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Fiziksel engelli bireyler için eğitim teknolojisi: Bir sistematik literatür taraması

Educational technology for physically disabled people: A systematic literature review

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ÖZ

Eğitim teknolojisinin son yıllardaki gelişimi, fiziksel engelli öğrencilerin özel gereksinimlerini karşılamak üzere yenilikçi teknolojiler sunmuş ve eğitim alanındaki araştırmacıların ve uygulayıcıların çeşitli öğrenme ihtiyaçlarını desteklemek için bu teknolojilerin etkin bir biçimde kullanımının önemini vurgulamıştır. Bu çalışmada, fiziksel engelli bireyler için eğitim teknolojisinin kullanımını araştırma amacıyla fiziksel engelli bireylerin kullandıkları teknolojiler ve bu teknolojilerin öğrenmeleri üzerindeki etkileri kategorize edilmektedir. Bu sistematik literatür taramasında önceden belirlenmiş kriterlere göre, Web of Science (WoS), Scopus, Education Resources Information Center (ERIC), EBSCOhost, Science Direct ve Education Source gibi tanınmış elektronik veri tabanları kullanılmıştır. Bu kapsamlı literatür taraması, fiziksel engelli öğrenciler için eğitim teknolojisinin kullanımındaki mevcut eğilimi gösteren ve farklı disiplinleri kapsayan 35 çalışmayı içermektedir. Seçilen çalışmaların yayınlandığı ülkeler incelendiğinde, fiziksel engelli bireyler için eğitim teknolojisinin kullanımı alanındaki araştırmaların geniş bir coğrafi dağılımı olduğu görülmektedir. Bu çalışmalar, dijital platformlar ve adaptif bilgisayar giriş cihazları başta olmak üzere çeşitli teknolojileri araştırmaktadır. Robotik, göz hareketleri takip teknolojisi, mobil teknolojiler, bilgisayar tabanlı teknolojiler ve destek ekipmanları da önemli ölçüde katkı sağlayan teknolojiler arasında yer almaktadır. Bu disiplinler arası araştırma, eğitim teknolojisinin dönüştürücü potansiyelini vurgulayarak, fiziksel engelli bireylerin kapsamlı eğitsel becerileri ve konu öğrenimi hususundaki özgün ihtiyaçlarını karşılamak için sürekli iş birliğine olan ihtiyacı vurgulamaktadır.

Anahtar Sözcükler: eğitim teknolojisi, yardımcı teknolojiler, fiziksel engellilik, özel eğitim

ABSTRACT

The evolution of educational technology in recent years has introduced innovative technologies to meet the specific requirements of students with physical disabilities, emphasizing the importance for educational researchers and practitioners to understand its effective use in supporting diverse learning needs. The present study aimed to explore the utilization of educational technology for physically disabled people. It categorized the technology they used and how it affected their ability to learn. This systematic review followed predetermined criteria and utilized well-known electronic databases, including Web of Science (WoS), Scopus, Education Resources Information Center (ERIC), EBSCOhost, Science Direct, and Education Source. This comprehensive review includes 35 studies demonstrating a maintained trend in using educational technology for physically disabled students. The examination of the published countries in the selected studies reveals a diverse geographic distribution of research efforts in the field of employing educational technology for individuals with physical disabilities. The studies explore various technologies, with digital platforms and adaptive input devices taking the lead. Robotics, gaze-based technology, mobile technology, computer-based technology, and support equipment also contribute significantly. This interdisciplinary exploration highlights the transformative potential of educational technology, emphasizing the need for continued collaboration to address the unique needs of physically disabled individuals across comprehensive educational skills and subject learning.

Keywords: educational technology, assistive technology, physical disability, special education

INTRODUCTION

Educational technology enables researchers in the field of education to develop and implement innovative tools, strategies, and resources aimed at enhancing teaching methods, learning experiences, and educational outcomes. Despite the extensive technology integration into education, it is noteworthy that the field of special education has yet to fully capitalize on its advantages. Students with disabilities have remarkable problems with accessibility and independence on campus while trying to maintain their education (Aamlid & Brownfield, 2019). Therefore, there is a demanding requirement to advocate for the adoption of Information and Communication Technologies (ICT) and Assistive Technology (AT) in the instruction of disabled children with diverse learning needs (Bouck & Long, 2021; Donmez, 2023; Ouherrou et al., 2019). Significantly, AT holds the potential to significantly enhance the development of social and communicative skills, as well as improve learning outcomes for students with unique requirements (Campbell et al., 2006).

In today's digital age, the significance of technology in education has reached unprecedented heights. There is a significant transformation in online learning, offering students from various backgrounds, including those with disabilities, a higher degree of flexibility and accessibility (Stambekova et al., 2022). While this transformation aims to touch the lives of all students, it holds great potential to provide benefits for individuals with physical disabilities, including those who may be paralyzed (Lomellini et al., 2022; Seale et al., 2010). In this context, using AT services is crucial in breaking down barriers and enhancing the educational journey of students with disabilities (Malcolm & Roll, 2017). Besides, the availability of accessible e-learning systems can offer significant opportunities for the education of students with disabilities (Laabidi et al., 2014).

Ensuring accessibility to educational resources and fostering an inclusive learning environment for learners with disabilities has become a paramount concern. Accessibility, a cornerstone of modern education, is not only about providing equal opportunities but also empowering individuals to realize their full potential. In this context, the use of educational technology, along with a suite of assistive technologies, becomes instrumental for those with physical disabilities. These technologies offer solutions that transcend physical limitations, providing physically disabled learners the tools to access, engage in, and thrive in educational settings.

Given the importance of technology usage for physically disabled learners, there arises a necessity to explore the use of educational technology in enhancing their learning. Hence, the current study followed a systematic literature review to investigate educational technology for physically disabled learners. In particular, a review of prior educational research spanning from 2010 to 2024 was conducted to gain insights into the application of educational technology in improving the learning environments of individuals with physical disabilities. The findings revealed that educational technology holds significant promise for improving their understanding and learning. Moreover, this study can be a helpful resource for upcoming researchers by providing details about the particular participants, subjects, and objectives through the research reviewed. Additionally, the current study aimed to organize and identify potential applications of technology in the development of comprehensive educational skills and subject learning.

BACKGROUND

Educational technology, an expanding field at the intersection of education and technology, has experienced remarkable growth and transformation in recent years. There are technological tools and platforms aimed at improving the educational experience of learners, particularly those with unique needs and challenges (World Health Organization, 2017).

Assistive Technology (AT) plays a crucial role in special education by leveraging technology to enhance the learning experience and support disabled people (Assistive Technology Act of 1998, 1998). The Assistive Technology Act of 1998 defines AT as the use of technology to facilitate access to assistive digital devices and services to improve the quality of life for individuals with disabilities. AT encompasses a wide range of tangible materials, such as specialized equipment,

products, or systems, as well as related services (Assistive Technology Act of 2004, 2004). Besides, AT has proven indispensable in supporting learners with disabilities throughout their educational journey, helping to remove barriers and provide equal educational opportunities by enabling them to participate more fully in learning environments. For instance, devices such as adaptive keyboards, adaptive controllers, and writing tools can be examples of educational technology enabling students with limited physical ability to access and engage with digital educational content (Laughlin et al., 2018). AT is essential to support them throughout their educational journey. Besides, learners with physical disabilities who have challenges in communication can be helped with Augmentative and Alternative Communication (AAC) systems (Lersilp et al., 2016). For instance, there are applications for mobile devices like iPads or iPhones that can provide high-technology communication aids for people with specific needs (Bradshaw, 2013). Mobile applications are increasingly used as educational tools adaptable to learners' unique needs (World Health Organization et al., 2019). In addition, online educational resources like electronic books (e-books) can provide accessible educational content for disabled learners (Slater et al., 2015). Creating and distributing accessible educational content is a fundamental aspect of supporting learners with physical disabilities.

