iJEResearch

International Journal of Education and Research
Vol. 1, Number 2, September - 2025 | Peer-Reviewed Journal
ISSN 2764-9733 | ijeresearch.org
DOI: 10.5281/zenodo.17254055

DIGITAL CHILDHOOD: NAVIGATING THE EDUCATIONAL IMPACTS OF SCREENS

AUTHOR

Alaide Palagano Ferreira: Master in Educational Sciences from UNIDA - PY, Director of Education and Training at APROMAM/Mauá-SP/Brazil, Teaching Supervisor at the City Hall of Mauá-SP/Brazil, Neuropsychopedagogue, Institutional Psychopedagogue.

Contact: alaidepalagano@hotmail.com | +55(11)99349-1576

ABSTRACT

This paper presents the development of a research project linked to the Stricto Sensu Program in Educational Sciences at the International Institute of Education and Research (IIEP) and the University for the Integration of the Americas (UNIDA), Ciudad del Este, Paraguay. The project's guiding theme is the investigation of the impacts of digital childhood that reverberate in the school environment. Children in early childhood education, from zero to five years old, tend to interact early and excessively with digital screens during a crucial phase of biological, neural, psychosocial, cognitive, motor, affective, and linguistic development. Educators express concerns about the consequences of this early technological exposure, particularly given that most children are shifting from playing to screens. The research project's literature review indicates that early and extensive screen time in early childhood education causes sleep and eating disorders, a sedentary lifestyle, obesity, difficulty concentrating and socializing, among other harmful effects. Conversely, technology, when combined, supervised, and planned in the classroom, provides and improves sensory activities, autonomy, and decision-making. Research like this helps avoid a one-sided and reductionist view, warning of future harm to child development, and providing guidance to the entire school community, redefining education.

Keywords: Early Childhood Education and Screen. Digital Childhood. Impacts of Screens.

INTRODUCTION

The age range for Early Childhood Education, established by the National Education Guidelines and Bases Law No. 9394 (Brazil, 1996), ranges from zero to five years old. In contemporary times, Early Childhood Education is comprised of a unique generation, born in an era of accelerated technological evolution amid an abundance of stimuli, and will grow up immersed in this constantly changing context. The internet, the digital universe, and artificial intelligence have become permanent parts of daily life, providing convenience and advancements in various areas. However, schools, as a significant representation of society, end up absorbing both the positive and negative impacts of this globalized scenario.

The educational community in general expresses concerns about notable changes in children's behavior, potentially related to excessive exposure or inappropriate use of digital screens, especially after the COVID-19 pandemic (SBP, 2019). Given this, relevant questions arise, such as: What are the implications of early, routine, and/or inappropriate use of digital screens on the neuropsychomotor, psychoemotional, and socioaffective development of children in early childhood education, and how do these impacts affect the school environment? Does this reality require pedagogical reformulation of school curricula to effectively address the challenges presented by the digital age?

Given the above, the research project developed hypotheses about the impacts of early, excessive, and/or inappropriate exposure to digital screens on the development of early childhood education children, in order to inform the master's dissertation. Once the results are collected, some guidelines can be adopted at the end of the research, as a preventative measure against potential negative impacts in the future and to broaden the critical perspective of educators, families, and the entire educational community.

METHODOLOGY

This study used a basic, qualitative and descriptive approach. The theoretical framework of the research project was based on a bibliographic survey through contributions from books, periodicals, articles, websites, Master's dissertations and Doctoral theses, national and international, in the following scientific databases: Capes, Scielo, Google Scholar, Google Academic, National Digital Library, Mojo e-books, Academia.edu and Redalyc.

The established time frame was ten years, although many authors with older works will be used due to the importance of the theoretical legacy, as well as the interdisciplinary and transdisciplinary content, in order to avoid a simplistic and limited view of Education.

The dissertation will conduct a cross-sectional field study in the municipality of Mauá, São Paulo, Brazil, through questionnaires administered to teachers who teach in public municipal early childhood education schools. The location chosen was based on the researcher's work in the aforementioned municipality. The questionnaire will consist of open-ended and closed-ended questions, such as: 1. The age group with which the teacher works; 2. The number of students in the group; 3. What technological resources are used in class and how often; 4. Indicate whether any positive or negative impacts or consequences are observed in the classroom due to the use of digital screens by students, and describe them; 5. Indicate whether there is a need for pedagogical reformulation resulting from the degree program with children in the digital age. If so, describe the possibilities.

