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## **Digital games in early childhood – broadening definitions of learning, literacy and play**

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**Abstract**

Digital games attract children and young people with imaginary worlds, fascinating stories, and shared experiences with peers. They also can add children's learning, motivation, and offer a variety of new affordances to explore and play with. The pedagogical use of digital games has been found to potentially intensify a more critical use and understanding of varied forms of media. In this chapter, we will focus on analyzing the role of digital games in early childhood, especially from the perspectives of learning, literacy, and play. This chapter examines digital games as playing an essential role in young children's overall technology experiences, particularly in the context of the social dynamics of families and children's other close communities. In our mind, the analysis of young children's learning while they are engaged in digital games in informal contexts furthers our understanding of the potential of game-based learning in formal early childhood education settings.

**Keywords:** digital games, early childhood, learning, literacy, play

**Introduction**

Digital games captivate children with imaginary worlds, fascinating stories, and shared experiences. According to Jenkins et al. (2006), it is through digital games that children learn how to play, perform, express themselves, and collaborate in various communities in which they participate. Digital games can at best contribute to children's learning, motivation, and offer a variety of new affordances to explore and play with (Stephen & Plowman, 2014). There is also growing evidence that shows the importance of giving digital games and game playing a significant role at educational settings as part of the curriculum and ICT-enhanced practices (e.g., Dillon, 2004; Jenkins, 2006; Stephen & Plowman, 2014). Children are adept at learning new content through digital game playing, as has been revealed by studies in which digital games have been used in the classroom.

Digital technologies, in general, have become an integral part of children's daily lives (Chaudron, 2015), and in many countries, children are growing up in media-rich homes. For example, in the UK, nearly 90% of children aged 5-6 use computers or tablets, and around 70% use the Internet (Livingstone et al., 2015). This chapter examines digital games as playing an essential role in young children's overall technology experiences, particularly in the context of the social dynamics of families and children's other close communities such as daycare and school. The earlier research literature on the role of digital technology in early childhood emphasizes the need for a comprehensive understanding of practices and interactions in children's technology use within a wider learning context or ecology (Alper, 2011; Burnett, 2010; Jenkins et al., 2006).

Despite the advancement in the fields of game-based learning, the attractiveness of *learning games* and the level of engagement and flow they provide are generally far below the engaging flow offered by the commercial digital games designed for entertainment. Contradictory to the playfulness of young learners, games developed for educational purposes are mostly trivial in nature, being much less attractive to children, and thus discourage individuals who are familiar with more challenging and immersive games from a physical, cognitive, emotional, and social perspective (e.g., Charsky, 2010). Many contemporary games have either been developed without appropriate pedagogical principles or lack typical game features (Kiili, 2007), even though there are emerging guidelines and considerations for the design of developmentally appropriate games for young learners (Peirce, 2013).

In this chapter, we will focus on analyzing the role of digital games in early childhood, especially from the perspectives of learning, literacy, and play. The problem is that even though games are, for the younger generation, a distinct form of informal ICT literacy practice, their pedagogical use in early childhood education varies, and their educational potential is not always fully realized (Buckingham

& Burn, 2007; Kankaanranta, 2007a; Peirce, 2013). In our mind, the analysis of young children's learning while they are engaged in digital games in informal contexts furthers our understanding of the potential of game-based learning in formal early childhood education settings (see Lai et al., 2013; Voogt et al., 2013) as well how formal, non-formal, and informal learning can be bridged.

Overall, game development for children, especially for very young children, is still globally an emerging market with only about 8% of the market share of the game industry (Peirce, 2013). However, digital games comprise a fast-expanding field, and no other sector has experienced the same explosive growth as the computer and video game industry. A survey of the Apple App Store Education category indicates that in 2014, 60% of educational game apps were targeted towards ages 5 and under, 29% towards ages 6-8, and 11% towards ages 9-11 (Peirce, 2013). On the other hand, there is still scarce research evidence concerning young children and the use of digital technology in educational settings (Chaudron, 2015; Stephen & Plowman, 2014).

### **Learning in, through, and beyond digital games**

This section explores the relationship between digital games and learning in order to broaden the way we think about game-based learning. In the first volume of *Serious Games and Edutainment Applications*, Mitgutsch (2011) determined that players learn in three levels: in games (e.g., through the content, topic, and narratives in the games), through playing games (e.g., through rules and goals of the game), and beyond games (e.g., changing players' perspective about themselves, others, and the world). The transformative learning process that Mitgutsch describes is close to our purpose of better understanding the ways learning can be seen: not as restricted but as a multidimensional process.