Moreover, Learning Management Systems (LMS), web-based platforms, can provide a centralized system for educators to deliver course content and for learners to access it. These systems are often designed with accessibility features such as screen reader compatibility and navigational tools that facilitate ease of use for learners with physical disabilities (Baule, 2020). In addition to the accessible features of LMS, it can offer communication and collaboration tools, such as video conferencing platforms and online discussion forums, to increase the interaction between learners and educators. Using these tools, learners with physical disabilities can participate in class activities easily.

To sum up, educational technology has evolved significantly in recent years, offering innovative tools and platforms to enhance the learning experience for people with physical disabilities to meet their specific requirements. It underscores the importance for educational researchers and practitioners to understand how to effectively employ and adapt educational technology to enhance the learning experiences of individuals with physical disabilities and support their educational progress.

RESEARCH QUESTIONS

This study aimed to explore existing research on the use of educational technologies for individuals with physical disabilities. Accordingly, it sought to address the following research questions:

1. What are the publication characteristics (year, country, journal), participant information and purpose of the studies on learning technology for physically disabled people?
2. What educational technologies are used for comprehensive educational skills and subject learning applied for physically disabled people?

METHODOLOGY

This study was initiated by employing a systematic literature review to identify relevant research aligned with the research questions, followed by a comprehensive evaluation and analysis of the selected studies (Kitchenham, 2004). The period from 2010 to 2024, with articles published up to October 15, 2024, was chosen to focus on recent developments and innovations in educational technology that support physically disabled individuals. This time frame reflects a period of significant technological advancement, ensuring that the review captures the most up-to-date and impactful research in the field. The detailed process of inquiry and selection of studies is elaborated below.

In this context, key concepts are operationally defined as follows: educational technology refers to the use of technological tools and resources designed to facilitate learning and improve

educational outcomes, including software applications, interactive platforms, and other instructional technologies. Learning technology specifically focuses on tools and systems that enhance the learning experience, promoting engagement and skill acquisition among learners. Information and Communication Technology (ICT) encompasses the integration of telecommunications, computers, and software that allows users to access, store, transmit, and manipulate information, including resources like the internet and mobile devices that support communication and learning in educational environments. Finally, assistive technology (AT) consists of devices, tools, or software designed to enhance the functional capabilities of individuals with disabilities, ranging from simple aids to complex systems.

Inquiry Process

The literature on the use of educational technology for people with physical disabilities was investigated using well-known electronic databases. They were Web of Science (WoS), Scopus, Education Resources Information Center (ERIC), EBSCOhost, Science Direct, and Education Source. The inquiry process focused exclusively on educational research. While examining the literature across the mentioned databases, the subsequent keywords or combinations were utilized, incorporating commands of "AND" and "OR": "education", "technology", "learning", "disabled", and "paralyzed".

Selection Process

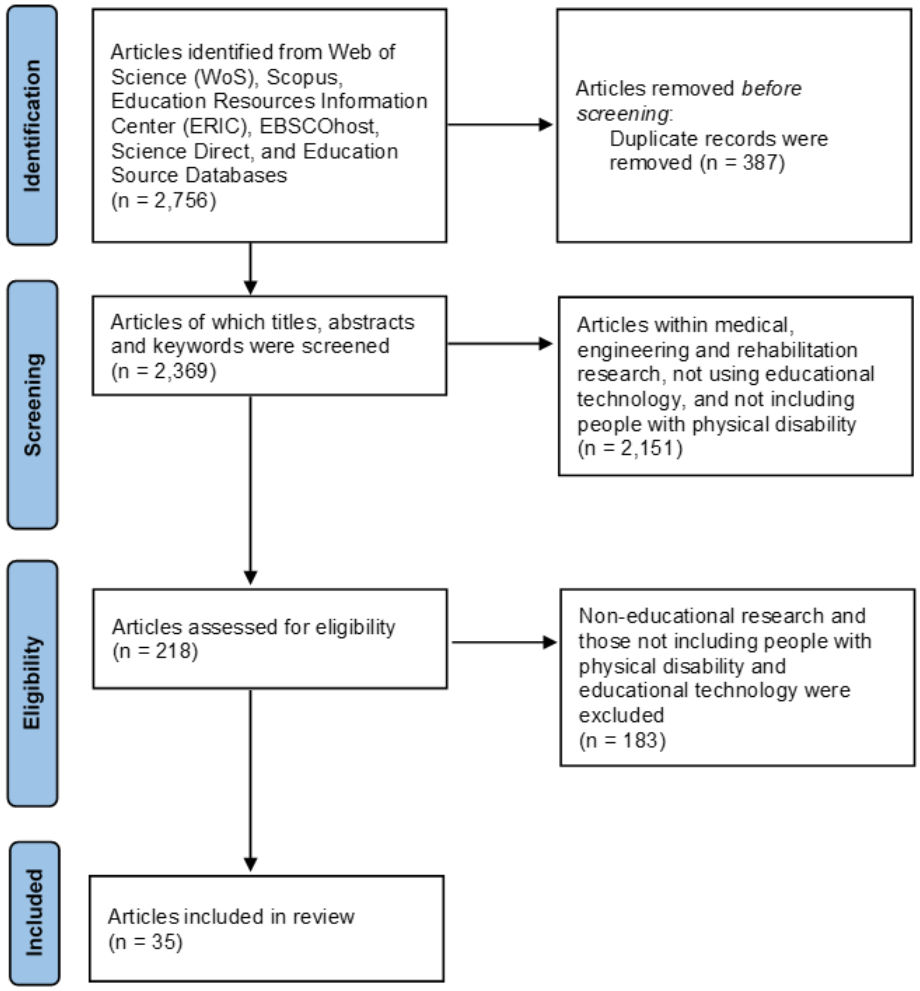
When choosing pertinent papers, the criteria for inclusion and exclusion for this systematic literature review (Table 1) were established following the PRISMA guideline, as Page et al. (2021) explained. Consequently, a comprehensive selection process was followed in four stages: identification, screening, eligibility, and inclusion (Moher et al., 2016; Shamseer et al., 2015).

Table 1
Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
The paper was published in an academic journal.	The paper was a review or meta-analysis.
The paper was written in English.	The paper was not written in English.
The paper was published in a peer-reviewed journal.	The paper was not published in a peer-reviewed journal.
The paper was available in full text.	The paper was not available in full text.
The paper was educational research.	The paper was medical, rehabilitation, or engineering research.
The paper was about educational technology use.	The paper was not about educational technology use.
The participants were people with physical disability.	The participants were people without physical disability or teachers.

Initially, the examination of studies on the specified electronic databases relied on particular inclusion and exclusion criteria as outlined in Table 1. A total of 2,756 articles were collected, and 387 duplicate papers were removed during the review. The titles, abstracts, and keywords of the remaining 2,369 publications were then carefully inspected to identify those meeting the exclusion criteria. Consequently, articles related to disciplines such as medical, engineering, rehabilitation, or other topics were omitted from this study. Subsequently, the remaining 218 articles underwent eligibility evaluation, excluding 183 more papers that did not involve individuals with physical disabilities or did not utilize educational technology. As a result, 35 articles were selected for the current study, and a flowchart illustrating the inquiry and selection processes is presented in Figure 1.

Figure 1
Inquiry and selection process



Research Ethics

All the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed in the entire process from the planning, implementation, data collection to the analysis of the data. None of the actions specified under the second section of the Directive, "Scientific Research and Publication Ethics Actions" have been carried out.

During the writing process of this study, scientific, ethical and citation rules were followed; no falsification was made on the collected data and this study was not sent to any other academic media for evaluation.