The methodology used to analyze and discuss the results of the research project was based on Laurence Bardin's (2011) theoretical framework, “Content Analysis”.

PRESENTATION AND ANALYSIS OF RESULTS

Meaning of “screen” in the context of research

In the not-so-distant past, the word "screen" was limited to television. Screens have moved to pocket-sized mobile devices—cell phones, tablets, and smartphones —bringing convenience and serving diverse social strata and age groups. Although such advances have not yet been achieved in some Brazilian and global locations (Nobre et al., 2021). Given the above, it is necessary to direct and clarify the research on which "screen" is meant.

According to Fernandes, Eisenstein and Silva (2018), children have access to electronic devices at an increasingly younger age, not only at home but in different places, and are also born with the motor skills to handle touch screens. In other words, a routine situation is to see an adult handing their cell phone to a child, so that the child can be distracted and remain quiet , naming this situation as “passive distraction”.

Some Designations for the 21st Century Generation

There is no absolute consensus regarding the birth dates for each generation of the 21st century. Different sources may present varying dates, resulting in various divisions. The following dates were used from the Pew Research Center and excerpted from the ebook "Generations and Their Ways of Learning" (DOT Digital Group , 2023).

- 1946-1964 – Baby Boomers;
- 1965-1980 – Generation X;
- 1981-1996 – Generation Y (Millennials);
- 1997-2010 - Generation Z (Centennials);
- From 2010 – Alpha.

The Leading Digital Corporate Company in Education, DOT Digital Group (2023), indicates that if the terminologies of the Greek alphabet continue, after the middle of the 21st century the generations will be named Beta, Gamma, Delta and so on.

The socioeconomic and historical moment influences people's behavior, therefore, the terminology does not matter, but rather the understanding of the differences in how each generation relates to, understands and consumes technology (DOT Digital Group , 2023).

Neuroeducation and Transversality

The Brazilian Society of Pediatrics (SBP, 2019-2021) states that the first thousand days of a child's life are the most important for brain development. Therefore, it is imperative to include neuroscience in the discussion about the impacts of early and/or excessive screen time. Neuroscientist Lent (2019) points out that in the first three years of life, brain architecture undergoes several structural changes through genetically inherited factors and external stimuli, which become stronger the more frequent they are.

As Cosenza and Guerra (2011), cited in Crespi, Noro, and Nóbili (2020), point out, the human brain weighs twice its birth weight at the end of the first year of life. This is due to brain plasticity, which creates new connections or synapses. Although this occurs throughout life, the crucial phase occurs in early childhood, from zero to six years of age. Therefore, it is extremely important to study the impacts of early and/or excessive use of digital screens on a child's brain.

> It is observed that brain maturation in Early Childhood implies not only the creation of new connections between neurons through synapses, the acquisition and improvement of skills and the expression of distinct behaviors, but also the growth of brain mass, since, as Cosenza and Guerra (2011) explain, around birth, the human brain weighs around 400g and by the end of the first year of life, it will have doubled its mass, weighing around 800g. (Crespi, Noro and Nóbili, 2020, p. 13)

Andrade (2022) alludes to the idea that Neuroeducation arises from the interrelationship between Neuroscience,

Psychology, and Education, theorizing that children born in the 21st century treat their parents and educators as digital disciples. Neuroscientist Desmurget (2021) refutes this by arguing that the new generation may be experts in technology, but only for recreational purposes. His research found that, for the first time in history, the 21st-century generation is being born with lower IQs (Intelligence Quotients) than their parents. This contradicts his previous research, which indicated that this quotient tended to increase from generation to generation. The aforementioned author's scientific study analyzed three variables: the amount of time children used digital screens, their early use of them, and the quality of the content.

There are convergent and divergent notes among various authors regarding the excessive, early and/or inappropriate use of digital screens in Early Childhood Education.

Some authors who defend the use of digital screens in Early Childhood Education

Certain authors provide positive points regarding the use of screens, media and technologies in Early Childhood Education, even at an early age:

Jerusalinsky (2018) states that the sooner a child has access to technology, the sooner they will have ease and technological appropriation.

