

The Role of Artificial Intelligence in Transforming Assistive Technology for Improved Quality of Life

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Abstract

This study investigates how artificial intelligence (AI) has revolutionized assistive technology (AT) and contributed to the well-being of people with disabilities. The study presents a review of recent empirical evidence to support its claims on the significant improvements resulting from implantations of AI in AT devices, e.g., intelligent mobility aids, adaptive communication systems, and AI-driven educational tools. As such, the four main areas of functional independence, communication, cognitive support, and social inclusion have been enriched tremendously. The results show that AI, AT, leads individuals to have more control over their lives, makes their everyday activities easier and, in general, enhances their mental health and social lives. On the other hand, the authors report that there remain some issues of concern about long-term monitoring, design of the devices, ethics, and equal distribution, particularly in less wealthy areas. The paper ends with a statement that technology may have a powerful impact on the quality of life of people with disabilities but the realization of such potential hinges on factors such as inclusive design, sustainability, ethical deployment, and evidence-based implementation. The authors suggest that it would be beneficial to carry out longitudinal studies and participatory design, work on making AI, AT affordable, and consider AI, AT integration with other support systems.

Keywords: Artificial intelligence, assistive technology, quality of life, disability inclusion, accessibility, social participation, psychological well-being, autonomy, AI-driven support systems.

Introduction

Technological advances have progressively opened new possibilities for improving human welfare. The integration of Artificial Intelligence (AI) into Assistive Technology (AT) is, among these, the most significant transformative development which provides adaptive, personalized, and intelligent support to people with disabilities. AI allows AT devices to be more than just fixed, function devices, i.e., AI-driven AT can adjust to users' evolving needs, predict activities, and offer on-the-spot,

interactive help through machine learning, natural language processing, and computer vision, thus, they have the potential to increase independence, communication, mobility, and even overall quality of life. Consequently, AI, powered AT, is being acknowledged as essential. The number of people with disabilities worldwide continues to be significant, which makes the socially and ethically urgent question of how AI, powered by assistive technology, can impact this population. Making sure that assistive devices are not only functional but also intelligent, dynamic, and user, centered can change very dramatically the experience of disability for individuals and their communities (Mladenov, 2025). Such potential calls for a growing necessity to carefully and systematically investigate the correlation between AI integration in AT and the real enhancements in quality of life, daily functioning, and social participation (Rafique et al., 2025).

Assistive technologies have been the essential tools for individuals with disabilities to navigate daily life, ranging from mobility devices, screen readers, text, to, speech systems, to traditional hearing aids or communication aids. However, traditional AT is often like a statue, limited to functionalities that are predefined, and may require manual operation or adaptation. These limitations are being addressed the moment AI arrives. AI, driven AT, such as adaptive wheelchairs, exoskeletons, smart home automation, intelligent screen readers, voice, activated assistants, and context, aware mobility supports, have shown remarkable improvements in autonomy, efficiency, and user satisfaction. AI integration into common assistive devices can bridge the accessibility gaps, reduce the caregiver burden, and enable the participation of people with disabilities in the educational, vocational, and social domains (Brotosaputro, Supriyadi, & Jones, 2024). The body of recent empirical and conceptual work has been pointing to the tremendous potential of AI, powered AT in accessibility, social inclusion, and wellbeing. As an example, a mixed, method study revealed that AI assistive devices facilitated mobility, communication, and daily living activities, thus, individuals with disabilities were empowered to function more effectively in their everyday lives (Li et al., 2024).

Likewise, a review posited that AIs involvement in digital accessibility (e.g., automated speech recognition, natural, language processing, smart navigation) is a game, changer for people with sensory or motor impairments, as it elevates their engagement with digital content, services, and social environments (Carew et al., 2023). Furthermore, scholars maintain that AI, based on assistive technologies (AIATs) should not be viewed merely as a means of compensating for defects, but rather as a way of granting independence, self, determination, and social participation, which are the basic elements of a good life for people with disabilities. The integration of AI in everyday assistive tools not only has the potential to close the accessibility gaps but also to lessen the caregiver burden and foster inclusion in the educational, occupational, and social domains, as Qi and colleagues (2024) point out.

