The Function of Mobile Device Use in Modern Child Development

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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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According to the World Health Organization, "the burden of depression and other mental health conditions is on the rise globally," and "fewer than half of those affected in the world receive [effective] treatment" (WHO, 2018a). Over the last decade, mobile device use has increased among all age demographics. In 2013, 24% of U.S. adults said that smartphones were their primary means of going online. This rate has increased to 37% in 2019 (Anderson, 2019). As mobile devices have become ubiquitous, their influence on their users has grown. This is especially true among children. Kabali et al. (2015) surveyed 350 children aged 6 months to 4 years at a pediatric clinic and found that "almost all children (96.6%) used mobile devices, and most started using before age 1," and "most 3- and 4-year olds used devices without help." Developers have responded by designing content that targets young users, including beneficial and educational content, as well as content that exploits behavioral psychology in children for monetary gain. As a result, there is a division among experts and parents regarding the usage of mobile devices by children. Some groups, such as the Consumer Technology Association and the Entertainment Software Association, argue that mobile content can promote children's healthy development. However, other groups, such as the American Academy of Pediatrics and the World Health Organization, contend that mobile device usage among children should be limited as it detracts from their development and can lead to negative mental health effects such as depression and sleep deprivation. Defenders and critics of mobile device use among children advance their respective agendas by appealing to parents through claims of the mental and social health effects of cell phone use as well as the regulatory state of the mobile industry.

Review of Research

Wennersten et al. (2015) studied the educational effects of mobile phone video content in India. Their project, BridgeIT, "had a strong, positive, and statistically significant effect on learning for both English and Science." Students exposed to BridgeIT outperformed others by 7.92% in English and 15.45% in Science. They could use mobile phones in the classroom, promoting positive learning habits at a lower cost than previous computer-based methods. Outside of the classroom, Yan (2017) found that mobile device use promotes cultural interaction; children can "develop cognitively, socially, and emotionally by observing and participating... within the general mobile culture," which engages children with communities that would otherwise be remote. Children can thereby extend their learning opportunities outside of the classroom. According to Yan, with smartphones, users can meet their "physical, cognitive, social, and emotional needs almost anywhere and anytime."

Gibson and Cartwright (2014) studied the experiences of adolescents using mobile phone text counseling. Previous researchers had doubted that "meaningful emotional communication cannot take place without people being physically present." Gibson and Cartwright found that young users value a "familiar and accessible medium" to receive counseling and psychiatric help. They found that "text counselling may help young people balance their contradictory needs for autonomy and connection and facilitate their engagement with counselling support."

Kim et al. (2018) studied the effects of cell phone reliance on adolescent self-control, finding that "the long-term effects of excessive cell phone use on adolescent self-control may be overstated." Excessive cell phone use can be harmful, but the researchers found no long-lasting effect on children. Short-term effects include withdrawal symptoms and relapse tendencies,

effects associated with gambling and drug addiction. However, children's apparent reliance on cell phones was only temporary.

Ng et al. (2020) studied the relationship between mobile phone use and depressive symptoms, body pain, and daytime sleepiness in secondary school students. They found that "problematic mobile phone users received significantly higher scores for depression severity, bodily pain, and daytime sleepiness." The correlation was stronger among female students than among males. Vernon et al. (2018) found that night-time phone usage among adolescents is associated with poor sleeping habits. Frequent phone use was "directly associated with increased externalizing behavior and decreased self-esteem and coping."

