

THE HIDDEN CURRICULUM OF ICT AND THE SOCIAL BEHAVIOR OF YOUNG CHILDREN

Research paper

Tiilikainen, Sanna, Aalto University, Helsinki, Finland, sanna.tiilikainen@aalto.fi

Abstract

ICT can have unintended impacts on the social behavior of children, but knowledge about the mechanisms by which they unfold is limited. To fill this gap, this paper examines the social behavioral impacts of ICT on young children (under seven-year-olds) who are in a critical developmental period for learning their basics of social behavior. This paper focuses on the ways in which ICT encourage them to modify their turn taking, the fundamental mechanism for conducting social behavior. Analyzing qualitative video data from real life child-computer interactions and parental interviews, these modifications are summarized as the hidden curriculum of ICT. Two dynamics unique to ICT interaction, the reprehension-free breaching of social expectations and the unlimited repetition of interactions, facilitate young children internalizing these modifications, with dual impacts on their social behavior. The negative impacts stem from the hidden curriculum of ICT desensitizing young children to the situational expectations of their social surroundings. The positives emerge from it promoting resilience sustaining social behavior in general. These results implicate that harnessing the hidden curriculum of ICT is important, especially when designing ICT for young children, because the conducts of social behavior internalized before the age of seven can persist for life.

Keywords: Young children, Hidden curriculum, Video analysis, Turn taking.

1 Introduction

Today, information and communication technologies (ICT) occupy a prominent place in our social life as the everyday life is increasingly intertwined with them (Hess et al., 2014). Also the children of the digital age are avid users of ICT. Starting from their very first years in life, children are growing up with and around ICT, often interacting with them up to several hours a day (Olson, 2010; Read and Markopoulos, 2013; Repo and Valkonen, 2017). According to the increasing evidence from the research on child-computer interaction (CCI), ICT can have unintended impacts on the social behavior of children (Antle, 2013). These can be both positive and negative (Ferguson, 2007). The positive impacts include facilitating interaction and prosocial (benevolent) behavior while examples of the negative are increasing social misconduct and schism (Cho and Lee, 2017; Greitemeyer and Mügge, 2014; Tiilikainen and Arminen, 2017; Tiilikainen and Tuunainen, 2014). According to the current research, the negative evidence outnumbers the positive (Cho and Lee, 2017).

Childhood defined as the time period from the birth of an individual until reaching adulthood, comprises important developmental objectives, including learning how to participate in social behavior (Mead, 1962). Here, especially the first six years of life are critical: during this period, young children (under seven-year-olds) internalize the basics for their lifelong ways of interacting and any unintended influence may alter this process with long term consequences (Mead, 1962). Today, also the lives of these young children are intertwined with ICT (Repo and Valkonen, 2017). It has been suggested that stemming from the critical period young children are in, their social behavior can be especially prone to the unintended impacts of ICT (Turkle, 2015). As ICT feature prominently in children's studying, playing and socializing today, they have potential to affect children's developmental outcomes, including social behavior (Straker and Pollock, 2005; Tan et al., 2011; Tiilikainen and Arminen, 2017; Tiilikainen and Tuunainen, 2014; Turkle, 2007; Wang et al., 2013).

At present, the impacts of ICT on the social behavior of children are understudied in IS research (Halkola and Iivari, 2014; Vodanovich et al., 2010). However, researching them is important, because concerns about the unintended, negative impacts, are increasingly voiced in many contexts, including academic research, education, health, municipalities and ICT design (Cho and Lee, 2017; Nusheen et al., 2016; Rosenstein and Sheehan, 2018; Turkle, 2015). Children are minors, they represent a substantial user group for ICT and evidence about the negative impacts of ICT on their social behavior is increasing (Antle, 2013; Azah and Aziz, 2013; Fang et al., 2011; Friedman et al., 2008; Moser, 2013; Nolan and McBride, 2014). Based on the negatives, it has been suggested that children's interactions with ICT, especially those of the young ones, should be closely monitored and regulated on parental, municipal and governmental levels (Nikken, 2017; Nusheen et al., 2016; Zhan and Chan, 2012). However, in practice, this has proved difficult (McClure et al., 2015), for example because of parents fearing that restricting children's ICT use would compromise their skills required in the digitalized society (Olson, 2010; Read and Markopoulos, 2013; Tiilikainen and Tuunainen, 2014; Wang et al., 2013). Further, ICT are increasingly easy for children to access and use. Therefore, even the young children can use them independently, out of sight of their parents, making it difficult to control when and how they use ICT (McClure et al., 2015; Tiilikainen and Tuunainen, 2014). ICT design has been suggested as one option for mitigating the negative impacts while facilitating the positive (Gunter et al., 2008; Simões et al., 2013; Straker and Pollock, 2005). Examples include teaching children empathetic social behaviors (Simões et al., 2013; Tan et al., 2011, 2016), or encouraging them take group leadership, as a way of getting ahead in games (Olson, 2010). However, the unintended impacts of ICT tend to emerge, by definition, unexpectedly, following covert mechanisms unrelated to the explicit design aim of ICT (Antle, 2013; Greitemeyer and McLatchie, 2011). Therefore, anticipating them is difficult, unless the covert mechanisms behind them are revealed (Antle, 2013). Currently, there is lack of knowledge about these mechanisms and more research is needed, to help avoiding the negative impacts and advancing the positive (Antle, 2013).

