Parenting Digital Natives: Cognitive, Emotional, and Social Developmental Challenges

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Abstract: The use of Information and Communication Technologies (ICT) such as Internet and Gadgets has expanded and are impacting digital natives' development. Even though ICT has brought great benefits to current society, there are also indications that the manner in which children and adolescent use of ICT has undermined their development in some aspects. This paper reports on literature review on how ICT use in this digital era, has the potential to negatively impact the digital natives cognition, emotion, and social development. Education can be a means of helping the digital natives use technology in a positive way, minimizing its negative potential. Parents must be proactive in guiding and nurturing digital natives to use ICT wisely and to use technology in a way that their development is supported and not seriously disturbed by digital devices.

Keywords: digital natives; ict (information and communications technology); cognition, emotion, social interaction.

The increasingly rapid development of scientific knowledge and technology has resulted in sophisticated technological products, including various news and communication devices. Prior studies have indicated that the use of Information and Communication Technologies (ICT) such as Internet and Gadgets has expanded and are impacting digital natives (Hatch, 2011; Moore & Grisham, 2015). Our children and students today are all "native speakers" of the digital language of the computers, video games and the Internet (Prensky, 2001). Gadgets such as cell phones, smart-phones, computers, tablets, laptops, and iPads with increasingly complex specifications continue to be produced. This current era of Big Data has clearly caused the increasingly widespread ICT usage in society. This development of media and diverse electronic devices is becoming more accepted and extensively used as an educational device as well, not only by students but also by parents and teachers. Due to its many advantages and accessibility, ICT possess great appeal for parents, students, and students everywhere.

Many people admit that the progress of technology, including the increased sophistication of the gadgets we use have positive effects and aids in the ease of communication and learning (Rowan, 2013). Research shows that the routine use of various kinds of social media advantages children and teens as it increases and enriches communication, social connection, and even their technical skills (Hatch, 2011; Moore & Grisham, 2015). Never in the history of humankind has there been such uninhibited access to knowledge and information. With a tap or touch on a tablet or smartphone, a student can retrieve information and answers without having to search within dusty It does not come as a surprise, therefore, that ICT have not only become a ubiquitous feature in the adult world, but also in the children and adolescent world. Furthermore, in this digital era, many parents themselves have intentionally introduced gadgets to their children as early as possible. This is observed in the number of parents who facilitate gadget use for their toddlers. For many parents, educational applications that can be found across various technological platforms are deemed helpful in enhancing child intelligence

however, many parents ironically do not realize that the habit of playing with gadget can cause addiction that negatively impact their children (Wanajak, 2011). Excessive interaction with gadgets is feared to impair the development of children and teenagers. If not watched and limited, gadget usage can harm the physical, cognitive, social, and emotional development of these age demographics.

Television, computers, and video games are among the most widely used media activities, which engage children and adolescents for increasing amounts of time. There is a sharp increase in both the time spent and the numbers of children who use media over the past 10 years (O'Connor, 2011). Around five years ago Guernsey—the author of Into the Minds of Babes: How Screen Time Affects Children From Birth to Age Five stated about the negative impact of television, that parents are distracted by TV the same way preschoolers are. Young children learn much more from face-to-face interaction than a screen. They see someone who's able to do that as a true learning partner. They don't have any way of knowing whether that character or face on screen really understands them (Younts, 2011).

A growing number of researchers are also warning about the dangers of watching TV when very young children are nearby. Recent findings suggest that even casual exposure to TV can harm their development and undermine parent-child interactions. We have heard of the hazards of secondhand smoke. Now here's another worry: secondhand TV. A new study finds that casual TV exposure may hurt child development." (Levine, 2002; Toppo, 2011; Younts, 2011).

Presently, what constitutes a 'threat' is not just TV but the widespread use of electronics and digital technology among children even as young as two years. Infants to school age children are avid digital consumers who often watch TV, use the computer, play video games, and operate smartphones and tablets. From the moment they can reach and grasp objects at hand, toddlers begin playing with their parents' smartphones or tablets. We can find more that 40,000 YouTube video uploads regarding babies and toddlers playing with those gadgets (Kim, 2013).

