



# Constructing social participation around digital making: A Case study of multiliteracy learning in a Finnish day care centre

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*Satu Valkonen<sup>a</sup>, Reijo Kupiainen<sup>b</sup> & Michael Dezuanni<sup>c</sup>*

<sup>a</sup> *University of Helsinki, corresponding author, e-mail: satu.m.valkonen@helsinki.fi*

<sup>b</sup> *University of Tampere*

<sup>c</sup> *Queensland University of Technology*

**ABSTRACT:** In this article, we present a case study of digital making as an example for constructing social participation around multiliteracy learning in Finnish early years settings. Digital making is explored and evaluated through the practices and experiences from workshops conducted with four- to five-year-old children in one day care centre in the Helsinki metropolitan area in Finland. Reflections scrutinize children’s social interaction with digital technologies and aim to examine shared meaning-making in the design process. We explain how innovative technologies mediate and enable social interaction and what leads children to either collaborate or work individually while making meaning digitally. Our study indicates that although social participation can be intentionally achieved by children themselves, early childhood education and care (ECEC) professionals and pedagogical practices play a pivotal role, especially when the cultural tools used in learning are new and unfamiliar to children, in this case tablet computers and smartphones.

**Keywords:** *multiliteracy, digital making, design process, social interaction*

## Introduction

The new binding National Core Curriculum for Early Childhood Education and Care is a national regulation that has been implemented in early years settings with children aged

zero to five since August 2017. The regulation emphasizes holistic growth, development and learning that are actualized via five transversal competencies, which include multiliteracy and ICT practices as one of these competencies (Finnish National Agency for Education [FNAE], 2016/2018). According to the core curriculum, multiliteracy is based on the broad conceptualization that texts can be written, visual, oral, audio-visual or digital, among other formats. Multiliteracy is approached as a repertoire of different competencies and literacies, such as competence in ICT, visual or media literacy.

The definition of multiliteracy in the National Core Curriculum for ECEC differs somewhat from the perspectives presented in established research literature about multiliteracies (Cope & Kalantzis, 2015; New London Group [NLG], 1996). In this study, we frame *multiliteracies* as situated and social learning at the centre of pedagogy (Cope & Kalantzis, 2009, 2015, 2017; Kalantzis & Cope, 2008, 2012; NLG, 1996). From this perspective, social practices and communal resources are considered salient in learning multiliteracies.

This article discusses young children's use of information and communication technology (ICT) within *multiliteracy learning* in early years settings in Finland. In this article, we draw from experiences of multiliteracy learning with young children within the national programme *Learning Multiliteracies with Joy* (see Kumpulainen & Sefton-Green, 2020). The paper scrutinizes workshops in which children took and edited photos using still images, green screen and a photo layers application and explored animation using a stop-motion animation application. We call these activities *digital making*. Digital making can refer to the making of any product using digital technology. This can include programming games and applications, but also producing and manipulating photos or creating visual constructions. Digital making, as a concept, is used as an alternative to media production, which is often associated with more formal and industrial modes of production (Dezuanni, 2018). As a concept, digital making provides the opportunity to think about children's interactions with digital technologies as being more playful and less formal than the structured practices undertaken by older children and young adults.

Our aim is to consider children's interactions around and with digital media and describe their resources for engaging in digital making with the film *Moomins and the Winter Wonderland* (2017). From a critical perspective, we consider the ways in which digital technologies can enhance participation by providing meaningful learning opportunities for children with diverse needs and interests. In this light, we ask how new technologies mediate and enable social interaction and what leads children to either collaborate or work individually while making meaning digitally, which can be approached as design practices, following the *pedagogy of multiliteracies* (Cope & Kalantzis, 2009; Kalantzis & Cope 2012; NLG, 1996). We investigate our research question by presenting two case vignettes: the first description is an assemblage of photo editing workshops and the

second of animation workshops; both focus on available designs, designing and redesigning practices (see Cope & Kalantzis, 2009; Kalantzis & Cope 2012). Finally, we consider under what conditions integration of a pedagogy of multiliteracies with innovative technologies in early childhood education and care may foster social participation among children.

## Perspectives on multiliteracy research

Research on multiliteracies in the education context has been extensive, with a growing interest in multimodality and digital technologies in meaning-making (Marsh, Norström, Sairanen, & Shkul, 2020; see also Mertala & Koivula, 2020). However, Kumpulainen and Sefton-Green (2020) have stated that both the concept and practice of multiliteracies in education remain underdeveloped and restricted which leads to problems in its systematic promotion in formal education. This also applies in Finland: according to Finnish Education Evaluation Centre's national evaluation report, multiliteracies seems to be difficult to put into practice in ECEC (Repo et al., 2019).