In this paper, I address the abovementioned gap with a qualitative study. I focus on young children, because they are in the critical developmental period for internalizing the lifelong basics of their social behavior (see Mead, 1962). As today, the social environment of young children comprises both humans and ICT (Cho and Lee, 2017), I examine the social behavior of young children with and around ICT. I approach social behavior as a multimodal, micro interactional phenomenon. Here, multimodality means that I view social behavior comprising both verbal (such as spoken words) and non verbal (such as gestures, body positions and gaze) interactions that are all meaningful ways of conducting social behavior (Jokinen and Wilcock, 2014; Stivers and Sidnell, 2005). Micro interactional means viewing social behavior as empirically observable phenomenon, comprising series of individual (micro level) turn takings between the participants (Mead, 1962; Sacks et al., 1974). Turn taking is a fundamental, structural mechanism individuals apply for regulating interaction and understanding each other (Sacks et al., 1974; Stivers et al., 2009). Turn takings are consequential to social behavior (Mead, 1962). This means that the ways of taking turns by one individual are interpreted in relation to the ongoing social behavior by the other(s), who then respond by adapting their subsequent turns accordingly (Mead, 1962). I ask the following research questions: *RQ1: How do ICT impact the social behavior of young children during CCI? RQ2: How do ICT impact the social behavior of young children around CCI?* To answer these, I examine the social behavior of young children, unfolding as turn takings during and around real life CCI, supplemented with parental interviews. To summarize and discuss my findings, I adapt the concept of hidden curriculum, defined as covert learning objectives accompanying pursuing an explicit learning objective, from education studies (Jackson, 1968), to social behavior with and around ICT.

This paper is structured as follows. First, I give an overview of literature about the impacts of ICT on the social behavior of children, followed by a chapter on the theoretical perspective and concepts. After that, a section about my research method, data and analysis follows. Next, I present my findings. After discussing the findings, I close the paper with limitations, further research and conclusions. My work makes a contribution to CCI (Antle, 2013; Straker and Pollock, 2005) by revealing the hidden curriculum of ICT and the ways in which it impacts the social behavior of young children.

2 Related Literature

ICT can have positive impacts on the social behavior of children. Examples include them promoting social learning and increasing interaction (Eynon and Helsper, 2014; Simões et al., 2013), staying in contact with and feeling close to peers (Andrade, 2014) and dispersed family members (Anthony et al., 2015). ICT can also mitigate tensions between parents and children by facilitating constructive interaction between them in face-to-face (f2f) settings (Golsteijn and den Hoven, 2011). However, the impacts of ICT on the social behavior of children are not always positive (Connolly et al., 2012; Sawyer, 2012; Straker et al., 2009). The negatives include game and smartphone addiction disrupting relationships with peers and family (Cho and Lee, 2017; Turel et al., 2016; Zhan and Chan, 2012), the formation of group norms and peer pressure facilitating cyber-slacking (extracurricular Internet usage) in classrooms (Gerow et al., 2010), coming to prefer ICT interaction to humans with voluntary social isolation (Cho and Lee, 2017) and decreasing motivation and skills for human f2f interaction in general, risking withdrawal and social offence (Turkle, 2015; Uhls et al., 2014).

ICT can impact the social behavior of children even within a short time (Saleem et al., 2012). Examples include one session of playing violent games increasing violent attitudes and the risk for violent behavior for those susceptible, and prosocial games facilitating prosocial attitudes and behavior, such as collaboration, volunteering and helping others (Ferguson, 2007; Granic et al., 2014; Greitemeyer and McLatchie, 2011; Greitemeyer and Mügge, 2014; Saleem et al., 2012). Interacting with ICT may also decrease empathy and suppress the nonverbal interaction skills of children, but a reversal effect can take place when a break of a few days is taken from using them (Uhls et al., 2014). Children may identify themselves with the game characters, to the point of copying their behaviors in real life (Konijn et al., 2007; Saleem et al., 2012) and affecting their perception of themselves as social beings (Bowman et al., 2012). Children's frequent interactions with ICT are associated with long-term social behavioral problems, such as peer conflicts and reduced prosocial abilities, but the causality between these, or the mechanisms by which these unfold have not been researched, yet (Pujol et al., 2016).

Stemming from their developing social skills, the social behavior of young children may be especially prone to the impacts of ICT (Antle, 2013; Cho and Lee, 2017; Straker et al., 2009). Young children are often drawn to ICT and voluntarily spend long periods of time with them, role-playing, learning the rules of the games and simultaneously repeating their interactions with ICT over and over again (Straker and Pollock, 2005; Tan et al., 2011). These may affect their social development (Cho and Lee, 2017). On one hand, ICT can help young children develop relationships also with those not present f2f (McClure et al., 2015). However, they may also develop problematic social behaviors that are against the norms and ethics of their surroundings, such as preferring ICT and isolation to meeting other children and objecting parental authority (Cho and Lee, 2017).

As a summary, ICT can have positive and negative impacts on children's social behavior, over the whole childhood. The existing research tends to focus on children older than six, with the exceptions of McClure et al. (2015), Tiilikainen and Tuunainen (2014) and Cho and Lee (2017). The related mechanisms have been studied as learning the explicit social objectives in educational ICT (Simões et al., 2013), copying in-game behavior to real life (Konijn et al., 2007), neural changes originating from ICT overuse (Pujol et al., 2016) and parents socializing their children to the acceptable uses of ICT (Tiilikainen and Arminen, 2017). Less is known about the mechanisms by which ICT may impact children's social behavior implicitly, such as altering the ways in which individuals pay attention to each other, in ways that are viewed as socially offensive (see Krasnova et al., 2016; Tiilikainen and Arminen, 2017). As the years before the age of seven comprise a critical period for internalizing the long term basics of social behavior (Mead, 1962) and children spend time with ICT during these early years (Repo and Valkonen, 2017), I suggest that inspecting the implicit social behavioral lessons young children may be learning from ICT, can be help understanding the impacts of ICT on the social behavior of children, during their early years and beyond.

3 Theoretical Perspective and Concepts

To bring forward the salience and the emergent nature of the recurrent, micro level turn takings with human(s) and/or ICT and the adjoining interpretations in shaping the social behavior of young children, I draw from the literature on symbolic interactionism (Aakhus et al., 2014; Charon, 2007; Mead, 1962), turn taking (Sacks et al., 1974; Stivers et al., 2009) and hidden curriculum (Jackson, 1968).

3.1 Symbolic interactionism

Symbolic interactionism is a theoretical viewpoint focusing on how humans learn about social behavior by engaging in real life interactions with their social surroundings, interpreting the outcomes and constructing symbolic meanings about social behavior accordingly (Mead, 1962). The idea of symbolic interactionism is that humans act guided by these symbols as meaningful representations of those things they have encountered before, whether concrete ones, such as a tablet computer, or abstract ones, such as the appropriate ways of behaving in social situations (for example, whether it is rude to turn your back to someone when talking, or not) (Aakhus et al., 2014; Charon, 2007).

