THE IMPACT OF GADGETS AND SCREEN TIME ON BRAIN DEVELOPMENT IN CHILDREN

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Annotation. The rapid development of digital technologies has significantly changed children's lifestyles and learning environments. Gadgets such as smartphones, tablets, computers, and televisions have become an integral part of children's daily activities. While digital devices provide educational and entertainment opportunities, excessive screen time may negatively affect brain development, cognitive abilities, emotional well-being, and social behavior in children. This article examines the influence of gadgets and prolonged screen exposure on children's brain development. It discusses the effects on attention, memory, language acquisition, sleep quality, emotional regulation, and academic performance.

Keywords. Screen time, gadgets, brain development, children's health, digital technology, cognitive development, mental health, smartphone use, child psychology, media exposure.

Annotatsiya. Raqamli texnologiyalarning tez rivojlanishi bolalarning turmush tarzi va o'rganish muhitini sezilarli darajada o'zgartirdi. Smartfonlar, planshetlar, kompyuterlar va televizorlar kabi gadjetlar bolalarning kundalik faoliyatining

ajralmas qismiga aylandi. Raqamli qurilmalar ta'lim va ko'ngilochar imkoniyatlarni taqdim etsa-da, ekran oldida ortiqcha vaqt o'tkazish bolalarning miya rivojlanishiga, kognitiv qobiliyatlariga, hissiy farovonligiga va ijtimoiy xulq-atvoriga salbiy ta'sir ko'rsatishi mumkin. Ushbu maqolada gadjetlar va ekran oldida uzoq vaqt turishning bolalarning miya rivojlanishiga ta'siri ko'rib chiqiladi. Unda diqqat, xotira, tilni o'zlashtirish, uyqu sifati, hissiy tartibga solish va akademik ko'rsatkichlarga ta'siri muhokama qilinadi.

Kalit so'zlar. Ekran vaqti, gadjetlar, miya rivojlanishi, bolalar salomatligi, raqamli texnologiyalar, kognitiv rivojlanish, ruhiy salomatlik, smartfonlardan foydalanish, bolalar psixologiyasi, ommaviy axborot vositalari ta'siri.

Аннотация. Быстрое развитие цифровых технологий значительно изменило образ жизни и учебную среду детей. Гаджеты, такие как смартфоны, планшеты, компьютеры и телевизоры, стали неотъемлемой частью повседневной жизни детей. Хотя цифровые устройства предоставляют возможности для образования и развлечения, чрезмерное время, проведенное перед экраном, может негативно повлиять на развитие мозга, когнитивные способности, эмоциональное благополучие и социальное поведение детей. В данной статье рассматривается влияние гаджетов и длительного воздействия экранов на развитие мозга детей. Обсуждаются последствия для внимания, памяти, усвоения языка, качества сна, эмоциональной регуляции и успеваемости.

Ключевые слова: время перед экраном, гаджеты, развитие мозга, здоровье детей, цифровые технологии, когнитивное развитие, психическое здоровье, использование смартфонов, детская психология, воздействие СМИ.

Digital technology has become one of the most influential aspects of modern life. Children today grow up surrounded by electronic devices such as smartphones, tablets, computers, televisions, and gaming consoles. These technologies provide

easy access to information, communication, entertainment, and educational resources.

Although digital devices offer many advantages, concerns have increased regarding their effects on children's brain development and overall health. During childhood, the brain undergoes rapid growth and development. Experiences during this critical period strongly influence cognitive, emotional, and social abilities.

Excessive screen time may interfere with healthy brain development by reducing physical activity, sleep quality, face-to-face communication, and creative play. Researchers and healthcare professionals continue to study how digital technology affects children's attention span, memory, emotional stability, and learning abilities.

Understanding both the benefits and risks of gadget use is essential for parents, teachers, healthcare providers, and policymakers who seek to support healthy child development in the digital age.

The human brain develops rapidly during infancy, childhood, and adolescence. During these stages, neural connections are formed through learning, communication, physical activity, and social interaction.

Early childhood is a particularly sensitive period for language development, emotional regulation, attention and memory, social communication, and problem-solving skills. Healthy brain development requires balanced stimulation, proper nutrition, physical movement, adequate sleep, and meaningful interaction with caregivers and peers.