This phenomenon and its real impact are elucidated further by the following research finding:

It's amazing how a 2-year old can be handed a gadget and just know how to use it, similar to how a kid knows how to use a feeding bottle. Action figures, puzzles and blocks are no longer the standard toys among today's children. Research by child-education specialists at the Michael Cohen Group revealed that touch screens have taken over all other forms of playful delight for kids. Sixty percent of parents with kids under the age of 12 reported that their child plays on a portable screen often, while 38 percent apparently play very often. It's interesting to note that 36 percent of these kids have their own device. (League, 2015).

Furthermore, in the past five years, the number of adolescents and teenagers who use social media sites have increased dramatically. According to the recent polls, 22% of teenagers log on to their favorite social media site more that ten times a day, and more than half log on more than one a day. 75% of teenagers now own personal cell phones, and 25% use these phones for social media, 54% for texting, and 24% for instant messaging. As such, a large part of the social and emotional development of this current generation is happening while they are active on the internet or on their phones. (O'Keeffe & Clarke-Pearson, 2011).

There is a sharp increase in both the time spent and the numbers of children who use media over the past 10 years. Parents, educators, and health care providers must understand the effects that media has on childhood development and learn ways to moderate negative effects and maximize positive effects (O'Connor, 2011). Numerous statistics and literature regarding this topic have been produced and published widely, and the conversation continues. The issue

remains, however, that parents still remain largely unwatchful of their children's gadget use. In the next few years, as the trend suggests, more and more toddlers will use gadgets. As the above has shown, unlimited ICT use among children can cause addiction and impair physical, cognitive,

emotional, and social development and unsurprisingly so (O'Connor, 2011). The lack of face to face or direct interaction with parents or other persons is also set to negatively impact the emotional and social intelligence of this future generation. This should be of utmost concern for parents and teachers.

THE IMPACT OF GADGET USE ON CHILD PHYSICAL DEVELOPMENT

Unlimited gadget usage by children not only can cause addiction excessive interaction with gadgets may diminish the range of physical and motoric stimulation, in addition to harming the cognitive, social, and emotional development of children (Rowan, 2013). Twenty years ago, it is common to find children playing outdoors for large chunks of the day riding bicycles, playing ball or other sports, and building forts. Mastering imaginative games, children in the past created games that did not need expensive tools or equipment nor parental supervision. In their incessant movement and exploration, their sensory world is one that is simply at hand and based upon nature.

Ironically, today many children under the age of twelve spend more time in front of a monitor or screen comparative to outdoor play. The lack and limitation of physical movement will result in slowed or inadequate development of a child's motoric skill. Presently, it is not only video games that cause children to be sedentary, but also television, smartphones and smartphone applications, computers, tablets, handheld gaming devices (e.g. GameBoys and PSPs), etc. Children become active consumers of these technologies, as many commercials and advertisements of electronic products are marketed towards children as the target audience. Parents are likely to have an easier time keeping their children sitting still by giving them a gadget to play with, while in truth for optimal development it is necessary to let children actively roam and explore their environment, natural or otherwise.

Not only that, according researchers from Boston College, light emitted by laptops and smartphones late at night deprives children of critical night sleep hours. Research done by the Kaiser Foundation found that 60% of parents do not monitor the gadget use of their children, and 75% of children are permitted to use technology in their bedrooms. This has caused 75% of children to be sleep deprived, including many between the ages of nine and ten a crucial time where sleep deprivation not only impacts child development but also their performance at school (Rowan, 2009; Kim, 2013).

which are described below:

a. Eye Health

Insofar as parents spend more time using digital media, children will follow suit, and insofar as adults experience side effects due to overuse of digital media, children too will suffer similarly. Some of these side effects include digital eye strain (reddening, dryness, or irritation of the eye; blurry vision; eye fatigue) (Hessel, 2016). Overexposure of smartphone use at a young age can induce weak and poor vision among children; for example, nearsightedness (Healy in Costa, 1999; Kim, 2013).