Moreover, there is a lack of knowledge about creating the learning conditions for the use of digital technologies that are inclusive for diverse children with different capabilities and interests (Kulju et al., 2018). Children are still often considered as one homogeneous group with similar knowledge and skills and who are competent with innovative technology (see Buckingham, 2003). The myth of digital natives (Prensky, 2001) has not yet been fully deconstructed. Thus, while research conducted on (multi)literacies has increased and digital technology are becoming ubiquitous, the focus has remained on traditional literacy skills in education (Yelland, 2018, 849). As Arnott and Yelland (2020, 126) note, "challenges remain in our understanding of childhoods in the 21<sup>st</sup> century and in integrating new technologies into children's learning cultures".

This may be due in part to the fact that there is no one "appropriate pedagogy" to integrate ICT in multiliteracy learning – learning conditions are subject to multiple realities and constraints that must be actively negotiated (Hesterman, 2011a). In fact, Hesterman's (2011a) study demonstrated that it is particularly challenging to provide children hands-on ICT experiences to design, construct and communicate their meanings. In another study, she demonstrated that popular culture, ICT and multimodal designs of meaning can have a positive effect on enhancing multiliteracy (Hesterman, 2011b).

Generally, children are thought to express enjoyment and interest when using tablet computers (Dezuanni, Dooley, Gattenhof, & Knight, 2015). Tablet computers are also seen to encourage communication and social interaction between children and motivate them

to engage in the collaborative activity (Kammer, Dang, Steinhauf, & Groh, 2014). It is not uncommon to see new technology as the driving force for educational change, without acknowledging the salient role of individual variables and social context that formulate ICT use in early years. Therefore, research should take into consideration the competence of children and ECEC professionals with digital devices as well as cultural and social influences; and various other factors related to learning (Kucirkova, 2014). Moreover, emotional engagement of children with ICT (Hatzigianni, Gregoriadis, & Fleer, 2016) and the relation between behaviours and emotions when using new technology (Sulaymani & Fleer, 2017) have received only little attention.

To sum up, although research on digital technology in early years contexts is substantial, more research data on factors influencing multiliteracy and ICT learning in ECEC is needed. We also need to diversify the perception of children's capabilities to participate when ICT is applied in multiliteracy learning. This article aims to address these concerns by exploring how new technologies mediate and enable social interaction. Our analysis contributes to a deeper understanding of pedagogical practices that account for and contingently impact on learning and teaching multiliteracy in early years education.

## **“Design” within the pedagogy of multiliteracies**

Within the multiliteracies metalanguage, the concept of “design” is pivotal. When the New London Group (1996) developed the key ideas of pedagogy of multiliteracies, they replaced the static conceptions of representation with a more dynamic concept of design (Cope & Kalantzis, 2009). The key idea is that *“all forms of representation, including language, should be regarded as dynamic processes of transformation rather than processes of reproduction”* (Cope & Kalantzis 2009, 175). This means that meaning making is not a reproduction of representational conventions and replication of what has been given but an active transformation of meaning in different communicative practices.

Therefore, designing is an act of agency and an expression of the voice of the meaning-maker. It is based on the meaning-makers' own interests and experiences, which we see as a starting point for the designing process. Design-based pedagogy necessitates opportunities for children to show their ideas and thoughts, learning and knowledge (see Hesterman, 2011b, 87). Considering learners as active meaning-makers has important pedagogical implications since agency should be recognized “and in that recognition, design seeks to create a more productive, relevant, innovative, creative and even perhaps emancipatory pedagogy” (Cope & Kalantzis, 2009, 175).

The design process has three aspects: 1. available designs, 2. designing and 3. the redesigned (Cope & Kalantzis, 2009). Available designs are cultural resources for meaning making leading to the creation of something new (Kalantzis & Cope, 2012). We identify digital making as a design process in which children create innovative designs by using such modes of meaning as linguistic, gestural, visual, aural and multimodal resources. During designing, children transform knowledge by producing a new construction. The redesigned construct is an original object, image, animation or crafted construction. Others may explore a redesigned construction as a new available design (Hesterman, 2011, 87–88). Pedagogically, this is significant since it may help other meaning-makers to see these things in fresh ways and present opportunities for dialogue. Therefore, designing has the potential to be a transformative act. The change could be small, but the world is not the same as before the redesigned (Cope & Kalantzis, 2009; Kalantzis & Cope, 2012). Through the process of digital making and redesigning, children are able to communicate meaning of the world around them.

