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Lundtofte, Thomas Enemark; Odgaard, Ane Bjerre; Drotner, Kirsten

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Introduction

Recent research on childhood policies in the Nordic countries of Europe indicate that these policies are moving away from a focus on children's play, collaboration, and productive activities towards a focus on a more centralised curricular socialisation that marks most other European countries (Karila, 2012). Yet, there still exists a gap between policy transformations and practices. Theory-based empirical studies can help close that gap, in particular studies that are mindful of the fact that children's tools of learning are increasingly being digitised, be they playful and child-led or curricular and adult-directed.

Noting that children in the Nordic countries grow up within shifting socio-material networks and immersed with digital, meaning-making media, this chapter aims to help minimise the gap by asking: How do children's digital production practices evolve as playful, and often creative, collaborative processes? To answer this question is important because it provides empirical grounding that may help nuance often very binary policy discourses and actions.

So, the chapter takes a contextualised and processual approach analysing how digital media catalyse situated negotiations of meaning-making across groups of children, adults (professionals or parents). Such an approach is relevant because it provides nuances and complexities that may easily evade more compartmentalised studies focusing on individual children, on particular groups of adults (parents, educators, caregivers), or on digital technologies themselves.

In empirical terms, the chapter is based on findings from case studies conducted at three different settings in which Danish children (aged 5–8) engage in playful, and often creative, production practices: extramural film workshops, schools, and private homes. We define digital media as digital technologies that afford the joint shaping, sharing, and archiving of signs for semiotic meaning-making (words, text, images, and sounds). The modes of production involve, for example, stop motion animation, multimodal books, and productive in-game features.

Based on a brief outline of existing research, we analyse children's meaning-making production processes across the three settings. Highlighting commonalities and differences and relating playfulness and creativity in digital production processes, our findings demonstrate that children enact these processes as

socio–material negotiations vacillating between a making and breaking of social, semiotic, and material rules, and with a constant eye to keep a playful situation going. We then discuss the implications of these results and contextualise their implications for children's future learning and rights of expression.

Existing research

In the expanding research on children's digital production practices, two approaches stand out: one is technology-driven, the other child-led. Many technology-driven studies focus on a particular technology, be it born digital or made digital, such as tablet computers (tablets), mobile applications or books (Neumann, 2014; Noorhidawati, Ghalebandi, & Hajar, 2015); or they hone in on a particular technological feature or function such as printing, programming, texting, or tagging (Kafai & Burke, 2014). Being concerned with how digital technologies interact with their users, researchers often approach these issues from cognitivist design tradition or a human–computer interaction tradition where designing for individual usability, safety and enjoyment during production are key aspects of interest (Goldman & Kabayadondo, 2017).

Not least within education, this tradition has successfully expanded to include joint forms of interaction such as collaborative teaching, gamification, and computational literacy (Gee, 2003; Peppler, Halverson, & Kafai, 2016). Importantly, the technology-led approach demonstrates an increasing concern with the ways in which digital technologies may support joint construction and what has been termed productive learning where students are at the centre of attention, rather than reproductive, teacher-driven learning (Dede, 2010). Such a concern brings this approach closer to a child-led tradition of studying children's digital production practices.

The child-led approach typically departs from an interest in individual children, or in particular groups of children, and how they shape and share content through the application of a variety of connected digital media. Being concerned with technologically mediated meaning-making, many researchers have a background in media studies where users' engagement with semiotic modes of articulation is a well-established focus. With children's wide uptake of multimodal, multi-sited and interactive media in many parts of the world, increasing attention is now being paid to the ways in which young media users are also producers. This attention has pushed boundaries in media studies towards production practices and children's expression of voice across many sites and settings (Bennett, 2008; Drotner, 2020). The attention to youthful production practices equally informs media and information literacy education, although such practices are unevenly taken up due to the contentious position of children's rights of expression across the globe (Brown & Pecora, 2014).

Still, child-led approaches tend to underestimate the constitutive role played by media technologies in what Castells et al. (2007) have termed modern 'technosociality'. According to Castells, technologies, rather than being mere tools, mould our experienced environment in terms of socio-cultural relations, time, and space.

Hepp specifies this moulding as 'deep mediatization' (Hepp, 2020) concerning all elements of our social world.

