, in turn, is achieved by having first year preservice teachers as participants. The overarching research question is: *how do preservice teachers' perceptions of technology integration relate to early childhood education's threefold task of education, socialisation, and care?*

5. Methods

Frame analysis can be applied to research into actual behaviour and research into talk (Goffman, 1974). While actual behaviour is connected to the present situation, ‘talk enables the speaker to move between the present, past, future and possible situations’ (Puroila, 2002, p. 37). As the research interest here lay in investigating preservice teachers’ perceptions, I decided to concentrate on researching talk. In this paper, present situation refers to the position from which the participants have produced the data: they are first year teacher students attending the very first semester of their initial training. Past situations, in turn, are participants’ former experiences, and possible situations refers to their descriptions of why and how technology should or should not be used in early childhood education.

5.1. Research design

A total of 38 students participated in this study. Thirty-five were female and three were male. The youngest participant was 18 years old, the oldest 37 years old, and the mean age was 23. The participants were attending a compulsory educational technology course, which took place in the middle of the respondents’ first semester in November 2014, and on which I was the teacher. As the teacher–student relationship entails power asymmetry in favour of the teacher (Muller, 2001), I was hesitant about using research interviews as the data collection method. Asymmetrical relationships can have a notable impact on interviewees’ answers (Anyan, 2013) and this was something I had personal experience of⁵. In short, I was concerned that the students would hold back their critical views if the data were collected via interviews, and on this basis, I reasoned that the use of written assignments would allow the participants to express their views more freely than face-to-face research interviews would. Using written assignments as a form of data collection also has some unique benefits in terms of providing rich, multi-layered, intricate, detailed, and nuanced data (Fusch & Ness, 2015). If the schedule for returning the texts is long enough (in this case it was two weeks) the writer can produce the data when they are in the right mindset for it and have an opportunity to work on the text in a process-oriented manner, including phases of writing, reading and re-writing. This enables the writers to reflect on what they want to say and how they want to present their case.

As a pre-course assignment, the students were asked to write a free-form essay in which they discuss their views, beliefs, and attitudes regarding young children and technology. The participants were informed that the aim of the writing task was to prepare them for the course by having them reflect

⁵ A year earlier I had conducted practitioner interviews as part of a development project on which I worked as an in-service teacher educator. During the interviews, I noticed that several participants found it difficult to discuss the possible shortcomings of the project. By remaining silent about their doubts, the participating teachers were ‘serving up’ what they thought was wanted from them in order not to appear to be challenging partners. For further information, see Mertala (2017a).

on their beliefs and attitudes towards using technology in early childhood education. In the instructions, the students were asked to write down what kind of experiences they believe children have with technology, and what the role of technology should be in early childhood education. No examples of what was meant by technology were given. All gave written consent to allow the use of the assignments as research data. As the sample was dominated by female participants, and matters of gender will not be addressed in this paper, all of the participants are referred to with a feminine pronoun to protect their anonymity. The data comprises 72 pages.

5.2. Analysis

An abductive approach guided the analysis process. Abductive reasoning discards the idea that the researcher's observations and interpretations could be purely inductive, and acknowledges that there is always a guiding theoretical thread included in the analysis process (Grönfors, 2011). However, unlike in deductive analysis, the following of a theoretical thread does not mean that the theory is taken as given or that the role of the analysis process is simply to test the theory. Instead, in abductive analysis, the researcher moves between inductive reasoning and existing theoretical models to open up new ways of theorising on the phenomenon under investigation (Dey, 2003) by practising a constant comparative analysis method (Suddaby, 2006). There are no universal and all-applicable rules governing how constant comparison should be carried out in practice. It is suggested that it is the research objective (Fram 2013) and the kind of material involved (Boeije 2002) that determine the number of steps taken and the types of comparisons carried out during the analysis process. In this study the comparison comprised three different levels:

1. comparison between theory and data;
2. comparison within data;
3. comparison between data and theory.

