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THE USE OF TECHNOLOGY IN THE EDUCATION OF CHILDREN WITH SPECIAL NEEDS: A REVIEW OF RECENT LITERATURE

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Abstract

The use of technology in the education of children with special needs offers great potential to improve learning quality and accessibility. Recent literature reviews have shown that technologies such as assistive devices, educational apps and online learning platforms can provide more individualised and effective solutions in supporting the academic, social and emotional development of children with special needs. However, the implementation of these technologies is not free from challenges, including cost, the need for adequate training for educators, and issues of privacy and data security. Therefore, strong collaboration between the government, educational institutions and the technology sector is needed to overcome these barriers and maximise the potential of technology in inclusive education. The study concludes that with the right approach, technology can be an important tool to meet the unique needs of children with special needs and help them reach their full potential.

Keywords: Technology, Education, Children with Special Needs.

Introduction

The development of technology in the 21st century has brought significant changes in various fields of life, including in the education sector. The application of technology in education not only helps the teaching and learning process to be more effective and efficient, but also opens up opportunities for students with special needs to get equal education. Children with special needs (ABK) are individuals who require a different teaching approach compared to children in general (Sitopu et al., 2024) ; (Guna et al., 2024) ; (Fawait et al., 2024) .

Education for children with special needs is a very important aspect of self-development and achieving their full potential. Through appropriate and inclusive education, children with disabilities not only gain academic knowledge but also experience social, emotional and cognitive development that is crucial for their future survival (Iksal et al., 2024) ; (Syakhrani & Aslan, 2024) . Specialised education tailored to their individual needs helps overcome learning barriers so that children with disabilities can acquire the skills needed to live independent and productive lives. In addition, inclusive and sustainable education also supports the creation of a society that is more empathetic, values diversity and provides equal opportunities for every individual

without exception. Therefore, technological innovation can play a key role in meeting their unique needs (Nurhikma & Hendriani ., 2024)

The number of children with special needs who require special attention in the field of education is increasing from year to year. Various types of special needs such as hearing, vision, motor and other developmental disorders require specific solutions for each case. Educational technology, in the form of adaptive software, interactive learning applications, augmentative and alternative communication (AAC) devices and other assistive devices, has shown great potential in supporting the learning of children with disabilities. However, despite these innovations, the adoption of these technologies remains challenging and uneven across all educational institutions (Kingsdorf & Pančocha ., 2020)

One of the main obstacles in implementing educational technology for children with special needs is the lack of technological literacy among educators and parents. Teachers and educators often lack the knowledge and skills to optimise the use of technology in the teaching process. In addition, the high cost of procuring technologically advanced tools is also a barrier for many schools and families. Another important factor is the regulatory and policy barriers that do not fully support the integration of technology in the education curriculum for children with disabilities (Guo & Keles, 2024) .

Therefore, it is necessary to conduct an in-depth study of the use of technology in the education of children with special needs to determine the effectiveness, challenges and potential solutions that can be implemented. A review of recent literature provides more up-to-date insights into the development of educational technology, practical experiences from institutions that have implemented it and research results that contribute to understanding the impact of technology on children with disabilities' learning. It is hoped that this review will provide comprehensive recommendations for improving the quality of education for children with special needs through the use of technology.

This study aims to summarise and analyse recent literature on the use of technology in special needs education, evaluate its effectiveness, and identify challenges faced and ways to overcome them. By doing so, it is hoped to provide useful guidance for educators, policy makers and stakeholders in developing better inclusive education strategies.

Research Methods

The study in this research uses the literature method. The literature research method is an approach used to collect and analyse existing information related to research topics through written sources such as books, scientific articles, journals, research reports, and other documents. This method involves looking back and conducting a critical review of relevant literature to identify research gaps, build

theoretical foundations, and understand the latest developments and trends in a particular field of study (Setiowati ;, 2016) (Syahran ;, 2020) (Helaluddin, 2019) . This process includes the systematic search, selection, evaluation, and synthesis of information obtained from various sources to produce informative and useful conclusions. Thus, literature research not only serves as a guide in formulating research questions and hypotheses, but also helps ensure that the studies conducted have a strong and significant basis (Sanusi, 2015) .