In western cultures, there has been a shift toward lifelong learning within the discourses of advanced liberalism and knowledge economies. Key competences for lifelong learning in the contemporary educational discourses seem to be deep engagement and positive attitude towards learning (Ailwood, 2008; Binkley et al., 2012; Buckingham Shum & Deakin Crick, 2012; European Communities, 2007). It is not surprising that digital games show up in these same discourses, since they have been proposed as an excellent way to motivate learners (e.g., Prensky, 2001). They have become an extremely popular subject in the field of education, mostly due to the fact that children from early on appear to be extremely attracted to playing and interacting with various kinds of digital media. A central question is, how useful are such digital games for teaching and enhancing deep learning among children? In order to draw conclusions on the effectiveness of digital games for promoting desirable learning outcomes, it is necessary to carefully evaluate the central factors affecting learning and the content design of the games.

**The elements of motivation, autonomy, competence, and relatedness in digital games**

There are numerous theories on learning. Given that our goal is to broaden the concept of learning in the context of playing digital games, we specifically concentrate on the interfaces of learning and motivation. One of the most used and cited theoretical concepts for understanding human learning is the concept of *intrinsic motivation*, originally introduced in 1950s (White, 1959). This natural motivation tendency is considered an important element in learning and development, since individuals are more likely to expand their knowledge and skills when acting upon their inherent interests (Ryan & Deci, 2000). This inclination to use one's skills creatively is present in very young children but also detectable throughout the whole human lifespan. Such intrinsic motivation exists in the relation between individuals

and activities (e.g., Deci & Ryan, 2000). People are intrinsically motivated for some activities and not for others. These conceptions of motivation helped investigators to determine the task characteristics that make any activity interesting.

In line with Connolly and his colleagues (2012), the most frequently mentioned positive effect of games on learning is increased motivation, which is often lacking among children who find traditional education challenging. In their broad-based social theory on motivation and personality, the so called *self-determination theory (SDT)*, Deci and Ryan (2000) argue that an activity is intrinsically motivating if it satisfies the basic psychological needs of human beings. According to SDT, these innate needs are autonomy, competence, and relatedness. So, when evaluating and reflecting on the educational value of digital learning games for young children, the SDT offers one potential theoretical framework to apply.

The basic *need for autonomy* and the intrinsic motivation for activities that support this need in young children is clearly seen in their state of deep absorption, for example, in free play with toys, with other children, and various natural or artificial materials. Free play represents an activity that is freely chosen and offers freedom of choice and opportunities for the creative use of one's skills. A vast majority of researchers acknowledge that the most prevalent benefits of digital games are their ability to motivate and engage children (Erhel & Jamet, 2013). It is no wonder then why digital game-based learning—specifically game play, which is used as a primary tool for learning—has been proposed as an excellent way to offer educational contents and promote knowledge learning (e.g., Prensky, 2001).

Digital games are examples of user-centered designs that give the children the power of ample expression and motivation through arousing interest (Iten & Petko, 2014), and thus they can be regarded as fulfilling the basic need for autonomy. However, the examples with school-aged children (see Ronimus et al., 2014) show that enjoying

the game was insufficient to ensure persistence and sustained engagement in educational learning games. In addition, showing flow while playing did not necessarily affect the learning outcomes of high-school students (Admiraal, Huizenga, Akkerman & Dam, 2011). It appears that merely providing an activity that is intrinsically motivating for the children does not guarantee successful learning outcomes. Hence, further research is required in order to identify the kind of engagement the game should provide in order to accomplish the learning goals.

The other psychological need, *need for competence*, refers to the experience of effectiveness in carrying out a particular activity (White, 1959). It has been said that digital games support engagement and motivation because they offer constant challenge and feedback to the players (Sweetser & Wyeth, 2005). In the study by Inal and Cagiltay (2007), the flow experiences of 7- to 9-year-old children were studied in a social game environment. The study found that, for the majority of the children, the most rewarding element of the game was the *challenge*. So, the games that include various challenge levels and immediate feedback seem to be the most effective for producing flow experiences. Yet, as mentioned, a flow experience is not the same as being engaged with the process of deep learning (see Erhel & Jamet, 2013).