By comparison between theory and data, I mean that while no strict deductive analysis was applied in this study, the analysis process did not take place in a 'theoretical vacuum'. The act of conducting a frame analysis means that the researcher has committed to the theoretical underpinnings of the frame analysis theory (Puroila, 2002). Another theoretical thread was the holistic view of early childhood education consisting of education, socialisation, and care (e.g. Broström, 2006; Niikko, 2004). Initially, I went through all the data, focusing on material that discussed why and how technology should or should not be used in early childhood education. Then these extracts were scrutinised through the analytical framework of education, socialisation, and care. In accordance with Puroila (2002), my main interest when carrying out the analysis was not only what the participants

were writing about, but rather from what perspective they were writing. Given the situational nature of frames, in the next phase special attention was given to the question *who are the children the participants are writing about?* (i.e. how old are they, what are their developmental needs, do they have access to technology at home). With this analytical query I aimed to identify how participants' perceptions of children relate to the frame through which they approach technology integration. In other words, the objective was to identify for whom the technology integration was thought to be beneficial and for whom it was not, and to establish how these perceptions are related to education, socialisation, and care. Any personal experiences linked to these views were also identified, to establish if and how they shape preservice teachers' perceptions of technology integration. In other words, technology-related extracts highlighted and scrutinised in the first phase were further compared to the whole data from each participant, and the interpretations made based on the data from individual participants were compared with each other to identify (possible) patterns in the whole data set (comparison within data). Lastly, to better identify the role of macro-level situationality (i.e. how participants' perceptions relate to early childhood education traditions as well as to the broader discourses promoting or opposing integration) in participants' perceptions, I compared the data-driven interpretations to theoretical literature (comparison between data and theory). This was also carried out to gain a better understanding of the interplay and dynamics between the frames. Extracts from the data are presented in the Findings section to improve the reliability and clarity of the research.

6. Findings

Preservice teachers' perceptions of how early childhood education should react to societal changes and advances in technological development were varied. This said, it is important to acknowledge that this variation took place *within* the participants' views rather than between them. Only one out of 38 participants approached the subject of technology integration from one point of view only: in this particular case the student discussed only education related benefits in her essay. All the other essays included perceptions for and against technology usage in early childhood education. In other words, an individual preservice teacher can be for or against using technology, depending on which frame s/he is reflecting on the technology integration through. To give an example, in the following extract a student approaches technology integration through all three different frames. She begins by acknowledging that technology, namely instructional games, can benefit children's learning (educational frame), but in the very same sentence she also expresses her concerns about the negative effects of prolonged technology usage (caring frame). The passage ends with a reminder about the importance of traditional activities (socialisation frame).

Games that are age-appropriate and develop a child's skills are beneficial for a child, but excessive gaming or screen time is not beneficial for a child's development. It is important to remember to go outside too, as well as to play with traditional board games, cars, and dolls. (Student#11)

Based on the extract, this particular preservice teacher could be placed in the centre of Figure 1, where all the three domains intersect. However, as I am about to show, it is the situation (i.e. who are the children concerned) that determines which frame becomes the dominant one. In regard to the interplay and dynamics between and within the frames, two main themes emerged from the data. The first is *children's access to technology* (Section 6.1): children with no access to technology were thought to have different kinds of needs to those who used technology at home on a regular basis. The second key theme is *age and body* (Section 6.2). This describes how children of different ages were thought to have different developmental needs, which caused tensions between the educational frame and caring frame. Within this section I also discuss findings related to game-based learning, as it was the most frequently mentioned concrete method for integrating digital technology into early childhood education.

