

## The Impact of mobile Communication Device Notifications on Pre-School Children's (Aged 3-5) Cognitive Performance.

Aboub Mohammed Amine<sup>1</sup>

National Institute for Higher Training of Youth Cadres "MADANI Souahi" (INFSCJ),

aboubamine@gmail.com

Received: 21/06/2023

Accepted: 14/05/2024

Published: 01/06/2024

### Abstract

Marshall McLuhan (1964) said, "Any technology gradually creates a totally new human environment." (McLuhan, 2019) This is affirmed by the changes we are experiencing today, which have occurred and continue to occur in the details of our lives. Rapidly evolving technology has transformed the specifics of the environment in which we live, as well as our responses to the natural stimuli that surround us. As a result of this technology, a virtual space has emerged parallel to our physical reality. It utilizes a variety of notifications, emanating from mobile Communication devices of various kinds, Children, being the first generation growing up within this emerging environment, are among the groups exposed to these notifications. These auditory, sensory, and visual notifications have an impact on various cognitive functions of the child, especially during the stage of completing mental and perceptual development between the ages of 3 to 5 years .In this stage, the child strives to learn and acquire a range of skills that influence their human capacities (including cognitive, sensory, and social abilities). This paper aims to shed light on a set of indicators through which these impacts can be monitored, along with the resulting consequences, while also Suggesting ways to overcome them.

Keywords: Communication device notifications, cognitive performance, child.

## 1. INTRODUCTION

Numerous academic and empirical studies indicate the negative risks arising from the excessive and unguided use of modern communication media on the child's body and physiological growth. Studies affirm the harsh effects that can be observed on the user's spine, body shape, weight, as well as the impacts on the eyes, overall senses, and the aspects related to hand function. Additionally, the average movement and physical activity essential for healthy bodily growth are affected. However, studies that focus on the mental aspect of the user, especially when the user is a child, are comparatively fewer. Similarly, studies that delve into the impact of notifications on this performance are rare.

## 2. Where is the Problem?

In accordance with modern international criteria for measuring auditory and visual pollution within human living spaces, including the digital realm, there is discussion about what is referred to as auditory pollution resulting from external noises emitted by humans in their environment. This also includes pollution generated by devices of various kinds, particularly mobile communication devices that accompany humans, including notifications, news alerts, communications, text messages, updates, and more. Not to mention the recent discussions about visual pollution in the digital environment, this includes the materials and content of communication/media devices. Some studies indicate that the brain is exposed to types of neural toxins captured by the senses, negatively affecting users in general. This impact is even more pronounced on the sensitive nervous structure of a child and the potential consequences that might occur.

Recently, there have been growing concerns about these changes, particularly regarding the impact on children. These concerns have escalated to the point where specialists and researchers in the field have sounded the alarm, raising awareness about the potential consequences. One prominent figure in this concern is child psychology expert

Dr. Anne-Lise Ducanda. She emphasizes that addiction to the use of visual communication media, especially mobile devices, can lead to symptoms of introversion in children. This is particularly prevalent among pre-school children who spend hours of their day at home within the family context. This is especially concerning due to the absence of typical family activities such as games and direct social interaction. (Ducanda, 2019)

The possibility of children developing a strong attachment to these communication media is increasing day by day. Psychologist Larry Rosen, a professor at California State University, suggests that notifications trigger physiological responses that flood your life with chemicals, the most notable being cortisol, (Rob Hopkins, 2018) Cortisol is associated with anxiety and the fear of missing out or losing out, which prompts children or young individuals, for instance, to check their phones about every 15 minutes. Behavioral studies have revealed that users check their smartphones about 100 times per day (Stabile, 2023) on average to ensure they haven't missed anything" *Accordingly, the amount of time children and young adults spend in front of a screen has risen sharply compared to pre-pandemic levels, up to about two hours and 45 minutes a day on social media alone*" (Latschan, 2023). These users belong to the first generation of media users (Generation Z). What about the second generation (Generation ALPHA), who are growing up under the influence of these media from the earliest stages of their upbringing? Therefore, it is crucial to conduct research and provide answers to a number of questions in order to pinpoint the sources of these concerns and propose practical solutions that can be implemented.

