

MOBILE DEVICES DISTRACT CHILDREN FROM SOCIAL INTERACTION

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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EXCESSIVE TIME SPENT ON MOBILE DEVICES AND OTHER MEDIA BY CHILDREN

In modern first world homes, it is not uncommon to find children of any age sitting on the couch for hours at a time playing video games, watching television, or using mobile devices instead of participating in sports or playing with blocks or any sort of unstructured play activity. This phenomenon was not prevalent before the recent advancement of technology that made those media sources possible. According to a report by Common Sense Media, children under eight years old have increased their time spent on mobile devices from five minutes a day in 2011 to about 45 minutes a day in 2017 and that number is still increasing (Rideout, 2017, p. 14). From the same study, it was found that 98 percent of children in that age range live in a home with some kind of mobile device and 42 percent have their own tablet device (p.18).

The primary source of concern from these statistics is that children are spending less time exploring their environment, interacting with others, and participating in unstructured play. A group of 830 mothers in the United States were interviewed about their childhood play time compared to that of their three to 12 year old children's play time. The study found that 70 percent of the mothers reported playing outside every day and 56 percent stayed outdoors for three hours or more. 31 percent of the same mothers' children were reported to play outside every day and 22 percent stayed outside for three hours or more (Clements, 2004, p. 72).

The effects that this transition in allocated time has on child development are unknown or not considered by the general population (Radesky, 2015). Mobile devices and learning applications are targeting a younger and younger population, so they are having more of an effect on child development at a very young age. If there are negative consequences to this

rearrangement of time in children, parents and caregivers are not purposely aiming for those effects. There is simply a general ignorance of the effects they may have.

The question being considered in this research paper is how the distraction of mobile smart devices affect children by hindering their time for unstructured play and social development. This research aims to shed light on the consequences of too much time spent on mobile devices and media in general during young ages along with the importance of unstructured play. In order to determine how caregivers, educators, and the general population should treat mobile devices with regards to children's use, the technology and social relationships framework will be analyzed.

The technical capstone project is designing and building a vest that generates enough electricity to power LED strips on the front and back of the vest. It accomplishes this by using the vertical motion of the body while running to move permanent magnets through coils of wire, which induces an EMF in the coil. The power generated charges a battery that can be discharged to the LED strips. The purpose is to make runners and hikers more visible on streets or mountains at night. Our inspiration for the project was to use some sort of renewable energy, so the vest is sustainable and eco-friendly. It should be considered how the vest could be used for other applications. The social construction of technology (SCOT) framework will be used by the engineers to determine how the device could affect the broader social context. Figure 2 on the following page shows the groups that this technology has the potential to affect and that we, as the engineers, should study. The vest is intended to be used only to power LEDs, but that power could also be used to power a mobile power bank or mobile device directly. This could allow children or other mobile device users to go longer periods of time without needing an outlet to

charge their phones. Consequentially, this could also allow them to use their mobile devices for longer durations and intensify the effects on their development.

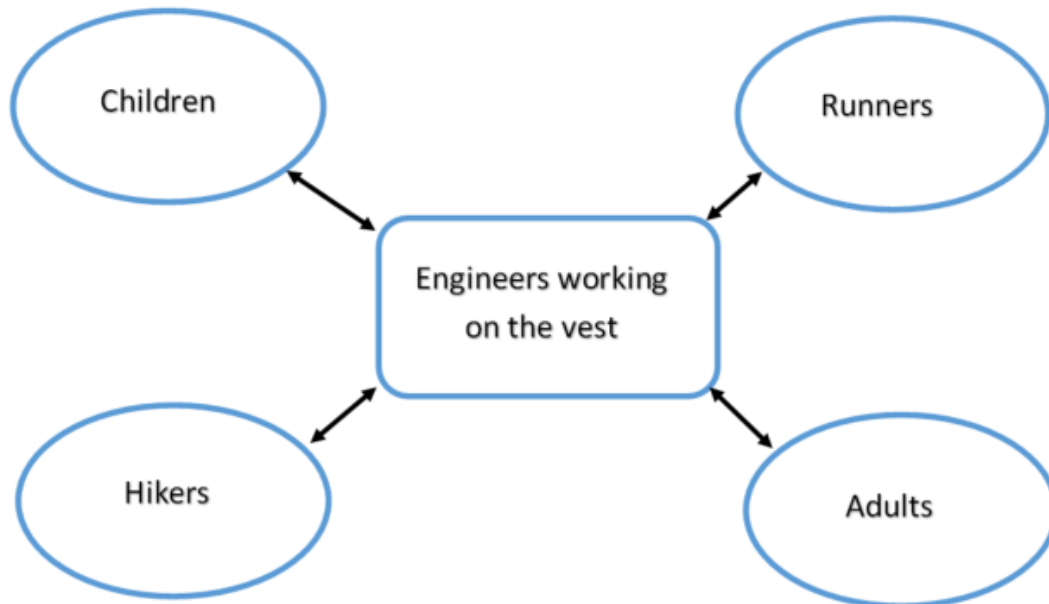


Figure 1: The STS framework showing what groups the engineers designing the power-generating vest should consider. Engineers should consider not only the intended users of their product, but also the potential for other applications. (Adapted by Trevor Cook 2020 from W.B. Carlson 2009)