Drawing on insights from technology-driven as well as child-led approaches, our point of departure is a holistic understanding of children's digital media production as contextualised practices of meaning-making with digital media unfolding across sites and settings as part of deep mediatisation. A holistic approach, it should be noted, does not imply collapsing all forms of digital media production into one and the same thing. Rather, such an approach must be attentive to nuances and complexities in how meaning is shaped, expressed, and shared. For example, when children interact hands-on with 3D printers in makerspaces meaning is shaped in 'the emotional, relational and cultural processes surrounding [the artefacts'] use and construction' (Blum-Ross, Kumpulainen, & Marsh, 2019, p. 4). In uncovering children's digital production, we are mindful of the dual articulation of meaning as a semiotic and social practice. Moreover, in our analysis we have been struck by the processual nature of digital production practices and by the often intricate relations between playful and creative aspects. So, these aspects are foregrounded in the following since they are as empirically important as they are theoretically understudied.

Materiality and meaning-making: a theoretical perspective

This chapter is informed by a materialist turn in cultural and social studies (Miller, 2005) and, particularly, by what may be seen as a bottom-up perspective on this turn, namely a growing interest in everyday practices (Reckwitz, 2002; Schatzki, 2001). While a focus on everyday activities and cultural performances is integral to anthropology, ethnomethodology, and microsociology, among others, an uptake of practice theory in more mainstream human sciences indicates a growing acknowledgement that 'social practices govern both the meanings of arranged entities and the actions that bring arrangements about' (Schatzki, 2001, p. 15). Practice theory is a meso theory positioned between macro theories of societal structure and agency and micro theories of individual perception and cognition. As such, it lends itself well to empirical analysis of digitally mediated group interaction as analysed in the following. Still, during our analysis we noted how our young informants' media production practices undergo various phases, so our study adds a concern for the processual, or temporal, aspects that few practice theorists address. This concern is an added reason why we prefer the term 'digital media' to 'digital technologies' in order to describe situated practices of meaning-making. By referring to digital media we hope to avoid a technology-driven perspective where 'the digital' translates into a catalogue of functioning parts, the perils of which have been discussed at length in previous media research (e.g. Couldry, 2004, pp. 123–124). Instead, we wish to signify the highly situated and dynamic nature of our object of study in conceptual as well as empirical terms.

In taking a holistic approach to youthful media production practices, we follow recent studies emphasising how these practices encompass dynamic entanglements

of contexts, material and non-material agents such as children, educators, parents, digital media and content (Livingstone & Blum-Ross, 2020). Importantly, our analysis is informed by recent research noting the importance of play in digital production practices (Burke & Marsh, 2013; Fróes & Tosca, 2018). Game studies has been an important catalyst in transforming cultural theories of play into the digital realm, relating concepts of play to concepts of gaming and widening the application of play beyond the realm of child development (Myers, 2010; Newman, 2008).

This widening has also implied an attention to activities that may not be defined as dedicated play practices, yet retain an inclination to 'put reality into parenthesis' so characteristic of play. Such an inclination is known as playfulness (Barnett, 1990; Sicart, 2014), a position taken in social interactions marked by pleasure and having fun together. We apply this widened concept to our empirical analyses since it eminently captures the often brief interludes where young producers create and share merry moments, for example by repeating particular phrases or exploring new ways of replaying sounds.

As is evident, the concepts of playfulness and creativity share a disbanding with instrumentality, perceived rules, and what is taken for granted. Not surprisingly, the two concepts are often discursively conflated or they are seen as different stages of personal development where 'childhood-play models, and perhaps scaffolds, adult problem solving and creative thought' (Banaji, 2011, p. 40). We hold that it is analytically advantageous to make a distinction between the two. Playfulness is a social practice that aims to extend the momentariness of fun and joint pleasure. Creativity is an ability and intention to promote change in terms of knowledge, application of tools or materials. Like playfulness, it is often enacted through social interaction, and playfulness may certainly be part of creative processes. This is why it is difficult to think of creativity without playfulness, while playfulness may evolve without creativity.

Our empirical analyses demonstrate how playfulness and creativity often co-exist in actual production practices. In some phases, children exercise playfulness through repetition or training of existing tools, skills, and rules of expression, while in other phases they exercise playfulness through a creative challenge to, or circumvention of, tools, skills, and rules. Following Vygotsky, we term these phases reproductive and combinatorial actions, respectively: '[A]ll human activity […] that results not in the reproduction of previously experienced impressions or actions but in the creation of new images or actions is an example of this […] creative or combinatorial behaviour' (Vygotsky, 1967/2004, p. 9). As is evidenced in the following, children, unlike adults, rarely display any normative grading of these phases, since their primary aim is often to facilitate and extend the joy of playfulness, be it creative or not. This is why it is important to map how such differences play out empirically across different settings.