An essential factor here in analyzing learning in gameplay is the active investment in information processing, also called the cognitive load that the child invests in gameplay. If the game is too difficult and the cognitive load too big, the game fails to provide experiences of success for the player, and hence the need for competence is not fulfilled (e.g. Sweetser & Wyeth, 2005). However, if the instructions or the given feedback supports the player to actively invest in playing (e.g., employ high quality cognitive processing and strategies) meaningful learning is expected as a result. In the case of young children, it is probably even more important that the significant adults around give him/her encouraging feedback and acknowledge her/his efforts.



With regard to need for competence one typical factor in digital games, which provides both challenge and motivation, is the element of *competition*. This might happen between the player and other players or when the player is competing with her/himself to attain better scores for solving problems, completing tasks faster, or collaborating successfully (see e.g. Inal & Cagiltay, 2007; Prensky, 2001; Sweetser & Wyeth, 2005).

The last of the three psychological needs is the need for *relatedness*. This concept refers to a sense of connectedness with significant others. This is also a very critical aspect, since one of the most often stated risk factors of digital playing relates to the social disconnectedness of playing. There is a fear that playing has negative impacts on children's social relationships. Playing is stated to be unsocial and disconnecting the children from real life interaction and social relationships. However, studies have indicated that young children's digital gameplay activities are often in fact social, since they contain peer interaction, social interaction between humans and machine, and games that include social objects (e.g., Mustola et al., 2016). There are also digital games that train social competences (see Koivula et al., in this volume). Children can, for instance, exercise their mind by putting themselves into a simulation of real-life social situations. So, when we consider the educational significance of a digital game, one crucial feature to reflect on is its social value, e.g., the kinds of interaction opportunities, strategies for solving social problems, and models for social behaviors that it fuels.

Examining the intersections between learning and the fulfillment of basic psychological needs offers one way to understand learning with digital games. Nevertheless, it is not the only way to consider learning in our digitalized society. There are several disciplines and discursive strands involved in a way learning in, through, and beyond digital games is conceptualized (see Mitgutsch, 2011), which we will explore next.

### **Early childhood and the learning potential of digital games**

The pedagogical use of digital games has been found to potentially intensify a more critical use and understanding of varied forms of media (e.g. Dillon, 2004; Jenkins, 2006). It has also been shown to diversify the ways that information and communication technology is utilized at schools and the ways that schools help students to become digitally competent and ethical citizens of the information society (e.g., Kennewell & Morgan, 2006). At best, digital games provide rich, fun, and interactive experiences that contribute to young children's learning and social interactions (Lieberman, Fisk & Biely, 2009). However, despite the emergence of research in this area, what children actually learn through playing digital game remains a key issue.

When we discuss learning through digital games, the current *developmental stage of the child* that forms the basis for learning also becomes relevant. As Plowman (2016) highlights, there exists a variety of skills, dispositions, and competences that a child learns during one year of life, and therefore, only generalized statements can be made about the influence of children's developmental stage on the use of technologies. First of all, children need certain fine and gross motor skills in using technology, including swiping a touchscreens or pressing keys, and these become possible after learning movement control. Cognitively, many digital games presume skills like understanding simple rules, making choices, or sorting. These skills develop around the ages from 4 to 6, and through learning the skills needed, an array of new digital gaming opportunities becomes available for children. Also, in the same age period, children grow more independent, begin to control their behavior and impulses, and understand different rules; these abilities have also impacted their gameplay experiences. Furthermore, the visual aspects of the game, storylines, and the humor in many games appeal to children's senses and make games even more attractive, though it is necessary to recognize that children respond to games individually and age-dependently.

However, in the literature, the emphasis seems to be more often on the technology than on learning (Plowman, 2016), and there is a paucity of research concerning technology-mediated learning of children under the age of 7. Connolly and colleagues (2012) identified the most frequent outcomes of game playing of children age 14 years or older to be affective and motivational as well as knowledge acquisition or content understanding. These were followed with effects related to perceptual and cognitive skills, behavior change, physiological outcomes, and social/soft skills outcomes. However, for the age group of this chapter, i.e., children under the age 7, these areas of learning are supposedly somewhat different. It can be assumed that the affective and motivational dimension or content understanding as the most frequent outcomes of gameplay applies also for this younger age group. However, it should be acknowledged that young children learn many things through imitation and observing the use of technologies by their parents, siblings, or more competent peers (Plowman, 2016). Together with teachers and peers, children learn to interact with ICT, and become competent users of new technologies, as revealed by Kennewell and Morgan (2006).