### **3. What are Communication Device Notifications? What are their types?**

Notifications, or alerts, are everything that is emitted by electronic communication devices and applications (such as Mobile & Smartphone, tablets, Smart Watches etc.). Historically, it is evident that notifications did not originate with these new media; they emerged with the appearance of clock notifications in public squares and wall clocks in

homes, for instance. Later, fixed-line phones introduced notifications upon their initial appearance, extending to various household devices. This trend continued with different types and generations of communication devices.

Communication device notifications encompass various forms, including alerts for personal communications and text messages, news and current events, appointment reminders, and more. They also include notifications about device status (battery level, memory capacity, etc.), alerts from various types of assistant applications, email notifications, and notifications about new content shared or published across different platforms. These notifications can take the form of auditory alerts (ringing/chiming), visual alerts (using colored lights or distinctive flashes), and sensory alerts (device vibrations or shakes).

#### **4. Why Were Notifications Created?**

The primary purpose of notifications is to inform and alert users about various events (calls, text messages, emails, etc.) and changes that occur on the device (power on, power off, etc.). However, many researchers consider that the primary purpose of notifications, especially within modern communication devices, is to enhance consumption. By "consumption," we mean encouraging the consumption of content and products that are produced and disseminated through these media. Increasing communication consumption indeed contributes to heightened attention towards these contents and devices. This attention increase serves as the primary goal for marketers of any product, regardless of its type and purpose.

#### **5. What are the Effects on a Child's Cognitive Performance?**

##### **5.1. Effects on Cognitive Development in Children:**

Some studies have shown that excessive exposure to modern communication devices weakens the activity of certain areas of the brain. Henry H. Wilmer explains, The growth of imaginative thinking in a child at the age of five is of utmost importance since it represents the second stage after sensory thinking and precedes the child's arrival at abstract

thinking. Excessive use of all modern devices, which exceeds an hour to an hour and a half daily, weakens this cognitive capacity. (Wilmer, Lauren, & Jason, 2017) This is because notifications occupy the child's attention, preventing the development of cognitive skills such as imagination, thinking, and perception—skills that form the cornerstone of creative behavior in children. Notifications can also scatter the child's focus and divert them from engaging in important daily activities crucial for their cognitive development. Additionally, notifications can have an impact on a child's memory. *“The study has shown a significant effect of radiation on the right hemisphere of the brain, where visual memory is located”* (Shield, 2018).

#### **4.2. Effects on a Child's Intelligence:**

Parents often marvel at their children's ability to interact with various types of modern communication devices, leading them to believe that their children are intelligent. However, what most parents are unaware of is that intelligence comes in various forms. The focus on this type of interaction with such devices can cause children to miss out on many innate talents they have inherited. Additionally, it can hinder the development of other forms of intelligence and impair the cultivation of multiple facets of their cognitive abilities. According to the researcher Howard Gardner, intelligence has eight types (Tritsch, 2020):

- *Logical– Mathematical Intelligence*
- *Linguistic Intelligence*
- *Spatial Intelligence*
- *Bodily – Kinesthetic Intelligence*
- *Musical Intelligence*
- *Interpersonal Intelligence*
- *Intrapersonal Intelligence*
- *The Naturalist Intelligence*

Engaging extensively with new communication media can hinder or sometimes deprive the child of the opportunity to learn skills and acquire various forms of intelligence,

which are crucial in their life as a biological and social being. They miss out on many chances to integrate into society, establish relationships, and engage in social rituals that make them an integral part of the community.

#### **4.3. Impact on the Child's Social Responses:**

One of the social effects that affect the child is the loss of a distinct type of intelligence, known as social intelligence. This intelligence is developed through the child's interactions with family members (siblings, parents, relatives) and through relationships that they need to establish, such as forming friendships and playmates.

