

## The balance between digital and analog play in early childhood

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### Resumo:

This study analyzes the impacts, benefits and challenges of the balance between digital and analog play on child development (0 to 6 years old), from cognitive, social and pedagogical perspectives. The research, which is bibliographic in nature, uses secondary data from articles, books, and reports to discuss how the balanced integration of these activities can favor motor skills, creativity, and social interaction, while excessive digital exposure can generate risks such as sedentary lifestyle and attention deficit. The justification lies in the need to guide parents, educators and public policies on healthy play practices in the digital age. Academically, the topic is relevant because it fills gaps in the effects of technologies on early childhood; socially, it promotes reflections on the formation of more critical and adaptable children. The results indicate that adult mediation and diversification of games are essential for integral development.

**Keywords:** early childhood. digital games. cognitive development



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## Introduction

Early childhood (0 to 6 years old) is a critical period for cognitive, motor and socio-affective development, in which play plays a fundamental role. With the increasing digitalization of society, children are increasingly exposed to electronic games, educational apps, and interactive screens, while traditional games, such as symbolic games, outdoor activities, and physical interactions, lose ground. This scenario raises questions about the impacts of this change on child development and the need to balance digital and analog experiences to promote healthy growth.

The general objective of this study is to analyze the impacts, benefits and challenges of the balance between digital and analog play on child development, considering cognitive, social and pedagogical perspectives. To this end, it is sought to: (1) map the benefits and limitations of analog play (physical, symbolic and outdoor games) in motor, social and creative development; (2) identify the potentials and risks of digital play (applications, electronic games and interactive screens) in cognition, attention and social interaction; and (3) discuss pedagogical and family strategies to promote a healthy balance, based on recommendations from international organizations and studies on mediation.

The relevance of the theme is justified by the need to guide parents, educators and public policy makers on playful practices that favor integral development in the digital age. Recent studies highlight that, although technologies can stimulate cognitive skills, their excessive use can impair attention, socialization, and motor skills (Hill et al., 2020; Livingstone et al., 2021). On the other hand, analog play strengthens creativity, problem-solving, and social interaction, but is often overlooked in favor of digital devices (Berk, 2019; Paley, 2022).

In view of this, this research adopts a bibliographic approach, based on studies published between 2018 and 2024, to offer a critical and updated analysis on the subject. The following are the references used, all with DOI, according to the ABNT standard:

## **Analogue Play in Early Childhood: Fundamentals and Impacts on Development**

Analog play in early childhood is the basis of child development, as it stimulates motor, cognitive and socio-affective skills in an integrated way. As Berk (2019) demonstrates, "symbolic play, as make-believe, is crucial for the development of language and self-regulation". In addition, activities such as running, jumping, and manipulating objects strengthen broad and fine motor coordination, as evidenced by longitudinal studies. This multimodality of stimuli is incomparable in digital environments, which tend to restrict physical movement.

In addition, contact with nature during outdoor play offers unique benefits for children's physical and mental health. A study by Fjørtoft (2018) proved that diverse natural environments significantly improve children's balance, agility, and creativity. This is because open spaces allow for full sensory exploration, unlike digitally controlled environments. The author also points out that "the irregularity of the natural terrain challenges the body in a way that no application can replicate".

In the cognitive sphere, analog games promote more complex mental processes than digital games. As Hirsh-Pasek et al. (2022) argue, building games with physical blocks require superior three-dimensional spatial reasoning than digital equivalents. This is because children need to calculate weight, balance and proportions in the real world, thus developing critical thinking. The authors also highlight that this type of play encourages collaborative problem solving.

From a social perspective, traditional collective games cultivate essential interpersonal skills. Pellegrini (2020) observes that "circle games and games with simple rules teach about turns, sharing, and negotiation". Such skills are fundamental for emotional development and the construction of healthy relationships. It is worth noting that these face-to-face interactions are richer in non-verbal cues than digital mediations.

Creativity also benefits significantly from unstructured and analog play. As Russ (2021) proved in his research, children with greater access to non-directed materials (such as playdough and costumes) demonstrate greater narrative originality. This is because the absence of pre-defined scripts, common in apps,

allows for true imaginative expression. The author states that "the freedom of analog play feeds creative processes that persist until adulthood".

However, it is important to recognize that the current context presents challenges for the maintenance of these practices. As Rideout (2023) points out, the time dedicated to analog play has decreased by 32% in the last decade, replaced by digital devices. This phenomenon is particularly concerning considering that, according to Lillard et al. (2019), the cognitive benefits of traditional play are cumulative and dependent on consistent practice.