According to symbolic interactionism, every time individuals engage in interaction, they interpret the social consequences of their interactions as positive, negative or neutral, and orient their future actions accordingly (Mead, 1962). This is the mechanism by which, over time and cumulating experience, things acquire their symbolic meanings (Charon, 2007; Mead, 1962). For example, for an individual, the gesture of hand waving can have a symbolic meaning as a viable social behavior for getting the attention of others if it has been working such way in past. Symbolic meanings serve as a guide for individuals interpreting the current social situation and choosing the appropriate ways of behaving in it (Mead, 1962). As symbolic meanings are constructed in interaction and interpretations, the outcomes of this process are emergent, not based on copying behavior neither determined in advance (Mead, 1962). However, theorizing on them is possible by focusing on the recurrent dynamics in interaction, with the adjoining tensions, tendencies and preferred responses by the participants (Mead, 1962).

Also young children learn how to take part in social behavior in real, micro level, multimodal interactions between them and their social surroundings (Mead, 1962). Young children are still developing their symbolic meanings with repetition, when playing, gaming and interacting and they tend to generalize those symbolic meanings they already have, across social contexts (Mead, 1962). By interpreting their cumulative feedback and constructing symbolic meanings accordingly, young children infer the fundamentals of how to behave in social situations, over their first six years in life (Mead, 1962). This way, although individuals keep constructing symbolic meanings throughout their lives, the first 6 years of life comprise a special, critical phase for the future social behavior of an individual: here, a young child forms the basics for his/her lifelong ways of interacting later deemed as “natural” (Mead, 1962; Sidnell, 2007). Therefore, it is important to internalize the well-adjusted basic conventions for conducting social behavior before the age of seven, as shortcomings in these can be resistant to change later in life and risk an individual for lifelong social maladjustment, such as difficulties in establishing and sustaining social relationships (Mead, 1962; Tan et al., 2011, 2016).

3.2 Turn taking

As the social surroundings today comprise humans and ICT (Hess et al., 2014), I suggest that exploring the micro level details in real social behaviors and their interpretations by both humans and ICT, can help in understanding the impacts of ICT on the social behavior of young children. To this end, I focus on turn taking, a mechanism comprising the structural properties of social behavior in interaction (Sacks et al., 1974; Stivers et al., 2009). Turn taking coordinates social behavior, helping individuals figure out who does what, when and why (Stivers et al., 2009). It keeps social behavior orderly, helps individuals understand each other and avoid social offence and conflicts (Sacks et al., 1974).

Turn taking comprises a set of behavioral principles applied in interaction, based on interpretation and learning (Sacks et al., 1974). These are deemed universal although with some cultural variation, such as what constitutes a pause or an overlap in conversation (Stivers et al., 2009). The principles include

that in interaction, *only one individual is supposed to have a turn at a time* and the *one who has started a turn has a right to finish it*, before the other(s) can take the next turn for themselves (Sacks et al., 1974). The beginnings and endings of turns are constructed with *transition relevant places* that allow individuals to figure out when the previous turn is finished and infer the socially appropriate moments to take the next turn, or end interaction (Sacks et al., 1974). Individuals monitor the turns of each other to find these, synchronizing their future interactions accordingly (Sacks et al., 1974). Pauses in speaking and gesturing signal that a turn can shift (Stivers et al., 2009). *Overlaps*, where more than one individual is talking at the same time *are deemed problematic*, because they can blur turn taking organization, making it unclear, how to continue (Schegloff, 2000). When an overlap occurs, individuals attempt to resume the one at a time organization by first evaluating the situation (for example by pausing talking) and then by either defending their turn (for example by raising their voice or using assertive body language) or by giving it up (Sacks et al., 1974). The last principle of turn taking, *“violations are reprehensible,”* means that disregarding the principles is deemed socially offensive and subject to reprimand, encouraging individuals to comply with the principles (Sacks et al., 1974). Table 1, below, summarizes these principles, drawing on Sacks et al., (1974) and Stivers et al., (2009).

Turn taking principle	Description
1: One at a time	Only one individual is to have a turn for him/herself at any given time
2: The starter finishes	The individual who has started a turn, has the right to finish it, before the other individual(s) can take the next turn for themselves
3: Transition at transition relevant places only	An individual can take a turn for him/herself, or end interaction, in transition relevant places
4: Overlaps are problematic	Individuals deem overlaps in turns problematic and try to avoid them
5: Violations are reprehensible	Violating turn taking principles is deemed offensive and can lead to the offending party being subject to reprimand

Table 1. Principles of turn taking

Turn taking applies to interaction between individuals and individuals and objects (Sacks et al., 1974), such as ICT that are the focus of this study. However, its social expectations vary according to the responsiveness of the other party (Kallinikos et al., 2013; Mead, 1962). Stemming from their interactivity, ICT are more adaptive in their responses than the objects with fixed responses, such as books (Kallinikos et al., 2013). Nevertheless, many ICT in use today are operating based on their predefined responsive logic (Jokinen and Wilcock, 2017; Kallinikos, 2009). Although the conversational capabilities of ICT are advancing fast, at the time of writing, conversational artificial intelligence solutions and social robots are not yet widely available for young children (Jokinen and Wilcock, 2014, 2017), besides the digital, voice controlled digital assistants of Apple and Google. Most ICT within reach of young children today, are not responding to the social surrounding the same way as humans: the touch and mouse-controlled ICT and the voice-controlled social robots are not adapting to the implicit, emergent social expectations of interaction up to the same detail as humans (Darling, 2017; Kahn et al., 2012). Nevertheless, because of their developing perceptions of social behavior and ICT interactivity, young children tend to perceive ICT as “a little bit alive,” responding to them in ways resembling the conventions of human interaction (Darling, 2017; Kahn et al., 2012; Turkle, 1984, 2007).

