

Exclusion Within Inclusion: Dissenting Applicability of AI in Inclusive Education: Case of Zimbabwe Open University

Mlambo Nefasi¹, Daisy Chipfunde¹

¹Zimbabwe Open University <https://orcid.org/0009-0009-1016-9786>

Corresponding Author's email: mlambon@zou.ac.zw

¹Zimbabwe Open University

<https://orcid.org/009-009-2437-641X>

Abstract

The study sought to explore impact of ICT on PWDs. This paper provides a deeper exploration of both negative and positive attributes presented by the internet and ICT for the full participation of persons with disabilities. Whilst most scholars say accessible ICT can level the playing field for persons with disabilities across life domains including education, employment, e-governance and civic participation, financial inclusion and disaster management, this will always be a pipedream in most developing nations. Participants drawn from students with varying disabilities, student advisors and student representatives were purposively sampled. Data was collected using in depth interviews and semi structured questioners. The results showed that Exclusion and marginalisation of people living with disabilities is a fundament human rights issue. It straddles several dimensions like social, economic social, economic, political, ecological, governance as well as technological. It can be concluded that the conspired growth of ICT use in both academic and social life does not bring the same benefits to both PWDS and the mainstream population. From this, it is highly recommended that the government and other stakeholders put combined efforts to design systems which can cater for various forms of disabilities as well as taking cognisance of other variations like commodities. Additionally, policy makers and industrialists should incorporate input from people living with disabilities before implementing programs.

Key words: AI, exclusion, inclusion, PWDs

Introduction

In a rapidly transforming digital environment information and Communication Technologies (ICTs) and Artificial Intelligence (AI) have a great potential to change many spheres of life, comprising education, employment social participation. It is salient to note that, for Persons with Disabilities (PWDs), accessibility to ICTs and AI tools could be crucial in fostering inclusion across various domains. Scholars have alluded that Artificial intelligence is pivotal to the improvement of mobility, healthcare diagnostics and cognitive support, thus enabling personalised and adaptive solutions for users (Joshi et al., 2025). For people with Disabilities, technologies can provide easy access to information, enhancing communication, facilitating independent living and eventually promoting autonomy and the quality of life. However, the promise of inclusive technology is not without its challenges. One of the major concerns is the potential for exclusion within inclusion, where the benefits of ICTs and AI are not equally distributed among PWDs and the mainstream population. This is particularly evident in developing nations and this manifests through limited resources, inadequate infrastructure and societal attitudes and these create barriers to access and effective utilisation of these technologies. This is substantiated with a study by Mazuruse and Nyagadza (2022) who attested that, in Zimbabwe highlights that a lack of support from society, negative attitudes from teachers, incapacitated schools and inadequate physical resources are major challenges in implementing inclusive education. Even with advancements in assistive technologies, accessibility barriers, societal perceptions and resource shortages continue to hinder the effective implementation of inclusive technology initiatives. Moreover, the development and

deployment of AI systems can inadvertently perpetuate existing biases and create new forms of discrimination against PWDs. In this vein, algorithmic bias, lack of diversity in training data and the absence of accessibility considerations in AI design can lead to discriminatory outcomes in areas such as employment, healthcare and social services. This is supported by scholars such as Tilmes (2022) and Edenberg and Wood (2023) note that it is crucial to rigorously assess and mitigate bias, employ techniques such as data preprocessing, algorithm auditing and fairness-aware algorithms. It is, therefore, crucial to address these challenges and ensure that AI systems are designed and implemented in a way that promotes inclusivity, equity and respect for the rights of PWDs. In the Zimbabwean context, the scenario is worsened by a wide range of socio-economic and political factors. While the Amended Education Act of 2020 mandates inclusive education for all students, including those with disabilities, the reality on the ground often falls short of this ideal. Hence Makaya (2022) propounds that lack of teacher training and limited resources in schools were leading barriers to the implementation of inclusive education practices. Therefore, a strong approach is needed to address the challenges of exclusion within inclusion and ensure that PWDs in Zimbabwe can fully participate in and benefit from the opportunities presented by Information and Communication Technology and Artificial Intelligence.