Results and Discussion

Use of Technology in Children with Special Needs

The use of technology in the education and daily lives of children with special needs has had a significant and positive impact. Technology provides opportunities to overcome the various barriers that children with disabilities face in learning and communicating (Bayraklı, 2023) . For example, supporting software and applications such as interactive learning apps, alternative communication apps and assistive devices such as tablets and computers can be customised to suit individual needs, helping to improve cognitive, motor and social skills. The use of these technologies enables children with disabilities to learn at their own pace, gain access to information in ways that suit their learning styles and communicate with those around them more effectively (Durgungoz & Clair, 2024) .

In the context of education, technology provides solutions to create an inclusive and engaging learning environment for children with disabilities. Tools such as interactive whiteboards, specially designed computer programmes and technology-based hearing aids help facilitate teaching and learning in the classroom. These technologies not only help to reduce the physical and sensory barriers that children with disabilities may face but also allow teachers to provide a more personalised approach to teaching, based on the needs and abilities of each individual. As a result, children with disabilities have a greater opportunity to actively participate in teaching and learning activities and achieve optimal results (Olumorin et al., 2022) .

In addition to education, technology also plays an important role in supporting daily life and the development of independent living skills for children with disabilities. Technology devices such as automatic timers, reminder systems and navigation assistance devices can help children with disabilities organise their daily activities, move around more freely and increase their independence. Technology also enables the use of sensor-based devices to monitor health and physical condition, which is particularly important for children with certain medical conditions. Thus, technology helps enrich the quality of life of children with disabilities and supports them in leading more independent and productive lives (Roth & Faldet, 2020) .

The use of technology also provides benefits in social and communication aspects for children with disabilities. Specially designed communication applications

and devices, such as augmentative and alternative communication (AAC) applications, allow children with speech or communication difficulties to express themselves more easily (Andreeva, 2020) . With these technologies, children with disabilities can participate more actively in social interactions in school, home and community settings. Communication technology also helps to reduce isolation and increase the confidence of children with disabilities, so they can build better and more meaningful social relationships with people around them (HUSSAIN & Begum, 2024) .

However, while technology has many benefits for children with disabilities, it is also important to consider the challenges and risks of using it. It is important for educators, parents and carers to ensure that the technology used is safe, effective and appropriate for the individual needs and abilities of children with disabilities (Petti, 2020) . Appropriate assistance is also needed to monitor the use of technology so that it is not excessive and remains balanced with offline activities that are also important for the holistic development of children with disabilities. With the right approach, technology can be an invaluable tool in supporting the development and wellbeing of children with disabilities, helping them lead richer and more meaningful lives.

New Technology for Children with Special Needs

Children with special needs require different and customised educational approaches to effectively access learning. Adaptive technology has played an important role in supporting them. Specially developed educational aids and software aim to support their learning, communication and socialisation skills. As technology evolves, new innovations continue to be introduced to help these children optimise their potential (Mehta, 2023) .

Today, there are many educational apps and software designed for children with special needs. For example, apps that utilise augmented reality (AR) help autistic children understand social situations better. Computer programmes that utilise artificial intelligence (AI) technology also enable learning that is tailored to a child's individual learning pace and style. These applications provide an interactive and fun learning environment, thus increasing children's interest in learning (YAZGAN, 2022) .

For children with speech or language difficulties, alternative and augmentative communication (AAC) technology has been a lifesaver. These devices can range from simple apps on tablets to specialised devices designed to help children express themselves. Recent technologies have integrated voice recognition and virtual assistants such as Siri or Google Assistant, making it easier for children with speech impairments to interact using synthesised voices (Griffin et al., 2024) .

Innovations in robotics also bring positive impacts for children with special needs, especially in terms of socialisation and therapy. Some robots are designed to offer interactive therapy that assists children in improving their social and emotional skills. These robots can be programmed to respond to interactions with children and

offer motivational feedback, making them highly effective learning tools (Venkatesan, 2024) .