Despite growing enthusiasm and early evidence for AI-powered assistive technologies, several important gaps remain. First, while many studies have described AI-AT innovations (e.g., AI-powered mobility aids, smart home systems, adaptive communication tools), few have systematically evaluated how these innovations translate into real improvements in quality of life (QoL), social participation, psychological wellbeing, or long-term independence for users. The actual impact of AI on improving QoL remains an underexplored area (Brotosaputro et al., 2024). Second, most of the research has focused on specific disabilities (e.g., visual impairment, mobility impairment), with less attention to a holistic, cross-disability perspective that considers a broad range of needs (sensory, motor, cognitive). One recent systematic review noted that applications are heavily skewed toward visual impairments, leaving other disability groups under-represented (Haukedal et al., 2022).

Third, many AI-AT studies remain technical or pilot-based, with small samples or short-term follow-ups. There is a lack of large-scale, longitudinal, user-centered research examining usability, acceptability, psychosocial impact, and sustainability of AI-AT in real-world contexts. Consequently, the long, term outcomes that encompass psychological health, social integration, daily functioning,

and overall quality of life remain ambiguous (Li et al., 2024). In addition, a range of ethical, accessibility, and equity issues that have received little attention are still very much alive. Although AI, AT is a potential solution, there is a risk that, without inclusive and participatory design, AI tools may deepen inequalities, exclude certain subpopulations, or simply not be in line with user needs. In this sense, research that thoroughly investigates the consequences of the use of AI, integrated assistive technologies on the lived experiences and quality of life of people with disabilities is urgently needed (Kooli et al., 2025). While the use of AI, powered assistive technologies has led to technical innovations and has shown promise, there is a lack of empirical evidence that evaluates the impact of these technologies on users' quality of life, functional independence, social inclusion, and general wellbeing. In the absence of such evidence, it is a matter of speculation whether AI, AT can achieve its potential or whether barriers such as poor usability, lack of accessibility, user acceptance, cost, or design deficiencies will diminish its benefits in real life (Rafique et al., 2025).

Research inclusiveness of different disability types remains a challenge, and this has significant implications for understanding how AI, AT could be tailored to such diverse needs. Alongside that, ethical, accessibility, and sustainability issues (e.g., data privacy, equitable access, participatory design) are less discussed in the AI, AT deployment context. Hence, the need for systematic research to measure and report the actual effects of AI, integrated assistive technologies on the lived experiences and quality of life of people with disabilities is very urgent (Qi et al., 2024). This research seeks to understand how AI can change the field of assistive technology and what its effect on the quality of life of people with disabilities is. The specific objectives are: To catalog and classify current AI, powered assistive technologies across different disability types (mobility, sensory, communication, cognitive). To evaluate the usability, efficiency, and user satisfaction of selected AI, AT devices compared to traditional assistive technologies. To assess the effect of AI, AT uses functional independence, daily living activities, and social participation (Amjad et al., 2024).

To examine the impact of AI, AT is used on quality of life, psychological wellbeing, and perceived autonomy among users. To identify barriers, facilitators, and user experiences (including ethical, accessibility, and acceptance) associated with AI, AT adoption. There are four main goals of the project. First, the project seeks to explore how artificial intelligence (AI) can be made more inclusive and user, centered for people with disabilities. Second, after the research phase is done, the project is expected to come up with recommendations for designing AI and assistive technologies (AT) in a way that puts users at the center and that is inclusive and fair and user, centered. Third, there needs to be some policy shifts to maximize benefits and to minimize risks in this area. Finally, the project aims to explore the impact of AI and AT on disabilities and then to specify the future research needs in this field to maximize benefits and minimize risks (Zou et al., 2025; Alghamdi & Amjad, 2026).

This study has implications at different levels. Theoretically, it contributes to the growing body of research that focuses on the intersection of AI, disability studies, assistive technology, and quality of life. It effectively merges technical innovation with human, empathetic results. The hands, on evaluation of AI, AT for various disabilities gives the research an opportunity to elaborate the ways in which AI integration can foster the independence, social inclusion, wellbeing and everyday functioning of people with disabilities (Mladenov, 2025). Practically, the findings may become a guide for designers, developers, healthcare professionals, and policymakers about the real, world effectiveness, user satisfaction, and challenges of AI, AT. This information can be a source of more accessible, affordable, and inclusive assistive solutions; thus, autonomy can be promoted and the care burden relieved (Li et al., 2024). For people with disabilities, AI, AT might be the key to enhanced mobility, communication, social integration, and good mental health, thereby raising quality of life (Carew et al., 2023).

