EXPLORING THE EFFECTS OF TECHNOLOGY ON CHILD DEVELOPMENT AND EDUCATION

Ozodakhon Elmurod qizi Izzatillaeva,

Uzbekistan state world languages university

Annotation: This article explores the impact of technology on young children's cognitive, social, and emotional development. It presents evidence-based research on the positive and negative effects of technology use on child development, such as enhancing cognitive skills while decreasing social interaction. The article also discusses parental mediation and digital literacy skills as effective strategies to regulate children's screen time and promote healthy technology use.

Keywords: technology, children, cognitive development, social development, emotional development, parental mediation, digital literacy skills, screen time, virtual learning, assistive technologies, adaptive learning platforms.

In recent years, the use of technology among young children has increased rapidly. Children are now exposed to various technological devices such as iPads, smartphones, and computers at an early age. While such technology can have a positive impact, it is essential to investigate the impact of introducing technology to young children and how it influences their cognitive, social, and emotional development.

Studies have shown that the use of technology in early childhood **enhances cognitive development**. Children can learn and **develop problem-solving skills** through the use of educational apps, games, and videos. For example, children can learn new languages, numeracy, literacy, and even social skills. Technology can enhance memory and analytical skills, which can be crucial for cognitive development (Lillard, 2019).

In contrast, the overuse of technology can negatively impact children's cognitive development. Studies suggest that children who spend more than two hours on screen time every day tend to develop weaker cognitive and language skills. Overreliance on technology can also lead to **attention problems** and **a decrease in creativity**.

The **social development** of young children can also be impacted by technology. Social interaction is crucial in a child's development, and the excessive use of technology can lead to a decrease in social skills. Children who spend most of their time playing on tablets or smartphones tend to have weaker communication skills and struggle with empathy

and emotional regulation. Children who are deprived of human interaction may have difficulty building relationships with peers and adults, leading to social isolation.

Lastly, technology can impact children's **emotional development**. Studies suggest that excessive screen time can lead to behavioural problems such as aggression and hyperactivity. The constant exposure to images portraying violence or inappropriate content can cause anxiety and stress in children. It is crucial to limit children's screen time and monitor the content children are exposed to on technological devices (Lillard, 2019).

The American Academy of Pediatrics (AAP) recommends no screen time for children under the age of 18 months except during video chatting. For children between 18 to 24 months, parents should choose high-quality educational content and watch it with them to foster social interaction and learning. For children between the age of 2 to 5 years, screen time should be limited to one hour of quality programming per day. Children over 6 years old should have consistent limits on screen time and prioritize healthy activities such as physical exercise, social interaction, and sleep.

While these guidelines are well-intentioned, there is an ongoing debate on whether they are too restrictive or not restrictive enough. Some experts suggest that different families have different screen time needs, and a one-size-fits-all approach may not be appropriate. Critics also argue that the AAP guidelines are not based on enough evidence and that technological advancements may have made them obsolete.

However, studies have shown that excessive screen time can negatively affect child development and educational outcomes. Children with prolonged screen time tend to have higher rates of obesity, sleep problems, and impaired social skills, such as empathy and communication. They may have difficulty with problem-solving and may struggle with attention and memory.

In contrast, adhering to **screen time guidelines** can have a positive impact on educational outcomes. Children who have less screen time tend to perform better in cognitive tasks and academic achievement. They also have increased creativity and more free play time, which can enhance their social and emotional development.

Digital literacy skills encompass the ability to use technology effectively, critically evaluate information, and protect oneself online. Firstly, **critical thinking** is an essential digital literacy skill that children need to develop. To navigate the digital landscape effectively, children must develop the ability to evaluate information critically. With the abundance of information available online, it is crucial for them to discern credible sources from questionable ones. By learning critical thinking, children are equipped with the ability to think logically and rationally, enabling them to make informed decisions when using

technology. Secondly, **media literacy** is another crucial digital literacy skill that children should develop to navigate the digital world effectively. Children need to understand how media works and the techniques used to manipulate it. Media literacy teaches children how to question media messages and how to perceive the visual and audio elements to make informed decisions when consuming media. This skill is particularly important, given the increasing prevalence of false and misleading information online. Lastly, **online safety** is a critical digital literacy skill that children must possess to navigate the digital world safely. Children should learn about the potential dangers that exist online and the steps they can take to protect themselves from threats such as cyberbullying, online predators, and identity theft. By equipping children with online safety skills, we empower them to make safe and informed choices when using technology.

As you are aware, the global pandemic has forced schools and universities to adopt **virtual learning environments**, such as online classes and educational apps, to ensure continuity of education for students. While such environments offer several benefits, including flexibility in learning and access to digital resources, they also pose challenges to children's engagement, motivation, and academic performance.