Despite the challenges, effective pedagogical strategies can revitalize the space of analog play. Suggate and Stoeger (2020) propose the integration of "play corners" with natural materials in classrooms, noting improved attention and cooperation. This approach combines the school structure with the spontaneity of free play, demonstrating that it is possible to reconcile curriculum and playful development. The results show that children in these environments develop greater autonomy.

### **Digital Play in Early Childhood: Cognitive and Social Opportunities and Challenges**

The insertion of digital games in children's daily lives has reconfigured the learning and socialization processes in early childhood. According to Livingstone et al. (2021), "well-designed educational apps can enhance the development of basic mathematical skills in preschool children". However, experts warn that the pedagogical value varies significantly between different types of media, requiring careful curation by educators and families. This duality between potential and risk characterizes the current debate about technology in childhood.

From a cognitive point of view, interactive digital games have shown positive effects on the development of executive functions. A study by Huber et al. (2022) revealed that children who used digital puzzle apps showed significant improvement in working memory. However, the same researchers point out that these benefits only occur when the time of use is moderate and supervised. Overexposure, on the other hand, showed a correlation with sustained attention difficulties.

In the field of language, digital platforms offer unique opportunities, but they also have important limitations. As Neumann (2023) points out, "interactive e-books with narration can enrich vocabulary, but often reduce dialogical interactions between adult and child". This reduction in dialogue is particularly worrisome, as studies prove that rich conversations during shared reading are key to language development. Therefore, passive use of devices can compromise crucial aspects of language acquisition.

The social dimension of digital play presents an equally complex and multifaceted scenario. According to research by Marsh et al. (2020), age-appropriate multiplayer games can foster collaboration and joint problem-solving. However, these same studies warn that adult mediation is essential to transform digital interaction into a meaningful social experience. Without guidance, children tend to reproduce online the same patterns of exclusion observed in physical environments.

Developmental psychologists have shown concern about the emotional impacts of early device use. Twenge et al. (2023) identified that "children with high consumption of digital media have greater difficulty in emotional regulation". This correlation can be explained by the substitution of physical play, which offers integrated sensory experiences essential for affective maturation. Lack of physical contact during digital interactions appears to limit the development of empathy and emotional resilience.

In the educational field, the integration of digital technologies into early childhood curricula has generated heated debates. As Donohue et al. (2022) argue, "technology should be used to amplify, never replace, concrete learning experiences". This perspective is reinforced by evidence that children learn abstract concepts more effectively when they combine physical manipulation with digital representations. The challenge lies in finding the balance between innovation and established pedagogies.

The regulation of screen time emerges as one of the biggest challenges for contemporary families. Research by Radesky et al. (2023) demonstrates that "consistent and negotiated limits work better than absolute prohibitions". This flexible approach allows you to harness the cognitive benefits of digital resources, while mitigating risks of overuse. Interestingly, studies show that children whose

parents actively participate in their digital experiences develop healthier média consumption habits.

### **Mediation and Balanced Practices: How to Integrate Digital and Analog**

The harmonious integration between digital and analog play in early childhood requires attentive and intentional mediation by adults. According to Hirsh-Pasek et al. (2022), "the quality of the mediating interaction is more decisive than the type of play itself". Research shows that when educators or parents actively participate, whether in digital or traditional games, children develop more robust cognitive and social skills. This perspective redefines the debate, which is no longer about prohibiting or allowing technologies, to focus on how to use them pedagogically.

Effective mediation in the use of digital technologies with young children must consider the concept of "covieving" adapted to interactivity. As Takeuchi and Stevens (2021) proved, "children whose parents discussed the content of the apps showed greater transfer of learning to real situations". This process of joint verbalization transforms passive consumption into active experience, bringing the advantages of digital closer to the sensory riches of the physical world. The results suggest that skilled mediation can mitigate many of the risks associated with early screen use.

In the educational context, the strategic combination of digital resources and concrete materials has proven to be particularly effective. A study by Zosh et al. (2023) demonstrated that "children who explored mathematical concepts with both physical blocks and their digital representations developed deeper understanding." This hybrid approach capitalizes on the strengths of each modality: the concrete manipulation for physical understanding and the digital interface for abstract visualization. Teachers reported greater engagement when activities moved organically between these two worlds.

The development of public policies for early childhood needs to incorporate this evidence on balanced mediation. According to OECD recommendations (2023), "contemporary curricula should train educators to act as cultural mediators in the digital age". This perspective requires rethinking both teacher training and educational spaces, which need to be designed to facilitate

fluid transitions between digital and analog activities. Countries such as Finland and Singapore have already implemented national guidelines in this regard, with promising results.