In addition to informal learning of technology, it is necessary to look at the pedagogical practices and how different games are utilized in the educational contexts. Games are not yet frequently used in learning and its assessment, even though during the last few years the development in this area has been exceptionally fast. With regards to curricular subjects, positive effects have been reported in areas such as language and literacy learning, history, and physical education (Kankaanranta, 2007a; Young et al., 2012). As an example of acquiring cross-curricular skills, digital games can provide opportunities to learn skills such as self-expression and collaboration (Jenkins, 2006), critical use of varied forms of media (e.g. Dillon, 2004; Jenkins, 2006), and other digital competences (e.g., Kennewell & Morgan, 2006). Game-based learning has also been found to be a good way to

support learners with disabilities (e.g., Pivec, 2007), as well as migrant children and youth in identity formation (Kankaanranta, 2007b). As for young children, games have found to support the development of skills such as phonological awareness, memory enhancement strategies, motor skills, and coordination (Peirce, 2013).

We should still acknowledge that positive effects of technology on learning are not, however, automatic. In particular, the effects of game-based learning for traditional academic achievement of subjects such as sciences and math have been questioned (see Young et al., 2012). In the review of studies focusing on learners ages 4-19 (Young et al., 2012), authors found only some effects of video games on language learning, history, and physical education, but only little effect on learning science and math. There are also claims about the negative effects of games for learning and development (e.g., Lieberman, Fisk & Biely, 2009; Plowman, 2016; Singer & Singer, 2005; Stephen & Plowman, 2014) such as detracting from cognitive, practical, social, emotional, and psychomotor development. Some of the most frequent claims are related to increased aggressiveness, antisocial behavior, and obesity (see Mishra & Foster, 2007; Peirce, 2013). Especially, when considering young children, the discussion tends to turn out even more critical and emphasize the possible negative outcomes of digital technologies (Palaiologou, 2016). These notions articulate the challenges related to the effective use of games for educational purposes, and call for more detailed research on the processes of game-based learning and digital games on both learning and development. Peirce (2013) emphasizes that in addition to common game-based learning challenges, the design of educational games for early childhood necessitates the consideration of more specific issues. The most crucial factors relate to the developmental level of the learners, including the pedagogical approaches and learning tasks reasonable for young children.

In other words, we need to gain an understanding of what makes game-based learning a productive, enjoyable, and rewarding experience. It is suggested that from the perspective of children, although they find many digital games intriguing, available learning games are often less attractive than entertainment games. In addition, we require more knowledge about the qualities of different games that support children's learning and participation. In particular, we are lacking research that examines specific features of educational games that support engagement and promote deep-level learning by providing a meaningful learning context. We still need to address questions like what type of instruction and feedback do successful educational games provide, what specifically occurs in the gameplay situation (e.g., presence, involvement, and dialogue with peers/teachers/parents), what kind of game design motivates children to learn through gameplay, and how the game design and contents aligns with the curriculum.

#### **Towards multiple literacies**

This section explores the relationship between digital games and children's literacy development and practices. We start by discussing the widening definitions of literacy and then analyses current understanding of the effects of digital games on young children's literacy learning and practices.

#### **Digital games and multiple literacies**

Young children's digital learning opportunities and their role in overall literacy development is rapidly piquing interest in academics and also among general public. At increasingly earlier ages, children today encounter various digital media that offer them opportunities to discover diverse digital texts. Young children are nowadays coming to early childhood education environments with a different set of literacy skills, with experiences of more diversified possibilities for

learning and literacy than previous generations, and also with more diversified access to possibilities of digital technology (Burnett, 2009; Alper, 2011; Blanchard & Moore, 2010).

There seems to be a number of definitions and concepts through which digital games are connected or associated with literacy. Digital games are generally characterized as multimodal texts that employ a range of strategies that contribute to new forms of literacy. As multimodal text, they combine text, still and moving images, sounds, movements, and bodily sensations, and necessitate the use of different communicative means (Gee, 2003; Buckingham & Burn, 2007; Marsh, 2002). They also present children broader elements, such as narratives in which they can be actors and producers by carrying out actions of the game characters (e.g., Marsh, 2002). Burnett (2010) underlines the need for using a broader gaze for understanding children's interactions with digital texts, as they offer them new opportunities to engage with multiple contexts.