Sousa (2016) advocates that schools cannot fall behind the technological instruments offered by society and must evolve alongside technology.

Izilda, et. al . (2023), presents a paradigm shift, in which the teacher-student relationship was previously vertical and the student was only a listener. Through technology, the child becomes active in the process.

Estevam (2023) shows that working with artificial intelligence in Early Childhood Education stimulates protagonism, awakens motivation for discovery, making the child actively involved in the content through "gamification", elucidating that the child is born with the ability to work with smart technology , as they are part of an independent generation.

The Brazilian Society of Pediatrics (SBP, 2019) launched the Guidance Manual: Scientific Departments of Developmental and Behavioral Pediatrics and School Health: "Healthy use of screens, technologies and media in daycare centers, nurseries and schools", defining the healthy use of technological resources in the children's school environment.

Ferreira and Izequiel (Portal COLAB, 2021), defend the use of technology for children with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD), proving it to be a strong tool for the development of this target audience.

Some authors who oppose the use of digital screens in Early Childhood Education

Many authors cite negative consequences regarding the early, excessive and/or inappropriate use of digital screens in Early Childhood Education, as we will see below:

Bozza (2016) proves that digital screens project a blue wavelength range that is harmful to human vision. This range, according to Kahn, et al., apud Sousa and Carvalho (2023), inhibits the production of melatonin, a hormone essential for sleep quality.

Young children cannot distinguish what they see on screens from reality. There is no associative cognitive perception for such action (Parky, 2017).

From the perspective of Mélo and Fink (2017), studies show that fine motor skills and psychomotor skills can suffer atrophying influences due to excessive use of screens in childhood.

Cardiovascular problems, reduced life expectancy, aggressiveness, depression, irritation, anxiety, language impairment, difficulty concentrating and remembering are consequences arising from the inappropriate use

of screens, highlighted by Desmurget (2021).

The Brazilian Society of Pediatrics (2019-2021) reports that children's media fills "voids," such as idleness, busy parents who don't play, who are often more attentive to their phones than to their children, lack of affection, and lack of entertainment. There is evidence of consequences generated by a lack of adult supervision regarding excessive screen use, leading to access to inappropriate content on the internet, abuse of privacy, and delayed schooling and child development (SBP, 2019-2021).

The PEBMED Portal and Polakiewicz (2022) address that excessive and/or inappropriate use of screens leads to hearing problems and/or decreased hearing capacity due to the use of headphones at high sound frequencies, postural disorders, risks of exposure to sexuality, nudity, extortion, abuse, computer vision syndrome, weight gain or loss.

Schamache, et al., (2021), recommends that the longer the time of exposure to screens, the shorter the time of exposure of children outdoors, thus, they lose contact with nature, consequently generating myopia due to lack of exposure to the sun, or visual syndrome.

Bozza (2016) describes cognitive delay, socio-emotional decline and attention deficit as arising from the negative impacts of the digital age.

Padmapriya, et al., (2021), point out that due to the post-pandemic confinement resulting from Covid-19, a sedentary lifestyle prevailed in children and consequently obesity.

A very serious and important contribution, mentioned by the authors Santos and Barros (2017), concerns addiction and/or dependence on electronic devices, since childhood.

Paiva and Costa (2015) point out that because screens are easily accessible, it is increasingly difficult for families to set limits on children, creating impatient human beings with increasingly early anxiety attacks.

The digital age has brought about a reduction in social ties and created the "digital other," making feelings of love and being loved impossible. The screen has led to the absence of real people and a lack of human interaction (Estigarribia, 2018; Fernandes, Eisenstein, and Silva, 2018).

With the increasing use of screens on an increasing scale, authors in consensus point out several negative consequences: delay in brain and motor development, lack of emotional control, lack of concentration, worsening of the prognosis of Attention Deficit Hyperactivity Disorder (ADHD), lack of memorization, psychiatric problems, speech and language delay (Fernandes, Eisenstein and Silva, 2018; Crespi, Noro and Nóbile, 2020).

In Carr's (2011) view, cited in Teixeira (2014), the attention demanded by the internet and computers further stresses cognitive abilities, reducing learning, comprehension, and the range of concentration, because each click opens up a range of possibilities for distraction. For every question posed, there is an answer on the internet; in other words, the screen is stealing human memory and intelligence.