One significant advantage of virtual learning environments is the ability to provide students with diverse digital resources, including videos, interactive exercises, and online textbooks. Online learning resources can help children to personalize their learning experience and cater to their individual learning styles. For instance, students can work at their own pace, revise concepts, and access supplementary materials quickly. Moreover, technological interfaces can enhance students' engagement, motivation, and attention span in the learning process.

However, virtual learning environments also create challenges that affect children's engagement, motivation, and academic performance. For example, technology glitches and malfunctions can lead to disrupted learning and frustration. Additionally, the absence of face-to-face interactions with teachers and peers can cause feelings of isolation, detachment, and social disconnection. This lack of human interaction can have adverse effects on students' motivation and engagement levels in the classroom.

Moreover, virtual learning environments can also create **problems in academic performance**, such as cheating and plagiarism. Online classes and educational apps do not provide a real-time evaluation of the students' understanding, and it is easier for students to plagiarize or cheat on assignments and quizzes. It is essential to find a balance between virtual and face-to-face learning environments to maximize the benefits and minimize the

challenges of virtual learning (U.S. Department of Education Office of Educational Technology, 2017).

Children with special educational needs and disabilities (SEND) face unique challenges in their learning environments. Technology has emerged as a powerful tool to support children with SEND, as it provides **customized** and **accessible learning experiences**. Assistive technologies and adaptive learning platforms have been developed to cater to the individual needs of these children.

Assistive technologies are devices and software designed to help children with disabilities to perform daily activities and improve their quality of life. These technologies can be used to address issues such as mobility, communication, and sensory impairments. For example, children with visual impairments can use Braille display devices that translate digital text into Braille output, whereas children with motor impairments can use switched adapted devices that allow them to control computers and other devices by pressing switches. These augmentative and alternative communication (AAC) tools enable children with complex communication needs to express themselves more effectively than traditional communication methods.

Adaptive learning platforms are another technology-based tool developed to support children with SEND. These platforms provide individualized learning experiences by adapting to the abilities and needs of the child. The platforms use algorithms and machine learning to analyze the child's performance and offer personalized feedback and support. Adaptive learning platforms can be particularly helpful for children with learning disabilities who require additional support to engage with the curriculum.

One example of an assistive technology and adaptive learning platform is the assistive technology suite Kurzweil 3000. Kurzweil 3000 provides text-to-speech and reading support, visual and auditory highlighting, and speech recognition technology. The platform can scan and read documents to provide support for children with reading difficulties, such as dyslexia. Moreover, it provides a wide range of different features to cater to the individual learning needs of the child. Technology-based tools such as assistive technologies and adaptive learning platforms have become instrumental in providing support to children with SEND. They offer customized and accessible learning experiences that cater to the individual needs of children with disabilities. Development of these technologies demonstrates that technology plays a vital role in supporting all learners, enabling them to learn more effectively and reach their full potential (Kurzweil Education Systems).

Finally, parents play a crucial role in their children's digital lives and must effectively mediate their technology use. **Parental mediation** refers to the multiple strategies and processes that parents use to influence their children's internet and technology use.

Setting boundaries is one of the most effective ways for parents to regulate their children's technology use. Parents can set restrictions on the amount of time their children spend on digital devices, specific applications or websites they can access, and the location or times of day when technology use is permitted. These restrictions also help children develop a sense of responsibility and self-regulation, ultimately promoting healthy digital habits.

Monitoring content is another crucial aspect of parental mediation. Parents must be aware of the content their children are consuming, including games, videos, and social media platforms. Parents can use filtering software or parental control tools to restrict access to inappropriate content. They can also encourage their children to consume age-appropriate content and teach them about online safety and privacy issues.

Promoting **healthy screen habits** is essential for parents, as well. It involves encouraging children to take breaks and engage in physical activities, have face-to-face conversations, and participate in non-digital activities. Parents can also model healthy screen habits themselves by limiting their own technology use.

A recent study by Head et al. (2020) found that parental mediation was related to lower odds of problematic internet use among adolescents. The study highlights the importance of parental involvement in guiding children's technology use and the positive influence it has on their digital well-being.

Conclusion. While technology offers numerous benefits, its overuse can negatively impact young children's cognitive, social, and emotional development. Therefore, it is essential for parents and educators to monitor and regulate children's screen time effectively. This can be done by setting boundaries, monitoring content, and promoting healthy screen habits. Additionally, digital literacy skills can equip children with the ability to navigate the digital landscape safely and critically. Furthermore, the use of assistive technologies and adaptive learning platforms can support children with special educational needs to improve learning outcomes. Overall, the article emphasizes the importance of responsible technology use and parental mediation to ensure that children can experience the benefits of technology while minimizing its negative effects.

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