3.3 Hidden curriculum

To address the role of ICT repeatedly encouraging some ways of taking turns over the others in CCI, thereby impacting social behavior and the symbolic meanings constructed in it, I adopt the concept of hidden curriculum, originating from education studies (see Jackson, 1968), to ICT. In education studies, a hidden curriculum is defined as covert learning objectives (such as the behavioral pattern and preference to do one’s homework carefully) accompanying and affecting the pursuing of the official curriculum, defined as the overt learning objectives (such as learning calculus and thus achieving good grades at mathematics) (Jackson, 1968; Snyder, 1973). A hidden curriculum can be present also in

everyday life (Bourdieu, 1984). An example is an individual internalizing the distinctive ways of speaking and behaving that is identifiable to one's social circle, as a by-product of interacting with his/her family, friends and peers (Bourdieu, 1984). A hidden curriculum impacts behavior through repetition and learning (Jackson, 1968; Snyder, 1973). It can have lifelong impacts on the social behavior of an individual, both negative and positive, beyond the area where it was internalized (Giroux and Penna, 1979). An example of its negative impacts is an individual internalizing social behaviors that support interaction only within a limited social circle, making it harder for him/her to make friends or work outside that social circle (Willis, 1978). However, a hidden curriculum can also augment the interactional capabilities of an individual, especially if it is present from the early childhood, so that the individual can internalize it as s/he is growing up (Bourdieu, 1984). In the digitalized education of today, ICT are part of the official curriculum, also for young children (Hoda et al., 2014; John and Sutherland, 2004; Nolan and McBride, 2014). Here, ICT may contribute to a hidden curriculum in learning, because of the ways in which they present, promote or block information, altering the learning practices and outcomes of those who use them (Edwards, 2015; Nolan and McBride, 2014). However, to the best of my knowledge, the hidden curriculum of ICT in the context of the social behavior of young children has not been researched in IS.

The challenge in managing a hidden curriculum lies in its implicitness (Giroux and Penna, 1979). Because the hidden curriculum not a part of the official the learning objectives, it cannot be controlled unless it is made explicit with research and aligned with the official curriculum (Jackson, 1968; Kentli, 2009; Snyder, 1973). Discovering a hidden curriculum can be challenging because it tends to manifest in subtle ways, but studying the fine details of interaction can help discovering it: a hidden curriculum can reveal itself in social interaction, for example with the participants reinforcing or disapproving some ways of behaving over the others (Kentli, 2009). Therefore, inspecting interaction and paying attention to those aspects that appear unexpected, unintentional or somehow "out of place," can be used to identify a hidden curriculum (Kentli, 2009).

4 Empirical Study

My research interest calls for new knowledge about CCI and its emergent relationship with the social behavior of young children, with its adjoining symbolic meanings, unfolding in turn taking during and around CCI. Therefore, I conducted a qualitative study, as recommended by literature (see Babbie, 2010; Myers, 2013; Walsham, 2006).

4.1 Research setting and data collection

The dataset for this study was collected between November 2013 and December 2013 in Finland, by visiting the homes of 10 families with at least one young child. This research was conducted in collaboration with Yleisradio (Yle), a public service organization, for a joint research and development project. Yle and a commercial consumer research agency recruited the participants. As the children younger than three have limited motor dexterity for interacting with touch and mouse based ICT (Chiasson and Gutwin, 2005), the focus ICT of this project, 3-to-6-year-olds were recruited. The sample included five 3-to-4-year-old children and five 5-to-6-year-old children, both boys and girls. The visits took place in various cities around Finland, with the author visiting five families and a researcher from Yle visiting the other five. Each visit lasted around two to three hours and was video recorded with two cameras: a stationary one for recording overall social behavior around CCI and a hand-held one, used by a research assistant, for zooming into the details of CCI and documenting ICT screen capture. After the visits, the author got access to all data.

Young children are in the process of learning symbolic thinking and internalizing the social requirements (such as preferred social behavioral patterns) of their surroundings (Harris, 1995; Mead, 1962). They often cannot verbalize these, yet (Antle, 2013). Therefore, during the visits, they were not interviewed but were offered their favorite ICT and also the tablet computer of Yle (see Fig.1, below), to record real life CCI. They were also given a chance to express their ICT related social preferences and symbolic meanings over a play session with the visiting researcher (see Druin, 2002; Fails et al.,

2013). Here, the researcher role was pretending not to know anything about ICT but ask the young children what they doing and why and how the researcher could achieve the same results.



Figure 1. Start screen of the Yle tablet computer provided for young children during the visits

The social behavior of young children affects their parents and siblings at home (Mead, 1962). Therefore also parents were interviewed with a semi structured interview guide, to discover their views about their young children's social behavior around ICT. To avoid priming the parents to view ICT impacting the social behavior of their young children (see Babbie, 2010), especially as the noncompliance to the expectations of turn taking is often seen as negative (Stivers et al., 2009), they were not asked directly about it. Instead, they were asked to describe their young children's most and least favorite ICT, the ways and times of using them, any positive and negative experiences, potential preferences, restrictions and issues related to ICT, as well as describe their family life and relationships with and around ICT, in general.

Researching young children and video recording home environments, requires ethical planning (Kahn et al., 2012; Moser, 2013; Rounding et al., 2013). For this research, an ethical plan adhering to the RESPECT code (CORDIS, 2004) was made and approved by the Yle representatives before the family visits. The main points of this plan included parents signing informed consent forms for their young children and receiving a copy declaring their rights. During the visits, the focus was in ensuring that the research was not harmful for the participants. The young children could decide themselves whether to participate and if, how and for how long to attend to ICT. They and also their siblings could exit and re-enter the research situation at will. To make them feel safe, one parent stayed in sight. However, the parent was asked not to take part in the turn taking between young children and ICT, unless the young child insisted. During visits, the young children were monitored for any signs of discomfort or getting tired, to avoid stressing them. When asking questions, special care was taken to keep the situation play like and not to press the child to engage in CCI, or insist on them answering questions, because children can easily perceive adult strangers as authority figures and feel threatened by them (Druin, 2002; Fails et al., 2013). Data excerpts in this paper were anonymized by replacing the young children's names with pseudonyms and cropping the pictures to include only ICT and the hands of young children, excluding any facial features and background details, as recommended by LeBaron et al., (2017).