Educational Applications

The educational potential of mobile devices is commonly cited by advocates of mobile device usage among children. These advocates assert that the digital medium helps children learn. Many mobile phone companies acknowledge the capabilities of their products toward education, such as Apple advertising that their mobile devices have "built-in apps and intuitive software [to] create an incredibly personal learning experience" (Apple, 2020). Other companies have developed mobile devices explicitly for adolescent use. The Quanta GizmoTab, for example, is a "full-functioning Android tablet, specifically programmed for kids… with up to 300 curated apps" to "let them learn and play worry-free" (Verizon, n.d.). The Consumer Technology Association contends that mobile devices are a beneficial addition to classrooms, stating that "91% of parents and 87% of educators agree tech allows students increased access to education," with only "34% of parents and 39% of educators say tech is a distraction for students" (CTA, 2019). CTA argues that mobile devices are useful in the classroom as they

promote the technological skills children will need. Many companies, such as ClassDojo, have created programs to better equip schools to utilize mobile devices for learning. ClassDojo claims that their software helps "teachers and students to build an incredible classroom culture," through supplemental lessons and community building activities that "help kids develop skills like perseverance and mindfulness" (ClassDojo, n.d.). Others, such as Sesame Workshop, believe that mobile devices can be used to learn beyond the classroom, stating that "educational apps can be used to reinforce what children are already learning in school and at home" (Chiong, 2010).

The Entertainment Software Association promotes youth mobile gaming, claiming that "game-based learning is a growing movement," and that the "educational applications of video games might be even more powerful than we ever anticipated" (ESA, 2019). ESA is promoting access to educational games through video game companies such as Riot and Ubisoft. The Summer Slugger program supported by ESA is an example of a collection of educational video games. The program aims to help the player retain knowledge over the summer, when students are susceptible to falling behind in their studies. Many video game companies extend their educational outreach beyond the games they make. For example, Ubisoft Montreal has a variety of programs for educating and mentoring young students. Alloprof, a program supported by Ubisoft Montreal, "[involves] a team of qualified teachers and a virtual community made up of student assistants, parents and educational stakeholders" in order to help students learn and develop workplace skills (Ubisoft Montreal, 2020).

Therapeutic Applications

Another key application of mobile devices often cited by the defenders of adolescent use is online therapy. Compared to traditional methods of therapy, online therapy benefits from

having lower overhead costs and a higher ease of access. In a study performed with Talkspace Therapy, a company that delivers therapy over SMS messaging, “cost-effectiveness analyses suggest that text therapy is 42.2% the cost of traditional services and offers much reduced wait times.” Additionally, “twenty-five (46%) of participants experience clinically significant symptom remission,” and “high levels of satisfaction with text therapy were reported on dimensions of affordability, convenience, and effectiveness” (Hull & Mahan, 2017). Headspace, another online therapy company, delivers meditation sessions through a mobile app. Along with accessibility, they claim that their services provide users with a “significant improvement in well-being, distress, job strain, and perceptions of workplace social support” (Bostock et al., 2019).

The recent growth in online therapy options can be attributed to the increase in mobile device use. The American Psychological Association stated that “telepsychology… has been around in one form or another for more than 20 years… but the explosion of smartphone users has created new opportunities for app-based companies to offer more accessible and affordable therapy” (Novotney, 2017). The American Occupational Therapy Association also advocates for the use of mobile devices, stating that “occupational therapy practitioners are reporting the benefits of using these devices to improve client performance,” which includes providing “a source for health monitoring that is easily accessible and cost effective,” and “instant feedback and information without the need to wait for an appointment with a provider” (Erickson, 2017). The American Counseling Association contends that mobile devices “rapport building” and foster “a therapeutic alliance” with clients “in a new and different way,” and that clients who utilized mobile devices in their therapy “tend to return for follow-up sessions with feedback to share on their experience and ask for additional recommendations” (Vecchio-Scully, 2012).

Beneficial Health and Social Effects

Although some contend that mobile device use among children can lead to negative mental and social health effects, those that defend adolescent use counter that these negative effects are poorly substantiated and that, in reality, there are many positive effects. The United Nations Children's Fund stated that "there is very little evidence demonstrating that any significant number of children and adolescents are so dependent on their devices that they experience severe impairment in a major area of life – the definition of addiction – or are at risk of significant and snowballing health risks as a result." UNICEF also stated that the problems that seem to be caused by excessive screen time are actually due to deeper underlying problems and that a "reduction in screen time would represent a surface intervention that is unlikely to serve its purpose" (UNICEF, 2017). As for the health of mobile device users, the Food and Drug Administration studied the effects of cell phone radio signals and found that "the available scientific data on exposure to radio frequency energy show no categorical proof of any adverse biological effects," and that "public health data show no association" as well (FDA, 2020).