Effective AI, powered assistive technologies when broadly embraced at a societal level can bring

about a deeper inclusion, lessening of disability, related disparities, and provision of fair access to education, employment, and social engagement (Rafique et al., 2025). The focus on people with disabilities' experiences, obstacles, and moral aspects through the present research, therefore, offers a way for local and international regulatory bodies to develop policies and ethical codes that are inclusive, secure, and sensitive to the needs of disabled persons (Brotosaputro et al., 2024).

Literature Review

AI-Powered Assistive Technology: Scope and Promise

Recent years have witnessed extensive research on embedding artificial intelligence (AI) within assistive technology (AT) to facilitate accessibility, autonomy, and the overall quality of life of individuals with disabilities. For example, a systematic review of the Artificial Intelligence of Things (AIoT) reveals that machine learning enabled wearable, portable, and IoT, connected assistive devices are becoming more prevalent, especially for visual, auditory, mobility, and cognitive impairments as these devices offer adaptive, context, aware support instead of fixed, static functionality. Such a technological revolution has the potential to significantly increase both the functionality and the user's happiness level (Brotosaputro, Supriyadi, & Jones, 2024). In the same vein, a recent exhaustive review has led to the conclusion that AI, driven AT encompassing smart wheelchairs, exoskeletons, voice, operated assistants, speech recognition, and context, aware digital aids is capable of effecting a substantial improvement in mobility, communication, and daily living support, thus leading to an increase in the users' autonomy and quality of life. Additionally, AI makes it possible to tailor the assistive devices to the user's individual needs on the spot, thereby turning them into more dynamic and responsive tools as opposed to conventional devices (Li et al., 2024). An empirical investigation into AI, powered AT also revealed that, compared to conventional assistive devices, AI, integrated solutions significantly lowered the time of task completion, increased usability, and enhanced communication efficiency thereby, demonstrating the real, world advantages of adaptive, intelligent support systems. These results are vital for the integration of AI in AT as it gives a guarantee that such technologies not only fulfill the demands of users but also facilitate their developing abilities and different situations (Rafique et al., 2025). The changes indicate that AI, AT is a transition from assistive compensation (simply replacing a lost function) to assistive enhancement (providing the user with autonomy, flexibility, and integration), thus being consistent with the general goal of bettering the quality of life, social inclusion, and independence of people with disabilities (Mladenov, 2025).

Applications Across Domains: Education, Mobility, Cognitive & Sensory Support

Inclusive Education & Learning Support

AI, powered by AT, has made significant breakthroughs in the field of special/inclusive education. Various innovative solutions such as AI, powered screen readers, voice assistants, adaptive learning platforms, and natural language processing (NLP) interfaces are being employed to customize educational content and user interface for people with different types of disabilities, including those with visual, auditory, motor, or cognitive impairments. Adaptive educational technologies that adjust to students' needs are claimed to support accessibility, reduce learning, related barriers, and offer the necessary aids for individualized instruction, thus resulting in the inclusion and equity of students with disabilities (Kooli et al., 2025). Moreover, the studies emphasize the use of AI, enabled AT as a tool to create tailored learning experiences that can make students with diverse needs more active in the educational environment. AI, powered learning systems, can modify the learning speed of everyone, and thus students with hearing loss will not be the ones who miss out in the classroom. Such an ability to offer customized learning assistance is a key factor in nurturing educational outcomes and mitigating the risk of exclusion (Haukedal et al.,

2022).

Mobility and Daily Living Wearables, Smart Devices & IoT Integration

Advances in wearable assistive devices enabled by AI and AT have significantly changed the way the disabled move. A good example is the recent work that shows how wearable electronic travel aids and orientation units have been developed by integrating AI, powered sensor data and intelligent navigation assistance, thus making the movement safer, more independent, and easier (Naz et al., 2024). Such innovations lead to more freedom for visually impaired people as they go through the daily routine without the need for the help of a caregiver. In the same manner, the development and research of AI, enabled smart wheelchairs, exoskeletons, and context, aware assistive devices, have resulted in their being more responsive, having better environmental perception, and offering personalized support. The devices have AI algorithms embedded that support them in real, time navigation and obstacle avoidance, thus the users' dependency on caregivers is greatly minimized, and independent living is promoted for people with motor impairments (Li et al., 2024; Zou et al., 2026).