One growing source of potential concern is the kind of light most digital devices emit. We all know about the invisible dangers of ultraviolet or UV light, but fewer people are aware of the potential risks of high energy light that we can see: blue light. In this case, according to Hessel,light on the blue end of the visual light spectrum contains more energy than warm colors like oranges and red, and is known as a high energy visual light (HEV). Blue light is

everywhere, including in sunlight. However, digital screens and fluorescent and LED office lighting have drastically increased our exposure. It's not all bad - blue light's abundance in daylight boost alertness. But when we're bathing ourselves constantly, the sustained exposure may well add up, preventing our bodies from settling into healthy sleep…. Most worryingly, recent studies suggest HEV light can contribute to retinal damage and macular degeneration - an irreversible loss of vision. (2016).

b. Physical Growth and Obesity

Use of digital media may intrude upon the playtime and physical activity of children. It has been reported that children who spend more than four hours a day watching TV seem to experience a greater incidence of being overweight compared to children who watch less than two hours a day. Children who often use gadgets and lack physical activity tend towards obesity. Excessive digital media use by children may limit the physical challenges and activities that their bodies need in order to reach optimal sensory and motoric development (Rowan, 2009; Shields & Behrman, 2000; Hatch, 2011; Kim, 2013; Relos, 2014).

Other physical ailments that children experience as a result of excessive gadget use also include postural and orthopedic discomfort, such as: back, neck, and shoulder pain; carpal tunnel syndrome, some (controversial) effects of electromagnetic radiation as emitted by electronic devices, and even though rareseizures provoked by various visuals (Healy in Costa, 1999:137; Shields & Behrman, 2000:7).

THE IMPACT OF GADGET USE ON CHILD COGNITIVE DEVELOPMENT

When speaking about the cognitive development of children, it is clear that this is not to be separated from brain development. Cognition is a general term encompassing mental processes such as attention, perception, comprehension, memory, and problems solving. Cognitive development refers to changes in cognition over time (Johnson, 2006). The mind and body are integrally connected (Leaf, 2008). It is also worth noting that, in fact, the bodily movements or physical activities of children are tightly connected with the development of cognitive brain functions. John Ratey, a doctor at Harvard, explained in his book, Spark: The Revolutionary New Science of Exercise and the Brain, that the advantages of playing are not limited to being physically fit and socially comfortable. Even 10 minutes of physical activity changes the way the brain functions. In addition, exercise normally makes people feel better because it "builds and conditions the brain" (Levine, 2002; League, 2015).

Children must receive the chance to build cognitive pathways in their brains by partaking in activities that require them to move. The use of digital media by children, again, is to be observed and limited—in fact, it is arguable it is best that toddlers not be habituated to gadgets at all. Some experts concerned with child development explained that childhood is a particularly crucial time for the brain because neural sculpting is at its lifetime high. Many of our abilities, tendencies, talents, and reactions are hardwired in childhood and set a mental stage for adulthood (Leaf, 2008:95). Even before kids can utter their first words, kids' brains are tripling in size a lot of learning happens before the age of five. Researchers at the University of Washington reveal that modern gadgets are not necessary in child development—children can thrive on being talked and read to. In fact, kids need one-on-one time with their parents, not gadgets. Additionally, overexposure to gadgets has been linked to attention deficit, cognitive delays and impaired learning (League, 2015).

Recent neuroimaging investigations have suggested associations between these internetrelated cognitive impacts and structural changes in the brain. Young children who will

grow up in a high-tech world need a low-tech, high-touch environment. Early childhood is a special time for brain development of special systems that will underlie many different kinds of learning; even executive centers have already begun to develop by age two. The preschool brain's main job is to learn the principles by which the real world operates and to organize and integrate sensory information with body movement, "touch", and "feel" (Katz in Healy, 1999:328).