Research ethics committee approval information

Since this study is a systematic literature review, it does not fall under the category of studies requiring Ethical Committee Approval. Therefore, Ethical Committee Approval has not been declared.

FINDINGS AND DISCUSSION

The results were organized into two main categories following a comprehensive assessment of the selected papers: overall findings and use of educational technology for individuals with physical disabilities.

The studies explored a diverse range of technologies tailored to benefit physically disabled people, as depicted in Table 2.

Table 2
Summary of selected papers on the use of educational technologies for physically disabled people

Authors	Participants	Purpose of the Study	Technologies Used	Comprehensive Educational Skills and Subject Learning
Inman et al. (2011)	13 children with severe orthopedic disabilities (4-20 years, M=11)	To investigate the impact of a training program utilizing technology on the educational experiences of children with physical disabilities	Digital Platforms	Motor Skills Enhancement
Kirshner et al. (2011)	16 children with cerebral palsy (6-12 years, M=8) 16 typically developing children (M=8)	To assess the usability of the Meal-Maker and its ability to discern performance disparities between typically developing children and those diagnosed with cerebral palsy	Digital Platforms	Motor Skills Enhancement
Batanero-Ochaíta et al. (2023)	26 students without visual or motor problems 28 blind or partially sighted students 6 reduced motor skill students (M=40 years)	To examine the time students with disabilities spend on questionnaires in e-learning compared to students without disabilities	Digital Platforms	Academic Activities
Ersoy & Güneyli (2016)	20 students with physical disabilities	To discuss how orthopedically impaired learners use social networking for leisure, education, and personal development	Digital Platforms	Communication and Interaction
Majeed (2018)	52 physically disabled students 15 hearing impaired students 46 visually impaired students	To investigate the challenges and obstacles related to the usability and accessibility of Open Educational Resources and Massive Open Online Courses (MOOCs) for students with specific needs in distance learning environments	Digital Platforms	Distance Learning
Sghaier et al. (2022)	50 students with disabilities (6-9 years)	To develop and construct a virtual learning space utilizing Open Simulator, which is based on a 3D virtual environment and simulates real-world surroundings	Digital Platforms	Mathematics Education
Khamparia et al. (2020)	30 children with disabilities 30 typically developing children	To incorporate microworld game-based learning with the aim of improving learning performance and problem-solving for special needs students in classroom teaching	Digital Platforms	Science Education

Authors	Participants	Purpose of the Study	Technologies Used	Comprehensive Educational Skills and Subject Learning
Gregg et al. (2016)	1 college student with physical disability 2 college students with learning disabilities 1 college student with visual impairment	To understand the provision of electronic mentoring to support the educational persistence of disabled students	Digital Platforms	STEM Education
Shih et al. (2010)	2 students with physical disabilities (12-15 years)	To assess the enhancement of pointing accuracy using a novel target acquisition method designed for individuals with multiple disabilities	Adaptive Input Devices	Academic Activities
Standen et al. (2011)	23 participants with intellectual and physical disabilities (17-21 years)	To assess the practicality of employing the Nunchuk as an alternative assistive tool for individuals with intellectual and physical disabilities through the use of switch-controlled software	Adaptive Input Devices	Academic Activities
Stasolla et al. (2015)	6 children with cerebral palsy (9-12 years, M=10)	To expand the application of assistive technology with a novel configuration, enabling children with cerebral palsy and severe motor disabilities to enhance academic engagement in classroom settings	Adaptive Input Devices	Academic Activities
Stasolla et al. (2013)	3 children with cerebral palsy and severe communication impairments (6-9 years)	To assess the effectiveness of a technology-driven program aimed at encouraging independent decision-making behaviors in children diagnosed with cerebral palsy	Adaptive Input Devices	Communication and Interaction
Stoner et al. (2010)	1 student with cerebral palsy (16 years)	To describe a single case of augmentative and alternative communication implementation	Adaptive Input Devices	Communication and Interaction
Chang & Shih (2014)	2 students with cerebral palsy (16-18 years)	To assess the effectiveness of using a standard keyboard enhanced by finger-pressing position detection program for fine motor activities	Adaptive Input Devices	Motor Skills Enhancement
Lancioni et al. (2011)	3 participants with extensive motor disabilities (13-46 years, M=35)	To evaluate the efficiency of microswitches and a keyboard emulator in assisting participants with severe motor disabilities in their writing tasks	Adaptive Input Devices	Writing Skills

Authors	Participants	Purpose of the Study	Technologies Used	Comprehensive Educational Skills and Subject Learning
Adams & Cook (2014)	3 children with physical disabilities and complex communication needs (10-14 years, M=12 years)	To examine the influence of employing a robot controlled through a speech-generating device on demonstrating knowledge in math measurement activities	Robotics	Mathematics Education
Adams & Cook (2016)	1 child with physical disabilities and complex communication needs (12 years)	To investigate interactive educational tasks utilizing a Lego robot operated by a speech-generating device tailored for communication	Robotics	Mathematics Education
Esquivel et al. (2024)	3 students with physical disabilities (3-17 years, M=9)	To investigate the environmental factors that facilitate students with physical disabilities in utilizing robots and computers during mathematics lessons	Robotics	Mathematics Education
Encarnação et al. (2017)	9 children with neuromotor disabilities (3-6 years) 9 typically developing children (3-6 years)	To develop and evaluate combined physical and virtual assistive technologies for manipulation and communication tailored for children facing challenges with motor and speech abilities	Robotics	Academic Activities
Molins-Ruano et al. (2018)	19 students with disabilities (16-18 years)	To propose that integrating a physical robot can enhance the accessibility of programming for disabled students	Robotics	Programming Education
Lindsay & Hounsell (2017)	18 children with disabilities (6-13 years)	To comprehend the creation and execution of a tailored robotics curriculum for children and adolescents with disabilities	Robotics	STEM Education
Borgestig et al. (2016)	10 children with severe physical impairments (1-15 years)	To examine changes in eye gaze abilities over time in children with physical limitations utilizing gaze-based assistive technology	Gaze-Based Technology	Academic Activities
Borgestig et al. (2017)	10 children with severe physical impairments without speaking ability (1-15 years)	To determine the influence of gaze-based assistive technology on the range of activities, independent utilization, and achievement of objectives in children with severe physical impairments	Gaze-Based Technology	Academic Activities
Donmez & Cagiltay (2024)	1 student with physical disability (23 years)	To develop an eye-tracking solution for students with physical disabilities by allowing them to access and use personal computers for their educational needs.	Gaze-Based Technology	Academic Activities

Authors	Participants	Purpose of the Study	Technologies Used	Comprehensive Educational Skills and Subject Learning
Karlsson et al. (2019)	5 children with cerebral palsy (3-5 years)	To determine the results of eye-gaze control technology, parental perspectives, and assess the viability of existing measures	Gaze-Based Technology	Academic Activities
Moseley et al. (2021)	2 students with cerebral palsy (16-19 years)	To introduce a research study on two innovative assistive technology-enabled digital assessment methods designed for individuals who are non-verbal and experience severe motor impairments	Gaze-Based Technology	Language Education
Goldberg et al. (2016)	2 students with physical disabilities 3 visually impaired students	To provide assistance to college students experiencing difficulties with mobility	Mobile Technology	Academic Activities
Hayhoe et al. (2015)	18 self-identifying disabled college students	To propose a new model of comprehensive technical resources advocating for the utilization of common mobile technologies and m-learning for students with disabilities	Mobile Technology	Academic Activities
Wiley et al. (2016)	73 students with intellectual and physical disabilities (4-43 years)	To review data gathered during a pilot project trialing the use of a tablet computer for students with intellectual and physical disabilities	Mobile Technology	Communication and Interaction
Atchison et al. (2019)	40 students with mobility disabilities (Undergraduate and graduate students)	To investigate the emergence of inclusive learning environments for disabled students within geoscience field courses	Mobile Technology	Geoscience Education
Bansal et al. (2023)	27 students with locomotor disability 22 students with hearing impaired 1 student with visual disabilities (18-28 years)	To recognize the significance of computer technology in vocational training for disabled people	Computer-based Technology	Academic Activities
Murchland & Parkyn (2010)	5 children with physical disabilities (10-14 years)	To investigate the involvement of physically disabled children in school activities through the utilization of assistive technology	Computer-based Technology	Academic Activities
Mangiatordi (2012)	3 children with cerebral palsy (8-10 years, M=9)	To investigate the interaction between utilizing computers to aid children with disabilities in educational settings and the one-to-one computing model	Computer-based Technology	Communication and Interaction