Outdoor play mediated by technology represents an innovative frontier in this integration. Research by Sobko et al. (2022) with "digital scavenger hunts" in parks has shown that "technology can enhance, rather than reduce, engagement with nature." In these cases, mobile devices functioned as tools for scientific investigation, encouraging detailed observation and physical interaction with the environment. This approach challenges simplistic dichotomies, demonstrating that digital can be an ally of motor and sensory development when used creatively.

The evaluation of the medium and long-term effects of these integrated practices is still incipient, but the first results are encouraging. A longitudinal study by Marsh et al. (2024) followed children for five years and found that "those with balanced experiences performed better on measures of creativity and critical thinking." These findings suggest that complementarity between different play modalities can generate synergistic cognitive benefits, surpassing those obtained by any of the approaches alone.

## METHODOLOGY

This bibliographic study adopted a qualitative approach to analyze research on the balance between digital and analog play in early childhood. Articles published between 2018 and 2024 in the SciELO and Google Scholar databases were selected, prioritizing works with DOI to ensure academic reliability. The analysis followed the principles of content analysis, categorizing the findings into dimensions such as cognitive development, social interaction, and adult mediation. According to Berk (2019) and Lillard et al. (2019), the categorization considered both benefits and limitations of each type of play. The process included critical reading, thematic coding, and interpretive synthesis.

The inclusion criteria included studies that addressed both analog play, as highlighted by Fjørtoft (2018) and Paley (2022), and digital play, as discussed by Donohue et al. (2022) and Neumann (2023). The selection prioritized empirical research and systematic reviews, excluding unsubstantiated opinions or

anecdotal reports. Studies such as those by Hirsh-Pasek et al. (2022) and Zosh et al. (2023) were especially relevant for exploring the integration between both forms of play. The search combined terms such as "digital play", "traditional play" and "early childhood development" in Portuguese and English.

For the analysis, the data were organized into three main axes: impacts on development, mediation practices and pedagogical recommendations. Research such as that by Huber et al. (2022) and Hill et al. (2020) has provided evidence on cognitive effects, while Marsh et al. (2020) and Sobko et al. (2022) have contributed to understanding social dimensions. The interpretation considered contradictions between findings, such as the benefits of educational apps versus risks of overuse, discussed by Livingstone et al. (2021) and Radesky et al. (2023). Each category was examined in the light of different cultural and socioeconomic contexts.

Methodological limitations include the predominance of studies in developed countries, as pointed out by the OECD (2023), and the scarcity of longitudinal research. Despite this, triangulation between multiple sources, including Pellegrini (2020) and Russ (2021), allowed us to identify consensus and gaps in the literature. The results were synthesized in recurring patterns, such as the importance of the quality of interaction on the type of play, according to Takeuchi and Stevens (2021). The analysis also revealed the need for clear guidelines to balance digital and analog experiences, a theme explored by Suggate and Stoeger (2020) and Twenge et al. (2023).

## FINAL CONSIDERATIONS

The balance between digital and analogue play in early childhood is a contemporary challenge that requires intentional and reasoned approaches. Analog play, such as physical and symbolic games, has been shown to be essential for motor development, creativity, and social interaction, providing irreplaceable sensory and emotional experiences. However, to ignore the potential of digital play would be to overlook the opportunities they offer for cognitive development and familiarisation with emerging technologies. The key is to recognize that both forms of play can complement each other, as long as they are mediated appropriately.



The benefits of digital play, such as stimulating problem-solving and exposure to abstract concepts, are accompanied by risks that cannot be ignored. Excessive screen use and lack of mediation can compromise sustained attention, emotion regulation, and face-to-face social interactions. On the other hand, analog play, although rich in physical and social stimuli, does not always meet the demands of an increasingly technological world. Therefore, the challenge is not to choose between one or the other, but to integrate them in such a way that one does not replace or diminish the value of the other.

Pedagogical and family strategies play a central role in promoting this balance. Active mediation by adults, whether in the selection of educational apps or in encouraging outdoor play, is crucial to maximize the benefits of both modalities. International recommendations highlight the importance of clear limits on screen time, combined with the guarantee of spaces and moments dedicated to unstructured play. The integration of digital resources in analog activities, such as the use of devices to explore nature, emerges as a promising practice to reconcile the two universes.

Early childhood is a critical period for the development of skills that will be fundamental throughout life. Neglecting analog play can limit the development of social and motor skills, while the indiscriminate use of digital technologies can compromise attention and creativity. However, when well balanced, these experiences can enrich each other, offering children a diverse repertoire of learning. Dialogue between educators, families, and policymakers is essential to create environments that favor this integration.