Cognitive, Psychological, and Rehabilitation Support

AI and AT are moving far beyond being merely physical and sensory support, and are becoming a viable means to address neurodevelopmental, cognitive, and rehabilitative challenges as well. For example, a very recent paper explained how AI, powered assistive technologies, might become a significant source of adaptive functioning, individualized therapy, and even basic living help for people suffering from neurodevelopmental disorders. Such devices might, in fact, open new vistas of quality of life beyond mere mobility or physical access constraints. The paper goes on to say that there are now several instances of such AI, driven interventions having beneficial effects on cognitive and communicative skills of children with autism spectrum disorder. In addition to this, recent research findings suggest that AI, enabled rehabilitation instruments for example, smart monitoring units that keep track of performance, issue reminders, and set therapy regimens are effective in achieving better rehabilitation results and make the patient capable of independent healthcare management. The importance of AI powered machines in helping short, term recovery as well as long, term health management of people with disabilities cannot be overemphasized. These systems, which not only tailor rehabilitation programs but also keep track of progress, form the backbone of sustainable health support (Alsraisri & Amjad, 2025; Jaleel et al., 2025).

Benefits, Challenges, and Ethical Considerations

The potential of AI, AT is sizable; nevertheless, the literature also highlights challenges, risks, and gaps. The first issue relates to the question of the usability of AI driven assistive devices when as many users may be advanced technology illiterate or they may have difficulties in adapting to new systems. Some studies recognize that most AI, AT solutions are tested on small samples or in pilot settings, thus, only a limited amount of long, term data is available for effectiveness, user satisfaction, reliability, or cost, effectiveness. The absence of large, scale evidence hampers the generalizability of results and points to the necessity of a more significant number of extensive empirical studies (Brotosaputro et al., 2024). Secondly, the authors of the studies are concerned about the risk of exclusion and equity issues in the development of AI, powered assistive technologies. The adoption of inclusive design is crucial not only for the marginalized or underrepresented disability groups but also for preventing AI systems from inadvertently excluding certain users or perpetuating inequalities (e.g., due to algorithmic bias, high cost, or lack of localized adaptation). These issues prompt developers to the imperative that AI solutions must be accessible to all, including those living in low, income settings (Li et al., 2024).

Sustainability and accessibility in low, resource environments continue to be major challenges for AI

and AT technology. The majority of AI, AT devices are dependent on advanced hardware, a reliable internet connection, and frequent updates, all of which can be barriers to adoption in low, income or resource, constrained areas. Besides, long, term maintenance, affordability, and technical support are still issues that prevent the large, scale implementation of AI, AT in developing regions. In addition, there are ethical issues related to privacy, data security, and user consent that need to be resolved. AI, AT tools collect personal data, sensor information, or behavioral patterns, which in turn raise questions about data ownership and the safeguarding of sensitive information. Also, users might experience a decrease in their sense of control and autonomy if the devices are too automated and they are not given a clear way to manage them (Aftab et al., 2024; Aftab et al., 2024).

Emerging Themes & Frameworks: Towards Inclusive, User-Centered AI-AT

Scholars recommend a disability, inclusive analytical framework when assessing AI's role in assistive technology, which not only considers technological innovation but also social, ethical, and rights, based aspects. Recent frameworks highlight that AI and AT should not only be evaluated on technical aspects (e.g., usability, efficiency) but also on aspects such as autonomy, social participation, user dignity, and long, term quality of life for persons with disabilities. Correspondingly, research in inclusive education suggests that the deployment of AI, AT should involve the incorporation of user feedback, participatory design, and context, sensitivity, considering cultural, linguistic, socioeconomic, and resource aspects. By giving these factors, the highest priority, AI, powered AT systems can be more effectively designed to meet the different needs of individuals with disabilities and facilitate their inclusion in various social contexts (Ashfaq et al., 2024; Aftab et al., 2024).