Digital devices are regarded as cultural tools that afford children multiple modes of action and various new opportunities for dealing with diverse texts and reconstructing their views of the world; this process may be different from what is typically used in an early years' context, like drawing, modelling or construction (Gilje, 2011). It is worth stressing that affordances do not determine how technological tools will be used but offer possibilities for action (Gibson, 1979). Since new cultural tools allow children to make meaning in new ways, they potentially transform literacy practices as well.

We consider literacy to be socially constructed through conversation and other language practices that occur in several ways across complex communicative settings. This stance regards learning as a type of social interaction rather than a cognitive activity (Mills, 2016). Designing is not only a process of producing new texts, but includes shared experience and communication with others. This leads us to examine not only the individual skills that each child develops during digital making but also to consider children's social interactions during multiliteracy learning processes. When multiliteracy is approached as a situated social practice, diverse behaviours and actions, knowledge and new modes of communication and meaning-making are acknowledged as necessary for children to fully participate and feel connected to others in current times.

## **Methodology, design and context**

This qualitative case study aims to describe and analyse how new technologies mediate and enable social interaction around digital making and what leads children to either

collaborate with each other or work individually during multiliteracy workshops. As is typical within case studies in early childhood settings, the workshops were carried out in a single day care centre. The centre is situated in a low socio-economic and culturally diverse suburban area in the Helsinki metropolitan area. The workshops included six themes: 1.) narrative play, 2.) a cinema visit, 3.) constructing movie scenery, 4.) photo editing, 5.) stop-motion animation and 6.) crafting (see Table 1). Workshops were implemented with children from two- to six years old and conducted during the morning hours once a week over a six-week period. All workshops were implemented with small groups and each workshop was carried out several times adapted for the children's interests and needs. Workshops were implemented by two researchers, the first author and her colleague.

TABLE 1 Overview of multiliteracy workshops

<i>WORKSHOPS</i>	<i>OBJECTIVES</i>	<i>DESCRIPTION</i>
1. Narrative play	<ul style="list-style-type: none"> <li>- Name things and objects</li> <li>- Learn concepts</li> <li>- Familiarize children with Moomins</li> </ul>	Narrating, story-acting, participation and involvement, voluntariness
2. Cinema visit	<ul style="list-style-type: none"> <li>- Introduce cultural services appropriate for children</li> <li>- Provide emotional and cultural experiences</li> <li>- Interpret audio-visual text</li> </ul>	Preparing the cinema visit, familiarizing movie theatre and discussing experiences and filmmaking
3. Constructing movie scenery	<ul style="list-style-type: none"> <li>- Introduce children to filmmaking</li> <li>- Produce various types of crafted construction</li> <li>- Process senses (haptic, olfaction).</li> <li>- Name things and objects; learn concepts</li> </ul>	Constructing the mis-en-scene, utilize dried foods, modelling clay and various crafting material; processing filmmaking
4. Photo editing	<ul style="list-style-type: none"> <li>- Produce personally various types of messages</li> <li>- Interpret and explore digital messages.</li> </ul>	Familiarizing children with the tablet computer, taking and editing photos, respectful media use
5. Stop-motion animation	<ul style="list-style-type: none"> <li>- Interpret and produce collaboratively various types of messages.</li> <li>- Explore digital messages.</li> <li>- Experience and produce art.</li> </ul>	Familiarizing children with the smart phone, stop-motion animation and collaborative storytelling
6. Crafting	<ul style="list-style-type: none"> <li>- Provide and explore self-made toy</li> <li>- Encourage creative thinking</li> </ul>	Making Hattifattineres from white socks, crafting material and led-lights. Applying products to talk and play.

The data for this particular study is gathered in one ECEC class with four- to five-year-old children. It is based on participant observations and teaching experiences conducted in multiliteracy workshops dealing with digital making, i.e. photo editing (4<sup>th</sup> workshop) and

stop-motion animation (5<sup>th</sup> workshop). Altogether seventeen (N = 17) children participated. Workshops were implemented with small groups that were formed by class' professionals; ECEC professionals did not participate in workshops. In total, eight workshop were conducted and in each group there were 4–6 children. Each workshop lasted from half an hour to forty minutes.