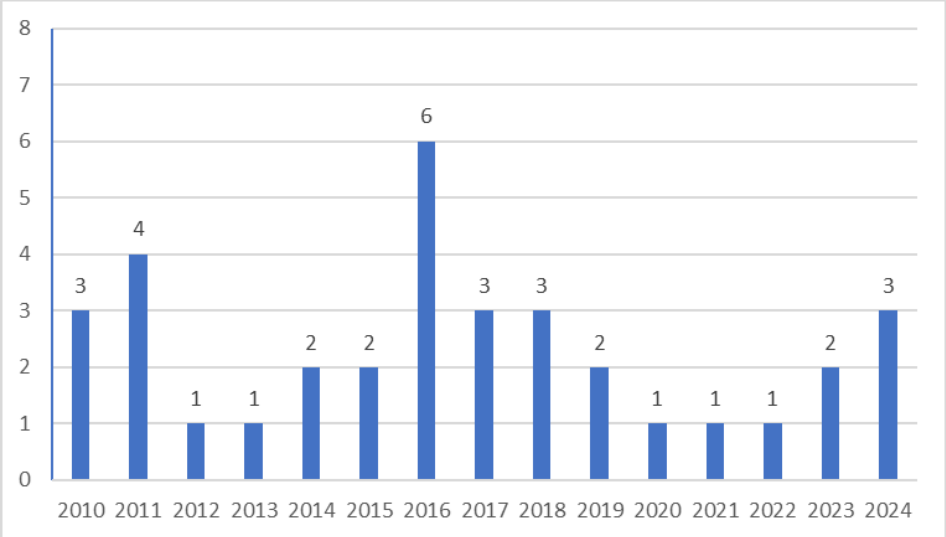
Authors	Participants	Purpose of the Study	Technologies Used	Comprehensive Educational Skills and Subject Learning
da Silva et al. (2018)	4 students with cerebral palsy (14-19 years)	To assess the practicality of an affordable prototype device designed to aid educational tasks for teenagers diagnosed with cerebral palsy	Support Equipment	Communication and Interaction
Förster & Schnell (2024)	11 children with varying cognitive and physical abilities (11-15 years)	To develop accessible digital musical instruments that enhance music-making opportunities and support motor development for students with special education needs	Support Equipment	Motor Skills Enhancement

Overall Findings

This section provides an overview of the selected papers (N=35) from 2010 to 2024 along with descriptive details regarding the chosen articles. It encompasses the annual distribution of studies, the diversity of studies across countries, relevant journals, participant information and study purposes.

Regarding the utilization of educational technology for people with physical disabilities, a discernible pattern emerges, as presented in Figure 2. From 2010 to 2015, research output fluctuated, with one to four studies published annually. An increase in the number of studies became apparent from 2016 onward, indicating an augmented focus by researchers during this period. From 2016 to 2019, a consistent level of interest was sustained. However, starting in 2020, a decline is observed, with only one article per year in 2020, 2021, and 2022. This decline may suggest that while interest persists, the rate of new studies has diminished in recent years. Despite this reduction, a resurgence is evident with two studies in 2023 and three in 2024, suggesting a renewed focus on this area. The recent increase in publications points to potential revitalization, warranting further exploration of the evolving challenges and opportunities in utilizing educational technology for individuals with physical disabilities.

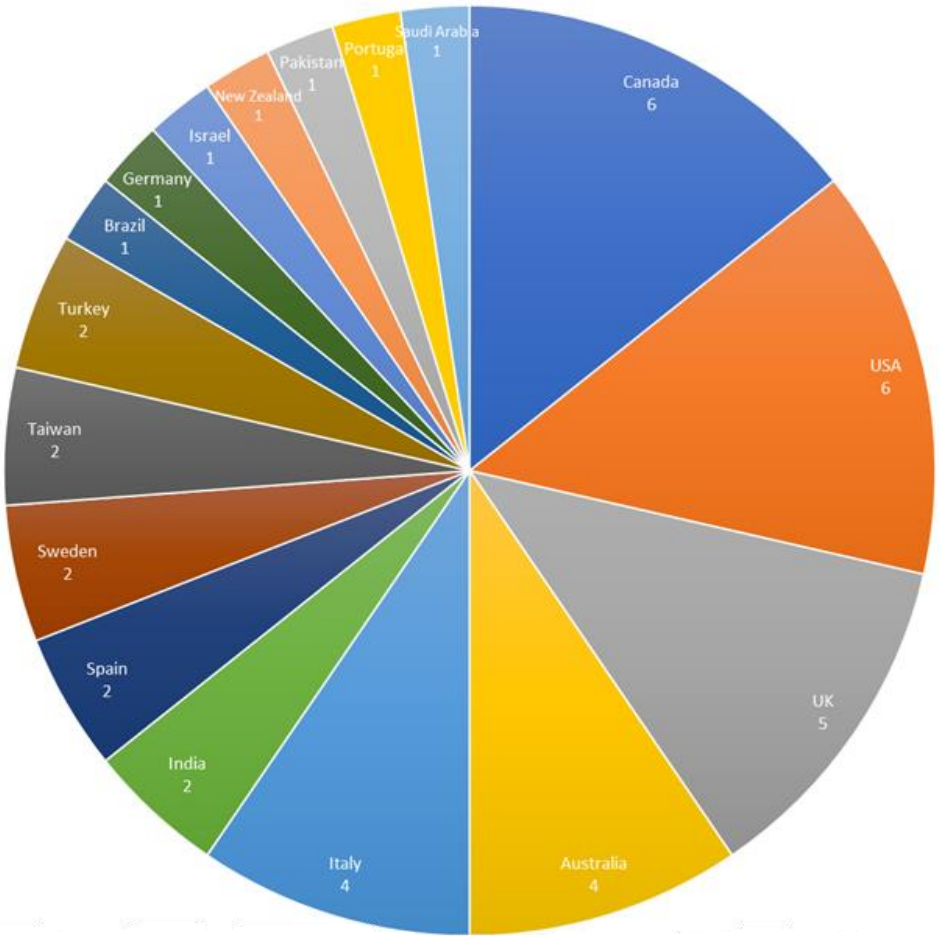
Figure 2
Number of articles by year



The analysis of the geographic distribution of studies (N=35) on the use of educational technology for individuals with physical disabilities reveals a diverse international contribution (see Figure 3). Canada and the United States lead the research efforts, each contributing six studies, underscoring significant investment and focus in this field. The United Kingdom follows closely with five studies, demonstrating a robust commitment to advancing research in this area. Both Australia and Italy contribute four studies each, further highlighting their substantial roles in this domain. Several other countries, including India, Spain, Sweden, Taiwan, and Turkey, each with two studies, have also made notable contributions. Additionally, Brazil, Germany, Israel, New Zealand, Pakistan, Portugal, and Saudi Arabia, each with one study, enrich the global research landscape. This international diversity reflects a widespread recognition of the importance of educational technology in addressing the needs of physically disabled individuals across different regions and educational contexts.