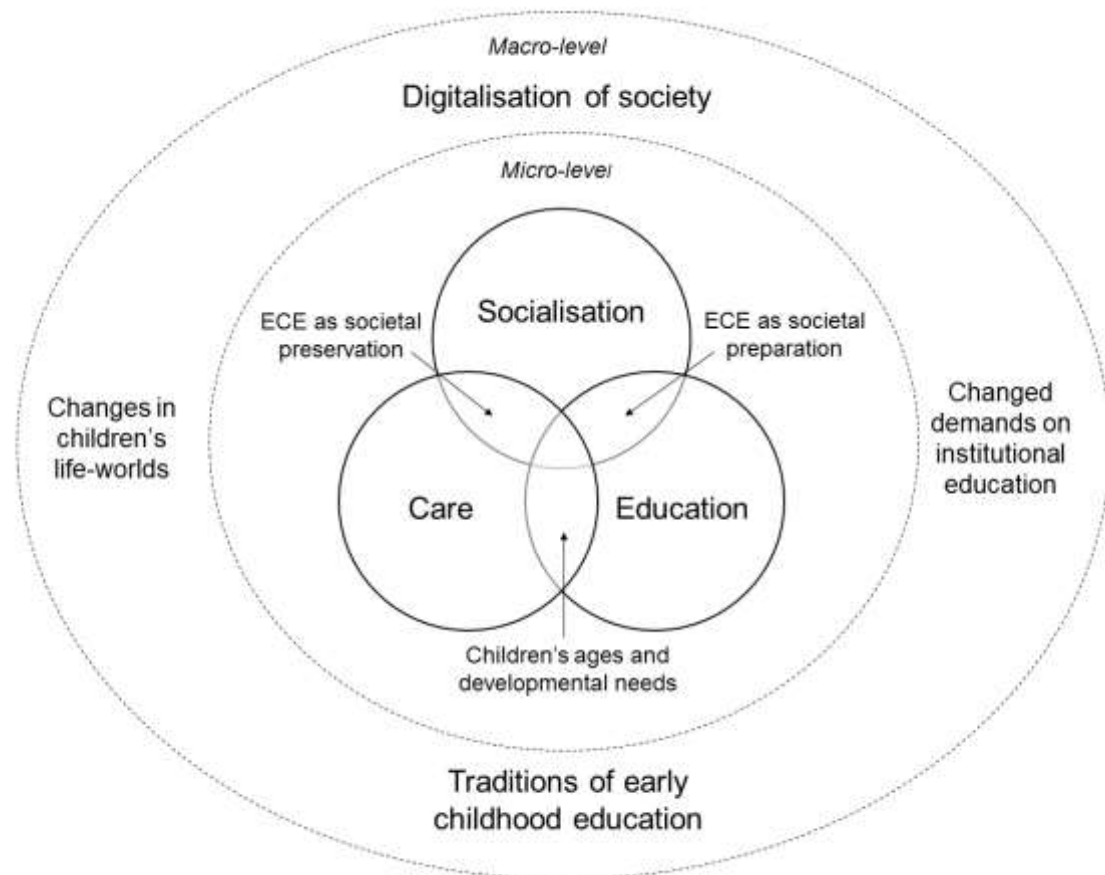


Figure 1. Interplay of the frames.

6.1. Children's access to technology

Almost all of the participants mentioned the digitalisation of contemporary society in their essays. In line with the Finnish Core Curriculum (FNBoE, 2016), learning to master technology was considered a necessity for full citizenship, and technology integration was considered *societal preparation* (see also Lindahl & Folkesson, 2012b):

I think it is good that technology is introduced in early childhood education as online services have become a part of everyday life and knowing how to manage them is becoming more and more a part of the civic skill set (Student#19).

Technology integration was seen as most beneficial to children who had no access to such technologies at home. The lack of access was presumed to be the result of families' difficult financial situations, as poorer families were not believed to own as much technology. The absence of digital affordances was thought to discriminate against children who come from less affluent socio-economic backgrounds.

In school, [the need for] computer skills is starting to increase, and inequality is beginning to become more apparent among children. With regard to their future study paths, it would be good for all children to start schooling with roughly similar skills and knowledge. (Student#4)

In this particular case, the socialisation frame overlaps with the educational frame; according to the student, children with lower levels of computer skills cannot use digital educational resources as efficiently as their more skilled peers, which results in a cumulative increase in educational inequality. In other words, early years technology integration was understood to play an important affirmative role for children coming from less affluent families.

On the other hand, participants were also concerned about children's increasing use of technology. A common view was that most children use technology on a regular basis, if not excessively, and not all children were believed to get their share of traditional play, social interactions and outdoor activities at home. Many participants wrote that preschool should be a place where children have opportunities to engage in imaginative roleplay and social interaction. In these cases, early childhood education was approached as *societal preservation*: it was seen to be up to early childhood education to ensure that traditional activities remain a part of young children's lives. Some students challenged the prevalent macro-level discourse about the necessity of technology integration by suggesting that, despite the potential benefits of technology integration, early childhood education should offer children an alternative environment in which no technology is used (see also Friedrihcs-Liesenköter, 2015):

I do not think that technology is needed in early childhood education. For children under school age, it can be more of a risk than an opportunity, and the disadvantages therefore outweigh the benefits. (Student#3)

Children's excessive use of technology at home was believed to be a consequence of incompetent parenting⁶: parents were thought to lack the skills or the will needed to regulate their children's use of technology.