4.2 Analysis

I started analysis by writing summaries of each family (such as the ages of the parents, the number and ages of children, ICT the young child has access to, experience with them). With video data, I could repeatedly observe the minute details of social behavior between young children, ICT, the researcher and the occasional parent or sibling, as they took place in real life during and around CCI (see Mondada, 2008). This approach reveals how social behavior unfolds and how its tiny details are consequential, yielding tangible outcomes for social behavior (LeBaron, 2005). For analyzing video data, I used multimodal interaction analysis (Andrade et al., 2015; Bezemer, 2014; Heath et al., 2010; Jewitt, 2014), combined with literature on examining social processes (Avgerou, 2013; Langley, 1999; Schegloff, 1996). Multimodal interaction analysis investigates social behavior as series of micro level turn takings, taking into account both the verbal (speech) and the non verbal behaviors (body language, such as gestures the individuals use with and around objects) (Goodwin, 2000, 2007; Streeck et al., 2011). It can be used to reveal how ICT are consequential to the interactional turns and therefore to also social behavior (Jordan and Henderson, 1995). To uncover the how the symbolism of ICT looks

like when seen through the eyes of the young children, I broke down their social behaviors during and around CCI into the detailed processes of turn takings, classifying them according to the principles in Table 1. I documented these by taking video clips and screenshots, according to the guidelines of Langley (1999) and Schegloff (1996, 2007). Here, I paid attention to the antecedent condition before a turn started (including the application used or not any being chosen yet), the initiator of a turn (the young child or ICT), its multimodal cues (such as the finger of a young child accidentally dragging the screen, or a popup screen, picture, written text, sound or an animation appearing on screen), the proposed symbolism of ICT (such as an arrow hinting where to drag or press) and how the young child received this symbolism (such as pressing the arrow, or pressing around it on screen, or exiting the application by pressing the home button). With further screenshots, I documented the subsequent turns as well their outcomes (such as the young child getting rewards or losing them, becoming upset or delighted, sustaining interaction with the researcher or withdrawing, ICT getting stuck or starting to load) and the post condition of this process (such as the young child continuing with the same or another application, or stopping CCI). Next, I compared these processes with literature on turn taking between humans (see Sacks et al., 1974; Stivers et al., 2009). I write down any differences, where they originated and what kinds of symbolic meanings they encouraged the young child to attach to the turn takings (such as comprehending pressing home button as “a viable way of getting forward when stuck in CCI, by resuming interaction”). Here, if a young child was rewarded (such as getting ahead in a game) by a certain kind of turn taking, I concluded that a symbolic meaning of that turn taking as a viable way for participating in social behavior was being reinforced, and the other way round.

For analyzing the parental interviews, I used content analysis, (Krippendorff, 1980). Here, my goal was to find if and how the parents described young children generalizing (see Mead, 1962) their social behavior during CCI to humans around CCI. To this end, I transcribed interview data and classified parental accounts into categories, based on them matching or contrasting with the turn taking processes I observed in video data during CCI. I summarized the parental views about the social behaviors in each category, paying attention to their ways of describing them (such as the parent viewing a young child breaching a turn of his/her parent as being “rude”). Based on these, I classified each parental view within the categories as positive, neutral or negative, including the reasoning given for them.

I collected cumulative evidence about the social behaviors of interest (see Langley, 1999; Schegloff, 1996). For validating my analyses, I used the data session procedure from conversation analytic tradition (Knoblauch, 2006). This included showing four video clips representative of my findings, to groups of multimodal interaction analysis experts over two data session meetings, as recommended by Jordan and Henderson (1995) and Have (2007). Here, the experts first watched the videos and gave their interpretations of the social behavior included, without being informed about my views. I told my interpretations last and we resolved any differences by discussing them until 100% agreement.

5 Findings

The families visited have several ICT their young children have access to, including laptops, tablet computers, smartphones and their applications. The young children tend to interact with ICT daily and independently, from 30 minutes to three hours a day. The parents say they insist their young children use benevolent, age appropriate applications only. Especially the touch technologies (tablet computers and smartphones) are easy for the young children to learn and use.

5.1 ICT and the social behavior of young children during CCI

During the visits, the young children were eager to engage in CCI with their tablet computers and smartphones, as well as the tablet computer provided by Yle. Some of their favorite apps included HelloKitty, MyLittlePony, AngryBirds, SubwaySurfer and P2 (Finnish public service website for young children). None of the young children studied could yet read or write.

I found that young children struggle in coping with the social symbolism of ICT, such as the meaning of text, arrows, colors, loading signs and animation loops featuring human or cartoon characters. The

youngest ones have most trouble. Not understanding the symbolism and faced with unpredictable turn taking outcomes in CCI as a result, can lead to the young children treating these symbolic elements of ICT as social actors, with intentionality of their own. These struggles in turn taking and the ways in which young children resolve them, can lead to them modifying their turn taking to get forward in CCI. This process influences their emerging symbolic meanings of turn takings as ways of taking part in social behavior, based on the outcomes. Especially the youngest ones (3-to-4-year-olds), tend to initiate turns in CCI along to the principles of turn taking, such as waiting for ICT to stop its turn for a transition relevant place to turn up, or pause their turn in case of overlapping activity by ICT. However, finding these efforts futile, they soon grow impatient and start demanding a turn for themselves. They can attempt interrupting the turn of ICT, either by trial and error, such haphazardly pressing or swiping something on the screen, or by deliberately pressing the home button, for example. While the former technique provides only occasional success, the latter tends to grant the turn to the child. Even the youngest know the outcome of pressing home button in advance and are able to verbalize or act it out when asked. Using the home button, followed by initiating a novel turn (whether resuming the same application or by opening a new one), is a routine and recurrent way of demanding a turn for all the young children. However, the 5-to-6-year-olds appear more adapted to coping with the social symbolism of ICT by modifying their turn taking: they tend to bluntly and recurrently interrupt ICT, without hesitation, to demand a turn for themselves. They can even make fun out of ICT by deliberately interrupting them. Fig.2, below, illustrates young children coping with the social symbolism of ICT.