Figure 3

Number of articles by countries



Moreover, the distribution of the selected studies (N=35) across various journals revealed interesting patterns in the scholarly landscape of educational technology for people with physical disabilities. Notably, a concentration of articles was observed in three key journals, namely "Disability and Rehabilitation: Assistive Technology", "Research in Developmental Disabilities", and "Developmental Neurorehabilitation" (Table 3). These journals can be considered as primary platforms for disseminating research findings in this field, collectively hosting 17 of the selected articles. "Disability and Rehabilitation: Assistive Technology" emerged as the most prominent outlet, publishing ten articles, followed by "Research in Developmental Disabilities" with five articles, and "Developmental Neurorehabilitation" with two articles. Additionally, a wide dissemination pattern was evident, as the rest of the articles were distributed across a diverse

range of 18 distinct journals. This diversity underscores the interdisciplinary nature of educational technology for physically disabled individuals, as it finds space in a broad spectrum of academic publications, reflecting the collaborative efforts in various comprehensive educational skills and subject learning.

Table 3
Host journals (N=35)

Journal	# of articles
Disability and Rehabilitation: Assistive Technology	10
Research in Developmental Disabilities	5
Developmental Neurorehabilitation	2
Other Journals (including one article)	18

Besides, the studies included in this review feature a diverse range of participants, primarily focusing on children and young adults with various physical disabilities. The age of participants spans from as young as 1 year to 43 years, with the majority being school-aged children. For instance, several studies involve children with severe orthopedic disabilities, cerebral palsy, and motor impairments, emphasizing the challenges faced by these individuals in educational settings. Additionally, many studies compare groups, including typically developing peers, to assess the unique educational needs and experiences of those with disabilities. The research also encompasses participants with complex communication needs, visual impairments, and cognitive disabilities, highlighting the varied backgrounds and requirements of physically disabled individuals in educational contexts.

Lastly, the primary aim of the studies reviewed was to explore and enhance the use of educational technologies for individuals with physical disabilities, focusing on improving their learning experiences and outcomes. Many studies investigate the effectiveness of specific assistive technologies, such as eye-gaze control systems, speech-generating devices, and virtual learning environments, to facilitate communication, engagement, and independent learning among disabled students. Others aim to assess the usability and accessibility of online resources and tools, particularly in distance learning settings. Additionally, some studies seek to understand the broader implications of integrating technology into educational practices, including fostering social connections, improving academic performance, and promoting the overall well-being of physically disabled individuals. Overall, the research highlights a commitment to developing tailored educational solutions that address the unique challenges faced by these learners.

Use of Educational Technology for Physically Disabled People

In recent years, educational technology has emerged as a transformative force, particularly in addressing the unique challenges faced by physically disabled individuals. This systematic review examines the diverse applications of educational technology in enhancing access, engagement, and learning outcomes across comprehensive educational skills and subject learning for individuals with physical disabilities.

The findings are categorized based on the employed technology, including digital platforms, adaptive input devices, robotics, gaze-based technology, mobile technology, computer-based technology, and support equipment. Among the various technologies discussed in these studies, digital platforms (N=8) were the most frequently addressed, highlighting the role of online platforms in catering to the educational needs of this demographic. Similarly, adaptive input devices (N=7) emerged as a prevalent focus, emphasizing the significance of tailored input mechanisms for individuals with physical disabilities. Robotics (N=6) also featured prominently, with studies showcasing the integration of robotic systems to enhance educational experiences for physically disabled individuals. Gaze-based technology (N=5) and mobile technology (N=4) were other noteworthy technologies explored in the reviewed articles, emphasizing the

adaptability of these tools to address specific educational challenges. Furthermore, computer-based technology (N=3) and support equipment (N=2) were also acknowledged, shedding light on the diverse range of technologies employed for the educational empowerment of individuals with physical disabilities.

The categorization of studies in comprehensive educational skills and subject learning reflects specific educational interventions aimed at individuals with physical disabilities. Each category encompasses distinct aspects of learning and skill development, allowing for a nuanced understanding of the educational technologies utilized.

Motor skills enhancement includes studies that focus on improving physical abilities and coordination through various technologies, such as digital platforms and adaptive input devices. Research in this category explores the impact of training programs and tools designed to enhance motor skills in children with physical disabilities, providing insights into effective methodologies.

Academic activities comprise a broad range of educational tasks that promote knowledge acquisition across subjects like mathematics, science, and language. Studies in this category highlight the use of digital platforms and robotics to facilitate learning and engagement among students with physical disabilities. These interventions aim to create inclusive educational experiences, allowing participants to participate actively in their academic journeys.

Communication and interaction emphasize interventions designed to foster effective communication and social interaction skills, which are crucial for personal development. Research in this area investigates how technologies, such as gaze-based and mobile technologies, can empower students with disabilities to communicate and engage more effectively with their peers and educators.

Distance learning focuses on educational programs that enable learning from remote locations, ensuring accessibility for students with physical disabilities. Studies investigate the usability and challenges of online resources and courses, emphasizing the importance of inclusive design in distance education.

Categories such as mathematics education, science education, and STEM education integrate specific subject areas, exploring the role of technology in enhancing educational outcomes in these fields. Robotics, for instance, is utilized to facilitate interactive learning experiences, encouraging creativity and problem-solving skills among students with disabilities.

Language education is another vital category that emphasizes activities centered on language acquisition and literacy. Research in this area seeks to enhance communication skills and promote language learning through innovative technologies.

The overlap of academic activities across different subjects indicates a common theme of fostering engagement and learning in various educational skills and subject learning. By providing a structured categorization of studies, the review ensures that the distinctions among categories are clear and meaningful, offering a comprehensive understanding of the educational interventions discussed throughout the review.

Digital platforms

Eight studies out of 35 were conducted to investigate digital platforms as the used technology among those with physical disabilities: motor skills enhancement (N=2), academic activities (N=1), communication and interaction (N=1), distance learning (N=1), mathematics education (N=1), science education (N=1), and STEM education (N=1) (Batanero-Ochaíta et al., 2023; Ersoy & Güneyli, 2016; Gregg et al., 2016; Inman et al., 2011; Khamparia et al., 2020; Kirshner et al., 2011; Majeed, 2018; Sghaier et al., 2022).

Inman et al. (2011) and Kirshner et al. (2011) both investigated the use of digital platforms for motor skills enhancement. Inman et al. (2011) focused on the impact of a technology-based training program on the education of children with severe orthopedic disabilities, while Kirshner

et al. (2011) assessed the usability of the Meal-Maker and its ability to distinguish performance between typically developed children and children with cerebral palsy.

Batanero-Ochaíta et al. (2023) contribute a significant investigation into the assessment of interaction duration among students facing vision and motor challenges when utilizing computers and e-learning technologies. Centered on digital platforms within the academic activities, their research endeavors to examine the average time expended by students with disabilities on interacting with questionnaires, a prevalent e-learning tool, in comparison to students without disabilities.

Ersoy and Güneyli (2016) explored the use of digital platforms for communication and interaction among orthopedically impaired learners. Their study aimed to discuss how these learners utilize social networking for leisure, education, and personal development.

Majeed (2018) addressed digital platforms in the context of distance learning, exploring issues and barriers to the usability and accessibility of Open Education Resources and MOOCs for physically disabled students. Sghaier et al. (2022) designed a virtual learning environment using Open Simulator for mathematics education, aiming to create a 3D virtual environment that simulates real-world scenarios for students with disabilities. Khamparia et al. (2020) integrated digital platforms into science education, employing microworld game-based learning to enhance learning performance and problem-solving for students with special needs.