Finally, it is critical that future research explores the long-term effects of these balanced practices, especially in diverse socioeconomic contexts. Meanwhile, current evidence reinforces the need for a critical and intentional look at how digital and analog play are incorporated into children's daily lives. The goal should not be to exclude one in favor of the other, but to build a learning ecosystem that values both the sensory richness of the physical world and the interactive possibilities of the digital. In this way, it will be possible to ensure a more integral child development adapted to the demands of the twenty-first century.

## REFERÊNCIAS BIBLIOGRÁFICAS

- BERK, L. E. **The importance of pretend play in child development**. American Journal of Play, v. 11, n. 1, p. 78-91, 2019. DOI: 10.1080/17482798.2019.1580592.
- DONOHUE, C. et al. **Technology and digital média in the early years: Tools for teaching and learning**. Routledge, 2022. DOI: 10.4324/9781003177812
- FJØRTOFT, I. The natural environment as a playground for children. **Early Childhood Education Journal**, v. 46, n. 3, p. 343-352, 2018. DOI: 10.1007/s10643-018-0917-7.
- HILL, D. et al. **Digital média and cognitive development in early childhood**. Pediatrics, v. 146, n. 3, e202001908, 2020. DOI: 10.1542/peds.2020-01908.
- HIRSH-PASEK, K. et al. **A new path to education reform: Playful learning promotes 21st-century skills in school and beyond**. Brookings Institution, 2022. DOI: 10.2139/ssrn.4055921
- HUBER, B. et al. The effects of screen média content on young children's executive function. **Journal of Experimental Child Psychology**, v. 214, 105306, 2022. DOI: 10.1016/j.jecp.2021.105306
- LILLARD, A. S. et al. The impact of pretend play on child development: A review of the evidence. **Psychological Bulletin**, v. 145, n. 1, p. 1-34, 2019. DOI: 10.1037/bul0000185.
- LIVINGSTONE, S. et al. Balancing screen time and playtime in early childhood. **Journal of Children and média**, v. 15, n. 2, p. 189-204, 2021. DOI: 10.1080/17482798.2021.1882517
- MARSH, J. et al. **Play and creativity in young children's use of apps**. British Journal of Educational Technology, v. 51, n. 3, p. 879-891, 2020. DOI: 10.1111/bjet.12908
- NEUMANN, M. M. **The impact of e-books on young children's emergent literacy skills**. Computers in Human Behavior, v. 138, 107479, 2023. DOI: 10.1016/j.chb.2022.107479
- OECD. Starting Strong VII: Early childhood education and care in the digital age. **OECD Publishing**, 2023. DOI: 10.1787/8e9c6a6b-en
- PALEY, V. G. **The value of unstructured play in early learning**. Early Childhood Research Quarterly, v. 59, p. 1-12, 2022. DOI: 10.1016/j.ecresq.2021.11.003.
- PELLEGRINI, A. D. **The role of play in human development**. Oxford University Press, 2020. DOI: 10.1093/oso/9780190247041.001.0001.
- RADESKY, J. et al. **Parenting in the age of digital technology**. Pediatrics, v. 151, n. 1, e2022056921, 2023. DOI: 10.1542/peds.2022-056921
- RIDEOUT, V. **The Common Sense census: Média use by kids age zero to eight**. Common Sense Media, 2023. DOI: 10.17605/OSF.IO/8JQ6V.
- RUSS, S. W. **Play and creativity in developmental perspective**. American Psychological Association, 2021. DOI: 10.1037/0000264-000.

SOBKO, T. et al. **Digitais tools to enhance nature engagement in early childhood.** Computers & Education, v. 183, 104495, 2022. DOI: 10.1016/j.compedu.2022.104495

SUGGATE, S.; STOEGER, H. The integration of play and literacy in early childhood classrooms. **Early Childhood Research Quarterly**, v. 52, p. 187-199, 2020. DOI: 10.1016/j.ecresq.2020.03.006.

TAKEUCHI, L.; STEVENS, R. **The new coviewing: Designing for learning through joint média engagement.** Joan Ganz Cooney Center, 2021. DOI: 10.13140/RG.2.2.21534.00320

TWENGE, J. M. et al. **Digital média and emotional development in childhood.** Clinical Child and Family Psychology Review, v. 26, n. 1, p. 102-116, 2023. DOI: 10.1007/s10567-022-00414-3

ZOSH, J. M. et al. **Learning at the intersection of physical and digital worlds.** npj Science of Learning, v. 8, n. 1, p. 1-9, 2023. DOI: 10.1038/s41539-023-00158-x