According to the ECEC professionals, three of the participating children had diagnosed language delay and five were on track to have a diagnosis of behavioural problems and/or emotional disorders. Informed consent was obtained from children's guardians, ECEC centre and its personnel and municipal officials. Furthermore, at the beginning of each workshop children's permission was ensured orally. Throughout the process, there was approving and excited atmosphere amongst the children. Although children participated workshops eagerly, they did not give permission for videotaping; thus, the research data were recorded only as audio data on a smartphone. Both workshops concerning digital making were implemented in a small playroom, which made the recording possible. Another of the researchers recorded audio data while we wandered outside the playroom. The data from eight workshops contained four hours and five minutes of audio data. In addition, this study also applies the semi-structured group interview<sup>1</sup> with class' professionals (N = 3) that contained one hour and five minutes of audio data and reflection by researchers (N = 2) who conducted the workshops including one hour and twenty-eight minutes of audio data.

A range of principles, congruent with characteristics of case study, was applied to data collection and then information was assembled into a case study vignettes. Vignettes are focused descriptions of a series of events taken to be representative, typical or emblematic (Miles & Huberman, 1994) of the group under study; and to provide space in the text for their "thoughts and feelings" (Fetterman, 1989). They are particularly suitable in reporting cases because of their narrative form. Vignettes rarely include raw data extracts, but it is important that they are presented together with rich contextual descriptions (Reay, Zafar, Monteiro, & Glaser, 2019). They are rhetorical artifices, narratives, that integrate data from multiple sources and are assembled by the researcher. The assemblage of vignettes is based on "workshop talk", interview with ECEC professionals and reflections by researchers who were "at the site where practice occurred" and thus it benefits from insider knowledge (see Cohen, Manion, & Morrison, 2018, 443). Thus, vignettes are the author's construction rather than an objective truth.

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<sup>1</sup> During the interview ECEC professionals' views on multiliteracy were asked. In addition, basic information about children, class' social relations and learning activities were examined.

The vignettes were developed to describe and reveal interesting points from the perspectives of this study holding closely to actual occurrences. The guiding principle in constructing the vignettes was to reduce the case material into compact manageable overviews, highlighting the conditions of social participation while making meaning digitally. Thematic analysis was used in assembling and analyzing the vignettes. Thematic analysis fits well in this study since it “allows the researcher to see and make sense of collective or shared meanings and experiences” and “is a way of identifying what is common to the way a topic is talked or written about and of making sense of those commonalities” (Braun & Clarke, 2012, 57).

At first, all audio data was listened to, and notes were made from main themes, subthemes, and interconnections between them in order to clarify the data. Then, audio data of reflection by researchers were listened to again, this time focusing especially on the research question. This also included note making. In the second phase, coding was carried out by underlining the relevant points in the notes. Here, it was important to go beyond the participants’ meanings and provide an interpretation about the data content. During light coding additional remarks were made. This led to the next phase where four themes were identified: collaboration and enjoying working together, withdrawing and discord, engagement in using ICT and ICT competence. After identifying and reviewing the themes, two case vignettes were assembled, and after that the other researcher reviewed them. If there were any discrepancies, or different interpretations, they were discussed. In the end, vignettes were reviewed to ensure that complete, comprehensive, and authentic picture of multiliteracy workshops were provided. (See Braun & Clarke, 2012.)

In thematic analysis, consistency and coherence of the framework and analysis is salient (Braun & Clarke, 2012, 58). A conceptual framework of analysis was developed applying the research literature related especially on design and social participation within multiliteracy pedagogy and drawing from studies considering young children’s ICT use in early educational settings.

## **Digital making with Moomin action figures**

An important starting point for this study was to create purposeful learning experiences for all children despite their diverse needs, interests and various competences. While planning the workshops, it was necessary to consider what was purposeful for all in the context of the children’s needs and local diversity and how to ensure that differences did

not become barriers for multiliteracy pedagogy (see also NLG, 1996, 61). Especially in the case of digital making, it was important to consider children's access to digital technologies, their informal experiences with digital devices and their competence in ICT.

A pedagogical planning process of the set of multiliteracy workshops was founded on the principles of the design process. The integrative theme of the project was based on the stop-motion animation film *Moomins and the Winter Wonderland* (2017). The movie tells about one special winter in Moominvalley when Moomintroll decides not to sleep through the winter but to explore the wonders of winter. Moomintroll meets strange creatures in his exploration. After a little while, residents of the Moominvalley start to expect a mysterious guest called Christmas. They all work together to please the visitor and learn much about community, friendship and kindness.