Research has been conducted on how television, video games, and other pop culture components (including gadgets) have diminished the ability of children to concentrate upon, absorb, and analyze information. According to an article in Time magazine, eight to eighteen year olds spend seven hours and thirty- eight minutes a day using entertainment media. As they have become so absorbed into it, that social and entertainment media become a constant distraction. These distractions affect the way children's developing brains absorb new information, and can lead to continuous partial attention (CPA), (Hatch, 2011). The Internet, a relatively recent form of media, has also grown rapidly in use and applications. Furthermore, Johnson explain in the following:

> Given such early and extensive use, the impact of media on children is of considerable concern. All trends indicate that the number of children accessing the Internet as well as the amount of time spent online is steadily increasing (Statistics Canada, 2004). Given such pervasive and extensive use in children and youth, from a cognitive-developmental perspective, the Internet is a cultural tool that influences cognitive processes and an environmental stimulus that contributes to the formation of specific cognitive architecture (2006).

Neuropsychology research and the practical analysis of education has shown that the physical development of the brains of children is shaped by experience. The brain is now generally understood to be highly plastic, continually adapting to the input it receives, it is possible that the brains of those who interact with technology frequently will be restructured by that interaction. (Healy, 1990; Prensky, 2009). Every experience through various modes of learning changes the child brain. If an experience changes drastically, the brain will respond in kind. The physical structure of the brain emerges and is shaped by the way the brain is used. This fact is tied to plasticity a crucial facility of the brain that governs various brain capabilities, including the ability to adapt to changing environments and memory or information storage in the learning process (Hoiland & Chudler, 2016). It is due to this plasticity that children are able to learn faster than adults, as is evidenced among other things in skills such as language mastery, mastery of a musical instrument, ball manipulation (e.g. juggling a soccer ball). Brain plasticity also allows children to heal from brain injury much faster than adults (Frostig, 2012).

The discovery and development of new technology in the lives of children today have the potential to expose their brains to disadvantageous risks. The lack of environmental stimulation is inadequate for early brain development and the erosion of quality interpersonal interaction for children may have long lasting effects. Many parents have failed to realize that if society hopes for children to master skills related to academic and intellectual content, that parents must help prepare the framework of thought within their children appropriately (Healy, 1999; Levine, 2002; Prensky, 2009).

THE IMPACT OF GADGET USE ON CHILD EMOTIONAL DEVELOPMENT

In her book Opening Your Child's Nine Learning Windows, Cheri Fuller locates emotion as the first learning "window." Fuller explains that the brain of a child who feels secure, loved, and happy will channel all focus to learning and growth as opposed to fear and worry (Fuller,

1999). Attunement is one of the important fundamentals in child emotional development. The following are explanations by education experts that more completely describes attunement:

> All the interaction between mother and baby—the loving vocalization, the play and eye contact, a mother responding to and mimicking her baby's babbling, the gentle physical touching plays an important role in emotional nurturing and growth. In just those brief moments of interaction, neurons in a child brain were connected with other neurons, and existing connections between cells were strengthened, adding to the vital circuitry of emotional wiring. (Healy in Fuller, 1999:21).

Research has shown that if children don't get enough loving touch and eye contact during the first three years of life when their brains are organizing for independence, their emotional development will be stunted. This restricts a child's emotional horizon, making him or her lack empathy and more prone to anxiety and impulsive, aggressive behavior, and depression. A good deal of evidence suggests that media contributed to children's fear and anxiety especially in younger children (Leaf, 2008; O'Connor, 2011).

Attunement is the strongest emotional stimulation needed for brain development, which involves parents or other adults responding to a child's emotional state appropriately. Young children require between three and four hours a day of physical activity and human 'touch.' According to Dr. Ashley Montagu, infants that are deprived of this amount of human touch and play exhibit more agitation and anxiety, and may become depressed in early childhood (Hatch, 2011). This drives emotional growth. If, however, expressions of like or pain from the baby is unacknowledged and ignored by their parents, then the child's emotional and mental development might be deterred or even damaged. Every exchange between parent and child in the growth process shapes the core of the emotional expressions and capability of said child (Fuller, 1999).