The American Psychological Association highlighted the ability of mobile phones to teach healthy behaviors among children. One application uses "a smartphone – coupled with virtual-reality technology – to help [children] learn how to cross the street safely," while collecting information on "when they choose to cross the street, their speed of walking, the speed of vehicles, which gaps they're choosing" and so on (Frame, 2017). The application is able to collect critical psychological research in the field of youth safety without putting children at risk. The Entertainment Software Association contends that there are various benefits of playing video games and using mobile phones. ESA states that "games allow kids to set goals, tackle challenges, solve problems, and take risks," and that "kids who played sports games were

frequently motivated to take up athletics in real life." Instead of being the socially isolating activity that others claim gaming to be, ESA claims that games can lead to increased sociability by acting as "a common conversation topic in the real world that can nurture and strengthen a budding friendship," and that games allow children to "develop their teamwork, collaboration, and leadership skills while enjoying friendly competition." (Vance, 2019).

Undesirable Health and Social Effects

Those who oppose young children using mobile devices often cite negative mental and social health effects that potentially come with extended mobile device usage. The World Health Organization has recently included gaming disorder in the 11th revision of its International Classification of Diseases. According to WHO, gaming disorder is an "impaired control over gaming, increasing priority given to gaming over other activities" (WHO, 2018b). WHO adds that excessive gaming can also cause sleep deprivation and decreased physical activity. Common Sense Media extends gaming disorder by contending that excessive mobile device use by children can lead to tech addiction later in life. It found that "50% of teens said they feel addicted" to their mobile device and that "62% of parents said they feel their teen is addicted" (Robb et al., 2019). These rates have increased from 45% and 61% respectively since 2017. Common Sense Media argues that the increase in rates can be attributed to various factors, such as the increased access to and functionality of mobile devices. The rising concern of gaming and mobile devices has prompted the creation of various programs to combat the apparent addiction. For example, Game Quitters, created by Cam Adair, claims to help parents "feel clear, confident, and focused, on getting [their] gamer back" (Adair, 2020).

The American Academy of Pediatrics claims that young children using mobile devices risk “displacing language-and-play-based interactions with caregivers,” which are crucial to developing “important preacademic skills such as self-regulation, empathy, social skills, and problem-solving" (Radesky et al., 2015). AAP argues that while other mechanisms, such as heavy television exposure, can also displace these interactions, mobile devices greatly increase exposure. AAP found that children with existing behavioral concerns are disproportionately affected by this loss of parental interaction, stating that “toddlers with a difficult temperament or self-regulation problems, and toddlers with social-emotional delays are more likely to be given a mobile device to calm them down,” and that “heavy parent use of mobile devices is associated with fewer verbal and nonverbal interactions between parents and children and may be associated with more parent-child conflict,” highlighting that child development can be hindered indirectly through mobile phone usage (Radesky & Christakis, 2016).

Regulatory Action

Proponents of mobile device use among children claim that the increasing amount of regulations for mobile privacy allows children to safely use devices online. Last year, the Federal Trade Commission looked into a collection of mobile games that offered microtransactions to evaluate their need for regulation. They stated that “video game microtransactions raise important consumer issues,” such as “concern about whether [microtransaction] mechanics are predatory or contribute to gambling-like behavior” (FTC, 2019b). During this investigation, the Entertainment Software Association, which includes key game developers such as Sony, Microsoft, and Nintendo, announced that they would adopt regulations set out by the International Game Developers Association and FTC. These regulations included disclosing the

odds for games-of-chance microtransactions and preventing games from targeting youth users for microtransaction sales.