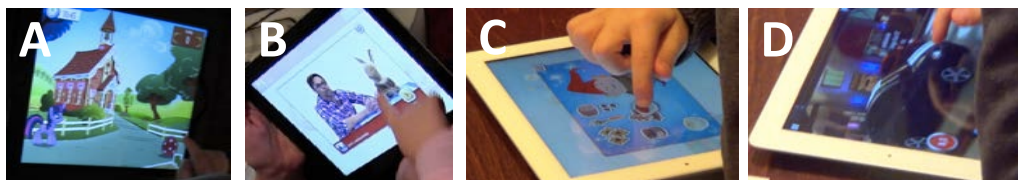


Figure 2. *Young children coping with the social symbolism of ICT*

As an example of the ways in which the 3-to-4-year-olds cope with the social symbolism of ICT, in Fig.2A, Lisa (pseudonym), 3y, has opened an application, where she can play ball with a pony figure, by setting the ball in motion by dragging and releasing her finger on screen. A swaying arrow is pointing towards the ball, symbolizing intended user action. Lisa does not understand the symbolism, but declares: “look, the pony plays ball.” When asked whom the pony is playing with, she answers “the arrow plays.” She tries to participate by randomly slapping the screen, accidentally sending the ball flying and repeating: “the arrow plays.” This way, she is giving both the arrow and the pony a symbolic meaning as social actors, who initiate interaction and have social intentions of their own not dependent on Lisa’s actions. With Lisa hesitating, the pony starts to jump up and down, symbolizing its eagerness to keep on playing with her. Lisa notes this but does not understand this symbolism, either. She says: “look, the pony jumps. Why is it jumping?” Not getting an answer from the pony, which keeps on jumping, or the “unskilled” researcher, Lisa decides to ignore the pony and concentrate on catching the ball. This has no effect on the pony or the arrow, which keep on playing together, any time Lisa’s finger accidentally sweeps the ball on screen. As the pony and the arrow keep up their turns incessantly, no transition relevant places become apparent to Lisa for initiating her turn. As a consequence, breaching the turns of the pony and the arrows appears the only viable option for her to eventually get a turn to herself. For Lisa, this process encourages symbolic meanings of the multiple, simultaneous and overlapping turns of herself, the pony and the arrow as normal and breaching them as rewardable: to her, as it appears that she does not have to pay attention to the social cues of the pony or the arrow when initiating her turn. In Fig.2B, Lisa has opened a storytelling application, where human narrators pop up and give spoken cues for interaction in Lisa’s mother tongue (Finnish), such as saying “come with me to explore the magic forest, push a sign to select,” accompanied by inviting gestures, such as smiling, nodding and hand waving. Not wanting to act on these, Lisa keeps on breaching ICT’s turns within seconds, mid sentence and mid gesture, by pushing the home button and starting anew by reselecting the same application from the start screen. This too, is inconsequential to their social behavior, as the narrators just keep popping up the same way, not manifesting any signs of

offence or irritation for these countless interactional repetitions, or their turns being cut off. From Lisa’s point of view, this encourages a symbolic meaning of these breaches as not having to wait for the others to finish a turn before taking a turn for herself, reinforced by the accompanying swift and unlimited repetitions. To her, also these violations appear rewardable, as this way, she can keep on exploring the application at her own pace, without having to wait for ICT to finish their turns first.

Fig.2C illustrates a 5-to-6-year-old coping with the social symbolism of ICT. Here, Marcus, just about to turn 7y, is using an application where an elf can be fed by dragging and dropping food on him. Amused, Marcus says he has previously been “feeding the elf even with rocks and he ate the whole ham. He eats it all, just like that.” On screen, the elf keeps devouring stacks of potatoes and cartons of milk offered by Marcus, the same way, over and over again. Eventually getting bored with the feeding, Marcus pushes the home button, interrupting the elf mid munching. He proceeds to exploring his options with the application the same way as Lisa did with the storytelling one, by breaching ICT’s turns with the home button and starting anew at will. In Fig.2D, Marcus has opened his favorite car racing application, explaining his social relationship with its symbols: ”this is my car (pointing at Car1) and here is my opponent that I have never won (Car2, a computer generated character). Now, I try to win my opponent.” This way, Marcus treats Car2 as a social actor, but unlike Lisa, who hesitated at times, Marcus just ignores the multiple, overlapping social cues of ICT, such as a human like game character winking at him while he is preparing for a new car race. He does not wait for transition relevant places to turn up in the never ending turns of ICT, before interrupting them, if it fits his objectives. Like Lisa, he keeps on breaching the turn taking expectations of ICT with the home button or also with trial and error, when faced with symbolism he does not understand. Also Marcus faces no reprehension from ICT for these breaches, but gets rewarded with them advancing his objectives, instead.

Taken together, the social behavior between young children and ICT during CCI, complies only partially with the principles of human turn taking, as described in literature (see Sacks et al., 1974; Stivers et al., 2009). Stemming from this, emergent social tensions can arise. For resolving these and advancing their objectives (such as getting ahead in a game), young children tend to modify their turn taking. Coming to these modifications sometimes requires reflection from them, but the process can also be very brief (a few seconds) and repetitive (with the young child repeating the modified turn taking several times before moving on). I summarize the tensions between the turn taking principles in literature (see Sacks et al., 1974; Stivers et al., 2009) and the modified turn takings during CCI as the hidden curriculum of ICT in Table 2, because I found ICT encourages young children to modify their turn taking and learn the modifications, by rewarding them. I also found during CCI, ICT impact the social behavior of young children over this hidden curriculum of ICT, by encouraging them to construct symbolic meanings of these modified turn takings as viable ways of participating in social behavior.