Lastly, Gregg et al. (2016) delved into digital platforms within the context of STEM education, providing electronic mentoring to university students with disabilities to maintain their education.

These studies collectively showcase the diverse applications of digital platforms, emphasizing their role in enhancing motor skills, supporting academic activities, facilitating communication, supporting distance learning, and enriching STEM, mathematics, and science education for individuals with physical disabilities. The findings underscore the potential of digital platforms to create inclusive and accessible learning environments for diverse educational skills and subject learning.

Adaptive input devices

Seven studies out of 35 were conducted to investigate adaptive input devices as the used technology among those with physical disabilities: academic activities (N=3), communication and interaction (N=2), motor skills enhancement (N=1), and writing skills (N=1) (Chang & Shih, 2014; Lancioni et al., 2011; Shih et al., 2010; Standen et al., 2011; Stasolla et al., 2015; Stasolla et al., 2013; Stoner et al., 2010). Collectively, these studies contribute valuable insights into the application of adaptive input devices across diverse educational skills and subject learning.

Shih et al. (2010) and Standen et al. (2011) emphasized the role of adaptive input devices in improving academic activities, specifically computer pointing efficiency and switch-controlled software interaction, for students with physical disabilities. Besides, Stasolla et al. (2015) aimed to improve academic participation for children with cerebral palsy by introducing a new configuration of assistive technology. This approach enabled children with severe motor impairments to increase their engagement in classroom activities.

Stasolla et al. (2013) also explored communication and interaction by using adaptive input devices to foster choice-making behaviors. Stoner et al. (2010) addressed communication and interaction through the implementation of augmentative and alternative communication in an inclusive educational setting for a student with cerebral palsy.

Furthermore, Chang and Shih (2014) focused on improving fine motor activities for individuals with cerebral palsy through a response-stimulation strategy using a standard keyboard. Lancioni et al. (2011) explored the use of microswitch and keyboard-emulator technology to facilitate writing skills for individuals with extensive motor disabilities.

These studies collectively highlight the versatility of adaptive input devices, showcasing their potential to enhance motor skills, communication, academic activities, and writing skills for individuals with physical disabilities in educational settings. The findings underscore the importance of tailored technological interventions to address specific educational skills and cater to the unique needs of diverse participants.

Robotics

Six studies out of 35 were conducted to investigate robotics as the used technology among those with physical disabilities: mathematics education (N=3), academic activities (N=1), programming education (N=1), and STEM education (N=1) (Adams & Cook, 2014, 2016; Encarnação et al., 2017; Esquivel et al., 2024; Lindsay & Hounsell, 2017; Molins-Ruano et al., 2018).

Adams and Cook (2014) examined the influence of employing a robot controlled with a speech-generating device on demonstrating knowledge in mathematics measurement activities. Building on this, Adams and Cook (2016) further explored mathematics education, focusing on hands-on academic activities for a child having complex communication needs by using a Lego robot operated through a speech-generating device. Similarly, Esquivel et al. (2024) investigated the environmental factors that enable students with physical disabilities to effectively utilize robots and computers during mathematics lessons.

Encarnação et al. (2017) developed assistive robots to foster inclusive education, allowing children with motor and speech impairments to manipulate educational materials by commanding a robot equipped with a gripper. The research suggested that although the developed technologies facilitate the involvement of children with disabilities in academic tasks, achieving complete inclusion might necessitate supplementary approaches. Moreover, Molins-Ruano et al. (2018) explored the use of robotics in programming education, suggesting that employing a physical robot can increase the accessibility of programming for students with disabilities. Lastly, Lindsay and Hounsell (2017) implemented a robotics initiative to boost engagement and enthusiasm in STEM subjects among children with disabilities. The preliminary investigation proposed that involving young individuals with disabilities in robotics activities can augment both learning outcomes and interest in STEM disciplines.

These studies collectively highlight the diverse applications of robotics in enhancing mathematics, academic activities, programming, and STEM education for people with physical disabilities. The findings underscore the potential of robotics to offer innovative and inclusive educational experiences, fostering engagement and skill development in various educational skills and subject learning.

Gaze-based technology

Five papers out of 35 were conducted to investigate gaze-based technology as the used technology among those with physical disabilities, focusing on academic activities (N=4) and language education (N=1) (Borgestig et al., 2016, 2017; Karlsson et al., 2019; Moseley et al., 2021).

Gaze-based technology emerges as a powerful tool for facilitating academic activities for individuals with physical disabilities. Borgestig et al. (2016) conducted a longitudinal study on eye gaze performance for children with severe physical impairments. The findings suggested that continuous use of gaze-based technology can lead to improved academic engagement and skill development for physically disabled students. In a subsequent study, Borgestig et al. (2017) explored the impact of gaze-based assistive technology on daily activities for children with severe physical impairments. The study revealed that the intervention effectively guided parents and teachers to support children in performing activities with assistive technology, showcasing the potential of gaze-based technology in fostering academic engagement. Furthermore, Donmez and Cagiltay (2024) developed an eye-tracking solution for a student with a physical disability, enabling access to and use of personal computers for educational purposes solely through eye movements, thereby eliminating the need for physical interaction.

Karlsson et al. (2019) explored gaze-based technology outcomes and feasibility in academic activities involving children with cerebral palsy. Moseley et al. (2021) conducted a pilot study using accessible digital assessments based on gaze-based technology for students with cerebral palsy. The study focused on language education, indicating the adaptability of gaze-based technology to diverse educational skills for individuals with physical disabilities.

Collectively, these studies underscore the significance of gaze-based technology in enhancing academic activities and language education for individuals with physical disabilities. The findings emphasize the potential of gaze-based assistive technology to support diverse learning outcomes and contribute to the overall well-being and communication capabilities of individuals with severe physical impairments.

Mobile technology

Four papers out of 35 were identified to investigate mobile technology as the utilized technology among individuals with physical disabilities, focusing on academic activities (N=2), communication and interaction (N=1), and geoscience education (N=1) (Atchison et al., 2019; Goldberg et al., 2016; Hayhoe et al., 2015; Wiley et al., 2016).

Goldberg et al. (2016) emphasized the transformative potential of mobile technology in supporting students with mobility challenges, mainly targeting academic activities. Preliminary results suggested increased participation and potential benefits for students with physical disabilities. Hayhoe et al. (2015) provided insights into the role of mobile technology in making educational resources more accessible for physically disabled students to enhance their academic activities, contributing to the development of inclusive technical capital beyond traditional allowances.

Wiley et al. (2016) explored the use of mobile technology for communication and interaction among students with intellectual and physical disabilities, emphasizing the need for assistive tools. Atchison et al. (2019) delved into geoscience education, investigating the emergence of inclusive learning communities in field courses for students with mobility disabilities.

These studies collectively highlight the multifaceted role of mobile technology in addressing the diverse educational needs of people with physical disabilities. From supporting academic activities to fostering inclusive learning environments, the findings underscore the potential of mobile technology to enhance accessibility and promote active participation in various educational skills and subject learning.

Computer-based technology and support equipment

Three studies out of 35 were identified to investigate computer-based technology as the utilized technology for individuals with physical disabilities, focusing on academic activities (N=2) and communication and interaction (N=1) (Bansal et al., 2023; Mangiatordi, 2012; Murchland & Parkyn, 2010). Additionally, two studies examined the use of support equipment specifically in the contexts of communication and interaction (N=1) and motor skills enhancement (N=1) (da Silva et al., 2018; Förster & Schnell, 2024).