The use of digital devices among children has increased dramatically in recent years. Many children spend several hours daily using smartphones, tablets, televisions, and online platforms for entertainment, education, social communication, gaming, and video streaming. The COVID-19 pandemic further increased children's screen exposure due to online learning and social isolation.

Digital technologies can provide educational and developmental benefits when used appropriately and in moderation. Educational applications, videos, and interactive programs can improve language learning, mathematical skills, creativity, and problem-solving abilities. Interactive learning platforms may help children better understand complex concepts through visual and audio stimulation.

Digital devices also provide children with access to educational materials and global information resources. Early familiarity with technology may help children develop digital literacy skills important for future education and careers. In addition, technology allows children to communicate with friends and family members, especially during periods of social isolation.

Despite certain benefits, excessive and uncontrolled gadget use may negatively affect children's brain development and health. Prolonged exposure to fast-moving digital content may reduce children's attention span and concentration abilities. Children who spend excessive time on screens may experience difficulty focusing on tasks, reduced academic performance, and increased distractibility.

Young children learn language primarily through direct human interaction. Excessive screen exposure may reduce communication with parents and caregivers, leading to delayed speech and language development. Overdependence on digital devices may also reduce active thinking, memory training, and problem-solving activities. Furthermore, excessive passive consumption of digital content may limit imaginative play and creative thinking.

Screen time also influences children's emotional well-being and psychological health. Excessive use of social media and online platforms may contribute to anxiety, depression, low self-esteem, social comparison, and emotional stress. Children exposed to cyberbullying or negative online content are particularly vulnerable.

Some children develop behavioral addiction to digital devices, making it difficult to control screen use. Symptoms may include irritability without devices, reduced interest in other activities, sleep disturbances, and social withdrawal.

Constant digital stimulation may also affect children's ability to manage emotions and tolerate boredom or frustration.

Blue light emitted by screens interferes with melatonin production and disrupts sleep patterns. Children who use devices before bedtime may experience insomnia, poor sleep quality, daytime fatigue, and reduced concentration. Sleep is essential for memory formation and healthy brain development.

Excessive screen time often reduces physical activity, increasing the risk of obesity, poor posture, vision problems, and musculoskeletal disorders. Regular physical movement is important for both brain and body health.

Children who spend excessive time online may have fewer opportunities to develop social communication skills and emotional intelligence. Excessive exposure to violent or inappropriate content may contribute to aggressive behavior, emotional instability, and reduced empathy. Uncontrolled gadget use may also interfere with homework, reading habits, and classroom performance.

Balanced and supervised use of digital technology is essential for protecting children's health. Parents and healthcare organizations recommend age-appropriate screen limits, avoiding excessive screen exposure in early childhood, encouraging regular breaks during device use, and reducing screen use before bedtime.

Parents should monitor the amount of screen time, the quality of digital content, and online safety and communication. Outdoor play, sports, and physical exercise support healthy brain and body development. Children should also be encouraged to participate in family activities, communication, and creative play.

Choosing high-quality educational programs and applications can improve the positive effects of technology.

Educational institutions and healthcare providers should promote digital health awareness. Schools can educate students about healthy technology use, encourage balanced learning methods, and promote physical and social activities.

Doctors and psychologists can help parents recognize signs of excessive screen exposure and provide guidance on healthy habits.

As technology continues to evolve, digital devices will remain part of children's lives. Future research should focus on the long-term neurological effects of screen exposure, the development of child-friendly technologies, digital wellness education, and safer online environments.

Balancing technological progress with child health protection will become increasingly important.

Gadgets and digital technologies play an important role in modern childhood and education. When used appropriately, digital tools can support learning, creativity, and communication. However, excessive screen time may negatively affect children's brain development, attention, emotional well-being, sleep quality, and social behavior.

Healthy brain development requires balanced experiences that include physical activity, direct social interaction, adequate sleep, and creative play. Parents, teachers, and healthcare professionals must work together to establish healthy digital habits and protect children from the harmful effects of excessive gadget use.

Responsible and balanced technology use is essential for supporting children's cognitive, emotional, and social development in the digital age.

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