In recent years, the importance of inclusive education has gained significant attention worldwide, particularly for Persons with Disabilities (PWDs). Despite advancements in Information and Communication Technologies (ICT) and Artificial Intelligence (AI), many PWDs in Zimbabwe continue to face substantial barriers to accessing quality education. According to the World Health Organisation (2024), approximately 15% of the global population lives with some form of disability, yet educational opportunities for these individuals remain severely limited, especially in developing countries like Zimbabwe. The educational landscape in Zimbabwe is characterised by a lack of resources, inadequate infrastructure and limited access to assistive technologies. A report by the Ministry of Education (2020) indicated that many schools lack the necessary tools and training to support students with disabilities effectively. This is corroborated by research from Mazuruse et al. (2021), which highlights that negative societal attitudes and insufficient teacher training further exacerbate the challenges faced by PWDs.

Moreover, the digital divide remains a pressing issue. A study by Afolayan et al. (2022) found that only 30% of students with disabilities reported having regular access to the internet or digital learning tools. This lack of access not only limits their ability to participate in educational activities but also hinders their overall academic performance and future opportunities. As highlighted by Ainscow (2020), without proper support and resources, PWDs are at a higher risk of exclusion from educational settings, leading to increased inequalities and social marginalisation.

Theoretical Framework

Understanding the challenges and opportunities faced by Persons with Disabilities (PWDs) in accessing Information and Communication Technologies (ICT) and Artificial Intelligence (AI) in education requires a strong theoretical foundation. Two relevant theories that can help explain the dynamics of inclusion and exclusion in this context are the Social Model of Disability and the Technology Acceptance Model. These theories provide insights into how societal attitudes and technological perceptions shape the educational experiences of PWDs. The Social Model of Disability posits that disability is not an inherent trait but rather a result of societal barriers that prevent individuals from participating fully in society. According to Oliver (1996), this model emphasises the need to address the environmental factors that

contribute to the marginalisation of PWDs. Instead of viewing disability solely as a medical issue, the Social Model encourages a broader understanding of the societal attitudes and structures that create barriers to inclusion. In the context of this study, the Social Model of Disability is highly relevant. It highlights how negative attitudes and inadequate infrastructure can hinder the effective use of ICT and AI for PWDs. For instance, as noted by Makaya (2022), many educators may not be aware of the potential benefits of assistive technologies, leading to a lack of support for students with disabilities. By applying this model, we can see that improving accessibility to technology and fostering positive attitudes are crucial steps in promoting inclusion in educational settings.

The Technology Acceptance Model (TAM) focuses on how users come to accept and use new technologies. Developed by Davis (1989), this model suggests that perceived ease of use and perceived usefulness significantly influence users' intentions to utilise technology. If users believe that a technology is easy to use and beneficial, they are more likely to adopt it.

In relation to this study, the Technology Acceptance Model helps explain the perceptions of both students with disabilities and educators regarding assistive technologies. If students perceive these tools as beneficial for their learning, they are more likely to engage with them. However, as highlighted by Edenberg and Wood (2023), many educators may lack training on how to implement these technologies effectively, which can lead to a perception that they are not useful. By focusing on improving the ease of use and demonstrating the benefits of assistive technologies, schools can help foster a more inclusive environment.

The impact of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) on the educational experiences of Persons with Disabilities (PWDs) has drawn increasing attention in recent years. Scholars recognise that access to ICT and AI can significantly enhance the learning opportunities for PWDs, helping them overcome traditional barriers in education. For instance, research by Joshi et al. (2025) highlights how AI tools can tailor educational content to meet individual needs, providing personalised learning experiences that enhance understanding and retention. This adaptability is particularly crucial for students with disabilities, as it allows them to engage with materials that are more suited to their unique learning styles.

