Proceedings of ICILLP 2025 Symposium: Property Law and Blockchain Applications in International Law and Legal Policy
DOI: 10.54254/2753-7048/2025.LD29389

The Impact of Network Environment on the Construction Process of Children's Thinking and Cognition

Zhiyin Liu

University of Birmingham, Birmingham, UK
zxl239@student.bham.ac.uk

Abstract. The influence of the internet on kids' cognitive growth, in consideration of the pervasiveness of intelligent tools, has been a global problem. This article explores the dual effect of the internet on kids' cognitive growth. The outcomes show that moderate internet application can generate a spark of kids' creativity, grow their interest in the study process, and increase the level of their cognitive abilities. Their horizons can be expanded by using several educational resources. On contrary, overutilization of electronic tools can cause problems whose names are distraction, social abilities decay, and worsened fragmented thinking. These issues can impair kids' higher-level cognitive abilities. Based on these outcomes, the suggestions are proposed below: maximum coordination and joint monitoring of parents and teachers in kids' online action, setting up proper screen time norms; the package of selection and combination of excellent educational content and the merit of integrating online learning and offline measure; and attention to the development of kids' media literacy and self-control abilities and assisting them in developing healthy digital habits. In virtue of cooperation between different stakeholders and scientific gut, the empowering heights in the kid's growth would be reached by the Internet.

Keywords: Children's Cognitive Development, Internet Use, Screen Time, Educational Applications, Media Literacy

1. Introduction

In today's digital world, children are growing up surrounded by screens, apps, and online content. This is very different from past generations, who played outside more and had fewer interactions with technology. Now, digital tools are part of daily life for many families. Kids watch videos on tablets, use educational apps in schools, and sometimes even learn from virtual classrooms [1]. These changes show how deeply the internet and technology have entered the lives of children.

At the same time, researchers are paying attention to how these digital tools affect children's learning and thinking. Some studies suggest that online learning platforms and games can help kids learn better. They may become more curious, creative, and independent in solving problems. Other studies raise concerns. Too much screen time might harm attention spans, reduce face-to-face interaction, or cause emotional and behavioral issues [2]. Because of these mixed opinions, the research background is full of both hope and caution.

© 2025 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

DOI: 10.54254/2753-7048/2025.LD29389

This paper focuses on a very important issue: how the network environment shapes the way children build their thinking and understanding. Understanding this influence is very meaningful because it helps parents, teachers, and policymakers make better choices.

This paper explores the topic by looking at three things: the positive impacts of the online environment, the challenges it brings, and finally, recommendations for how to guide children in using the internet wisely. This structure will help in understanding the full picture of how digital life affects children's thinking.

2. Positive impacts of the online environment

2.1. Vision expansion

The internet gives children access to information they could never get so easily before. Instead of just relying on books or teachers, they can explore new topics through videos, pictures, and games. For example, a child can learn about space by watching NASA videos or by using a planet simulation app. This makes learning more exciting and visual, helping them understand difficult topics better [3]. It also means they are no longer limited by what is available in their local area. Even if they live far from a good school or library, the internet opens up many opportunities.

Also, many online resources are interactive, which encourages children to explore more. Unlike traditional books, online tools often include visuals, audio, and even 3D animations. These help children form mental pictures in their minds, which supports better understanding. In this way, the internet supports the expansion of children's cognitive frameworks by making learning more global and visual [4].

2.2. Interactive enhancement

Digital platforms do not just give information; they allow children to take part. For example, educational games often ask children to answer questions, solve puzzles, or make choices that affect what happens next. These kinds of activities support active learning. Children become part of the process, which keeps them engaged and helps them remember better [5].

Another benefit is problem-solving. Many games and apps are designed to challenge kids to think carefully, try again when they fail, and find better solutions. This builds perseverance and logical thinking. Also, online collaboration tools allow children to work on tasks together, even if they are in different locations. This helps develop teamwork and communication skills. When children interact with online tools instead of just watching passively, they improve their ability to think clearly and deeply [6].