Existing research literature focuses on explaining the relationship of literacy to young children's comprehensive technology use, and digital games are considered part of young children's digital world (e.g., Blanchard & Moore, 2010; Burnett, 2010). The current frameworks on the relationship of digital games and literacy are generally conceptualized around older children and young people. Blanchard and Moore (2010) remind us that they continue to build valuable understandings about the digital media environments that surround young children as they develop emergent literacy skills. Nevertheless, the more specific evidence-based understanding of the effects of digital game playing on the literacy development and practices of young children is limited, and its impact on young children's literacy development is still largely unknown. The following section seeks to ground the conception of the relationship between digital games and literacy on the studies that seek to understand the effects of digital media or technology on literacy development and practices as well as on the studies focusing on older age groups.

As Plowman (2016) highlights, a strand of research, usually based on experimental designs, compares traditional reading-to-reading practices on screen. Miller and Warschauer (2014) suggest, based on their literature review, that there are certain features in digital books that engage children and promote literacy (e.g., font size manipulation, dictionaries, automatic page turning, and animation hotspots), but there exists also hindrances like too much animation, which draws attention away from the text. Moreover, Miller and Warschauer (2014) assert that printed books and e-books seem to play different roles in the literacy process, thereby offering children also different literacy experiences.

The frameworks on the relationship of digital games and literacy generally highlight that development in computing contributes to wider or even entirely new forms of literacy or that digital game playing demands specific literacy skills that overlap with skills utilized in interactions with printed texts (e.g., Alper, 2011; Blanchard & Moore, 2010; Marsh, 2002). Dillon (2004) locates this discussion within a wider re-evaluation of the nature and purpose of literacy in contemporary media-rich societies. Lankshear and Knobel (2006) distinguish two ways that new technology affects textual practices, firstly, through replicating practices associated with print text or so called old literacies, and secondly, by being associated with 'new literacies,' patterned by distributed relationships, multiple identities, multimodality, and global participation. Mateas (2005) mentions yet another skill, namely 'procedural literacy', as necessary for utilizing computational media such as digital games in school literacy curricula. He defines procedural literacy as the ability to read and write processes, to engage in procedural representations and aesthetics, and to understand the interplay between the culturally embedded practices of human meaning making and technically mediated processes.

Kress and Van Leeuwen (2001) widen the definition of being literate from having the ability to create and interpret traditional forms of literacy, such as reading and writing, to engaging with multiple

representations often at one time. Digital games finely exemplify this combination of written, visual, audio, and gestural modes of communication. Buckingham and Burn (2007) seek to combine social semiotic approaches on how young people make meaning with media authoring tools together with cultural study perspectives, exploring the cultural experiences and practices that inform such creative work. Their goal is to build a theory of game literacy, which addresses both the representational and the ludic dimensions of games. The theory addresses not only the critical and functional but also the textual dimensions of games. Moreover, it recognizes the social contexts and social processes through which literacy is manifested and developed. According to Sanchez-Navarro, Aranda, and Martinez-Martinez (2015), the concept of ludoliteracy refers not only to video games, or to what is explicitly understood as a game, but also to the current tendency of the digital society toward playfulness in the form of ubiquitous games on mobile devices and the increasing gamification of art, marketing, and social media.

Prescott (2004) suggests that there are at least three different ways to conceptualize how digital games relate to and affect literacy, namely altering traditional literacy, creating a new form of literacy, and spawning literacy more broadly. First, game playing can alter traditional literacy, especially the ability to read, and also our common understanding of literature as text. At the same time, however, games can teach new literacies, which shape the way people communicate. Secondly, then, digital games are creating a new form of literacy with varied visual character interactions and oral means of communication. This necessitates expanded definitions of literacy. Thirdly, digital games spawn literacy. This has to do with the different literacy practices that the gaming communities participate in by reading and writing game reviews and rankings and by building community websites to share game histories, ideas, and information about games they are attracted to or captivated by.



