The (Potential) Role of Technology for Young Children's Social-Emotional Learning: During and Beyond the COVID-19 Pandemic

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In an effort to combat the COVID-19 pandemic, various public health measures have been implemented worldwide. In most countries, preschools and kindergartens closed down, visiting playgrounds and other public spaces was prohibited, and social-distancing was enforced. These measures resulted in severe changes in the day-to-day lives of children in age groups 3 to 8, with social interactions being limited almost exclusively to the immediate family. We present a commentary to explore the potential role of technology and government in promoting social-emotional learning during the COVID-19 pandemic and beyond. A focus on technology that promotes appropriate social and physical experiences for young children is necessary, and we hope that our thoughts and selected examples can provide new insights for key stakeholders.

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1 INTRODUCTION

In an effort to combat the COVID-19 pandemic, various public health measures are/were implemented worldwide. In most countries preschools, nursery schools, and kindergartens closed down, visiting playgrounds and other public spaces was prohibited, and social-distancing was enforced. These measures resulted in severe changes in the day-to-day lives of young children (ages 3 to 8), with social interactions being limited almost exclusively to the immediate family. Looking at childhood from a bioecological developmental perspective [4], which emphasizes the importance of reciprocal social interactions (e.g., with family members and peers) and the immediate environment (e.g., at home, kindergarten, playgrounds), demonstrates how drastic these measures were for the lives of young children. Yet relatively little attention has been given to how young children adapted to the COVID-19 pandemic, with government strategies mainly focusing on e-learning as a mechanism to ensure continuation of academic learning in school-aged children. Social-emotional learning played only a minor role in government responses (for example in Sweden [16]). We maintain that it is important to consider social-emotional learning for young children in the formulation of public health measures, as well as post-pandemic technological and governmental policies.

2 SOCIAL-EMOTIONAL LEARNING

Early childhood is a key developmental stage, in which young children acquire vital social-emotional skills that are essential for later success. Social-emotional learning can be defined as effectiveness in social interactions, which are the result of organized behaviors that meet developmental tasks [7]. During early childhood, social-emotional skills are organized around the developmental task of successfully establishing and maintaining positive interactions with peers and adults by engaging positively with the physical and social environment and managing emotions and cognitive demands [7]. Among the many social-emotional skills required for this task, researchers and educators have highlighted the importance of emotion expression and regulation, perspective taking, empathy, social problem-solving, goal setting, responsible decision making, and self-regulation, as well as the ability to listen, take-turns, and cooperate [25]. Playing is essentially the primary context for social interactions and communication in early childhood, in which these skills are learned and enhanced [6]. Specifically in young children there is a drastic increase in the amount of sociodramatic play (e.g., role play), which is commonly considered to foster cognitive, linguistic, and social-emotional skills [6]. Furthermore, young children also begin engaging in rough-and-tumble play (i.e., playful fighting), which is a form of physical activity play and well-regulated social interaction, leading to social cohesion and bonding amongst peers [6].

Essentially the public health measures introduced during the COVID-19 pandemic have temporarily hindered young children from engaging in social interactions with peers, and thus the opportunity to develop their social-emotional skills within the common play contexts. Whether this has long-term consequences or not is yet to be empirically established. Nonetheless, [17] notes that a priority in the next few months should be helping (young) children by encouraging the development of strong social relationships. However, as the progression of COVID-19 is dynamic and not completely predictable, there is a possibility that the above mentioned public health measures are prolonged or may be reimposed. Furthermore, we find ourselves in a turbulent time of adjusting to and redefining the new social norm beyond the COVID-19 pandemic. This will directly affect research agendas in digital governance, such as smart approaches and ongoing discussions around problematic and undesirable outcomes, previously identified by [23]. For example, a prioritisation of performance and its consequent datafication leads to extremely reductionist pedagogical reforms and policies [21]. In this commentary, we explore how technology may be a beneficial tool for young children, during and beyond the COVID-19 pandemic. Specifically, we focus on how technology should allow young children to socially interact with their peers, in a way that is conducive for promoting their social-emotional learning.