While carrying out childcare work with families, I have noticed that children are interested in watching videos and playing computer games. If parents can't set limits for children's computer usage, the children sit in front of the screen for as long as they can. (Student#26)

The extract above captures the image of a struggling parent efficiently. The word 'can't' is the key-term here. Using it instead of 'won't' suggests that the student believes that parents want to do the right thing – which in her opinion and that of several others, is to regulate their children's use of technology– but that they lack the capability needed to fulfil their educational wishes. It also illustrates how perceptions of children's excessive use of technology and its consequences often included references to personal experiences or observations, in this case from childcare work with families.

To sum up, be it access to or regressing from technology, the role of early childhood education was understood as taking care of the things parents were believed to be failing to deliver. But how accurate are these presumptions? The assumed link between family income and children's access to digital technologies it is not supported by recent research (Marsh et al., 2015). Given the proliferation of affordable technology, such as smart phones and tablet computers, the idea of the 'digital gap' being a static condition of absolute inequalities between two distinct groups (van Dijk, 2006) is rather unrealistic. The same also applies to perceptions of children's excessive use of technology as a consequence of shortcomings in parental regulation. Research suggests that while digital technologies have become an integral part of young children's lives, they do not dominate it (e.g. Chaudron et al., 2015; Slutsky & DeShetler, 2016). Furthermore, regulating and monitoring children's use of technology is understood to be a good parenting practice by parents and guardians, who have reported feeling guilty if they let their children use such devices for prolonged times (Aarsand, 2011; Noppari, 2014).

6.2. Age and body

⁶ For further discussion, see Mertala (2017b).

There was a contrast between how technology integration was approached through the educational and caring frames. Whereas using technology was widely considered to improve children's learning, in all the essays that approached the subject through the caring frame, using technology was considered to be harmful to children's wellbeing⁷. Two conjoined themes – age and body – were identified as the key factors causing the variation in dynamics between these frames. Use of technology was seen as more preferable with older children, especially with those in pre-primary education (6 year olds), than with the youngest children (see also Dong & Newman, 2016; Lindahl & Folkesson, 2012a). As stated by one of the participants:

ICT creates many opportunities for teaching, but early childhood education-aged children may be too young for it. ICT's potential may therefore lie predominantly in pre-primary education. (Student#3).

The extract above illustrates how participants approached their (future) work through different frames depending on the age of the children. In this case, the student describes technology as a valuable educational tool to use in pre-primary education, but doubts its suitability for the youngest of children. In other words, her idea of what constitutes good quality early childhood education for, say, a two-year-old child is different to that for a six-year-old child. This notion is supported by Ylitapio-Mäntylä (2009), whose findings suggest that early childhood teachers orientate toward working with 0–2-year-old children in a care-oriented manner, while the educational frame is more prominent when working with older children, especially those in pre-primary education. Put another way, for the quoted student, it is not merely using technology that the children are seen to be 'too young for', they are also 'too young' to be taught in general.

As argued by Van Laere and Vandenbroeck (2016), care is often considered work related to the physical needs of children, while teaching is related to their cognitive needs, and this 'body-mind dualism' was visible in the data. Concrete examples of care-related concerns were highly body-related: obesity, eye fatigue, and adopting un-ergonomic postures were typical downsides linked to technology usage. In addition, younger children's developmental needs and ways of being were expressed in a more physical way than those of pre-primary-aged children. Technology usage, in turn, was not seen as meeting younger children's needs, as it was mostly associated with learning

⁷ Only one student expressed the idea that besides threats, ICT could have something beneficial to add to early childhood education. She wrote that 'children's naptime could be enforced by using a developed sound system' (Student#2). I understand this to mean that with a good sound system, some comforting music (or other calming soundscapes) could be played to children during their naptime to make the situation more relaxed and enjoyable.

elementary literacy and mathematics. The following two extracts are representative examples of these views:

With the youngest of children, pedagogical ICT usage can be difficult, maybe even pointless. The youngest children have quite enough to do with practising their fine motor skills. With pre-primary aged children, and even with 5-year-olds too, the use of instructional games and instructional videos is easier. (Student#29)

From the perspective of the children developing positively, it's more important to head outside and play imaginary games with others than to play with technical devices. In my view, this is particularly the case with 0–5-year-old children. (Student#28)

These extracts also illustrate well how the participants found it difficult to think about how technology could be integrated into the kinetic, tactile, and play-based traditions of early childhood education (see also Lindahl & Folkesson 2012a; Palaiologou, 2016). Given the participants were first year students, the reason for this could simply be a lack of knowledge about appropriate methods. While some of the participants had worked in preschools before entering the teacher training program, they usually commented that there were no digital technology devices for children to use. Thus, it appears that participants' perceptions of what technology usage in early childhood education could be (i.e. the use of instructional videos and games) draws on experiences or observations of other forms of institutional education, and that observed ways of technology integration are at variance with what they believed to be important in early childhood education.