### **Multiple literacies in early childhood**

According to Blanchard and Moore (2010) children's exposure to digital media clearly affects their emergent literacy development, and provides multiple emerging literacy learning opportunities outside formal early childhood environments. The quality and quantity of children's opportunities to develop and use emergent literacy skills, including digital literacy, has a critical role in laying a foundation for their language use and thinking skills in adolescence and adulthood as competent citizens in the digital globe (Hillman and Marshall, 2009). On the other hand, Mavers (2007) asserts that engagement with digital texts is valuable for children's current lives, and young children are already rather than just becoming literate. Alper (2011) continues in this same vein, highlighting early childhood as a phase of life with its own value and young children's active role as consumers, creators, and distributors of media, tools, and technology.

McTavish (2009) argues that children may differentiate between literacy practices at home and formal educational settings and even sustain separate 'literate lives' within and beyond these settings. Also Levy (2009) raise concerns of the negative impact of such contrasts on young children's literate identities. Moreover, Hashemi and Cederlund (2016) note that research on digital technology in early literacy learning and teaching is still rather scarce and have a focus on children's engagement with digital texts and on the use of new technologies as tools to support existing literacy provision to develop print-based literacy (see also Burnett, 2009). Thus, there is a need to address such possible discontinuities in children's literacies and to gain better understanding of the role of new technologies in early childhood practices and about the dimensions of young children's interactions with technologies (Alper, 2011; Burnett, 2010; Hashemi and Cederlund, 2016). According to Alper (2011), understanding of young children's media literacy necessitates an exploration on all the materials with which they work, learn, and play.

Burnett's (2010) research review into technology and literacy on children ages 0-8 in educational settings resulted in three categories that position digital technology (including digital games) as 1) a deliverer of literacy, 2) a site for interaction around texts, and 3) a medium for meaning-making. Similarly, Hashemi and Cederlund (2016) specify a relation between literacy and digital technology into three components, namely, digital technology as a means and resource for developing literacy acquisition, as a competence area that has an intrinsic value, and as broadening literacy development.

Through exploring the links of a new media literacy framework (NML framework; Jenkins et al. 2006) for early childhood education, and especially for Reggio Emilia pedagogy, Alper (2011) tracked several theoretical and practical ways in which this NML framework implicitly and explicitly addresses early childhood education. She emphasizes that its basic concepts (such as simulation, collective intelligence, and multitasking) are familiar, yet not named similarly, to early childhood education, and many of the 12 core media skills are, indeed, already an integral part of early childhood philosophies and curricula. The most distinct links relate to the learning theories, the effort to understand each child's learning and communication ecologies, and focus on partnership between home and children's learning environments. Out of the 12 core media literacy skills, Alper (2011) focuses on play, distributed cognition, and transmedia navigation. In the NML framework (Jenkins et al., 2006), play is conceptualized as the capacity to experiment with one's surroundings as a form of problem solving. Distributed cognition refers to the ability to interact meaningfully with tools that expand mental capacities and transmedia navigation as the ability to follow the flow of stories and information across multiple media. Similarly to Jenkins' (2006) accentuation of the relationship between digital games and children's play, Burnett (2010) has observed that the studies of young children's interactions and engagement with digital texts in informal settings highlight playfulness, agency, and creativity.

### **The significance of digital play**

In this section, we set out to explore the features and significance of digital play with games for young children. The issue around digital play seems to be, at least partly, a contested area. The literature review reveals that the discussions around digital play seem to be polarized: there are claims that technologies both enhance or inhibit children's development and learning (Stephen & Plowman, 2014). While some see technology as an integral part of children's play and learning (Jenkins, 2006; Koivula & Mustola, 2015; McClure & Sweeny, 2015; Mustola et al., 2016), others express concerns about technology causing passivity and preventing children's play and development (Blum & Parette, 2015; Stephen & Plowman, 2014).

The whole issue of young children's play with technologies seems to evoke emotions, and easily lead to discussions in which the arguments are not evidence-based, but rather comprise of personal opinions and emotion-based conceptions. More research is required on what kinds of affordances (e.g., for creativity, play, and imagination) technologies produce for children's play and in what kinds of ways children incorporate these in their digital play practices (Stephen & Plowman, 2014). Additionally, Erhel and Jamet (2013) state that the approach where we compare learning outcomes achieved through digital media against the ones achieved through conventional media is vulnerable due to many confounding factors (e.g., format, context, and teacher's presence). A more fruitful approach would therefore be to focus on identifying factors that enable or promote learning within the digital play context.