3 EXAMINING AVAILABLE TECHNOLOGIES

When the public health measures were implemented, most adults simply relied on the various communicative technologies that have been developed over the years to stay connected to physically distant family members and friends. However, from personal observations, we soon came to realize these technologies cannot simply be appropriated for the social interactions required and/or desired by young children. Trying to provide her young daughter with opportunities to interact with peers, one of the authors recalls how the children struggled to instigate interactive play situations and that the verbal exchange often became repetitive. We maintain that one caveat to these technologies is that they do not adequately account for young children's dire need to play in social peer interactions, instead of simply talking. Indeed, few studies have investigated how younger children perceive remote presence and interactions [18], and much more focus needs to be given to creating digital environments that mimic real-life interactions of young children, including the aspect of play.

Our next step involved looking for commercially available technologies that allow for social peer interactions for young children, or those promoting social-emotional skills; which turned out to be a very challenging task. Although entering key terms into Google Play Store resulted in a few relevant hits, the majority were academic learning applications or applications for specific populations (e.g., children with autism). Reading internet forums and blogs targeted at parents, we discovered lists of mainly single-player applications that reportedly develop social-emotional skills, as a primary focus or secondary benefit. Furthermore, we found that technologies that were originally developed for older children or adults, had been appropriated by young children to satisfy the growing need for social peer interactions in play contexts; thus, whether they actually are suitable and/or adequate for young children's preferred form of social interactions is unknown.¹

We note that this was an unsystematic search, and acknowledge that there might be available technologies that promote social-emotional skills within playful social peer interactions among young children. However, this highlights the process and the results parents are likely to be confronted with when searching for such technologies. This is of course assuming that parents are aware of the benefits of social-emotional learning, and are actively looking for technology to support their children. Although unlikely to be the first thought of most parents, as researchers we are concerned with the (pedagogical) theoretical foundations used to design these applications, and the empirical evidence for their effectiveness in promoting social-emotional skills in young children.

4 RESEARCH ON TECHNOLOGIES ADDRESSING SOCIAL-EMOTIONAL LEARNING

Examining research findings, we also note that very few technologies have been developed to support social-emotional learning in young children [24]. Most research studies investigated the general impact of using technology, such as mobile phones or social robots, on the social-emotional learning of children. However, we did find quite a few studies that report implementing technology to foster social-emotional skills within intervention programs, mainly for (young) children with autism [10]. It could be worthwhile examining whether it is possible to appropriate these technologies for everyday use by young children. At the same time this prompts us to think of the reverse; namely, that we also need to consider how best to create inclusivity for all children when developing technologies.

Technologies promoting social-emotional learning should ideally provide affordances for shared and embodied experiences, despite social distancing. Building on tangible technologies and the premise that younger children love pretend-play, the authors of Reference [3] prototyped remote synchronized dolls with voice communication features (PlayPal); the pilot study showed how two young girls immediately engaged in remote shared pretend-play with the synchronized dolls [3], yet the system was never fully developed or brought to market. A vast set of technologies promoting playful physical activity are on the market, yet they often do not combine elements of

¹This is of course irrespective of other ethical considerations, including access to age inappropriate content, regulated usage, and (data) safety concerns, which lies outside the scope of the current commentary.

narratives, social interactions, and activities to create fun experiences required for young children [22]. Having studied interaction patterns among children and technology, the authors of Reference [8] observed that children want stories, a relationship with characters, to collect, to be creators and to be in control. Preliminary findings of an evaluation of the KIDFIT Suite of applications demonstrated the children's affinity towards collaborative, synchronous, activity games with peers and family members [22]. Reference [11] suggests that the development of technology for young children should follow the 3C approach (based on Vygotsky's thoughts on the social nature of learning), which centers on creativity, connection with the social and physical surroundings, as well as communication with adults and peers. This partially aligns with the guiding principles for use of technology by early learners, provided in a U.S. educational policy brief, suggesting strengthening involvement and relationships among parents, educators and the children [15]. However, we postulate that further research is required to formulate refined technology requirements as well as government strategies in regard to technology development for young children.