Bansal et al. (2023) contribute to a recent study addressing the significance of computer devices in vocational studies for individuals with disabilities. In this exploration of computer-based technology within the academic activities, the study aims to identify the importance of computers in skill training for individuals with disabilities. Murchland and Parkyn (2010) investigated the experiences of children with physical disabilities utilizing computer-based technology for participation in schoolwork. Their focus primarily centered on academic activities and the impact of technology on the inclusion of these students in educational processes. Besides, Mangiatordi (2012) conducted a study exploring the intersection between the use of computers to support children with disabilities at school and the implementation of the one-to-one computing model, emphasizing communication and interaction.

Furthermore, da Silva et al. (2018) delved into support equipment, examining the practicality of an inexpensive prototype device intended to facilitate educational tasks for teenagers with cerebral palsy, particularly concentrating on communication and interaction aspects. In addition, Förster and Schnell (2024) developed accessible digital musical instruments aimed at enhancing music-making opportunities and supporting motor development for children with varying cognitive and physical abilities.

These studies underscore the significance of computer-based technology and support equipment in enhancing communication, interaction, and academic engagement for people with physical disabilities. The findings suggest the potential of these technologies to contribute to inclusive and supportive learning environments, addressing diverse educational skills and participant needs.

Summary

The systematic review of 35 articles (2010–2024) on educational technology for individuals with physical disabilities reveals diverse interventions. Eight studies emphasized digital platforms, demonstrating versatility in areas such as motor skills enhancement, academic activities, communication, distance learning, mathematics, science, and STEM education. Adaptive input devices, explored in seven studies, showed effectiveness in enhancing motor skills, communication, academic activities, and writing skills. Robotics, investigated in six studies, showcased innovative applications in mathematics, academics, programming, and STEM education. Gaze-based technology, studied in five instances, emerged as a potent tool for academic activities and language education. Mobile technology, explored in four instances, played a multifaceted role in supporting academic activities, communication, and geoscience education. Additionally, computer-based technology, explored in three studies, was utilized for academic activities as well as communication and interaction, while support equipment, examined in two studies, focused on communication and interaction as well as motor skills enhancement. The findings underscore the potential of educational technology to empower physically disabled individuals across diverse educational skills and subject learning, emphasizing the need for collaborative efforts to create adaptive, accessible, and effective learning environments.

CONCLUSION

This comprehensive review of educational technology applications for physically disabled people revealed a dynamic environment with a growing emphasis on inclusivity in education and technological diversity. Over the years covered in this review, ranging from 2010 to 2024, there has been a substantial increase in research publications focusing on leveraging various technologies to address the educational needs of physically disabled students, with a notable rise in the number of studies published annually, particularly from 2016 onward. This study demonstrates educational technology's diverse and transformative applications for physically disabled individuals. From digital platforms to adaptive input devices, robotics, gaze-based technology, mobile technology, computer-based technology, and support equipment, these technologies offer unique opportunities to enhance access, engagement, and learning outcomes across comprehensive educational skills and subject learning. The studies reviewed emphasize the importance of integrating these technologies into educational practices to create inclusive and accessible environments for physically disabled students (Kumar et al., 2024). As educational technology continues to evolve, its potential to further improve the educational experiences of physically disabled individuals remains promising, fostering their full participation and integration into diverse learning contexts (Alvarado et al., 2023). Each technology showcased distinct capabilities in addressing various aspects of comprehensive educational skills and subject learning, weaving together a diverse array of possibilities for individuals with physical disabilities. This diversity not only highlights the rapid evolution of educational technology but also underscores the importance of tailoring interventions to meet the specific needs of physically disabled students.

Moreover, the review highlighted a wide range of educational skills and subject learning addressed, including mathematics education, geoscience education, STEM education, programming education, language education, and distance learning. The breadth of coverage signifies a comprehensive effort to ensure that individuals with physical disabilities can access education across various disciplines and learning contexts. This aligns with the broader goal of fostering inclusivity and diversity in educational settings (Chiţu et al., 2023; Shivani et al., 2024).

The age range of participants in the reviewed studies also varied, encompassing children as young as one year old to young adults up to the age of 43. This diversity in age groups emphasizes the applicability of educational technology across different stages of life for individuals with physical disabilities. It suggests that the benefits of technology in education can be realized not only during formative years but also in higher education and beyond (Passey, 2018).

Furthermore, the studies revealed a consistent effort to include participants with various physical disabilities, such as cerebral palsy, neuromotor disabilities, and orthopedic disabilities. This inclusivity is crucial for ensuring that educational technology interventions are designed to cater to a broad spectrum of needs and challenges faced by individuals with physical disabilities. It acknowledges the heterogeneity within the disabled population and strives to provide tailored solutions.

In terms of outcomes, the findings indicate positive impacts on academic activities, motor skills enhancement, communication and interaction, and overall engagement in the learning process for individuals with physical disabilities. The technological interventions not only address specific educational goals but also contribute to breaking down barriers and fostering a more inclusive educational environment.

In conclusion, the systematic review illuminates the transformative potential of educational technology in enhancing the educational experiences of individuals with physical disabilities. The technological landscape has evolved significantly over the years, offering many options to cater to diverse needs in various educational skills and subject learning. The inclusive approach, diverse participant profiles, and positive educational outcomes observed in the reviewed studies collectively emphasize the importance of continued research and implementation of educational technology for individuals with physical disabilities. It is essential to build upon these insights, fostering collaboration between educators, technologists, and researchers to create adaptive, accessible, and effective educational technologies that empower physically disabled people in their pursuit of knowledge and skill development.

Recommendations for Future Practices

The exploration of educational technology for individuals with physical disabilities in this study provides valuable insights for future practices. The findings across various technologies, including adaptive input devices, digital platforms, robotics, gaze-based technology, mobile technology, computer-based technology, and support equipment, offer a comprehensive understanding of their applications in enhancing motor skills, communication, academic activities, and more. These insights can guide prospective researchers in tailoring interventions to specific educational skills and participant needs. Additionally, the study underscores the interdisciplinary nature of educational technology for individuals with physical disabilities, highlighting the collaborative efforts across diverse domains. Future researchers and practitioners can leverage these findings to inform the design of adaptive, accessible, and effective learning environments for individuals with physical disabilities. Considering the diversity of technologies explored, there is an opportunity for further research to delve into specific technologies, such as adaptive input devices or robotics, and their nuanced applications within educational contexts for individuals with physical disabilities. Finally, expanding the focus beyond children to include adult learners would contribute to a more comprehensive understanding of the role of educational technology in empowering individuals across the lifespan.

Limitations of the Study

Despite the comprehensive approach of this systematic literature review, several limitations must be acknowledged. Firstly, the inclusion criteria were restricted to studies published in English, potentially excluding relevant research in other languages that could have provided additional insights. Secondly, the review only considered publications from specific databases such as Web of Science, Scopus, ERIC, EBSCOhost, Science Direct, and Education Source, which might have limited the scope of the literature surveyed. Lastly, the focus on educational technology for physically disabled students means that findings may not be generalizable to other types of disabilities or educational contexts. These limitations suggest the need for ongoing research to continually update and expand our understanding of the role of educational technology in supporting physically disabled students.

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Statement of Contribution Rate

The entire process of the research was conducted by the sole author of the article.

Declaration of Conflict of Interest

As the author of this research, I declare that I have no conflicts of interest.

Statement of Publication Ethics

All the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed in the entire process from the planning, implementation, data collection to the analysis of the data. None of the actions specified under the second section of the Directive, "Scientific Research and Publication Ethics Actions" have been carried out.

During the writing process of this study, scientific, ethical and citation rules were followed; no falsification was made on the collected data and this study was not sent to any other academic media for evaluation.

Research ethics committee approval information

Since this study is a systematic literature review, it does not fall under the category of studies requiring Ethical Committee Approval. Therefore, Ethical Committee Approval has not been declared.