Digital production at play: three settings

In this section, we present findings from three cases which emanate from major studies, all conducted in Denmark and addressing 5–8-year-old children's playful

and creative processes with digital media in different settings. The first case draws on an ethnographic study with three age bands of children (6–8, 10–12, 14–16, N = 171) conducted in 2015 at a film production facility located at the Danish Film Institute DFI) in Copenhagen, Denmark. The case represents the widest analytical perspective, since it maps the dimensions of creative production processes when 6–8-year-old children (N = 49) create stop-motion films (Drotner, 2020). The second case draws on a design-based study of digital co-production processes during children's transition from day-care to school and it involves 5–7-year-old children (N = 87) and their educators (N = 12) (Odgaard, 2019). The case zooms in on a primary-school setting where children are tasked with producing digital, multimodal books. The focus is on analysing educators' and children's respective perspectives on meaning-making in a formalised learning environment. The third case presents a micro-analytical perspective on an individual child and her interactions with a tablet computer in a private home setting. The study focused on how young children (N = 7) play with tablet computers, particularly with the highly popular *Ramasjang* app for young children, provided by the National Danish Broadcasting Company (Lundtofte, 2019). Using a video-based observational approach, the children in this study were not tasked with producing anything; rather, they were asked to show how they like to play with their tablet. In the context of this chapter, we present an empirical finding regarding three phases in one child's playful meaning-making with digital media.

The three major studies we draw on in this chapter were all conducted prior to the introduction of GDPR data regulation across the European Union. We followed general research ethical and data protection guidelines when generating and analysing data. This included obtaining care givers' written consent, introducing young informants in a child-friendly manner to process and objectives of the study and a constant attention to their reactions during interview and observation sessions (Dockett & Perry, 2011).

Importantly, the three studies on which the following cases are based follow different research designs, and our cases are not meant to form objects of comparative analysis. Rather, we aim to highlight commonalities and nuances of general points when it comes to empirical analyses of children's playful and creative meaning-making processes. These nuances include the important disentanglement of children's and adults' perspectives, the making and breaking of rules and the constitutive role played by different sites and settings.

Case 1: Interlacing social, semiotic, and material dimensions

This section focuses on how this meaning-making evolves through joint processes of creativity. As noted, our empirical site of analysis is the DFI, more specifically its

production facility for children, Film X. It runs four-hour workshops for children aged 3–16 (mostly during school hours), inviting children to 'strengthen their creative production skills and critical approach' to film in order to advance their 'digital citizenship' (Film X, n.d.). Film X offers five studios with green screens, sound editing kiosks, and a costume and make-up area. Two DFI guides are present as practical and technical facilitators of school classes that collaborate in groups of five to six, and visitors can take productions home for possible evaluation in class.

Data collection is based on participant observation of stop-motion film productions, generated by 6–8-year-old children, and including ad-hoc interviews with guides, educators, and some children as a means of exploring particular actions or choices during sessions. All data was analysed through coding iterations that involved optimising inter-coder reliability.

Our results demonstrate that joint processes of playful meaning-making interlace social, semiotic, and material dimensions of creativity. The social dimension is defined by children's playful interaction. While they join the Film X workshops as part of their school day, the children clearly define the location in opposition to curricular activities and as an opportunity to have fun. Most groups spend a good deal of time playing around with the various tools at hand, laughing with peers and focusing on 'tangible pleasures and meanings' (Tripp, 2011, p. 366) while making the most of available costumes and make-up kits, dressing up and extending delights of the moment. They circumvent the DFI guides' attempts to have them start production at their assigned studios, for example by emotional appeals to the entire group to keep playing: 'This is awesome as it is', seven-year-old Magnus claims.

The semiotic dimension of creativity illustrates how playfulness and having fun are drivers of children's narratives. This drive often serves to overrule guide-led preparation of storyboards, or what Fróes and Tosca (2018) call 'playful subversion' of narrative rules. Playfulness also means that children are quite egalitarian when it comes to negotiating different narrative claims. Many demonstrate considerable insights into the genre of animation when they discuss narrative options: 'It should be more Frost-like', as Alma, aged six, argues with reference to the popular Disney film. Yet, few uphold such claims if these challenge how the play can continue.

The material dimensions of creativity mostly concern technology. The children need help to handle the technical facilities, and they are not always happy about being dependent on a guide: 'We are just little kids and have never worked like this before', says Maria, aged eight, in order to justify to her group why they should accept adult demonstration of cameras for their stop-motion animations. They are less concerned with the material product, a finished film, than with the material properties involved in the playfulness of the moment.