Fernandes, Eisenstein, and Silva (2018) argue that family lunches, leisure time, toys, and traditional games have become scarce due to tablets and cell phones. Children easily trade imaginative, outdoor play, and interaction with other children for screens.

The incorrect use of technology can transform children into passive beings: mere spectators or characters dependent on the control of a game, that is, on artificial intelligence (Rinaldini, et al., 2012, apud Boeira, Carmo and Fachin, 2022).

Câmara, et al., 2020, highlight that excessive screen time during childhood can lead to harm in adolescence and adulthood, such as drug and alcohol addiction, family isolation, hyperactivity, self-harm, suicide, and lack of focus.

Recommendations from the main National and International Government Agencies and Organizations for Health

and Education

Determining the amount of screen time that children should use, as well as whether or not to allow early use, is a topic that concerns school educators. Therefore, it is important to stay up to date with the recommendations of experts from the main National and International Governmental Health Organizations and Bodies, such as: World Health Organization (WHO), Brazilian Society of Pediatrics (SBP), American Academy of Pediatrics (AAP), Canadian Pediatric Society (CPS) and UNESCO.

The World Health Organization (WHO, 2019) published a guide that cites several studies worldwide, providing indications on the use of screens for children up to five years of age, stating that up to one year of age, screens are not recommended and after two years of age, the recommendation is one hour of screen time per day.

The Brazilian Society of Pediatrics (2019-2021) released a Guidance Manual on Screen Use in Childhood, suggesting that babies under two years old should not have access to screens. Children between two and five years old can use them for one hour a day under supervision. The Brazilian Society of Psychology endorses the proposal, imposing limits and balance on screen use, which should be enforced by parents.

Comparing Brazil to other countries, the Canadian Pediatric Society (CPS, 2017) follows the World Health Organization's (WHO, 2019) recommendations regarding the time and age for screen time. According to Dubicka (2019), many countries have not established age limits for technology use, such as the United Kingdom, claiming that it does not have sufficient studies to define such a limit.

As Arantes and Morais (2021) recommend, the American Academy of Pediatrics (AAP) recommends that children under two years of age should not use screens. After two years of age, one hour of screen time per day may be recommended.

In the field of Education, the National Common Curricular Base/Ministry of Education and Culture (Brazil, 2017), which serves as a mandatory guideline for school curricula throughout Brazil, both in public and private institutions, establishes the use of technology by children in Early Childhood Education as a learning right, without mentioning the word “screen”.

Mathias and Gonçalves (2017), historically trace in a timeline, all the changes in conceptions of “child/childhood”, warning that with the advent of the digital era and technological appropriation, society is facing a new conception, in which the child abandons an entire universe of children's games and today has access to the same knowledge as adults, which is dubious, and may represent progress or risk, depending on the approach.

Melo (2023) corroborates this, mentioning that consumerism, advertising, commerce, and social media surround children with shiny electronic products and television characters, encouraging purchases so that each child has their own device. As a result, this leads to more screen time. This suggests a new concept of "childhood."

The COVID-19 pandemic and other variations have exposed contradictions that have long permeated Brazilian schools and other countries regarding the technological gap (Boeira, Carmo, and Fachin, 2022). Changes that had previously been slowly taking place and discussed with school closures were urgently imposed for implementation. Due to the rapidity of technological advances, the difficulty teachers have in keeping up with them is notorious. Dantas et al. (2020) argue that teachers do not receive training on how to work with new technologies with children, and when they do receive it, it is fragmented, resulting in a lack of didactics and a disconnect from reality, revealing the need for a renewed pedagogy. Training teachers with technological skills is different from applying them to the construction of educational processes .

The Global Education Monitoring Report by the United Nations Educational, Scientific and

Cultural Organization (UNESCO, 2023), entitled "Technology in Education: A Tool at Whose Service?", contains a series of observations regarding the gap between educational technology theory and practice, presenting both positive and negative aspects. The document discusses the following questions:

> Does technology democratize knowledge or threaten democracy by allowing a select few to control information? Does it offer limitless opportunities or lead to a future of no return dependent on technology? Does it promote equality or exacerbate inequality? Should it be used in the education of young children or does it pose a risk to their development? (UNESCO, 2023, p. 35).