2.3. Thinking stimulation

Children's thinking becomes more flexible when they are exposed to different kinds of digital content. For instance, drawing apps let kids design freely, music apps help them try different sounds, and storytelling tools allow them to create their own endings [7]. These all support creativity, which is a key part of cognitive development.

Multimodal content, that is, content that uses text, sound, images, and animation, stimulates different parts of the brain. This can help children develop stronger connections between ideas and build more complex thinking structures [7]. When children use different types of tools, they also start to think in more connected ways, linking images with words, sounds with actions, and stories

DOI: 10.54254/2753-7048/2025.LD29389

with emotions. This variety builds stronger cognitive networks and encourages a richer way of understanding the world.

3. Potential challenges in the cyber environment

3.1. Attention issues

While digital tools offer many benefits, one of the biggest problems is attention fragmentation. When kids jump rapidly from one video to another or scroll through content with no focus, their brains get used to short bursts of activity. In this way, it is hard for them to stay concentrated on one mission for a long time. Under school or actual circumstances, this becomes an issue [2].

Besides, a lot of apps and games aim at grabbing attention instead of supporting deep learning. Bright colors, quick movement, and continuous rewards can train the brain to anticipate instant outcomes. Over time, this might decrease a kid's capacity for concentration, particularly on missions demanding patience [8].

3.2. Socialization gaps

Too much time in virtual contexts may decrease kids' actual social interplay. When children spend hours on screens, they have fewer opportunities to practice talking to people face-to-face. They might miss out on studying how to read body language, know tone, or display empathy [2].

This can result in weaker social abilities. Kids may feel shy or awkward in actual contexts because they are more adopted to online exchange. They may love chatting online instead of having real dialogues. This reduces their emotional intelligence and makes it more difficult to construct strong associations [9].

3.3. Cognitive fragmentation

The next issue is that the frequent change of type of digital content may result in discontinuous thinking. Children can find themselves thinking in bits and pieces as opposed to coming up with deep thoughts or concentrating on a certain subject. As an illustration, children can be exposed to a variety of short videos or random links and have numerous facts but no clear picture of how they are related to one another [10].

In addition, when children are left to over-expose themselves to unfiltered information, it may be confusing. Their heads are still in the making, and they might not be competent in telling the truth or something of significance. It is difficult to establish a stable thinking model or to believe in one's own thoughts, which makes it impossible to focus [11]. That is, they might be well informed on small details but fail to create the big picture.

4. Educational recommendations

4.1. Scientific planning

Teachers and parents are required to help children use the internet smartly and healthily. This is associated with setting up a clear strategy regarding the time children spend having internet access and the type of information that is accessible to them. Rather than prohibit screens altogether, it is better to establish rules that are related to their age and requirements. Research shows that planned screen use can reduce risks and increase learning benefits [1].

DOI: 10.54254/2753-7048/2025.LD29389

Planning also includes choosing high-quality apps, games, and websites. There are many educational tools online, but not all are good. Adults should test them and make sure they support learning goals. This helps children use digital tools safely and effectively.

4.2. Home-school collaboration

Helping children build strong cognitive skills in a digital world is not just the job of schools. Families also play a big role. That's why it's important for teachers and parents to work together. For instance, if teachers teach students to apply an educational app, parents can boost learning by using the same app at home [5].

Exchange between home and school assists in creating uniformity. If both sides know the ID's digital habits, they can cooperate with each other to back better learning and thinking. When schools and families share ideas and cooperate with each other, kids get a clearer and greater study context [5].

4.3. Offline balance

Despite useful internet, kids still require offline time. Emotional and physical growth is backed by playing outside, reading books, doing arts and crafts, and spending time with family. These activities also offer the brain time to rest and arrange data [2].

It is very significant to build balance between online and offline life. For instance, a rule like "no screens during meals or before bed" can assist kids in sleeping better and talking more with family members. Besides, outdoor activities and real-world play assist kids in building creativity, motor abilities, and real friendships [3].

With offline time, deeper thinking and imagination are allowed. When fast-moving digital content does not constantly distract kids, they get the opportunity to reflect, ask questions, and dig ideas on their own. Simple things such as drawing from memory, solving a puzzle, or constructing something with blocks assist them in practicing focus and patience [1]. These are basic life abilities that develop stronger by unstructured play and hands-on missions.