On the other hand, the device also has many potential benefits for different stakeholders and society as a whole. It could improve safety for runners who run on the road at night and for hikers at night. If this device is found to decrease motor vehicle to pedestrian accidents, then that should be weighed against the possible negative consequences using the SCOT framework.

GENERAL ISSUE ASSOCIATED WITH TOO MUCH TIME ON MOBILE DEVICES AND OTHER MEDIA

Parents and caregivers should be concerned with the amount of time their children spend on screen-based media like television, video games, or mobile devices. The problem with mobile devices specifically is that they are mobile. Children now have the ability to access games, shows, and other applications wherever they want to if not controlled by an adult. While many caregivers may suspect that too much screen time is harmful, there is a general ignorance of exactly what effect it may have and how much to regulate their children's time on media.

This research paper aims to shed light on the negative impact that excessive time spent on mobile devices and other media may have on adolescent cognitive, social, and emotional development as well as to recommend actions taken by caregivers and educators. In order to do that, professional opinions and studies will be considered from doctors, educators, and other researchers.

LESS TIME FOR COGNITIVE, SOCIAL, AND EMOTIONAL DEVELOPMENT

Experience is the key to learning. "The Power of Play: A Pediatric Role in Enhancing Development in Young Children" is a clinical report written for the American Academy of Pediatrics in 2018 that discusses unstructured play and the essential roles it plays to "promote the social-emotional, cognitive, language, and self-regulation skills that build executive function and a prosocial brain" (Yogman, 2018, p. 1). Dr. Michael Yogman wrote the first draft of this report and led efforts of numerous edits, contributions, and suggestions from the other authors. Dr.

Yogman has been involved with pediatrics in Cambridge, Massachusetts for 20 years and is currently an Assistant Professor of Pediatrics at Harvard Medical School where he teaches and does research on the father-son relationship and other related topics.

Adolescent culture has shifted in recent decades to less unstructured play. Even time set aside specifically for learning by parents and educators have become more structured and restricting. The No Child Left Behind Act enacted in 2001 set an increasing focus on structured activities that promote academic results instead of playful learning (No Child Left Behind [NCLB], 2002). The Head Start Act enacted in 2003 led to a focus solely on pre-literacy and pre-math skills without any social emotional skills assessments (Head Start Act [HS], 2007). For example, Section 641A states quality standards for early education in five main points, including numeracy awareness, language, vocabulary, and an appreciation for books. There are no requirements or even mention of creativity, emotional intelligence, or social skills growth as Dr. Yogman describes.

Dr. Yogman explicitly states that his clinical report was written for pediatric providers, but the information provided is useful for parents or guardians, educators, and those in charge of organizational guidelines for school systems. The purpose is to promote play as an essential component of child development and explain the reasons why that is true.

Removing unstructured play from the life of children diminishes many important qualities that are supposed to be learned at an early age as explained by the medical professionals in this report. Dr. Yogman argues that there are many cognitive, social, and emotional skills that cannot be learned by didactic practices. Didactic learning is the antithesis of experiential learning, using a scientific approach to teaching as opposed to learning in an unstructured manner as Dr. Yogman advocates for. Skills such as collaboration, problem solving, and

creativity have to be cultivated by allowing children to engage with the world and meaningful discovery (Yogman, 2018). He discusses different categories of play and the skills developed from each, including object play, physical play, outdoor play, and social play. For example, outdoor play activities “involve the child as an active participant and address motor, cognitive, social, and linguistic domains” (Yogman, 2018, p. 3).

While Dr. Yogman explains the role of playing in developing brain structure and functioning very thoroughly, he does not offer how orthodox, didactic teaching does and should play a role in a child’s cognitive and social-emotional development. He mentions that formal education is also important, but does not explain in what way its use differs from learning by playing. His goal is explicitly stated that pediatricians will “advocate for the importance of all forms of play as well as for the role of play in the development of executive functioning, emotional intelligence, and social skills” (Yogman, 2018, p. 9). He also extends that goal to parents and teachers and offers specific strategies for them to employ with their children to encourage play time.