This said, it needs to be underlined that while 'playing with technical devices' was presented as the opposite to traditional play in several essays, not all the participants shared this view. As can be seen from the following two data extracts, the use of digital learning games was sometimes associated with playful learning⁸:

Doing tasks and exercises can feel like playing and having fun when instructive computer games are used. (Student#34)

Playing games is fun for the children, and learning and development happen subconsciously as a result of gaming. (Student#37)

In addition to the use of digital learning games being explicitly referred to as 'feel[ing] like playing', the surreptitious nature of game-based learning can also be linked to play-based learning, as it

⁸ In Finnish, unlike in English, there are distinct terms for playing a game (pelata); playing a role play, construction play, or imaginary play (leikkiä); and playing an instrument (soittaa), which makes it easier to identify which form of playing participants were referring to, even if there are no clarifying terms such as 'game' used.

corresponds well with the idea that ‘even though children learn while playing, they don’t play to learn’ (Sintonen, Ohls, Kumpulainen, & Lipponen, 2015, p. 8) which is a commonly used expression in the Finnish context. As play is a central aspect in early childhood education in Finland (FNBoE, 2016), using this assimilative reasoning, preservice teachers were able to legitimate the use of technology by embedding it into established discourses and traditions of early childhood education. As suggested by Lindahl and Folkesson (2012a), by emphasising informal learning and playfulness preservice teachers can make the use of technology appear less threatening to early childhood education traditions. Indeed, according to earlier research, combining play-based pedagogy and digital technologies has appeared challenging for early childhood teachers (Edwards, 2016; Nuttall, Edwards, Mantilla, Grieshaber, & Wood, 2015; Palaiologou, 2016).

The assimilative logic presented in the extracts is, however, rather simplistic and pedagogically awkward. First of all, the phrase ‘children don’t play to learn’ refers to free play: a child-initiated activity with no goals set by the teachers. The use of instructional games, in turn, is a teacher-initiated practice with explicit educational goals. In general, the view of children as passive learners who are unaware of the purpose of their activities is highly problematic. Research suggests that encouraging children to think about what they are doing and why they are doing it makes learning activities more goal-oriented from the children’s perspective, and thus more conscious (Sandberg et al. 2017). This view is also at variance with the guidelines set out in the Finnish Core Curricula, as in the curricula the development of learning skills is named as one of the key tasks of early childhood education (FNBoE 2016). In short, having positive perceptions of technology integration does not necessarily mean that technology will be used in a pedagogically appropriate manner.

7. Discussion and conclusions

In this paper, Goffman’s (1974) frame analysis theory was applied to explore first year preservice teachers’ perceptions of the role of digital technology in early childhood education. Conclusively, it is fair to argue that preservice teachers’ perceptions of technology integration is a complex issue. In accordance with previous research on in-service teachers (Einrasdottir, 2003; Niikko, 2004; Niikko & Ugaste, 2012; Puroila, 2002; Puroila & Haho, 2016; Van Lere & Vandebroek, 2016) the preservice teachers in this study interpreted their (future) work through several frames simultaneously. The findings suggest that it is the situation (i.e. the children concerned) that determines which frame becomes the dominant one. According to this study, a child’s age has an effect on the dynamics between the frames: the caring frame and the needs of the body were emphasised when the participants wrote about education involving the youngest children, whereas the educational frame and the needs of the mind were emphasised when the early childhood education

of older, especially pre-primary aged children, was discussed. This notion is supported by earlier research (Ylitapio-Mäntylä, 2009). Another meaningful aspect was preservice teachers' beliefs about children's use of technology at home. If children were thought to lack access to technology, a preparative socialisation frame became prominent. On the other hand, if children's use of technology was believed to be excessive, the preservative socialisation frame and the caring frame were the prevalent ones.