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GENİŞLETİLMİŞ ÖZ

Giriş

Eğitim teknolojisi, eğitim araştırmacılarının medya ve dijital kaynakları geliştirip uygulamalarını sağlayarak öğrencilerin öğrenme deneyimlerini artırmasına olanak tanır. Yenilikçi teknolojilerin eğitim alanında kullanımının yaygın olmasına rağmen, özel eğitim alanında yapılan araştırmalara bakıldığında bu teknolojilerden yeterince yararlanılamadığı ve daha fazla yararlanılmasının mümkün olduğu görülmektedir. Özellikle fiziksel engelli öğrenciler, eğitimlerini sürdürmeye çalışırken kampüste erişilebilirlik ve bağımsızlık konularında ciddi sorunlarla karşılaşmaktadır. Bu nedenle, çeşitli özel gereksinimlere sahip öğrencilerin eğitiminde bilgi ve iletişim teknolojileri (BİT) ve yardımcı teknolojilerin benimsenmesi önemlidir (Bouck & Long, 2021; Donmez, 2023; Ouherrou et al., 2019). Teknolojinin öneminin her geçen gün arttığı günümüz dijital çağında, çevrim içi öğrenmede önemli bir dönüşüm yaşanmakta olup bu dönüşüm, fiziksel engelli öğrenciler de dahil olmak üzere tüm öğrencilere daha fazla esneklik ve erişilebilirlik sağlayabilmektedir (Stambekova et al., 2022). Bu bağlamda, engelli bireylerin eğitimi için erişilebilir çevrim içi öğrenim sistemlerinin kullanılması önemli bir fırsat olarak görülebilir. Modern eğitimin temellerinden biri olan erişilebilirlik, sadece eşit fırsatlar sağlamak değil, aynı zamanda bireylerin potansiyellerini gerçekleştirmelerine yardımcı olmak anlamına da gelmektedir. Sonuç olarak, fiziksel engelli bireylerin eğitiminde eğitim teknolojisinin ve yardımcı teknolojilerin kullanımı önemli bir rol oynamaktadır.

Yöntem

Fiziksel engelli öğrenciler için eğitim teknolojilerinin kullanımının önemini ortaya koyan bu çalışmada, 2010 ila 2024 yılları arasında yapılan ilgili araştırmalar, belirli kriterlere göre incelenerek sistematik bir literatür taraması yapılmıştır. Bu sistematik literatür taramasında Web of Science (WoS), Scopus, Education Resources Information Center (ERIC), EBSCOhost, Science Direct ve Education Source gibi alanın önde gelen elektronik veri tabanları kullanılmıştır.

Bulgular

Bu çalışmada, eğitim teknolojisi, özellikle fiziksel engelli bireylerin karşılaştığı zorlukların üstesinden gelmede dönüştürücü bir güç olarak ortaya çıkmıştır. 2010 ila 2024 yılları arasında yapılan araştırmaları inceleyen bu sistematik literatür taramasında, eğitim teknolojisinin çeşitli alanlardaki çeşitli uygulamalarını kapsayan 35 araştırma incelenmiştir. İncelenen bu çalışmaların yayınlandığı dergilere göre dağılımı incelendiğinde, çalışmaların çoğunluğunun üç ana dergide yoğunlaşmasına rağmen geniş bir çeşitlilik görülmektedir. Çalışmaların yoğunlaştığı bu üç dergi sırasıyla "Disability and Rehabilitation: Assistive Technology", "Research in Developmental Disabilities" ve "Developmental Neurorehabilitation" dergileridir. Ülkelere göre dağılıma bakıldığında ise yine geniş bir çeşitlilik görülmektedir. En çok katkı sağlayan ülkeler olarak Kanada ve Amerika Birleşik Devletleri ortaya çıkmakta ve bunu Birleşik Krallık takip etmektedir. Bu üç ülke de dahil olmak üzere toplam 17 farklı ülkeden araştırmacıların çalışmaların dahil edildiği ve bu ülkeler arasında iki çalışma ile Türkiye'nin de yer aldığı saptanmıştır. Bu araştırma kapsamında incelenen çalışmalar, dijital platformlar, adaptif bilgisayar giriş cihazları, robotlar, göz hareketleri takip teknolojisi, mobil teknolojiler, bilgisayar tabanlı teknolojiler ve destek ekipmanları olarak kategorize edilerek sunulmuştur.

Tartışma ve Sonuç

Bu çalışma, fiziksel engelli bireyler için eğitim teknolojisinin çeşitli uygulamalarını ortaya koymaktadır. Çalışma kapsamında incelenen araştırmalar, fiziksel engelli öğrencilere erişilebilir eğitim ortamları oluşturulmasında teknolojinin önemini vurgulamaktadırlar. Bu çalışma kapsamında incelenen araştırmalar incelendiğinde, fiziksel engelli bireylere yönelik eğitim teknolojisi kullanımında dijital platformlar ön plana çıkmaktadır. Dijital platformların, motor becerilerin geliştirilmesi, akademik etkinlikler, iletişim ve etkileşim, uzaktan öğrenme, matematik eğitimi, fen eğitimi ve STEM eğitimi gibi eğitimin farklı alanlarında kullanıldığı görülmüştür

(Batanero-Ochaíta et al., 2023; Ersoy & Güneyli, 2016; Gregg et al., 2016; Inman et al., 2011; Khamparia et al., 2020; Kirshner et al., 2011; Majeed, 2018; Sghaier et al., 2022). Dijital platformları, adaptif bilgisayar giriş cihazları takip etmektedir. Bu teknolojinin eğitimde kullanım alanları ise akademik etkinlikler, iletişim ve etkileşim, motor becerilerin geliştirilmesi ve yazma becerileri olarak ortaya çıkmaktadır (Chang & Shih, 2014; Lancioni et al., 2011; Shih et al., 2010; Standen et al., 2011; Stasolla et al., 2015; Stasolla et al., 2013; Stoner et al., 2010). Kullanımı öne çıkan bir diğer teknoloji ise robotik teknolojisidir ve incelenen araştırmalardan bu teknolojinin matematik eğitimi, akademik etkinlikler, programlama eğitimi ve STEM eğitimi gibi konuların pekiştirilmesinde kullanıldığı görülmüştür (Adams & Cook, 2014, 2016; Encarnação et al., 2017; Esquivel et al., 2024; Lindsay & Hounsell, 2017; Molins-Ruano et al., 2018). Bu teknolojilere ek olarak göz hareketleri takip teknolojisinin akademik etkinlikler ve dil eğitimi konularında (Borgestig et al., 2016, 2017; Donmez & Cagiltay, 2024; Karlsson et al., 2019; Moseley et al., 2021), mobil teknolojilerin akademik etkinlikler, iletişim ve etkileşim, ve jeo-bilim eğitimi konularında (Atchison et al., 2019; Goldberg et al., 2016; Hayhoe et al., 2015; Wiley et al., 2016), bilgisayar tabanlı teknolojilerin akademik etkinlikler, iletişim ve etkileşim konularında (Bansal et al., 2023; Mangiatordi, 2012; Murchland & Parkyn, 2010) ve destek ekipmanlarının ise iletişim ve etkileşim ve motor becerilerin geliştirilmesi konularında (da Silva et al., 2018; Förster & Schnell, 2024) yapılan çalışmalarda kullanıldığı görülmüştür. Eğitim teknolojisinin gelişimi, fiziksel engelli bireylerin eğitim deneyimlerini daha da iyileştirme potansiyeline sahip olması bakımından umut vericidir. Her bir teknoloji, farklı eğitim alanlarının farklı yönlerine hizmet etmekte ve bu teknolojiler fiziksel engelli bireyler için zengin bir yelpaze sunmaktadır.