First, it was necessary to ascertain that a particular available design, the Moomin film, appealed to the children's interests. Starting from children's media culture seemed purposeful since media culture as well as digital technology are regarded as motivational and engaging to promote children's learning by providing opportunities for exploration of new possibilities (Hermes 2005, 140). Then each learning activity was planned so that the designing process was based on shared and meaningful social experiences and offered children various new ways for dealing with diverse texts and modes of reconstructing their views of the movie and the world. It was also equally important to ensure that the redesigned texts could be applied as an available design during the following learning activities (see also Marsh et al., 2020, 135). Therefore, the process of pedagogical planning of workshops was iterative: evaluation and reflection of each workshop directed the ways multiliteracy was approached with children.

### **Case study vignette 1: Relocating Moomin figures in an early childhood setting**

This photo editing workshop (4<sup>th</sup> workshop) applied pedagogical elements like scaffolded experimentation with digital technology through a collaborative and social process. Learning by doing and play-based orientation were accomplished by using a creative communication tool to inspire and enhance children's creative and shared meaning-making and storytelling (see Dezuanni & Levido 2011, 45).

The workshop began by prompting the children to think back to the Moomin film they had seen as an available design and revise the character's names and personality traits. The children chose their favourite Moomin characters amongst the small Moomin action figures to work with them with a green screen and photo layering applications

(Background Eraser, PhotoLayers). The purpose was to use applications for relocating the Moomin figure into an extraordinary place in the day care centre. Children were directed that the first step was to take photos of the action figures with the tablet computers, then explore places around their ECEC classroom and lastly to undertake innovative experiments with applications. After that, the children could be photographed so that they could relocate themselves in an imaginary place with their ECEC professionals. The idea was that the children could continue digital making and storytelling by using the photo of the Moomin figure in an unexpected place or by using the photograph of themselves.

The design process began when the children took the photos of the small Moomin figures in front of a green carton. The children were helped to become acquainted with using the tablet computer's camera and to test various angles and framing options. The children were also guided to place the figures so that the image was preferable for them. During this activity, there was an opportunity to use several devices at the same time but because children needed substantial support in handling the tablet computer, only one tablet was used.

For the next phase, the children were urged to think about what kind of adventure their Moomin figure might undertake and where they would locate their figure if they could choose any place in their ECEC classroom. This activity integrated children's own creative processes with their experiences of what can be created in real and imaginary worlds. The children needed much support in thinking about what might happen if reality was transformable. They seemed to be a little suspicious but also enthusiastic which was evident in their wide-eyed expression, the tension in their bodies and the expectant smiles on their faces.

The children wandered around the ECEC classroom and were encouraged to think about extraordinary places to relocate the action figures. After each child chose a location, a photo was taken with assistance. When all children had taken their photos, they all returned to the small playroom. The excitement about what would happen next was jointly shared. Children's interactions were maintained and directed by verbal instructions and encouraging looks. All children had a chance to choose their best photo of the selected character taken in front of the green carton. The children were then told that the character would be relocated to the place from where they took picture.

By now, it was apparent that most of the children had minimal experience in using tablet computers although practically all children said that they had taken photos with digital devices at home. Even though taking a photo with a tablet computer is quite an easy task, the children still needed support in handling the tablet, directing the device toward the

area to be photographed and zooming. When children began to use applications to edit the photo, challenges in dragging, dropping, swiping and undertaking similar actions were evident.

Compared to more traditional hands-on activities carried out in previous workshops, most of the children's enthusiasm seemed to collapse for a while during digital making. This may be because the children needed significant support in finishing the task with applications. In other words, digital making did not support children's agency and self-imposed expression of their voice sufficiently. Although the design process was conceptualized verbally, watching without making did not seem interesting enough for the children. In addition, the motivation to cheer on and encourage a peer in this class was not a certainty because children were still practising their social and emotional skills and according to the ECEC professionals, the children were not yet attached to each other. Instead of concentrating on the digital making, some children in all small groups started teasing each other or playing with other toys that were available in the playroom.

The joint focus was not on digital making while one child used the tablet computer. The children worked actively together and were more independent and self-motivated when they were offered more familiar cultural tools for designing. The challenging task with the tablet computer disorganized and deconstructed the social interaction and connection.