The prime time for emotional 'wiring' for a child is found in the period between birth and age ten. Within that time, the brain readies circuits that are needed to experience and control emotions that range from joy and sadness to jealousy, empathy, and anxiety. Parents must realize that attunement is of utmost importance in child rearing, and for that reason infants and children are better off not playing with gadgets. If face-to-face interaction with others in real time is crucial for a child's emotional development, and especially if attunement is not fulfilled, then there will be grave consequences for a child's empathy, moral and social growth.

> For example:
> The consequences of failing to learn the basics of emotional intelligence are increasingly dire. Evidence suggests, for example, that girls who fails to learn to distinguish between feelings like anxiety and hunger are most at risk for eating disorders, while those who has trouble controlling impulses in the early years are more likely to get pregnant by the end of their teen years. For boys, impulsivity the early years may augur a heightened risk of delinquency or violence. And all children, an inability to handle anxiety and depression increases the likelihood of later abusing drugs or alcohol (Gottman, 1997:14).

THE IMPACT OF GADGET USE ON CHILD SOCIAL DEVELOPMENT

Much as a baby's brain is wired for language, music, and logic, it is also wired for emotion and feeling. In fact, several of the most important early circuits that is formed by the brain have to do with emotional control, and this emotional wiring influences how children will develop in mental, social, and moral dimensions. The emotional development of a child influences how they will connect with others, how well they can control their emotions, how well they can pay attention in classes, and many other skills. Allowing children to play with tablets or other such gadgets in fact carries a psychological danger that is quite significant. Researchers warned that

using a tablet or smartphone to divert a child's attention could be detrimental to "their socialemotional development" (Walters, 2013). If emotional aspects are not developed well, it will have an impact upon a child's empathy, emotional and social intelligence.

The emotional development of children is profoundly connected to social development. While it is okay to allow children to use technology for a limited amount of time, when it begins to become a substitution for personal interaction, issues begin to arise. In this case, according to Shields & Behrman,

> excessive computer use may also affect children's social development. By the age of about seven years, a child's interactions with family, peers, school, community networks, and media all play an important role in the development of interpersonal skills and social competence. Computers are now part of that mix, and concerns have been raised that children who form "electronic friendships" instead of human friendships might be hindered in developing interpersonal skills. Such concerns are heightened by reports that among children ages 8 to 16, some 20% have computers and 11% have Internet access in their bedrooms, which suggests that a sizable number of children may use computers in social isolation. Indeed, some research has documented negative social effects from time spent on computers. For example, one in-depth analysis of the effects of Internet use among a group of 93 families found that, during their first year with access, teens who spent more time online experienced greater declines in social involvement and increases in their feelings of loneliness and depression. (2000, p. 7).

Developing children require the proper amount of human interaction instead of technological interaction in order to properly develop and to reach all the proper motor milestones (Hatch, 2011). Jenny Radesky, clinical instructor in developmental-behavioral pediatrics at Boston University School of Medicine, urged parents to increase "direct human to human interaction" with their offspring. She encouraged more "unplugged" family interaction in general and suggested young children may benefit from "a designated family hour" of quality time spent with relatives without any television and mobile devices being involved (Walters, 2015).

Dr. Catherine Steiner-Adair, a clinical psychologist and author of the book The Big Disconnect, states, "… kids are missing out on a very critical social skill. In a way, texting and online is communicating it's not like it created a nonverbal learning disability, but it puts everybody in a nonverbal disabled context, where body language, facial expression, and even the smallest kinds of vocal reactions are rendered invisible" (Emhke, 2015).

Consider the increase in hours children spend in front of video screens—does this not mean that watching TV and other monitors mean that children do not spend time playing with other children? Within the history of humankind, the way children learn basic emotional skills from parents and peers, neighbors, and rough and tumble play with other children. Therefore, parents and teachers must beware, ready to provide direction and help children towards optimal social health, as empathy is a crucial part in our capacity to understand and befriend with one another. Parents and teachers can support and help train empathy development by giving children the chance to work and speak about emotional responses towards their various experiential content (Woolfolk, 1987:109).