### **Defining digital play**

There exists a paucity of research to date concerning the role of digital games in children's play. Exploring play has proven to be a challenge, since the very concept of play is inherently complex and elusive (Grimes and Feenberg, 2009; Marsh, 2010, 2014; Stephen and Plowman, 2014). Furthermore, there is a lack of consensus about the

definition of digital play. Here, we are using the concept “digital play” in referring to a range of activities in children’s technologically mediated play. Others (e.g., Edwards, 2014) prefer the term “contemporary play,” which is considered to include both technologically mediated play and traditional play without technological aids. Moreover, in the field of game studies, concepts of “gamification” (e.g., Tulloch, 2014) and “ludification” (e.g., Grimes & Feenberg, 2009; Kapp, 2012) inform new perspectives on the phenomena. Despite the variation in the use of these interlinked concepts around the phenomena of digital play, it is clear that exploring digital play has turned out to be challenging. There is no clear-cut boundary between play and gameplay (Marsh, 2014). Therefore, we should gain an understanding of the different ways children are combining games and play, and the different affordances available for their digital play.

For children, play can occur almost everywhere, and almost anything can turn out to be play (Glenn et al., 2013). Children learn when they play and through play. Play also molds and mediates children’s relationship to technology. In children’s daily lifeworld, play and gameplay have grown closer to each other. One manifestation of this is “hybrid play” in which the technology is combined with traditional toys or play affordances (e.g., Marsh et al., 2016; Plowman, 2016). The same applies to games: they bring together playful elements of ‘traditional play’ to the context of gameplay. As stated before, the element of autonomy in games seems to be important for children: they are the ones who determine, how to transform, develop, employ the affordances provided by the game (see Gergen, 2015), and thus, construct their own digital agency.

Yet, the issue of digital play is related to educational or serious games as well. Children can invent new, creative, and more playful ways of combining the different elements of the game into their play (see e.g. Marsh et al., 2016). When we gathered empirical data from children’s gameplay, we observed a variety of different possibilities that children were utilizing in digital play (see Koivula & Mustola

2015; Mustola et al. 2016). For example, children adopted play-roles related to gameplay and the events of the game, they took themes and ideas from the game and utilized them in their traditional play, and they imagined contents of the game, took videos with tablets from their traditional role play, and performed scripted movie trailers from play situations. Furthermore, children wanted to design new digital games themselves and began to draw them on paper collectively (Koi-vula & Mustola, 2015). These examples clearly show how children's hybrid play can appear in numerous forms.

#### **The educational value of digital play in early childhood**

Our empirical data suggests that the quality and interest-value of the digital game influences the gameplay activity and the ways that children's digital play evolves. In many cases, children became emotionally attuned to games that offer possibilities to utilize one's own creativity, include "open" layout instead of fixed options, and contain different elements (e.g., characters and events) that appeal to them and create a possibility for immersion (see Ermi & Mäyrä, 2005; Frissen et al., 2015; Mallon & Lynch, 2014). In digital play, children interact with each other, with the game, and with technology (Kalaš, 2010; Salonijs-Pasternak & Gelfond, 2005). In addition, children's digital play does not necessarily presume a face-to-face interaction with a partner, but digital online social interactions have grown more typical among children (Chaudron, 2015; Livingstone et al., 2015; Marsh, 2010). These above mentioned aspects represent the qualitative and unique features of digital play and differentiate them from "traditional play" (Salonijs-Pasternak & Gelfond, 2005).

In digital play, children are able to adopt new kinds of roles, experience adventures, and expand their imagination in a new way, because the digital games offer possibilities and guidance for this in their layout. Moreover, digital play is at many times social: the children play together, create solutions, construct knowledge, and create their own, unique digital play culture. This is linked to redefining, molding,

and shaping their personal and social group identity, and adopting and practicing different roles during their gameplay (Arnott, 2013). Children move fluently across different spaces and contexts of play and combine the elements of different forms of playing, i.e., virtual and traditional, together (see Craft, 2011). From the perspective of children, the boundaries between digital play and traditional play are artificial and irrelevant. As stated before, for children, anything can turn out to be defined as play (Glenn et al., 2013). Therefore, to understand the complexity of play and digital play requirements, constant interplay between children and peers is necessary, as digital play is a social construction that is created during joint activity (Craft, 2011; Marsh, 2010). From a research perspective, this presumes close examination of digital play, defining the criteria for digital play, and the effort to explore digital play across different contexts and among children of different ages. In our mind, through empirical research, it is possible to understand the benefits and possible risks related to children's play with technologies.