While there is much a child can learn just from interacting with other children and learning through experience explicitly, there is more that the child can learn through their parents or caregivers. This happens in two ways. One is through mimicking of the caregiver(s) and the other is instruction when a proper moment arises. In an interview with Dr. Amrisha Vaish, a professor in child psychology at the University of Virginia, she explains that children watch what their parents do and how they handle conflict and mimic their responses (A. Vaish, personal communication, February 21, 2020). Children inevitably make mistakes when playing with other children, talking to other adults, or acting out in public. Mistakes and conflict are natural and

expected in every child's life. How parents respond to them is how children learn. Therefore, proper parenting techniques are essential for optimal child development.

Consequentially, if children are spending a majority of their time watching television at home or playing on mobile devices in public, there are fewer occasions to teach them about how to act and think and feel. Increasingly in modern families, parents will use mobile technology to calm their children or keep them quiet (Radesky, 2016). Because of this shortcut, children do not learn how to deal with conflict or act in a socially acceptable way.

How educators teach in a formal school setting changes with new technologies and research. Since the inception of computers and mobile devices, they have crept into the classroom. While there are some uses for mobile devices, it is important to include exercises in the classroom for children to interact with peers and the environment (Weisberg, 2013). "Should we worry that American children are becoming less creative" is an article written for the Washington Post in 2019 that discusses school systems, unstructured play and the effects that decreased play has on child development, mainly focusing on creativity. Erika Christakis is an early childhood expert and author of the best-selling book, "The Importance of Being Little: What Young Children Really Need From Grown-Ups" (Christakis, 2016).

The fact that children are using mobile devices and other media more and more is alarming, because it is known that direct play and hands-on experiences with people, with materials, and in nature is essential for learning and brain development (Carlsson-Paige, 2012). In response to this fact, Christakis discusses in her article how she raised her adopted nine year old son with very little access to screens (only one movie a week, no video games, and no tablet or smartphone) and how his resulting development compares to the entire population of children his age (Christakis, 2019). Her main audience are parents or caretakers and educators. Caretakers

and educators are the adults that surround children the most and therefore are the most responsible for their learning and development. She explains many of the ways adults can foster creativity in a home setting and in school, giving examples of some ways that can benefit development and how common practices have decreased creativity and practical learning.

As creativity is the article's main focus, Christakis includes many details about how children are naturally more creative than adults, how that creativity is cultivated, and the fact that creativity has declined in the past decade. She cites a study done by creativity researcher Kyung Hee Kim, finding that scores on a reliable creativity test called the Torrance Test have declined more than a full standard deviation in a single generation. Most of the blame is put on video games and other media, but also on standardized testing and increasingly narrow academic goals.

Christakis' argument is that unlike popular belief, creativity is not a trait that certain children are born with and others are not. All children have the potential to be creative, but need to be given the proper conditions. Among the most important conditions is adequate time and space for unstructured play. Children learn by interaction with the outside world (Christakis, 2019). They cannot or will not access the world if they are constantly focused on media sources like video games or tablets. Adults control the lives of children more than any other factor, because at early ages, children are still completely dependent. It therefore lies on adults' shoulders to deliver proper conditions for children to foster creative skills.

Christakis' hope is that parents and educators will consider how a child's time is spent and perhaps change that if necessary. It is their moral obligation to aid in the development of the children they are in charge of, whether at home or at school. Every child is capable of being creative and in order to draw it out, screen time should be limited and proper time and space should be left for unstructured play with the outside world.

Figure 2 on the following page shows the relationship of children using mobile devices with relevant actors. As explained previously, child development is affected by caregivers, educators, other children, and other adults. The decisions that these actors make in the raising and educating of children can beneficially or adversely affect the children’s development.

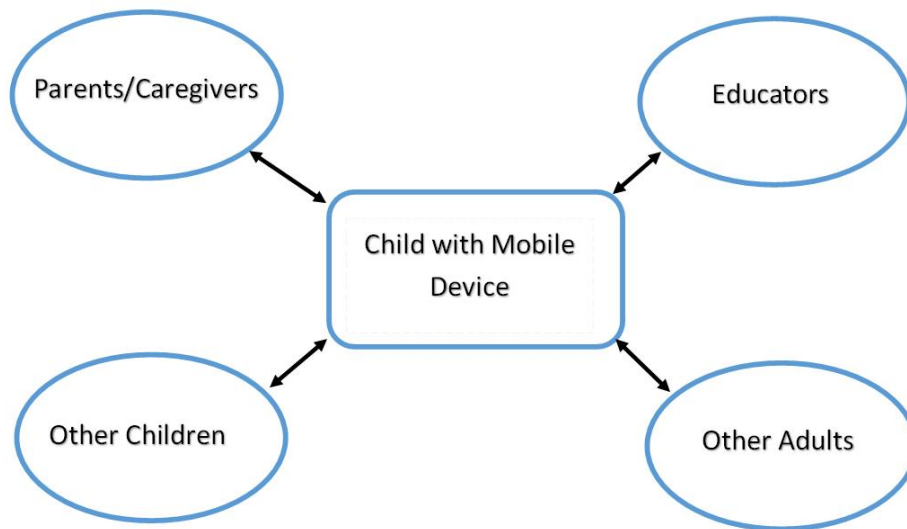


Figure 2: A depiction of the STS framework that portrays the use of mobile devices by children and the people who affect that usage. Children’s use of mobile devices in early stages of development affect and are affected by caregivers, educators, other children, and other adults. (Adapted by Trevor Cook 2020 from W.B. Carlson 2009)