The aforementioned Report "recommends that technology be introduced into education based on evidence demonstrating that it would be appropriate, equitable, scalable and sustainable" (UNESCO, 2023, p. 35).

State of the Art

To conclude this article, it is of paramount importance to present three key premises regarding the state of the art, which, undoubtedly, may appear as elements not previously assimilated by a considerable portion of readers.

1. International Classification of Diseases - ICD-11 Gaming Disorder (6C51)

The World Health Organization (WHO) updated the 11th edition of the International Statistical Classification of Diseases and Related Health Problems, ICD-11 , in 2018. It was adopted at the World Health Assembly in 2019 and came into force in 2022. Gaming disorder (6C51) is included. It consists of a behavioral pattern of dependence on digital electronic games or video games, which are very common in schools (OPA, 2022).

> Gaming disorder, predominantly online Gaming disorder, predominantly online is characterized by a pattern of persistent or recurrent gaming behavior ('digital games' or 'video games') that is conducted primarily through the internet and is manifested by: 1) impaired control over gaming (e.g., onset, frequency, intensity, duration, termination, context); 2) increasing priority given to gaming, to the extent that gaming takes precedence over other life interests and daily activities; and 3) the continuation or escalation of gaming despite the occurrence of negative consequences. The pattern of behavior is of sufficient severity to result in significant impairment in personal, family, educational, occupational, or other important social areas of functioning. The pattern of gaming behavior may be continuous or episodic and recurrent (ICID11, 2018, p. 167).

2. Nomofobia

The word "nomophobia" wasn't coined by a single person. It's a neologism formed by combining " no mobile" (without a cell phone) and "phobia" (phobia/fear). The term began gaining popularity in the mid-2000s to describe the fear, panic, outburst, or anxiety associated with the inability to use a cell phone. This condition is now very common in children, young people, and adults, causing pathological dependence (Spear, Egídio, and Cardoso, 2014).

3. Brazil ranks 3rd in the world in childhood screen addiction

The Brazilian Internet Steering Committee (CGI) and several media outlets released research by the British contact lens company Lenstore Hub (2021) on childhood screen addiction in 2021 and subsequent years, considering five metrics. Brazil ranked third in the world, behind only children in the United Arab Emirates and the United States. According to other research by the same company along the same lines, 94% of Brazilians spend more than 10 hours a day browsing the internet, ranking second in the world and third among the countries that use social media the most (Lenstore Hub, 2021).

These are alarming figures, but the following question remains: how can we correct children if the example should come from adults?

The Federal Government launched a public consultation on the "conscious use of screens and digital devices by children and

adolescents", on the "Participa+Brasil" Platform, from October 2023 to January 2024, with the objective of producing a guide with guiding guidelines through contributions from civil society, parents, mothers and/or guardians, educators and family members; which demonstrates the importance and contemporaneity of the theme proposed in this research (Brasil, 2023).

CONCLUSION

In urban environments where technology is prevalent, educating children without the use of electronic devices is nearly impossible. The research's goal isn't to take smartphones and tablets out of children's hands, but rather to foster a healthier relationship between childhood and technology in the school environment.

The use of digital screens in early childhood education has both positive and negative impacts on schools. The benefits that technology brings to humanity and any educational system are undeniable. However, early, excessive, and inappropriate use can have adverse consequences for neuropsychomotor, psychoemotional, and socioaffective development, requiring caution, monitoring of use, time, and content accessed, and often requiring adjustments.

Another facet that technology brings to the school environment is the technical competence that educators need to appropriate digital resources for teaching, which goes far beyond simply mastering the equipment. Educator training in the 21st century must be holistic, addressing not only technical knowledge related to the content but also developing socio-emotional skills, digital competencies, and the ability to adapt to a constantly changing educational environment, connected in a web of learning.

Research of this nature provides the ability to prevent a univocal and simplistic perspective, anticipating potential harm to child development, while fostering guidelines for the entire school community, effecting a profound redefinition in the educational sphere.