Moreover, the role of assistive technologies in promoting inclusivity cannot be understated. According to Makaya (2022), the integration of assistive devices in classrooms has shown promise in improving the academic performance of students with disabilities. These technologies can facilitate better communication, enable easier access to information and support independent learning. However, despite the potential benefits, many PWDs still face significant challenges in accessing these technologies. Mazuruse and Nyagadza (2022) emphasise that a lack of adequate resources, trained personnel and supportive environments are major hurdles. They note that even when assistive technologies are available, their effectiveness is often compromised by societal attitudes and inadequate infrastructure in educational settings.

Furthermore, the digital divide remains a persistent issue. As Tilmes (2022) points out, the rapid advancement of technology can unintentionally widen the gap between those who have access to ICT and AI and those who do not. In Zimbabwe, for instance, the lack of reliable internet access and the high cost of assistive technologies can prevent PWDs from fully benefiting from these innovations. This situation is exacerbated by prevailing socio-economic challenges, which limit the ability of educational institutions to invest in necessary resources. Therefore,

while ICT and AI hold great promise for enhancing the educational experiences of PWDs, significant barriers must be addressed to ensure equitable access and effective implementation.

Understanding the barriers that hinder the effective use of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) in promoting inclusion for Persons with Disabilities (PWDs) is crucial for enhancing their educational experiences. Numerous studies have identified various obstacles that PWDs face in accessing and utilising these technologies. One significant barrier is the lack of awareness and training among educators and students regarding the available assistive technologies. According to Edenberg and Wood (2023), many teachers are not adequately trained to integrate AI tools into their teaching practices. This lack of training results in missed opportunities to support students with disabilities effectively. When educators do not understand how to use these technologies, they cannot facilitate an inclusive learning environment that caters to the diverse needs of all students.

Furthermore, societal attitudes toward disabilities significantly impact the implementation of ICT and AI in educational settings. Research by Joshi et al. (2025) highlights that negative perceptions and stigma surrounding disabilities can lead to exclusionary practices. For instance, teachers may unconsciously favour mainstream students over those with disabilities, if the latter will struggle with technology. This bias can create a self-fulfilling prophecy, where PWDs are not given the same opportunities to engage with ICT and AI, thereby reinforcing their marginalisation. Additionally, Makaya (2022) points out that insufficient funding for schools hinders the acquisition of necessary resources, such as assistive technologies and infrastructure, which further limits the effectiveness of ICT initiatives.

Another critical barrier is the accessibility of technology itself. Many assistive devices and software are designed without considering the specific needs of PWDs. Tilmes (2022) emphasises that poorly designed technologies can create additional barriers rather than alleviate them. For example, software that lacks compatibility with screen readers can severely limit access for visually impaired students. Furthermore, the rapid pace of technological advancement can leave some PWDs behind, as they may not have the skills or resources to keep up with new tools. Mazuruse and Nyagadza (2022) argue that this digital divide is particularly pronounced in developing nations like Zimbabwe, where infrastructure challenges and socio-economic factors exacerbate the situation.

Exploring the perceptions of students with disabilities and educators regarding the accessibility and effectiveness of existing assistive technologies in Zimbabwe reveals important insights into the current state of inclusive education. Recent research underscores the critical role that assistive technologies play in promoting educational equity for Persons with Disabilities (PWDs). According to Edenberg and Wood (2023), effective assistive technologies can empower students by providing them with the necessary tools to engage fully in their learning environments. These technologies range from simple tools, such as text-to-speech software, to more complex systems that integrate AI for personalised learning experiences. However, the extent to which these technologies are perceived as effective varies significantly among users. In Zimbabwe, the integration of assistive technologies is often hindered by several challenges. Makaya (2022) highlights that many educators lack sufficient training and awareness regarding the available assistive technologies. This knowledge gap can lead to underutilisation of these tools in the classroom, resulting in students with disabilities not receiving the support they need. Furthermore, societal attitudes toward disabilities can influence how both students and educators perceive the effectiveness of these technologies. Negative perceptions can create an environment where the potential benefits of assistive technologies are overlooked or dismissed.

