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# Digital Technologies and Early Childhood: Guest Editorial

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Research conducted on digital technology and early childhood has increased notably during the past three decades (Mertala, 2016; Stephen & Edwards, 2018), and there are no signs that this trend will change anytime soon (the publication of the present special issue is one empirical example). On the contrary, it seems likely that the published research will continue growing. One reason is related to the ever-diversifying palette of digital technologies: Before the advent of personal computers, research on children and digital technology focused mainly on radio (Gruenberg, 1935) and television (Schramm, Lyle, & Parker, 1961). In the 1990s, digital technology was equated mainly with desktop computers (Clements, 1997), whereas in the 2000s interactive whiteboards excited researchers and practitioners (Morgan, 2010). In the mid- and late 2010s, the focus shifted to mobile devices, namely, tablets (Falloon & Khoo, 2014; Stephen & Edwards, 2018). Now that we have entered the 2020s, the digital landscape our children live in is more diverse than ever: The traditional forms of digital technologies listed above are now complemented by virtual and augmented reality, wearable technologies, and the Internet of Things, to name only a few examples of the technologies children encounter regularly. For instance, market reports predict that the already notable sales figures of computer- and/or Internet-enabled toys will grow rapidly in the near future (Statista, 2019).

However, technology is not the only field where developments have occurred. In addition, the relationship of (early) childhood and digital technologies is discussed more versatilely today than in previous decades. Historically, young children have been represented as helpless and passive victims of digital technologies (Gruenberg, 1935; Selwyn, 2003); an image that reflects a broader understanding and conceptualization of a child as malleable

becoming instead of an agentic being (Uprichard, 2008). The emergence of the new sociology of childhood has challenged these ideas and images, and presents childhood as a contextual, temporal, and cultural phenomenon that children actively construct (James & Prout, 2003). These viewpoints have been influential for research on children and technology as well. During the 2010s, research that explored and promoted children's agency and meaning-making became a mainstream approach, with the most well-known examples perhaps the large-scale and interdisciplinary research projects The Digital Literacy and Multimodal Practices of Young Children (2015–2019) and Makerspaces in the Early Years: Enhancing Digital Literacy and Creativity (2017–2019). Highlighting children's agency does not diminish children's right to be protected from harmful contents. Nor does it suggest that children are born competent "digital natives" (Prensky, 2001) who outshine adults with their technological competence. Instead, agency—as a situational concept (Kumpulainen, Lipponen, Hilppö, & Mikkola, 2014)—emphasizes that children's relationships with digital technologies vary, and are in constant movement and under constant negotiation.

The societal significance of digital technologies has been acknowledged in formal early childhood education, too, as many countries have now included digital literacy (or an equivalent) in early childhood curricula (Neumann, Finger, & Neumann, 2017). In Finland, for instance, the core curricula for early childhood education (Finnish National Agency for Education [FNAE], 2018) and preprimary education (FNAE, 2016) name competencies in information and communication technologies (ICTs) as one of the transversal competencies to be taught and developed across the curriculum. Supporting ICT competencies is not restricted to mere use of technologies. The core curricula demand educators aid children in observing and approaching digital technologies and media from new and alternative perspectives. For instance, the curricula state that the veracity of media texts (e.g., the ways digital images can be manipulated) should be explored and assessed with children (FNAE, 2018). These new pedagogical and technological demands are identified as challenging early years educators' professional identity and self-efficacy, a finding that is congruent in studies conducted in various contexts (Palaiologou, 2016), and the need for empowering initial and continuing training for educators has been widely acknowledged (Marsh, Kontovourki, Tafa, & Salomaa, 2017). The mention of curricula and educators serves also as a reminder of the plurality of actors who should be heard when studying digital technology and early childhood: In addition to children, these actors include teachers, nurses, directors/principals, educational administrative, technology designers and companies, and naturally, parents and other guardians.

To conclude, the combination of digital technology and early childhood is a multiperspective and multivoiced phenomenon. This diversity is also reflected in the eight original research articles included in this special issue. The issue starts with

**Mertala's[1]** article that proposes a transversal pedagogical framework for supporting young children's digital literacies. Drawing on the traditions of technology education, media education, and technology enhanced learning, he exemplifies how the exploration and use of digital technologies can be combined with the traditions of early childhood education. The second article, by **Kulju and Mäkinen,** focuses on the potential of the digital reading game Lola's Syllable Jungle to promote children's linguistic strategies, languaging and scaffolding during children's joint gameplay. The results suggest the majority of children's linguistic strategies are related to word structure, for example, identifying syllables and phonemes, but children also use languaging (i.e., thinking aloud) as a strategy to accomplish the tasks in the game.

The third article, by **Lawrence,** begins a series of articles on digital storytelling in this special issue. In her article, Lawrence offers novel insights into children's mixed gender–dyad digital play, exploration, and production with an open-ended storytelling app, Puppet Pals. Although the results suggest both genders used creativity and imagination similarly in creating pretend play scenarios, gendered scripts and stereotypically gendered characters emerged. The fourth article is by **Eisazadeh and Rajendam**. Their paper, a qualitative case study drawing on the theory of multiliteracies, examines the role of an adult tutor in the process of digital storytelling. The findings suggest that the tutor played an important role in making digital storytelling purposeful, authentic, and passion-led. In the fifth article, **Merjovaara, Nousiainen, Turja, and Isotalo** tap into the pedagogical process of digital storytelling. Their results reveal that four dimensions (the premises of digital storytelling, interpersonal processes during storytelling activity, affordances of digital tools, and significance of storytelling activity and products) contributed to the children's experience of and 21st-century skills developed during the storytelling activity.

In the sixth article, a conceptual piece, **Arnott and Yelland** advocate a reconceptualization of early learning in the 21st century. They introduce the idea of multimodal lifeworlds, which blurs the boundaries between analog and digital and emphasizes the transductive way children approach the world and its phenomena. The seventh article, by **Ouakrim-Soivio and Kumpulainen**, in turn, sheds light on the practice known as digital pedagogical documentation. The analytical focus is on the types and contents of the documents, as well as the way in which children's agency is present in documentations. According to the findings, there are substantial differences between

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[1] Despite acting as an editor of this special issue, Pekka Mertala did not participate in any way in the anonymous peer-review process of his article.

early childhood education groups in how the digital portfolio is used and what it is used for, raising up questions about educational equality. In the eighth article, **Marklund** introduces the experiences of Swedish teachers of using digital play as a pedagogical method in early childhood education. Grounded in thematic interviews, he argues that digital play can contribute positively to creative work and pedagogical documentation, to name several examples brought up by the informants.

Taken together, the articles of this special issue offer a variety of perspectives on digital technologies and early childhood. The articles contribute to the theoretical discussion regarding the role of digital technologies and media in children's lives, and emphasize the pedagogical possibilities that these technologies offer in diverse early childhood education contexts. The affordances of the rapidly evolving digital technologies transform and shape childhood, and the ways children utilize technology to, for example, communicate, play, explore, form relationships and communities, create knowledge, and express their creativity. In other words, the ever-changing landscape of digitalized early childhood and the transformations occurring in children's digital culture and their technological agency must be researched. Fortunately, as we stated in the beginning of this editorial, the research on early childhood digital technologies has increased during recent years, and keeps increasing.

We want to thank all the authors for their valuable contribution to this special issue, and the anonymous reviewers who gave valuable feedback. The empirical articles in this special issue bring forth new insights regarding our current knowledge on digitalized childhood in its various contexts and help to deepen our understanding of the ways and why's young children and their educators relate to technologies in their daily lives.

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