CHILD RAISING TECHNIQUE IMPROVEMENTS

Based on the research conducted, it is recommended that caregivers should allow limited exposure to media for their children and educators should conduct the majority of their teaching without the use of mobile devices or computers. The World Health Organization recommends no screen time for children less than two years old and only one hour of sedentary screen time per day for children two to four years of age (Keenan, 2019).

In addition to limiting screen time, there are proactive ways caregivers and educators can enhance learning and development. Dr. Yogman, a professor of pediatrics at Harvard Medical School, provides many recommendations for play-related development strategies in his clinical report about the importance of play in developing children. Much of it includes having the child explore his or her environment and leading activities that promote creativity (Yogman, 2018).

Part of Yogman's recommendations are allowing the children to gradually broaden their explorations of the world. In the first year of life, allow children to crawl and explore safe environments, show them interesting objects, and talk and interact with them to familiarize them with who you are. In the second and third years, attempt to promote creativity by allowing them to play with toys, draw on paper, or involve themselves in make believe situations. From ages four to about eight, Dr. Yogman recommends that caregivers "provide opportunities for your child to sing and dance", "schedule time for your child to interact with friends to practice socializing and building friendships", and "allow your child to move between make-believe games and reality (for example, playing house and helping you with chores)" (Yogman, 2018, p. 10).

Possibly the most important aspect of a child's development is the interaction with the caregiver. Children learn many social and emotional skills by mimicking and responding to their caregivers (Vaish, 2020). Dr. Yogman gives a great example. By smiling in reaction to their child's smile, caregivers are sending the message that "you can get my attention and a smile from me anytime you want just by smiling yourself" (Yogman, 2018, p. 10). Also when your child inevitably asks questions or speaks to their caregiver, that is a crucial opportunity to teach them how life works and to provide verbal encouragement.

There are benefits to teaching using mobile devices in a formal education environment. For example, mobile devices make resource logistics easier in classrooms. Instead of printing hundreds or thousands of pages of paper over the course of a student's education period, an iPad could eliminate all of that. Technology also makes it easier for teachers to grade tests and quizzes if they are single answer type tests. However, especially early on in education, teaching math skills and literacy are not the only goals for students. The first stages in school are also meant to increase social skills and emotional intelligence. Kids learn how to interact with peers, how to act in different situations, and how to handle conflict. If much of the learning taking place is on a mobile device, the amount of interactions with others is restricted, so children do not learn the proper social skills that they would otherwise learn.

ALLOCATION OF TIME SPENT ON SCREENS TO TIME SPENT PROACTIVELY LEARNING

From the research conducted, most sources agree that screen time should be limited for children, because the potential negative effects far outweigh the benefits it may possess. Using mobile devices to distract or calm down children is certainly more convenient for caregivers, but is harmful in their long term development. It is essential that children learn from social situations and part of that involves adults teaching them how to interact with others without the use of mobile devices to extract themselves from the situation completely. This learning process can be separated into two categories: explicit teaching and mimicry. When conflict or mistakes arise in the child's life, caregivers can intervene and explicitly explain how one should act. Children also tend to mimic the actions and reactions of the adults closest to them. Therefore, it is important

that children have the opportunity to naturally observe their caregivers. When they are absorbed in media like television or mobile devices, they do not have that opportunity.

While there is much a child can learn from their caregivers, other interactions provide different developmental benefits. An essential part of childhood is unstructured play. Play can be beneficial by oneself and also with others. It gives them space and time to be creative and to explore their environment. Similarly to learning from caregivers, children learn how to act socially when playing with other children. They develop empathy, emotional intelligence, as well as important skills like sharing or taking turns. Caregivers can promote unstructured play by doing three things: limiting time on screen media or mobile devices, providing time specifically to play, preferably outside, and providing toys, paper, crayons, and other tools that can be used during play time.

Although there has been a multitude of studies on the effects that excessive television and video game time has on child development, there has been little research on the effects that mobile devices specifically may have on child development. From related studies, one can speculate about what those effects may be and how potentially harmful mobile devices are early on in life, but more research should be done on mobile devices specifically. A good long term study may be to observe children of differing mobile device usage over a span of ten years to determine the effects that has on emotional intelligence, social skills, and cognitive ability.

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