This is due to the significant dopamine release that occurs when the child interacts with these communication media. However, this release of dopamine is not comparable to what the brain produces when interacting with individuals around the child. This phenomenon can lead the child's mind to become addicted to high levels of dopamine, also known as the "happiness hormone." This hormone works similarly to how a horse is rewarded with a sugar cube after performing a skillful act in the circus by its rider; *"A study conducted by a specialized Japanese institution in this field revealed that the latest survey carried out in 2011 on children and parents in five countries (Japan, Egypt, India, Chile, and Paraguay) showed that 70% of the children included in the study have independent mobile phones apart from their parents."* (Rika, 2019) *"In the United Kingdom more than 70% of children aged five to sixteen own a mobile phone. In the United States 83% of middle schoolers have a mobile phone and the age at which children first get a mobile is going down."* (IDEA, 2022)

This is an urgent demand for pre-adolescent children, a demand that parents have often yielded to. The noticeable issue is the severe deficiency in social skills that children who excessively use these media experience, leading to cases of shyness and introversion due to underdeveloped social skills in terms of verbal communication, nonverbal gestures, and direct physical interactions. It's also important to note that specific research findings from various international university research labs suggest that new media and

communication technologies, especially mobile devices that are directly linked to children, can lead to a range of symptoms similar to those of autism spectrum disorder. However, these technologies are not the causes of the disorder, contrary to common misconceptions.

#### **4.4. Impact on the Child's Perception of Time and Space (Natural Dimensions):**

The child's perception of time and space holds significant importance in their daily life, especially during the growth period when understanding facts and grasping quantitative elements within abstract concepts like time becomes crucial. Equally important is their perception of physical space and the objects around them within the environment they inhabit. This perception is developed through continuous and organized interaction with the environment, including people and objects within it. However, the detachment facilitated by communication devices for children during their usage keeps them distant from both elements of time and space. This poses a threat to the child's cognitive skills and their ability to comprehend these two dimensions within various contexts.

#### **5. What Practical Recommendations can be Suggested?**

- It is noticeable that parents are resigning from many of their fundamental responsibilities towards their children, the most important of which is companionship. It's important to distinguish between companionship and monitoring, where monitoring is just one of the various techniques of companionship and serves as a safeguard for it. With the impossibility of isolating children from the digital environment or preventing them from interacting with digital devices of all kinds, as well as the various available applications for play, communication, and consumption of entertainment and educational products. Companionship should encompass:
  - Parents being an integral part of the environment in which the child interacts with new media, serving as a point of reference for the child to inquire and understand

what they cannot grasp. The concept of companionship can be summarized as follows:

- Set specific timing and duration for the child's interaction with these media.
- Define the physical spaces where interaction is allowed, avoiding private areas such as the bedroom, for instance.
- Select and specify permissible and prohibited types of content, along with explanations and guidance.
- Regularly monitor the media, websites, and applications the child uses through these platforms.

Despite all these measures, these procedures will not be effective in the absence of parental supervision and monitoring of their children's activities during electronic interactions, entertainment, or learning through these platforms.

- Utilize specialized electronic applications for modern communication devices, especially mobile devices, to protect users of all ages from security breaches and exposure to content that is not suitable for their age levels.

- With the advancement of communication technologies, media, and new media platforms, it has become essential to enhance parental competence in navigating these environments. Most parents often find themselves struggling with technical aspects, understanding these technologies, effectively using them, and managing potential risks associated with them. Addressing these challenges is crucial to minimizing the chances of children's misuse and deviation in utilizing these platforms.
- As mentioned earlier, notifications serve as stimuli to increase consumption, and this is something that children need to be aware of. Notifications within these devices can be considered one of the most significant factors that amplify the likelihood of addiction, if not one of the main reasons behind it. For this reason, it is advisable to



keep young children away from all forms of electronic communication devices, including television, in their early years.