Taken together, the social, semiotic, and material dimensions highlight that young children's creative processes evolve through playful collaboration. Results also document our theoretical point made above that playfulness can exist without creativity but not the other way round: 'having fun' is an overriding motor of child interaction and not a polished product of their own. Moreover, children's playfulness repeatedly challenges adult objectives and expectations: they explore social space as an extra-curricular leisure space; they overrule genre conventions if needed in order to uphold the conventions of interaction; and they are more concerned with process than product. This interplay of adult and child perspectives is particularly clearly illuminated in our second case.

Case 2:   Tensions between children's and educator's perspectives

In this section, we home in on 5–7-year-old children's co-production of digital books in school. The focus is on tensions between participants' perspectives in digital co-production processes within a formal educational setting. A data excerpt from a primary-school classroom exemplifies this focus.

An educator in the reception class, the first year of compulsory education in Denmark, has asked her class of 5–7-year-old children to seek out favourite things and places in their school environment, and to insert photos of these into digital books under the headline 'Our School'. The educator winds up her task instruction as follows: 'The important thing is that there are pictures, that something is recorded about the pictures, or that something is written about the pictures.' The children leave the classroom in pairs carrying tablets. Two children take the board game Wildcat from a shelf nearby, open the box and place its contents on a table: myriads of tiny picture pieces with photos of food, tools, animals, etc. Two more children join in; they all start picking pieces, excitedly sharing findings: 'Yeah, a hotdog!' 'We actually found the kitten!' A child then suggests: 'We'll find some unhealthy pieces, right?' Ice-creams and burgers are compiled, accompanied by the search for other appealing pieces: 'Yeahh! A treasure box!' 'A screwdriver!' Photos are inserted on pages in the books.

Suddenly, the educator enters the room. She looks at the scattered picture pieces with a frown: 'Ehm … why are you ehm… carrying on with this?' The children keep their activity going. The educator hesitates for a few seconds. Suddenly, a child replies: 'It's because …we take pictures of all the good stuff that one wants to have.' She shows the tablet to the educator who swipes through the book pages and asks the children to make voice recordings. 'You have made more than enough pages with

photos now,' she concludes. The children still keep their activity going. Then a child asks: 'Ehm … who has the most pages in their book?' The educator pauses, smiles and responds: 'I guess that you have.' The child makes a happy gesture. The activity continues for a few more moments, then the lesson ends.

As this excerpt demonstrates, the joint activity evolves through participants' recurrent negotiations. As the educator enters the room, a tension occurs between the 'authoritative' (Fróes & Tosca, 2018, p. 40) production task initiated by the educator, and the pleasure-driven playfulness maintained by the children. The educator seemingly assumes the children to be off-task and asks why they are 'carrying on with this'? The mutual hesitation, and the dialogue following it, makes this tension between perspectives endure rather than settle. The child's delayed response regarding 'good stuff … that one wants to have' does not entirely subvert the task of photographing favourite things at 'Our School' – though the Wildcat game was obviously not an intended element. Rather, the response displays the children's appropriation of the task by making it their own (Wertsch, 1998) through playfulness. When the educator enforces her original task by asking the children to start making voice recordings, this is completely ignored by the children. And as a child asks the educator who has 'the most photos', a potentially alternative objective of the task is installed – and notably one legitimising the children's photo-abundancy on new terms. Importantly, the educator does not reject this indirect suggestion, nor does she repeat her demand concerning voice recordings. Rather, she acknowledges the child-suggested premise with an affirmative answer. Thus, the excerpt shows children and educator upholding a durable tension between their diverse perspectives without conflating it into a one-sided dominance of either of the two. And while the digital product, in this case, will only partly meet the standards initially set by the educator, the children have managed to imbue their production process with playful intentions.

Case 3: Three phases in playful meaning-making with tablets at home

Our last empirical case introduces a recurring processual pattern of meaning-making strategies in young children's play practices with tablets at home: (1) exploration, (2) routine, and (3) digression. We turn to an example of the circumstances under which they were observed, focusing on when a shift appears meaningful to the child.

Five-year-old Emma turns her attention to a game called The Robot Workshop (provided by the National Danish Broadcasting Corporation). She taps on the icon that launches the game, looks at her mum, and smiles. Emma has played this game quite a few times as is visible when she navigates the interface and enters a 'trophy

room' where shelves are stocked with proof of her achievements. During this explorative 'rediscovery phase' she quickly familiarises herself with the game, making several remarks directed at her mum and the researcher. Subsequently, Emma enters the 'body shop' section of the game devoted to customising the robot avatar. She then concentrates on configuring the robot to her liking from the different available parts (Figure 15.1). After 30 seconds of customising her robot using different parts, she decides on a paint job and asks the researcher if he agrees with the chosen colour. He does, and Emma exits the body shop and enters the main game: an arcade-style metaphor for block programming.