The difficulty of editing the photograph in a group situation highlights two points. First, it suggests that a pedagogy of multiliteracies requires attention to effective learning design in which all children have an opportunity to be continuously engaged. In hindsight, the activity could have been differently organized, especially if the children's ICT competence had been better known. The default understanding was that the ECEC class would have used ICT at least occasionally since it is required in the core curriculum. Afterwards it was learned that the ECEC professionals were suspicious of using the class' own tablet computer since children already had various difficulties with basic everyday activities and they worried that the computer would be broken. Secondly, in contrast to the digital natives' rhetoric (see Prensky, 2001) in popular discourse, children are not inherently able to use digital technologies. They require scaffolding, assistance, and an adult's guidance to become multiliterate, which is also mentioned in the core curriculum.

The joy of shared learning experiences was evident again when the photos were ready and everybody explored them together. Indeed, children relocated the Moomin figures in unusual places and then they wondered how the action figure had ended up on the ceiling or on top of the air-conditioning pipe; some children even watched the screen and the place where the character was relocated, disbelieving that it could be in two places at

once. In this case, the moment of design was a moment of transformation, with a remaking of the world by representing the world afresh, as Cope and Kalantzis (2009, 11) have presented.

The case vignette illustrates the designing process with available designs of meaning but designing is not only producing some new text, but also sharing experiences and communication with others and meaning making together with cultural tools and texts. From this perspective the pedagogy of multiliteracies is more than the application of individual skills and demands organization of teaching and learning that can enhance social participation and a sense of belonging. Therefore, the pedagogy should be more responsive to the level of social interaction that has been established in the class, especially in the case of young children.

### **Case study vignette 2: Exploring animation with Moomins**

The purpose of this workshop (5<sup>th</sup> workshop) was to introduce children to the stop-motion animation technique. Stop motion is based on a technique in which objects are placed, photographed, and then repositioned; this process is repeated several times. When the series of photos is viewed in quick succession, in sequence, objects appear to move. This technique was used in creating the Moomin film and it appeared to be an expedient way to familiarize children with smartphones and explore animation. After noticing challenges in relocating Moomin action figures with photo applications, the emphasis was placed on the process rather than the final product. The learning objectives were linked in the social processes of multiliteracy learning, collaboration and collectivity and shared experiences embedded in digital exploration and playfulness (see Dezuanni & Levido, 2011, 45).

The scenery for the animations was constructed from various crafting materials (silk, clay, textiles) and dry food (spices, grain legumes) (3<sup>rd</sup> workshop) after seeing the Moomin film (2<sup>nd</sup> workshop). Accordingly, the redesigned is used here as an available design. The animation workshop began by recalling the events of the film and then remembering what kind of learning activities children had been engaged with during the multiliteracy project. Then the children were informed that the purpose was to create a short story based on tales from Moominvalley, play the story with Moomin action figures and familiarize them with stop-motion animation. With the first group, children's story telling was facilitated with traditional tools like Moomin pictures or a magnetic book. However, the predetermined schedule obligated the researchers to strongly guide the narration process. After negotiating the topic and the plot for animation with the first group, the topic was presented as set for the following groups. Hence, the topic of stop-motion animation was the story of lost Little My (Pikku Myy)(The Book about Moomin, Mymbble

and Little My). This was the topic of the workshop in which children delved into narrative play (1<sup>st</sup> workshop).

It was important to keep the storyline simple because the children needed a lot of support in storytelling due to speech production difficulties. It was assumed that distinct key events would provide more opportunities to support children's digital making with stop-motion application (Stop Motion Studio). Using shared social experiences as a base for a script fostered collective ownership of digital making amongst all the children. Moreover, the familiar story of lost Little My (Pikku Myy) helped those having problems with communication to participate in creative meaning-making. A pedagogy of multiliteracies recognises the role of subjectivity and agency in this process. The meaning-maker-as-designer draws selectively from the infinite breadth and complexity of available designs in the many domains of action and representation that constitute the layers of their past and new experiences. It is an expression of an individual's identity at the unique junction of intersecting lines of social and cultural experience.

Generally, all the children were as anxious to take photos as they were to reposition the action figures on the scenery. To create the animation, children needed to move action figures only slightly, take a photo and then move the figure again before taking another photo. Children moved the figures and took photos by turns. One or a few devices were used, depending on the group's size and children's familiarity with using smart phones.

The children's storytelling was furthered during digital making using such leading questions as "and then what happened?" This was asked because it had been a familiar expression from the first workshop. Children were aided to take photos with the smart phone and to move the action figures. During digital making, children not only reproduced an available design but also made use of old materials; hence, they transformed knowledge by producing new constructions and representations of reality and also produced distinctive expressions of meaning (Cope & Kalantzis, 2000, 22).