- Introducing educational training material under the concept of "Digital Literacy" into the curricula at various educational levels (elementary school, middle or junior high school, and high school.) to acquaint students with the digital realm. This should particularly involve teaching children proper engagement with the mediums and content within this digital space, as well as promoting responsible consumption of products disseminated through it.
- Emphasizing social and mental alternatives such as social games and group activities including sports, recreational and tourism activities, and any activities that involve various levels and forms of social interaction. Designating specific regular schedules for these activities can help solidify the child's need for them.

## 6. Conclusion

Through the points discussed above, we think that the damage caused by pre-school children's immersion for long and excessive times on mobile communication media is clear in kind and scientifically proven, and perhaps the law issued in August 2023 by the Chinese authorities limiting children's use of smartphones (Guzman, 2023) is one of the social indicators that prove these risks, and that the solution that can reduce these damages is to restore parents to their roles in raising awareness and directing their children's use of technologies and mobile Communication Devices.

## 7. Bibliography List :

- Ducanda, A.-L. (2019, aug 23). *france.tv*. Consulté le (July 14, 2023), sur traite l'addiction infantile aux écrans: <https://www.france.tv/france-2/les-documents-de-l-info/1062961-le-dr-anne-lise-ducanda-traite-l-addiction-infantile-aux-ecrans.html>
- Guzman, C. d. (2023, Aug 3). *China Wants to Limit Children's Smartphone Use to Combat Addiction. Here's What to Know*. Consulté le (Dec 18, 2023), sur Time.com: <https://time.com/6301185/china-smartphone-addiction-children-limit/>

- IDEA. (2022, Jan 25). *Every child should have a mobile phone*. Consulté le (Sep 29, 2023), sur The International Debate Education Association: <https://idebate.net/every-child-should-have-a-mobile-phone-junior~b1746/>
- *Larry Rosen on activism and imagination in the age of the Distracted Mind*; (2018, Jan 23). Consulté le (July 19, 2023), sur Rob Hopkins: (<https://www.robhopkins.net/2018/01/23/dr-larry-rosen-on-activism-and-imagination-in-the-age-of-the-distracted-mind/>)
- Latschan, T. (2023, Dec 2). *Social media addiction: How can we avoid it?* Consulté le (dec 20, 2023), sur Welle, Deutsche: <https://www.dw.com/en/social-media-addiction-how-can-we-avoid-it/a-67597997>
- McLuhan, A. (2019, Feb 2). *Understanding Understanding Media*. Retrieved (Aug 1, 2022), from medium: <https://medium.com/@andrewmcluhan/understanding-understanding-media-8cdd40d46908>
- Shield, C. (2018, Oct 8). *Do mobile phones harm our health?* Consulté le (Jan 26, 2023), sur Deutsche Welle: <https://www.dw.com/en/is-your-mobile-phone-damaging-your-brain/a-45020000>
- Stabile, A. (2023, Oct 01). Cell phone shocker as 97% of kids use their device during school hours and beyond, says study. Consulté le (Feb 24, 2024), sur Fox News: <https://www.foxnews.com/health/cell-phone-shocker-97-percent-kids-use-device-during-school-hours-beyond-study>
- Tritsch, E. (2020, Mar 11). *8 Types of Intelligence: Howard Gardner's Theory of Multiple Intelligence*. Consulté le (Nov 13, 2023), sur Fairborn Digital Academy: <https://fairborndigital.us/2020/03/11/8-types-of-intelligence-howard-gardners-theory-of-multiple-intelligences/>
- Wilmer, H. H., Lauren, E. S., & Jason, M. C. (2017, Apr 25). Smartphones and Cognition: A Review of Research Exploring the Links between Mobile Technology Habits and Cognitive Functioning. Consulté le (dec 13, 2023), sur National Library of Medicine: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5403814/>
- Rika, K. (2019, Oct 31). Children Deprived of the Right to Learn About Sex . Consulté le (Apr 19, 2022), sur Nippon.com: <https://www.nippon.com/en/japan-topics/c06602/children-deprived-of-the-right-to-learn-about-sex.html>