The future of technology for children with special needs looks promising as innovations continue to emerge. By utilising technologies such as machine learning and the Internet of Things (IoT), more personalised and effective solutions are expected. All of this aims to bridge the gap in education and social development, and ultimately, help these children lead more independent and fulfilling lives. To achieve the full potential of these technologies, it is important for educators, developers, and parents to work together to facilitate access for every individual in need (Kamble & Gaikwad, 2021) .

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As such, the future of technology for children with special needs looks promising with many innovations constantly emerging. By utilising technologies such as machine learning and the Internet of Things (IoT), more personalised and effective solutions are expected. All of this aims to bridge the gap in education and social development, and ultimately, help these children lead more independent and fulfilling lives. To achieve the full potential of these technologies, it is important for educators, developers, and parents to work together to facilitate access for every individual in need.

Technology Challenges for Children with Special Needs

One of the main challenges is the availability and accessibility of appropriate technology for children with special needs. Many advanced technologies are specifically designed to help them, but they often come at a high price and are unaffordable for most families. In addition, in some areas, especially in rural or underdeveloped areas, inadequate infrastructure can be a major barrier to accessing these technologies. Governments and non-profit organisations need to play an active role in providing subsidies or assistance to ensure that these technologies are accessible to all children in need (Nurmukhamedova ., 2024)

Using technology for children with special needs often requires specialised knowledge and skills from parents, teachers and therapists. However, the lack of adequate training and ongoing support is a significant challenge. Without proper guidance, the technology cannot be utilised to its full potential and can instead be confusing or ineffective. Therefore, there needs to be a comprehensive and accessible training programme to ensure all parties involved can use the technology correctly and optimally (Jørgensen et al., 2020) .

The use of internet-connected technologies that involve the collection of personal data of children with special needs also raises concerns regarding data privacy and security. Children are a vulnerable group, and the protection of their data should be a top priority. Programmes and devices used must adhere to strict security standards to protect children's private information from potential misuse or hacking. Technology developers and regulators need to work together to ensure that these technologies are safe to use and children's personal data is well protected (Alamri, 2022) .

Each child with special needs has unique characteristics and needs, so one technology solution may not fit all. This poses a challenge in developing and finding the right technology that works for each child. An individualised approach is needed to ensure the technology can meet their specific needs. This requires close collaboration between technology developers, experts and families, and may require a greater investment of time and resources. Without a conscious effort to tailor technology to children's individual needs, its potential benefits cannot be maximised (Mahapatra, 2020) .

To address these challenges, technology development and innovation must be an ongoing endeavour involving various parties. Research and development needs to be enhanced to produce technologies that are more affordable, accessible, and suited to the individual needs of children with special needs (Armstrong, 2020) . Collaboration between the government, private sector and academia is essential to create an ecosystem that supports these innovations. In addition, hearing directly from children and parents about what is really needed can provide valuable insights in creating more effective and efficient solutions (Satherley & Norwich, 2021) .

As such, Technology has great potential to improve the quality of life for children with special needs. However, challenges, such as availability, training, privacy and individualisation, must be taken seriously to ensure these technologies can be optimally utilised. With collaboration between various stakeholders, proper training, and strict data protection, we can turn challenges into opportunities that will pave the way to a more inclusive and potential future for children with special needs. Our seriousness and commitment to this challenge will determine how far technology can truly fulfil its promise to help all children, without exception, to a better life.

Conclusion

The use of technology in the education of children with special needs has been shown to provide significant benefits, such as facilitating individualised learning, improving accessibility, and providing additional support needed by students. Technology, such as assistive devices, educational apps and online learning platforms, allows educators to customise materials to suit each child's specific needs. Recent literature studies have found that this use of technology in education not only helps in academic development, but also in the social and emotional development of children with special needs.

However, the challenges in implementing this technology are also worth noting. Factors such as cost, lack of adequate training for educators, and data privacy and security concerns are barriers that still need to be overcome. Cooperation between the government, educational institutions, and the technology sector is necessary to develop effective and sustainable solutions. With the right approach, technology can be a powerful tool to improve the inclusivity and quality of education for children with special needs, so that they can reach their full potential.

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