Self-regulatory actions have also been taken in order to address the privacy concerns of mobile games. The Entertainment Software Rating Board introduced new services to aid mobile game developers in ensuring privacy standards were being met, especially in apps targeted towards a young audience. These services included "solutions for obtaining verifiable parental consent for users under age 13," and "guidance on providing concise short form privacy disclosure to mobile user." The ESRB stated that their "unique expertise in interactive digital media offers tremendous value to companies that are grappling with implementing responsible and transparent privacy practices." (Llewlyn, 2013). Stalker apps track a device user's location and text history. In 2019, FTC received a complaint that various apps marketed to monitor children or employees were being used as stalker apps. The offending apps "agreed to delete the data they collected," and are now subject to "third-party assessments of their information security program every two years" (Fair, 2019). FTC now investigates other apps that could be abused as stalker apps, and is reexamining the COPPA Rule as a result of the "rapid technological changes that impact the online children's marketplace." It seeks "stronger protections for children and greater parental control over the collection of personal information from children" (FTC, 2019a).

Deception in the Mobile Device Industry

Although phones are regulated, opponents of mobile device usage among children continue to claim that deceptive practices in the mobile device industry still harm children. The Campaign for a Commercial-free Childhood recommended that the Federal Trade Commission

look into apps that are marketed towards children after finding there are many “apps that force kids to watch ads or make in-app purchases in order to advance in the game,” and that many apps use “practices [that] are deceptive to kids and parents alike” (CCFC, 2018). One such practice is the inadequate privacy policies that many apps use and fail to disclose in a reasonable manner. In 2015, FTC conducted a survey of over 300 kids’ apps. Although “164 of them (45%) had privacy policies that could be viewed from a direct link on the app store page,” they found that a “significant portion of kids’ apps still leave parents in the dark about the data collected about their children” (Cohen & Yeung, 2015). Some developers would have their disclosures well hidden within the app or would fail to disclose relevant information about data collection and usage.

Another key issue regarding deception on mobile devices revolves around truth in the media. While this is not a direct problem with mobile devices, the preference that mobile apps take toward short form media enhances the concerns of media reliability and so called “fake news”. Common Sense Media surveyed K-12 teachers regarding their perceptions about the effectiveness for mobile learning and found that “teachers’ top technology-related concern was that students lack skills to critically evaluate online information” (Vega & Robb, 2019). Lastly, with almost 3 million apps available for download on the Google Play Store alone, malicious developers aim to capitalize on a highly saturated market. The Institute of Electrical and Electronics Engineers found that copycat apps are being designed to confuse users “into misidentifying an app, thus, for instance, [deceiving them] into giving sensitive information to a malicious app” (Bianchi et al., 2015). Norton Security, expanding on the idea of copycat apps, stated that “criminals use emails and SMS messages that appear to be from [a user’s] bank, credit card company or… as security updates,” to compromise user data. Some even line the app with

"fake reviews that are often short and generic" to convince people to download their app (Norton Security, 2020).

Conclusion

In the past, televisions were the topic of debates similar to those currently involving mobile devices. Parents were unsure of the effects that televisions could have on their children, and as a result some were weary to give their children access to TVs. The average American now spends more time on their mobile devices than watching TV (He, 2019). Marketers are targeting mobile device users more aggressively, exposing children to new influences. Now, some parents fear that heavy phone use among children can cause effects such as sleep deprivation and depression. However, other parents believe that mobile phones offer many benefits, such as mobile classrooms and text counseling. The division that occurs among parents is due to the loss of authoritative influence that they have over their children once the device is introduced. Parents can no longer control the content that their child has access to. The division is more apparent now than it was in the past with television sets due to the increased lack of control parents have over mobile devices. It is harder for parents to prohibit access to mobile devices or control the content that appears on them than it was for TV shows. As new sources of media are created, developers will need to contend with this potential division among their users. Regardless of the proposed educational or social interaction benefits, some parents will be prone to push back against usage of a device if it acts as an authoritative intermediary between them and their children as shown with the television and mobile devices.

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