Family routines also benefit from offline time. Shared offline moments like helping in the kitchen, gardening, or storytelling before bedtime create emotional connections and teach values like cooperation, empathy, and gratitude. These daily interactions shape how children view relationships and learn to express themselves [7].

Offline environments are also safer from the pressures of social media, online ads, or inappropriate content. By spending more time away from screens, children can avoid negative influences that affect their self-esteem or attention [9]. On the contrary, they are taught to enjoy the current moment, to interact with people around them, and have a feeling of tranquility.

Finally, by offline balance, it is not necessary to deny technology but to wisely employ it. Young people exposed to both digital technologies and physical experiences, as well as those who have been educated and nurtured on the latter, tend to grow up as more self-confident, inquisitive, and balanced individuals [11].

5. Conclusion

This paper discusses the influence of the network environment on children's thinking and learning in this paper. A lot of tools helpful in the cognitive development of children can be found on the internet. It is a game that opens new horizons in the exploration of the world, problem-solving,

DOI: 10.54254/2753-7048/2025.LD29389

interactive games, and visual learning platforms. Meanwhile, there are grave concerns. Excessive screen time and disjointed content, combined with a lack of interaction with the real world, can pose issues to attention, social skills, and profound thought.

That is why it is better to plan the internet use, assist families and schools to cooperate, and make time to live an offline life. The digital world can be an effective means to help children grow with the right support. However, in the absence of balance and direction, it may also cause difficulties. More studies and more considerate methods should be carried out in the future in order to ensure that children can enjoy both online and offline worlds. This does not mean abandoning the internet, but making good use of it so that the minds of all children can benefit and have a brighter future.

References

[1] Panjeti-Madan, V. N., & Ranganathan, P. (2023). Impact of screen time on children's development: Cognitive, language, physical, and social and emotional domains. Multimodal Technologies and Interaction, 7(5), 52.
[2] Swider-Cios, E., Vermeij, A., & Sitskoorn, M. M. (2023). Young children and screen-based media: The impact on cognitive and socioemotional development and the importance of parental mediation. Cognitive Development, 66, 101319.
[3] Nguyen, L., & Walters, J. (2024). Benefits of nature exposure on cognitive functioning in children and adolescents: A systematic review and meta-analysis. Journal of Environmental Psychology, 96, 102336.
[4] Sauce, B., Liebherr, M., Judd, N., & Klingberg, T. (2022). The impact of digital media on children's intelligence while controlling for genetic differences in cognition and socioeconomic background. Scientific Reports, 12(1).
[5] Burke, N., Brezack, N., & Woodward, A. (2022). Children's social networks in developmental psychology: A network approach to capture and describe early social environments. Frontiers in Psychology, 13.
[6] Rakesh, D., McLaughlin, K. A., Sheridan, M., Humphreys, K. L., & Rosen, M. L. (2024). Environmental contributions to cognitive development: The role of cognitive stimulation. Developmental Review, 73, 101135.
[7] Karatela, S., Ward, N., Paterson, J., & Zeng, I. (2022). Environmental influences on the behavioural and emotional outcomes of children: A network analysis. International Journal of Environmental Research and Public Health, 19(14), 8479.
[8] Lavdas, A., & Salingaros, N. (2021). Can suboptimal visual environments negatively affect children's cognitive development? Challenges, 12(2), 28.
[9] Hu, W., Mao, Y., Huang, K., & Sun, Y. (2022). Does internet entertainment reduce the cognitive ability of children? Evidence from the china education panel survey. Behavioral Sciences, 12(10), 364.
[10] Fishbein, D. H., Michael, L., Guthrie, C., Carr, C., & Raymer, J. (2019). Associations between environmental conditions and executive cognitive functioning and behavior during late childhood: A pilot study. Frontiers in Psychology, 10.
[11] Tooley, U. A., Bassett, D. S., & Mackey, A. P. (2021). Environmental influences on the pace of brain development. Nature Reviews Neuroscience, 22(6), 372–384.