Additionally, the accessibility of these technologies is a major concern. Joshi et al. (2025) argue that even when assistive technologies are available, barriers such as high costs, inadequate infrastructure and limited access to maintenance support can severely limit their effectiveness. In many cases, students with disabilities may not have the opportunity to utilise these technologies due to logistical constraints, which can lead to frustration and disengagement from the learning process. Mazuruse and Nyagadza (2022) emphasise that for inclusive education to be successful, it is essential that both educators and students have a positive perception of assistive technologies and that these tools are easily accessible. The research was guided by the following objectives.

1. To assess the impact of ICT and AI on the educational experiences of Persons with Disabilities (PWDs) in Zimbabwe.
2. To identify the barriers that hinder the effective use of ICT and IA in promoting inclusion for PWDs in Educational Settings.
3. To explore perceptions of students with disabilities and educators regarding the accessibility and effectiveness of existing assistive technologies in Zimbabwe.

Materials and Methods

The methodology for this study was designed to comprehensively assess the impact of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) on the educational experiences of Persons with Disabilities (PWDs) in Zimbabwe. To achieve this, a mixed-methods approach was employed, combining quantitative and qualitative data collection methods. The study involved a purposive sampling technique, which allowed researchers to select participants who were specifically relevant to the research objectives. A total of 333 participants were involved, including students with various disabilities, educators and student representatives, ensuring a diverse range of perspectives.

Data was collected using in-depth interviews and semi-structured questionnaires. The semi-structured questionnaires provided a standardised way to gather quantitative data on participants' experiences and perceptions regarding the accessibility and effectiveness of ICT and AI in their educational settings. This quantitative data was essential for identifying common barriers and trends related to the use of technology among PWDs. In-depth interviews, on the other hand, allowed for a deeper exploration of individual experiences, providing qualitative insights into how technology impacts learning. Participants were encouraged to share their personal stories, challenges and suggestions for improvement, which enriched the data with contextual understanding.

Once collected, the data was tabulated and analysed to identify key themes and patterns. This analysis helped reveal critical insights into the barriers that PWDs face in accessing technology, as well as the perceptions of educators regarding the effectiveness of assistive technologies. By employing this mixed-methods approach, the study aimed to provide a holistic view of the educational landscape for PWDs in Zimbabwe, ultimately informing recommendations for policy and practice that can enhance inclusive education. The findings from this methodology are expected to contribute significantly to understanding and addressing the challenges faced by PWDs in utilising ICT and AI in their educational journeys.

Results

The research aimed to explore the impact of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) on the educational experiences of Persons with Disabilities (PWDs) in Zimbabwe. Throughout the study, we gathered insights from a diverse group of participants, including students with disabilities, educators and student

representatives. The findings reveal important trends and challenges that affect how PWDs access and utilise technology in their learning environments. By examining these experiences, we can better understand the barriers that hinder effective inclusion and identify potential solutions to improve educational outcomes for all students. The results shed light on the current state of inclusive education and highlight the need for collaborative efforts to create a more supportive and accessible learning atmosphere for PWDs.

Table 1: Gender distribution of participants

Category	Gender	Number of Participants
Persons With Disabilities	Male	100
	Female	33
Total PWDs		233
Student Representative Council Members	Male	35
	Female	20
Total SRC Members		55
Lecturers	Male	25
	Female	15
Total Lecturers		40
Student Advisors	Male	5
	Female	5
Total Student Advisors		10
Grand Total		333

The Impact of ICT and AI on the Educational Experiences of Persons with Disabilities (PWDs)
 The first objective of this study was to assess the impact of Information and Communication Technologies (ICT) and Artificial Intelligence (AI) on the educational experiences of Persons with Disabilities (PWDs) in Zimbabwe. The findings, derived from the mixed-methods approach involving in-depth interviews and semi-structured questionnaires, reveal both positive impacts and persistent challenges faced by PWDs in utilising these technologies.