REFERENCES

ANDRADE, L.. **Neuroeducação, tecnologias e formação docente:** convergências e divergências para o ensino de matemática e ciências da natureza nas escolas semi-integrais de Camaragibe. Tese de Dissertação de Mestrado. UNADES. Paraguay. 2022. Available at: https://www.unades.edu.py/wp-content/uploads/2022/11/2-TESIS-MAESTRIA-LINDEBERG-S-ANDRADE-1.pdf. Accessed at: January 23, 2024.

BARDIN, L.. **Análise de conteúdo.**Traduzido por Luís Antero Reto, Augusto Pinheiro.São Paulo: Edições 70, 2011.

BRASIL, **Lei nº 12.796, de 4 de abril de 2013: altera a Lei n. 9.394 de 20 de dezembro de 1996**, que estabelece as diretrizes e bases da educação nacional, para dispor sobre a formação dos profissionais da educação e dá outras providências. Brasília: Planalto Central, 2013. Available at: https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2013/lei/l12796.htm. Accessed at: December 10, 2023.

BRASIL, Ministério da Educação e Cultura. **Base Nacional Comum Curricular**. Brasília, DF, 2017. Available at: http://basenacionalcomum.mec.gov.br/abase/. Accessed at: December 10, 2023.

BRASIL. Secretaria de Comunicação da Presidência da República, SECOM - Secretaria de Políticas Digitais. **Consulta pública: Uso de telas por crianças e adolescentes**. Participa+Brasil. Brasília: Planalto Central. 2023. Available at https://www.gov.br/participamaisbrasil/uso-de-telas-por-criancas-e-adolescentes. Accessed at: December 12, 2023.

BOEIRA, A. da S.; CARMO, A.; FACHIN, P. C. (orgs). **Formação de Professores – Linguagens, Tecnologias e Ensino**. Cascavel, PR: FAG. 2022.

BOZZA, T. C. L.. Dissertação de Mestrado. **O Uso da Tecnologia nos Tempos Atuais: Análise de Programas de Intervenção Escolar na Prevenção e Redução da Agressão Virtual**. Unicamp. 2016. Available at: https://repositorio.unicamp.br/Busca/Download?codigoArquivo=457004. Accessed at: December 11, 2023.

CÂMARA, V. H., et al.. **Principais prejuízos biopsicossociais no uso abusivo da tecnologia na infância:** percepções dos pais. Revista multidisciplinar e de psicologia, Tocantins, v. 14, n. 51, p. 366-379, 2020. Available at: https://idonline.emnuvens.com.br/id/article/view/2588. Accessed at: December 9, 2023.

CPS. **Sociedade Canadense de Pediatria**. Available at: https://www.cps.ca.2017. Accessed at: December 8, 2023.

CRESPI, L.; NORO, D; NÓBILI, M. F.. **Neurodesenvolvimento na primeira infância: aspectos significativos para o atendimento escolar na educação infantil**. Ensino em Revista, Uberlândia, v. 27, p. 1517-1541, dez. 2020. Available at: http://www.seer.ufu.br/index.php/emrevista/article/view/57449. Accessed at: December 12, 2023.

DANTAS, D. M. P; CRISTOVAM, F. K. G.; ARAÚJO, M. J. BRANDÃO, I. A.; SANTANA, A. M. S.; PÊ, S. Z.. **O descompasso da sala de aula e as Tecnologias Digitais**. Research, Society and Development, v. 9, n. 11, p. 1-18, 2020. ISSN 2525. DOI: http://dx.doi.org/10.33448/rsd. Available at: https://rsdjournal.org/index.php/rsd/article/download/10416/9359/143030. Accessed at: December 11, 2023.

DESMURGET, M.. **A fábrica de cretinos digitais: os perigos das telas para nossas crianças**. São Paulo: Vestígio, 2021.

DOT – Digital Group. Empresa Líder Coorporativa Digital em Educação. Ebook **As Gerações e as Suas Formas de Aprender**. (DOT Digital Group, 2020.Título original: Como as Gerações Aprendem _ dot 2023. Direitos autorais:© All Rights Reserved. Available at: https://conteudo.dotgroup.com.br/ebook-geracoes. Accessed at: January 24, 2024.

ESTEVAM, P.. **Inteligência artificial na educação:** entenda quais os impactos e benefícios. Rubeus, 2023. Available at: https://rubeus.com.br/blog/inteligencia-artificial-na-educacao/. Accessed at: December 12, 2023.