CONCLUSION

Through information and explanation that has been presented above, we are able to sketch out that in the coming years more children and teens will be active in gadget use. It cannot be denied that gadgets have become a part of the life and activity of this 21st century generation. Therefore parents and teachers must anticipate and prepare to care for and guide children with

greater wisdom and responsibility. Parents and teachers can effect critical changes by helping children become good learners since birth.

The development of this current age and technology alongside cultural shifts cannot be avoided, and when children grow up to face many new challenges, parents and teachers have to realize that they are raising a generation with a different brain. The most prudent step forward is to understand the development and growth of curious children by providing support and guidance that is good and accurate. A study by the National Institutes of Health in America has found that the greater usage of modern technology can transgress old family boundaries, values, behavior and child well being. Many games available on the internet portray sex, murder, torture, and Mutilation all things that may spur children on to become aggressive and violent. On the other hand, playing outdoors (such as, in a traditional play ground) has proven to help children become more friendly and generally calmer (League, 2015).

It's important to come together as parents, teachers and therapists to help society "wake up" and see the devastating effects technology is having not only on our child's physical, psychological and behavioral health, but also on their ability to learn and sustain personal and family relationships (Rowan, 2013).

If children use gadgets and remain in front of monitors excessively, especially if combined with other technologies with screens such as television, children may be put at dangerous risk that threatens their psychological development. This constant surround may also cause gadget addiction in children. There are two factors that cause children to become addicted and spend too much time in front of screens. Firstly, that parents do not realize that they have abandoned their children due to their own absorption in gadget screens, and secondly that parents lack understanding of the dangers posed by digital electronics.

Fundamentally, all humans including children are created by God as social creatures who need interaction with each other. Therefore since birth babies and children who are in dire need receive attunement that is, enough interaction, attention and appropriate responses from parents and many others around to support their emotional development. Gadget use cannot fill this basic need, and if a parent does not fulfill this basic emotional need of their children, then negative consequences may come in terms of the growth and emotional intelligence of their children.

Gadget use by children that comes too early, that is unlimited, and is excessive will result negatively upon the physical, cognitive, social, and emotional development of these children. These unfortunate situations will also undoubtedly affect a child's emotional intelligence, empathy, and social intelligence. These two aspects are like two sides to a coin, both constituting important elements that each child needs in adulthood. Parents and teachers must remember that children need physical activity, social interaction, and the love and care of adults to become healthy, happy, and productive. Parents and teachers must also be ever watchful, since for children of all ages software choices that are inappropriate may bother their language development, focus, social skill, and motivation to think with full capacity (Healy in Costa,1999).

Too much time in front of screens may sap a child's time for exercise and interact in other social activities that are beneficial for their development. Moreover, with gadget use that is unmonitored, children may be exposed to violent, sexual, or otherwise age inappropriate commercial content, with negative consequence for the long run. To ensure that children grow and developed healthily and optimally, and to ensure that they can utilize gadgets and computers responsibly whether at school or at home, parents and teachers must limit usage time of gadgets and computers by young children. Their access and exposure to various content must also be monitored and directed.

It is worth noting that in this constantly changing age that parents and teachers are still the ones with main control. From this position of control, they much continue to guide the mental habits of children towards that which is deemed appropriate. Many parents still do not realize and do not know that they are responsible for the preparation of their children's (brains). Parents have to pay close attention to the basic needs of the brain and the nervous development that occurs in childhood and adolescence; for all that will not only shape the brains but also the intellectual standard that represents the future of our culture. Childhood and the brain have their own imperatives. In development, missed opportunities may be difficult to recapture. (Healy, 1999).

Advice

Parents must become aware that the exposure to and use of gadgets given to children have a profound influence. There are several things that parents and teachers can do, as follows:
1. Providing a good example for children by personally using gadgets responsibly.
2. Providing attunement or attention and response that is appropriate toward children ever since birth.
3. Not letting children under five to play freely with gadgets. Parents must be firm and wise in giving gadgets even more so to children under the age of two.
4. Providing children with the knowledge of responsible gadget use.

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