Positive Impacts of ICT and AI

The data collected through the semi-structured questionnaires indicated that a significant number of participants reported enhanced learning experiences due to the use of ICT tools. Approximately 65% of students with disabilities indicated that assistive technologies, such as screen readers and speech-to-text software, greatly improved their ability to access educational materials. For example, one visually impaired student shared how screen readers enabled them to participate in class discussions and complete assignments independently. Educators corroborated these findings, noting that personalised learning applications helped tailor educational content to the specific needs of students, fostering a more inclusive classroom environment.

Challenges in Access and Utilisation

Despite the positive feedback, the in-depth interviews revealed several barriers that hinder the effective use of ICT and AI among PWDs. A common theme among participants was the inadequate infrastructure in schools. Many students reported difficulties in accessing reliable internet, particularly in rural areas, where connectivity issues were prevalent. According to the data, 70% of students highlighted that poor internet access limited their ability to engage with online learning resources.

Additionally, the lack of training for educators emerged as a significant challenge. Many teachers expressed feeling unprepared to implement assistive technologies effectively. The interviews revealed that 60% of educators had not received any formal training on how to use these tools, which impacted their ability to support students with disabilities adequately. This lack of training contributed to underutilisation of available technologies, meaning that students did not benefit fully from the resources at their disposal.

Lack of Awareness

Another critical finding was the lack of awareness among students regarding the available assistive technologies. The questionnaires showed that 55% of students were unaware of the specific tools that could aid their learning. This lack of information often led to frustration and a sense of exclusion from the educational process. Students expressed a desire for more information and training on how to use technology effectively.

Barriers that Hinder the Effective Use of ICT and AI in Promoting Inclusion for PWDs in Educational Settings

The second objective focused on exploring the perceptions of students with disabilities and educators regarding the accessibility and effectiveness of existing assistive technologies in Zimbabwe. The findings revealed a significant gap in awareness and training among educators about the available assistive technologies. Many educators expressed a desire to support students with disabilities but reported feeling unprepared to implement these tools effectively in the classroom.

Students with disabilities shared mixed experiences regarding the assistive technologies they had access to. While some reported that tools like text-to-speech software and screen readers greatly enhanced their learning, others highlighted issues such as inadequate training on how to use these technologies effectively. Additionally, many students noted that the technologies were not always available or properly maintained, leading to frustration and disengagement. Furthermore, societal attitudes towards disabilities influenced perceptions of technology use. Some educators held biases that affected their willingness to adopt assistive technologies, believing that students with disabilities might struggle to use them. This lack of positive perception created barriers to effective implementation.

Overall, the findings indicate that while assistive technologies have the potential to significantly improve educational experiences for PWDs, challenges related to awareness, training and societal attitudes must be addressed to enhance their effectiveness and accessibility in Zimbabwean schools.

Perceptions of Students with Disabilities and Educators Regarding the Accessibility and Effectiveness of Existing Assistive Technologies

The third objective of the study focused on exploring the perceptions of students with disabilities and educators regarding the accessibility and effectiveness of existing assistive technologies in Zimbabwe. The findings revealed a mixed landscape, highlighting both positive experiences and significant challenges.

Many students with disabilities expressed that those assistive technologies, such as screen readers and speech-to-text software, have greatly enhanced their learning experiences. For instance, 70% of participants reported that these tools made it easier for them to engage with course materials and complete assignments. However, despite these positive outcomes, a substantial number of students also indicated that they faced difficulties in accessing these

technologies consistently. Approximately 60% of respondents noted that their schools lacked adequate resources and support for using assistive technologies effectively.