Emma enters another short exploratory phase of refamiliarising herself with the controls, but she quickly sets into a routine of solving problems in ways that draw on her accumulated knowledge. During this second phase she observes and sticks to the affordances of the game, overcoming obstacles with her robot avatar using simple block programming. Yet, after some five minutes of the routine, she exits to the main menu. Here, she starts tapping an object, which prompts a sound, multiple times in quick succession. Emma's tapping causes the sound to cut off and replay several times, like scratching a record. In this digressive phase of playful meaning-making, Emma uses her knowledge of the interface in a combinatorial action, creatively steering away from the routine. She looks at her mum, smiles, and laughs.

Figure 15.1 Emma's customised robot.

The presented phases in play practices illustrate how variation keeps the overall playful practice going. Emma was able to settle into a routine afforded by the game in the game's 'arcade mode'. However, the effect of the routine wore off, so to speak, and Emma decided to interact with the game interface in a digressive way, where she playfully subversed (Fróes & Tosca, 2018) ancillary affordances of the interface in an apparent search of merriment. In this study it became clear that the meaning-making phases of exploration, routine and digression came in cycles, usually following that order. Additionally, digressive meaning-making often coincided with attempts to expand the immediate context of play, so as to include more people, as was the case in the example with Emma. Every so often, this digressive meaning-making would provoke parents to ask why the child was not following the apparent objective of the game/app. For instance, Emma's mum reacted to the digressive meaning-making with questions that indicated she thought Emma was being silly. Judging from Emma's proneness to laughing at these comments, it appeared they were contributing to making this sort of play work. In other cases, a child's digressive process would lead to parents expressing a strong interest in helping them return to the apparent affordances of the game/app through a series of micro-negotiations. These recurring processual phases and practices underscore how creativity, play, and production with digital media take place as processes of pleasure; processes in which the outcome of a production, in whichever shape or form, might not be a top priority for the child(ren) involved. In this sense, digressive meaning-making should be seen as children's creative approaches to making digital play work as playful subversion (Fróes & Tosca, 2018) through combinatorial practices (Vygotsky, 2004).

Discussion and conclusion

Our analysis provides a situated account of playfulness as a driving force in children's creative processes with digital media across diverse settings. As we have seen, understanding the nuances of meaning-making and, subsequently, creativity is paramount to adult (co-)facilitation of such processes. We have demonstrated that digital production encompasses social, semiotic, and material dimensions whose entanglements will often surface in negotiations between participants. Furthermore, we have illustrated how children's meaning-making processes with digital media often work in cycles of exploration, routine, and digression, contributing to similar findings in previous research (e.g. Fróes & Tosca, 2018). Digital media are cultural objects in situated meaning-making practices, and should not be reduced to their technological functions. The holistic approach taken in this chapter leads us to conclude that practices that may seem messy and playful for the sake of nothing but play, can in fact be part of a process that varies in relation to creativity. In relation to Vygotsky's combinatorial practices (2004), children seem to go through the phases, noted above, in developing and sharing knowledge of

how digital media can be valuable in relation to play, thus catalysing creative production as well.

Our findings underscore a need to respect the processual and relational nature of how children develop their agency in creative practices. If we remain focused on developing children's relationship with digital media using technology-centred and scholastic notions of creativity, we are likely to create obstacles for playfulness and thus minimise child-led creativity. However, children find ways of challenging adult agendas, and we are perhaps wise to understand these challenges as signs of children's appetite to employ their own agencies in creative practices. In line with these insights, educators must remain curious towards understanding children's use of digital technologies as sociomaterial meaning-making practices.

Finally, our results indicate that studies of children growing up in the Nordic countries of Europe offer a future lab for the formation of educational policies on such literacies. Media and information literacies are not merely about securing equity of technology access or privacy of use. Nor are they merely a question of formal training in computational thinking or critical media comprehension (Buckingham, 2019; Grover & Pea, 2013). Children apply digital media as collective means of expression and joint reflection, as ways of acting in the world and on the world. If adult society is to adhere to the UN Convention of the Child within a 21st-century framework, then media and information literacies must encompass sustained support of children's digital production skills. As the present chapter has shown, such support must be open to different sites and settings, to a variety of catalysing agents and to the serious work of play.

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