This study focused particularly on first year preservice teachers' perceptions in order to explore the kinds of perceptions trainee teacher hold when entering into their initial training. To paraphrase Szetso, Cheng, and Hong (2016), young teacher students are considered digital-native teachers who can ride at the wave of potential pedagogical affordances of new technologies. Their older in-service colleagues, in turn, are often described as being disempowered and anxious about the use of such technologies (Byron, 2008). The findings of this study challenge this generational dichotomy: it seems that preservice teachers' perceptions do not differ remarkably from those of in-service teachers. In-service teachers, too have (often unfounded) presumptions about children's excessive use of technology at home (Nuttal, et al., 2015), find combining technology and tradition challenging (Hernwall, 2016), and consider surreptitious learning via digital games desirable (Mertala, 2017a), to name some of the similarities. This notion implies that preservice teachers have – to some extent – internalised the traditional values of early childhood education. For instance, the aggravated perceptions regarding the quality of children's upbringing at home can reflect the history and tradition of Finnish early childhood education policies. Based on an extensive analysis of curricula documents, Onnismäa (2010) has argued that due to its history as a social service, Finnish early childhood education has been developed for the competent and self-sufficient child of a weak family that needs the constant support and guidance of welfare experts. The findings of the present study also suggest that preservice teachers' personal experiences play a notable role in shaping their perceptions. This is supported by earlier research (see the review in Levin, 2015). Generalisations regarding children's high levels of technology usage at home and its consequences were derived from what could be called anecdotal observations, and views regarding children's excessive use of technology are not supported by research.

Another aim of this paper was to contribute to the theoretical grounding of early years technology integration research by exploring the possibilities of frame analysis in studying teachers' perceptions. The findings of this study suggest that the utility of frame analysis derives from its bi-directional nature: metaphorically speaking, it gives the researcher a magnifier, allowing them to focus their analytical gaze on the details of social situations, and a telescope through which the researcher can

explore the role of macro-level discourses in shaping the interplay of and dynamics between different frames. What I mean by this is that frame analysis rejects the idea of teachers having unambiguous for/against dispositions towards technology integration (Lindahl & Folkesson, 2012b; Palaiologou, 2016): it is the particular situation – an actual or a possible one – that determines which frame becomes the prominent one. As previously discussed, technology integration was seen as crucial for children who had no access to technology at home, but harmful for those who were believed to use technology at home excessively. In other words, frame analysis acknowledges the complexity of the human mind by recognising that an individual teacher – depending on the situation – can be both for and against the use of technology. As put by one of the participants, ‘there is no one simple answer to whether ICT is needed in early childhood education or not’ (Student#20). Another merit of frame analysis is that it acknowledges that perceptions are not just internal structures of individual teachers but that they are shaped by broader historical, cultural, and material circumstances – an issue that has been overlooked in early years technology integration research (Nuttall et al., 2015). Indeed, different kinds of macro-level discourses could be identified from the data: some of those could be recognised as tacit perceptions of the valued traditions of early childhood education, but views that correlated with the prevalent discourses promoting the necessity of technology integration also existed.

7.1. Limitations, and implications for future research

While this study has provided important theoretical and empirical information, it is not without its limitations. The most evident limitation is that this study has explored the frames by concentrating on talk only. Thus, the situations addressed in this paper are those that have already occurred and possible future situations, and more (observational) research is needed to gain information on how the frames are shaped in actual situations. Previous research suggests that teachers’ decisions are not always guided by pedagogical perceptions. Practical demands, for instance time and materials available, also have their role in shaping teachers’ choices in terms of how they act (Puroila, 2002). One important topic for future research would be the relationship and dynamics between pedagogical frames (education, socialisation, and care) and practical frames in early years technology integration.

A second limitation is that this study only looks at the kinds of perceptions preservice teachers hold when they start their initial teacher training. While such information is novel and valuable, further studies are required to find out if (and how) these perceptions change during initial teacher education, and what is needed to change them. Previous research suggests that if technology integration is introduced in a manner that takes into account early childhood education’s pedagogical traditions, teacher students’ negative preconceptions may change during the training (Istemic Starčić et al., 2016). However, as recently graduated teachers tend to assimilate with the pedagogical culture of

their workplaces (Karila & Kupila, 2010), longitudinal research that covers not only the period of initial training but also the first years as an in-service teacher is needed, as changes in perceptions can be temporary and situational (Levin, 2015).

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