Tension in turn taking principle	Description of the tension and the adjoining turn taking modification
Tension 1: Not “one at a time” but “one or more at a time”	<i>When taking turns with ICT, either one or several individuals can be simultaneously active any given time:</i> ICT or a game character can start doing unrelated things (such as ICT starting to blink, a character waving hands) while the young child does something else, without this having any impact on their further turns
Tension 2: Not “the starter finishes” but “the starter can be interrupted”	<i>With ICT, the individual who has started a turn, does not automatically have right to finish it, before the others can take the turn for themselves:</i> The young child can successfully break in interaction any time by touching the screen, or the home button for example, interrupting the turn of ICT
Tension 3: Not “transition at transition relevant places only” but “fluid and never ending turns with blurry transition relevant places”	<i>With ICT, there can be never ending turns with no evident transition relevant places (such as in animation loops), so breaking in and out of interaction, regardless of the turn of ICT, appears the only option for taking a turn for oneself or for terminating CCI:</i> The young child has to randomly decide when to take a turn for him/herself, or to exit CCI. As a result, in CCI, (s)he may have to interrupt ICT and/or leave the CCI turn taking sequences unfinished

Tension 4: Not “overlaps are problematic” but “overlaps are normal”	<i>ICT interaction comprises constant overlaps in turns that can neither be avoided nor do they affect future turns: As ICT tolerate simultaneous activity of several participants, allow interrupting their turns and do not monitor the turns of young children for transition relevant places, constant overlaps in turns are routinely produced and resolved</i>
Tension 5: Not “violations are reprehensible” but “violations are ignorable or even rewardable”	<i>In ICT interaction, violations of the turn taking principles tend not to be offensive and not lead to the violating party being scolded at. Instead, these can be ignorable, with no harm being done, or even rewardable: ICT tend to give a turn to the young child pushing home button any time, such as in the middle of game loading, without manifesting offence or commenting on it</i>

Table 2. *The hidden curriculum of ICT*

5.2 ICT and the social behavior of young children around CCI

In interviews, the parents say they notice ICT impacting the social behavior of their young children around CCI, both positively and negatively. Some young children are more easily affected than the others, even within the same family, but the increasing frequency of ICT use and lengthy interaction sessions tend to make the impacts more pronounced. Regarding ICT as social actors, parents say their young children can prioritize ICT over humans, because they can view the social demands of ICT as never ending, therefore insisting they cannot put ICT down when asked, or not being able to decide when to stop CCI. Parents say CCI can result in young children manifesting indifference and insensitivity to the social behavioral expectations around CCI, becoming stubborn and arguing more.

Combining the findings of my CCI video analysis and parental interviews, I found that when describing ICT impacting the social behavior of their young children, the parents tend to describe their young children taking turns in f2f interaction in ways which resemble the tensions and modified turn takings in Table 2, above. This behavior of young children applying the modified turn takings to f2f interaction can also be observed in the videos including a researcher, or parents and siblings. Therefore, it appears ICT impact the social behavior of young children around CCI, by young children generalizing their symbolic meanings of the modified ways of taking turns as viable options for conducting social behavior, from CCI to f2f interaction, with the hidden curriculum of ICT promoting this process.

The following data vignettes describe the points from above: when the researcher asks David, 4y, to discuss some pictures during a play session, David declines, saying: “No, I have to concentrate...the guy [game character] just crashed and I have to try again.” David successfully continues CCI by ignoring researcher’s next turns (see Tensions 3 and 5, in Table 2). Next, David’s mother asks him to fetch his toy parrot while he is playing a game requiring attention to a moving bird figure, with flocks of birds flying on the background. David successfully gets ahead in gaming by ignoring both the extra birds and the repeated pleas of his mother, for almost three minutes, whereby his mother comments to the researcher: “see, this is negative and typical of him and the longer he uses [ICT], the worse it becomes” (see Tensions 1, 4 and 5, in Table 2). In interviews, the mother of Maria, 5y and her sibling May, 2y, gives an example related to Tensions 1 and 2, saying: “I don’t like it when they use the tablet computer together, because they just become so hectic. They keep shouting they are bored, keeping hopping from one topic to another. I’d rather have them concentrate.” However, also positives can be associated with the tensions within the Table 2, such as the young children becoming more fluent and resilient in sustaining sociality with and around ICT. Demonstrating the positives, Maria and May jointly decorate a Christmas tree in one video, by dragging and dropping ornaments on screen. May struggles in dragging, but Maria cooperates by initiating dragging and then letting May take over, mid turn. She also finishes May’s turns whenever she drops the ornaments prematurely. ICT reacts to their individual and co-produced turns in the same way, not setting them apart. Their mother comments: “These shared moments are about the positive [impacts of ICT]” (see Tensions 2, 3 and 5). The mother of Lars, 3y, describes the positives related to Tensions 1, 4 and 5 as follows: “A positive is that Lars now knows how to share [what is currently going on within ICT]. He has learned to internalize and summarize to us what just happened. This calms him, if things going on [within ICT] are otherwise too hectic. And when we talk together about what’s going on, it increases interactivity [around ICT].”