Educators' perceptions were similarly varied. While many teachers recognised the potential benefits of assistive technologies, about 55% admitted that they did not feel adequately trained to implement them in their classrooms. This lack of training often led to underutilisation of available tools, resulting in missed opportunities for supporting students with disabilities. Additionally, some educators expressed concerns about the reliability of these technologies, with 45% reporting issues such as software compatibility and maintenance challenges.

Overall, the findings underscore the need for improved training and resources for both students and educators to enhance the effectiveness of assistive technologies. By addressing these gaps, schools can create a more inclusive environment that empowers all students to succeed in their educational journeys.

Discussion

The findings of this research resonate with existing literature on the use of ICT and AI in inclusive education, while also highlighting the unique challenges faced by Persons with Disabilities (PWDs) in Zimbabwe. The study's emphasis on infrastructure gaps, lack of training and attitudinal barriers aligns with broader global discussions on the implementation of assistive technologies (AT) in developing countries.

The finding that inadequate infrastructure, particularly poor internet connectivity, hinders the effective use of ICT and AI among PWDs is consistent with the work of Leshota (2013) and the United Nations (2012), who emphasise that a lack of accessible digital infrastructure leads to digital skills gaps among populations with disabilities. This digital divide exacerbates existing inequalities, preventing PWDs from fully participating in educational opportunities. Afolayan et al. (2022) support this, stating that funding for advanced technology remains a significant barrier in Zimbabwean universities.

The study's finding that many educators feel unprepared to implement assistive technologies effectively underscores the need for targeted training programmes. This aligns with Al-Zboon (2014) and Saleem et al. (2019), who found that teachers reported a lack of technical support and knowledge regarding the use of technological tools. McSweeney and Gowran (2019) also suggest that AT-related education and training is mainly provided by non-governmental organisations in most developing countries. The lack of awareness among students regarding available assistive technologies further emphasises the importance of awareness campaigns and accessible information dissemination, as suggested by Kamran & Bano (2024). The challenges identified in this study can be understood through the lens of the Capability Approach, which emphasises the importance of providing individuals with the necessary capabilities to achieve well-being and participate fully in society. Sen (2009) argues that access to education and technology are crucial capabilities that enable individuals to lead fulfilling lives. By addressing the barriers identified in this study, policymakers and educators can enhance the capabilities of PWDs, empowering them to access and utilise ICT and AI for their educational advancement. Furthermore, the findings align with the principles of Universal Design for Learning (UDL), which advocates for creating flexible learning environments that accommodate diverse needs. As highlighted by researchers (ERIC, 2024), UDL focuses on promoting an accessible learning environment and eliminating physical barriers to foster successful growth for all students. By applying UDL principles, educators can design inclusive curricula and instructional materials that are accessible to all learners, regardless of their abilities.

The study's exploration of societal attitudes towards disabilities highlights the importance of addressing stigma and promoting inclusivity. This aligns with Hernández-Torrano, Somerton, and Helmer's (2020) research, which emphasises the need for schools to adapt to the diversity of children. Inclusive education, as defined by Ainscow (2020), aims to make education accessible to all citizens, including those with disabilities, ensuring that every student has equal opportunities for involvement, engagement and achievement. The transformative potential of AI in education is increasingly recognised, as Crompton and Burke (2023) note that AI technologies such as intelligent tutoring systems are becoming integral in adapting instructional methods to individual student needs. However, ethical issues and resource constraints remain major concerns, particularly in resource-constrained environments like Zimbabwe (George & Wooden, 2023). Opesemowo and Adekomaya (2024) also highlight the ethical issues, including bias in algorithms and the transparency of AI-driven decisions, remain major concerns.

Conclusion

This research highlights the significant potential of ICT and AI to enhance the educational experiences of PWDs in Zimbabwe. However, it also reveals persistent challenges related to infrastructure, training, awareness and societal attitudes that hinder the effective implementation of inclusive education. While assistive technologies have proven beneficial for some students, disparities in access and support prevent many PWDs from fully benefiting from these advancements.

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