5 STAKEHOLDER'S ROLES

Coming from a bioecological perspective of development, we maintain that technology design and use involves multiple interacting stakeholders. Reference [2] realized that young children are agents, shaping their digital play and interactive experiences with technologies rather than being passive users; thereby transforming digital social interactions. The merit of involving children in technology design has long been established by researchers in References [9, 13], who even demonstrated children's ability to design for other children on the basis of their specific needs [12]. To develop technologies that fulfill young children's criteria, it is important to continuously involve them in the design process. Furthermore, we postulate that improvised usages and appropriations of technologies by young children (especially during the COVID-19 pandemic) can provide inspirations for novel technology design and interactions. For instance, one of the authors recalls being on a video call with her 5-year old granddaughter, collaboratively figuring out how to fulfill her wish to play hide-and-seek.

Although we are arguing for the design of technologies to help young children interact with their peers and build their social-emotional skills, the role of parents cannot be neglected. Depending on their attitudes, parents apply various forms of supervision, monitoring, mediation, and co-use when letting their children use media [19] as encouraged in the U.S educational policy brief [15]. Hence, future technology design and evaluation needs to consider the (home) context in which the tools will be utilized. This notion aligns well with current research agendas and technology developments; after 18 years of child-computer interaction research, family and mental health has been identified as an emerging area of research, which includes topics such as emotion regulation technologies and children's social home context [1].

Technology usage in childhood remains a hot discussion amongst both the public and researchers, with focus all too often being placed on problematic gaming (e.g., DSM-5 Internet Gaming Disorder). Although not contending against this perception, we rather wish to highlight the importance of extending research in this area, and incorporating empirical findings into future technology designs and policy recommendations around usage. It is necessary that researchers, medical practitioners, and technology developers work collaboratively to comprehensively understand technology use and gaming, looking at both the potential problems and benefits [14], as well as providing empirically supported guidelines and regulations for usage in early childhood. Hereby it is important to focus on adequate structures, allowing for a healthy balance of activities and content. Furthermore, we consider it crucial that industry and researchers find a way to collaborate, either during the development of technologies or for empirical evaluations afterwards.

The public health measures introduced during the COVID-19 pandemic ensured that the improvement and deployment of technology in education has become a top priority on government agendas. However, we observe a gap in the consideration of early childhood education and more specifically social-emotional learning curricula. Nonetheless, there is great variation in the early childhood education systems and policies in different

countries [20], as well as disparities in available e-governance tools in the educational preschool sector [5]. Hence, government strategies might vary. Considering the complexity of initiating trans-disciplinary work amongst educational stakeholders, we suggest that the government can play a vital role in the co-ordination of trans-disciplinary work, offering digital platforms for networking and the creation of task forces, leading to well informed educational policies. We maintain that insights gained from current technology use and uncovered needs during the COVID-19 pandemic, as well as further research should shape revisions of existing (outdated) educational government strategies concerning the development and usage of technology for social-emotional learning in early childhood.

6 CONCLUSION

In conclusion, the COVID-19 pandemic with its implemented public health measures has drastically changed the way children were able to socially interact with their peers. The experiences, observations and lessons learned during the pandemic can provide valuable input for future technology appropriations and development even beyond the current crisis. We need to review our current research and national policy agendas, focusing on technology that promotes appropriate social and physical experiences for young children, in which they can actively engage in peer interactions and build their social-emotional skills. We hope that the above provided thoughts and examples have intrigued researchers, game developers, and educational policy makers to reflect on technology that can be used, adapted, and designed to foster social-emotional learning in young children.

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