6 Discussion

ICT are an integral part of growing up and learning how to participate in social behavior in the digital society of today (Hess et al., 2014), also for young children. For a young child faced with ICT, the explicit learning objective is in figuring out how to interact with them, such as how to open game applications and play games. As ICT are operated by the young child taking turns with them, during CCI, the young child is also covertly learning about turn taking. When not understanding the symbolism of ICT, to get a turn for him/herself, young children tend to modify their turn taking. Some modifications grant them benefits by helping them to advance their objectives. Because of getting rewarded, young children are constructing symbolic meanings about these modified turn takings as viable ways of participating in social behavior during CCI. This mechanism comprises the hidden curriculum of ICT. The hidden curriculum of ICT manifests in the subtle but perceptible ways in which the turn taking of young children with and around is close to, but does not fully comply with the principles of human turn taking (see Kentli, 2009). My results suggest that learning the hidden curriculum of ICT is facilitated by two turn taking dynamics unique to ICT: 1) *granting reprehension-free benefits for breaching the expectations of turn taking and 2) enabling the swift and unlimited repetitions of these modified turn takings.* *Firstly*, unlike humans, ICT do not scold, but rather reward young children for modifying their turn taking, by repeatedly giving a turn to them and letting them get ahead in a game, for example. Further, ICT allow young children sidestep social accountability for breaching their turns, by redirecting interaction without demanding any explanation or excuse. In this regard, ICT are different from humans. Humans, adults and children alike, tend to protest, if somebody bends their turn taking expectations (see Goodwin et al., 2002; Sacks, 1987). Humans tend to be sensitive to the written and unwritten “rules of the game,” both literally and figuratively, which is why scolding and disputes are quick to follow if somebody tries breaching turn taking to get an advantage, be it in games, or in social behavior in general (see Sacks, 1995). Further, humans tend to demand continuity in social behavior, or at least accountability for any abrupt change of course (such as giving an explanation or an excuse), manifesting disregard if these expectations are not met (see Goffman, 1983; Sacks, 1987). *Secondly*, by allowing the young children to engage in swift and endless repetitions of these modified turn takings, ICT can facilitate young children internalizing them, by reinforcing their tendency to learn by keeping on repeating those actions they find meaningful and rewarding (see Mead, 1962). This dynamic, too, is different from the corresponding one between humans. When humans are taking turns with each other, there are limits to the number of repetitions tolerated by them, as humans tend to have social behavioral objectives of their own and expect the situation move forward at some point (see Sacks et al., 1974). Recent research suggests that this dynamic can persist between humans also when ICT are added as the third participant (see Tiilikainen and Arminen, 2017).

Young children tend to generalize their symbolic meanings from one social behavioral context to the next (Mead, 1962). My findings suggest that they can also be generalizing their symbolic meanings constructed about social behavior during CCI to their social behavior around CCI. The parents of young children interviewed for this study, say they notice persistent carryover impacts from CCI to the social behavior of their young children around CCI, both positive and negative. Them noting the negatives is not surprising, as humans construct their fundamental symbolic meanings of turn takings as participating in social behavior during their first six years in life and after that, they often regard the noncompliance to these as offensive social behavior (Mead, 1962; Sacks et al., 1974; Stivers et al., 2009). However, the parents say they also notice positives. This implies that the hidden curriculum of ICT can bring up clashes between the preferences of the young children, their parents and siblings, when combining social behavior with and around ICT, it can introduce emergent compatibilities, too.

In education and cultural studies, the hidden curriculum is recognized as a powerful mechanism impacting social behavior, contributing to the social inclusion and exclusion, equality and inequality of individuals (Bourdieu, 1984; Giroux and Penna, 1979; Snyder, 1973). Unrecognized, it can be destructive, but revealed and harnessed, it can contribute to the well being of individuals (Bourdieu, 1984). My findings show how the inclusion of ICT in our social behavior has given rise to a novel form of a hidden curriculum, the hidden curriculum of ICT. It appears to be shaping the social behavior of

young children in a tangible way, by modifying their micro level turn taking. These modified turn takings are different from but close enough to the principles of human turn taking (see Sacks et al., 1974) for a young child to generalize them also to humans. Despite their micro level nature, changes in turn taking impact the social behavior of young children, as turn taking is the fundamental human mechanism for governing social behavior, contributing to the social agreement and disagreement and to the ways in which humans either understand or do not understand each other (see Stivers et al., 2009). In addition, the hidden curriculum of ICT may be impacting the social behavior of young children also long term. Young children are in a critical developmental phase, constructing their fundamental, long term symbolic meanings of turn takings as ways of conducting social behavior and also those about the things in their environment as social actors (Mead, 1962). My results suggest that the hidden curriculum of ICT can also be blurring the distinction between the symbolic meanings of humans and ICT as social actors for these young children, promoting symbolic meanings of ICT akin to humans and more than just “a little bit alive” (see Mead, 1962; Turkle, 1984, 2007; Kahn et al., 2012; Darling, 2017).

Taken together, these results increase understanding about the covert mechanisms by which ICT can impact the social behavior of young children (see Antle, 2013; Cho and Lee, 2017). These results can be used for formulating behavioral guidelines and policies for the future ICT use and design for young children (see Nikken, 2017).

7 Limitations, future research and conclusion

This study focused on the mouse and touch controlled ICT, with 3-to-6-year-old children, within one country. Future research could study the social negotiations around CCI and turn taking, as well as the factors contributing to them, in further contexts and settings. Examples include studying voice controlled ICT and children younger than three. Studying children older than six can help in generalizing the findings to the childhood while studying digital natives (young adults who have grown up with digital technologies) (see Vodanovich et al., 2010), can reveal whether the turn taking modifications discovered in this study are present in their social behavior, too. Turn taking accommodates some cultural variation (Stivers et al., 2009), social behavior can evolve over time and individuals can adapt their expectations (Mead, 1962; Tiilikainen and Arminen, 2017). To examine the cultural and social tolerance in relation to the hidden curriculum of ICT, observation, breaching experiments (see Garfinkel, 1976), interviews and surveys could be used (see Babbie, 2010). To find out, whether the hidden curriculum of ICT could be impacting also the ways in children construct social relationships, studying their game playing behavior (see Sacks, 1995) during and around CCI, could be beneficial. My findings suggest that the hidden curriculum of ICT can contribute to the daily harmony and disharmony at home, by encouraging young children to construct such symbolic meanings of their modified turn taking as social behavior that are only partly compatible with those held by their parents. Therefore, focusing on the resulting daily symbolic struggle around social behavior at home, could be a way forward in understanding the impact of digitalization on family life (Hess et al., 2014).

In conclusion, my results imply that the hidden curriculum of ICT can be a powerful mechanism impacting the social behavior of young children during and around CCI. Because young children are in a critical developmental period for internalizing their lifelong basics of social behavior, the recurrent, modified turn takings encouraged and rewarded by the hidden curriculum of ICT, may have long-term social consequences for them. Therefore, harnessing the hidden curriculum of ICT for reinforcing its positive impacts while mitigating the negative is important, especially when designing ICT for young children, as the conducts of social behavior and symbolic meanings internalized before the age of seven can persist for life (see Mead, 1962).

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