Children were very committed to the topic and their comments furthered the story given various new meanings for the plot of the lost Little My (Pikku Myy). While the involvement of the events was jointly shared, concentration on taking pictures was not. During the digital making process, some children began to fumble with the phones and take photos nonstop. Consequently, photos captured the process of moving the Moomin figures even though the children were explicitly explained the stop-motion process in the beginning and each child had a chance to test a smartphone before the actual digital making. Moreover, moving figures only slightly was not motivating for the children and they made the action figures fly from one side of the scene to the other, hiding other characters than Little My (Pikku Myy). They also placed action figures in the sky and hung them on the

clouds made from cotton pads from which the action figures eventually fell down. Therefore, children's joint playful actions changed the course of events from what was planned and left the more formal digital making process as a secondary concern for the children. Nevertheless, the enjoyment of shared experiences was preserved.

With one group, the workshop was designed so that children would each hold a smartphone at once and be assisted if necessary. The others were moving figures around in the scene according to the teacher's clear verbal instructions. This required the co-operation of all the participants. This approach advanced digital making and maintained connection amongst the children. However, following specific instructions reduced the opportunities for children's own meaning-making and creative outputs in digital making; their playfulness also decreased.

Although some children were impatient and anxious to limit photographing in the moments when Moomin action figures were relocated and some found it difficult to move action figures only slightly in the scene, by and large the children were very devoted to the story. The shared positive experiences from the first workshop and ease of taking photos with the smart phone seemed to produce meaningful social interactions around digital making.

Various explorations with small groups around stop-motion animation provided diverse perspectives in learning multiliteracies: when emphasising the process, looser control was more suitable because it enabled considering the significance of shared meaning making and co-operation. On the other hand, overt control and adult-led teaching enabled a better orientation to the stop-motion technique. In sum, when there was less overt guidance, children constructed meanings more creatively with their peers by negotiating about the events and playing with Moomin figures outside the scene. When guidance was stronger, children actualized tasks more or less according to the researches' directions.

Exploring animation with Moomins enabled children to explore and produce meanings together in a digital environment that is emphasized in the Finnish national core curriculum for ECEC since it is thought to promote creative thinking, co-operation and literacy. Nevertheless, to achieve better balance with creative and digital meaning making, more time should be reserved for the children to work with small groups, create stories and explore digital technology.

## Discussion

This project emphasized multimodal strategies in dealing with Tales from Moominvalley as available designs. It was assumed in advance that this approach to promote multiliteracy would offer children numerous ways to share meaning-making and provide opportunities for them to present their views and opinions in order to direct their learning. Indeed, children were very motivated to participate and cooperated during the workshops. ECEC professionals reported that they were surprised that all children could participate, no one needed to be removed from class and that all workshops were carried out without breaks from beginning to end. They said this was quite unusual for this class.

Children's motivation to take part in multiliteracy workshops became apparent in many situations; for example, they often asked when the next workshop would be organized, they explicitly said they did not want to end what they were doing and they asked if the workshop could be held again immediately. The change was not so much in daily routines and spatial organization but in methods of learning, especially the use of cultural tools and deconstruction of adult-led teaching, which altered children's social participation and social positions during learning.

As we demonstrated above, in early childhood education and care, the multimodal textual landscape will be composed of many different layers of various forms of texts constructing the context and tools with which children learn about multiliteracy and texts in their community and society. Throughout the paper, we have emphasized an ongoing interaction among children and between children and adults, rather than individual activity, competencies and skills. Thereafter, it is important to recognize the ways in which multiliteracy learning objectives and pedagogical practices position children within these social relationships and multimodal landscapes. The textual landscape in which children made meanings and constructed social participation and connection is comprised of the texts of innovative technologies and children's media culture. We have also stressed (see also, Carrington 2005, 20–21) that popular and meaningful texts build connections among the learning objectives, pedagogical practices and children's everyday lives.

The findings clearly show that a pedagogy of multiliteracies involving digital making with young children needs to be carefully developed in terms of learning design. This is salient in situations where children have issues in co-operation, expression and behaviour control. To answer the question how new technologies enable social interaction among children, we need to focus how children interact with ICT and each other (see also Sulaymani & Fleer, 2017). Firstly, it became clear that young children struggled with the

most normative aspects of digital making. This included the relatively sophisticated task of layering images using drag and drop techniques on a touch screen device and the process of recording several images over time to create the illusion of movement leading to animation. Although children gave the impression that they are confident and competent in using smart phones and tablet computers at home, in hindsight, these two tasks were, perhaps, too complicated for the children who have not learned to apply digital technology in ECEC before. Although, conceptually, digital making is less formal than industrialised models of “media production”, it none-the-less requires the development of specific knowledge and skills that need to be age-appropriate. The findings also show that this was as much about the difficulties of children being appropriately “disciplined” regarding the movement of their bodies in relation to the digital device as it was about difficulties with the making process.