The examples presented above illustrate the ways that children participate in the practices of digitalized society, and how digital games offer a variety of possibilities and resources (see Arnott, 2013). The input of children has grown more important as co-researchers, for instance testing new products in the game industry (Lieberman, Fisk & Biely, 2009). This is why the understanding of digital play is becoming more and more topical. As the theoretical discussion suggests, digital play and hybrid play must be considered as more than merely a threatening opposite of traditional play.

#### **Concluding remarks: Towards a child perspective on digital game playing**

*The tangible nature of some of the technologies can support young children's play and learning, and the multimodal nature of feedback may have some impact on children's movement, cognition, and emotions; at the same time, cultural and*

*social change within the family and the wider community will influence patterns of play. (Plowman, 2016, 109)*

Our exploration on the role of digital games in early childhood proceeded through the perspectives of learning, literacy, and play. The review of the research literature in each of these perspectives indicates distinct polarities or tensions regarding the relationships of young children with digital games or, more generally, with varied digital technology. Such tensions seem to exist between, e.g., a child and teacher, home and early childhood education settings, intentional and unintentional learning, and digital and non-digital practices as associated with the relevance or role of digital games as young children's practices. However, when considering these tensions from a child's perspective, it becomes clear that it is not a question of tension for a child, but rather digital games and digital game playing appears as a natural part of children's various daily activities, especially in informal contexts such as at home or in interactions with peers.

Many of the tensions relate to the use of digital games for educational purposes in early childhood learning environments. Previous research has raised concerns regarding the established beliefs and attitudes of teachers about digital games and their integration in the teaching-learning process. Even though games are, for the younger generation, a distinct form of informal ICT practice, they are still not very frequently used in early childhood education (Buckingham & Burn, 2007; Mediappro, 2006; Plowman, 2016; Rideout et al., 2010). However, during the last few years, tablets in particular have become more common in the context of early childhood education. These mobile devices—thanks to their light weight, portability, affordability—offer new pedagogical opportunities, especially for children, e.g., for multimodal learning (Plowman, 2016).

The existing gap between the children's conception of digital games and gaming and those held by teachers is at least partly attributed to teachers' digital skills, as learning to use digital technology

usually requires many teacher particular efforts. Another central issue is that the pedagogical use of digital technologies tends to divide teachers (Plowman, 2016). Koivula (2015) found out in her study that there existed polarized opinions about the use of technologies in preschool. Some teachers emphasized the learning potential of digital technologies and used, e.g., tablets in their teaching innovatively. For example, they used digital learning games, made documentation with tablets, created QR-code assignments for children, and made movie trailers as a joint project (see also Marklund & Dunkels, 2016; Plowman, 2016). The positive attitude of these teachers allowed children to explore the possibilities of these devices quite freely, and thus promoted the children's technological agency and skills. The majority of teachers in Koivula's (2015) study had this kind of positive outlook on technology in early childhood education, and they appreciated the new contents and possibilities that technologies offered children, viewing these devices as an integral part of children's daily lives.

Nevertheless, some teachers were concerned about the pedagogical use of technology in preschool (Koivula, 2015). Their attitude towards new technology could be described as suspicious. Typically, they lacked confidence about their own skills as users of digital technologies. These teachers restricted children's activities to digital technologies (e.g., seldom permitting them to use tablets or only for a short while) and expressed concerns about the negative effects of digital gameplay on children's "traditional" play and learning (see also Marklund & Dunkels, 2016; Plowman, 2016). Koivula (2015) asserts that the attitude of the teachers on the whole seemed to depend on the amount of training they received. Generally, the teachers emphasized their need for a lot of training for the pedagogical use of digital technologies. In addition, getting oneself familiarized with new technology required time and effort. In the pedagogical use of digital technologies teachers also seem to need a great deal of support from their colleagues (Marklund & Dunkels, 2016).



The apparent changes in children's everyday world necessitate a re-examination of the educational practices and curriculum, as knowledge, learning, and relationships are being re-defined in digital environments (Burnett, 2010; Marsh, 2002). An up-to-date curriculum helps children to become competent and fluent users of various digital media, particularly of digital games, and the increasingly complex multimodal texts surrounding them. It would also bridge children's digital practices at homes with early childhood education environments (e.g., Burnett, 2010; Kankaanranta, 2007a). Early childhood settings should therefore take into account children's informal learning experiences and build upon them.

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