Luke (1992) noted that the normative literacy practices around reading in early years’ classrooms of sitting quietly and still can be as much about disciplining the body as engaging with a narrative. We see a parallel with the digital making work the children undertook in this project. To engage with available designs and redesign requires both the disciplinary knowledge and skills and bodily discipline to engage in the redesigning process. The more sophisticated the available design, the more disciplinary knowledge is required and the more disciplined bodies need to be.

Perhaps a way to enable young children to take part in shared meaning-making during digital making would be to lower expectations about the media designs they might be expected to redesign. This requires consideration of the kinds of digital making children of this age already undertake on digital devices. The challenge is for ECEC professionals and researchers to pay close attention to the available designs young children are already redesigning on touch screen devices. Here, we would like to stress that age determines generally what are developmentally appropriate practices but equally important is to consider what is appropriate for all in the context of ever more critical factors of local diversity and differences of children’s (sub)culture, language and social class (NLG, 1996, 61).

Secondly, the findings show that access and availability to digital devices was an important contextual matter for the teaching and learning experience, which made the researchers’ role as an instructor pivotal. The findings suggest that learning multiliteracy within an emphasis on media culture and supported by recent digital technology can provide meaningful learning experiences, promote social participation and strengthen connection among children but not without guidance. In this context, it is worth of stressing that children will not learn to use new cultural tools such as tablet computers and smartphones on their own; they need guidance and support to use them effectively

(see Vygotsky, 1962) and to produce something original (see Wertsch, 1998). Thirdly, the findings show that innovative technology can mediate and enable social interaction: although children had limited experience of digital devices from previous learning experiences, their enthusiasm and open-mindedness created an atmosphere where shared meaning-making did take place, despite a degree of non-conformity in the class.

Nevertheless, achieving such learning goals as familiarising children with photo editing and stop-motion techniques, critical reflections on teacher's technology competencies and expertise and the way technology is applied and facilitated in early years settings should be made. It is concluded that while popular media culture has been integrated into early childhood pedagogy quite widely using favourite media characters in arts and crafts, drama or sports, digital technologies are not yet broadly used with young children pedagogically (Blackwell, Lauricella, & Wartella, 2016). Still, applying ICT in early years pedagogy is limited in Finland (see Salomaa & Mertala, 2019).

In this case, it was valuable that ECEC professionals detected that new technology can be applied with children, since they thought that challenges in children's behaviour would be barriers to the use of digital devices (see also Yelland, 2018). However, they still explicitly said that they would need more support in using digital devices because it is something new and strange and they do not have established practices to use these cultural tools in a pedagogical way. Indeed, Hesterman (2013, 159) has argued that the quality of children's ICT and multiliteracy experiences is entwined with teachers' pedagogical considerations. Similarly, the findings indicate that appropriate pedagogical practices, by which we mean strategies that take into account children's diverse needs and competencies and various contextual matters, are salient in the ways new technologies can enhance social interaction and collaboration.

In addition to aforementioned difficulties, the findings show that digital devices do not promote social interaction automatically; instead engaging with tablet computers and smartphones has some affordances that invite individual digital making. Kalantzis and Cope (2012) suggest that within studying meaning-making, the question of how meanings connect the persons they involve should be addressed. Any pedagogy that provides children with opportunities to be active meaning-makers with their peers is unquestionably desirable in early childhood education and care.

The concept of social participation is significant in multiliteracy pedagogy since it is considered an important means to pursue full and equitable social participation in society and democratic education (Cope & Kalantzis, 2009; NLG, 1996). Hence, ECEC professionals should be aware that when applying unfamiliar tools for making, the texts and designs must be rewarding and meaningful in themselves. Learning activities that are

too challenging can deconstruct participation by hindering children's agency. Using digital devices pedagogically and sustaining children's motivation and interest in designing with new technology, call for applying digital devices as resources for everyday meaning making. As Gilje (2011, 50) has suggested, these new cultural tools can only have an impact on learning and development when children use them. Opportunities for children to use digital technology for the purposes of constructing meanings and making sense of their media culture or the world around them requires that pedagogy of multiliteracies make use of digital devices long-term and in diverse ways.

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