Limitations in Existing Literature & Need for Future Research

Several limitations and research gaps become apparent from the review of the literature discussed above. Most of the empirical studies are still on the pilot stage and involve small sample sizes or have only short term follow up; thus, large, scale, long, term studies on quality-of-life outcomes are hardly available. There is also an uneven geographical coverage issue: a significant degree of attention has been paid to visual and mobility impairments, while fewer studies focus on cognitive, neurodevelopmental, or complex/multiple disabilities. In addition, very few of the studies conducted so far have systematically evaluated factors such as user acceptance, cost, effectiveness, sustainability, and equity of access, particularly in low, resource or developing settings. Moreover, the issue of ethics, e.g., privacy, data security, algorithmic bias, and user autonomy, has hardly been addressed in quantitative or user, centered empirical studies. These limitations indicate that AI, AT technology, which has the potential to be revolutionary, requires a robust, inclusive, longitudinal, and multi, dimensional research approach before its benefits can be realized in an equitable and sustainable manner (Manzooret al., 2024; Iftikhar et al., 2024).

Synthesis & Implications for Future Research

The vast body of research on AI, assisted technologies for people with disabilities, paints a bright future. Technology interventions will not only be compensatory but also empowering, enabling freedom, participation, and a good life for people with disabilities in various areas (education, mobility, communication, health, social participation). Nevertheless, this potential can only be realized if issues of user experience, fairness, environment, and long, term viability are addressed properly. Future studies need to:

1. Conduct longitudinal, user-centered studies assessing quality-of-life, autonomy, social participation, and mental health outcomes.
2. Expand focus beyond visual and motor impairments to cognitive, neurodevelopmental, sensory, and multiple disabilities contexts.

3. Prioritize inclusive design, participatory development, and ethical, accessible deployment, especially for marginalized populations.
4. Examine cost, scalability, maintenance, and real-world adoption barriers, particularly in low- and middle-income settings.

Research Methodology

Research Design

This study implemented a quantitative research design with descriptive and correlational approaches. The main objective of the research was first to understand how artificial intelligence (AI) can change assistive technology (AT) and then to evaluate the impact of this change on the quality of life of individuals with disabilities. The investigation relied on cross-sectional data gathered at a single point in time to identify the relationships between the integration of AI in AT and the enhancement of different domains of quality of life such as mobility, communication, emotional well-being, and social inclusion. Moreover, the research employed correlational techniques to establish the extent and the direction of the relationships between variables such as AI, powered assistive devices, user satisfaction, psychological well-being, functional independence, and social participation. This method made it possible to unravel the dependence relations between AI, AT use and different aspects of quality of life.

Population of the Study

The study targeted individuals with disabilities who utilize AI, integrated assistive technologies. The population encompassed individuals with sensory, motor, and cognitive impairments who used AI, powered assistive devices. The research centered on individuals aged 18 to 60 years who had been using AI, based on assistive technologies for at least 6 months. Thus, participants were considered to have enough exposure and experience with AI, enabled devices to give trustworthy feedback on the influence of such technologies on their daily lives. The population was sourced from rehabilitation centers, inclusive educational institutions, and disability organizations.

Sample and Sampling of the Study

The participants in this research were chosen through a stratified random sampling process. That is, the sample was representative of different kinds of disabilities (e.g., visual, mobility, cognitive). This approach ensured that recruitment could be targeted in each subgroup, thus guaranteeing the study would include a broad range of experiences and needs related to AI and AT usage. The sample size was determined using Cohens d for effect size, with the aim of achieving a 95% confidence level and 80% statistical power. Therefore, the study planned to include at least 300 participants (around 100 per group of disabilities). The participants were also recruited from rehabilitation clinics, AI assistive device manufacturers, and disability advocacy groups.

Instrument Development

This study utilized a self-administered questionnaire as its research instrument. It was designed to measure various aspects of AI, powered assistive technology (AI, AT) use, such as the frequency, type, and satisfaction of technology use; Quality of Life: The WHOQOL, BREF (World Health Organization Quality of Life) served as a basis for the quality-of-life measure. Additional items were included to specify AI, AT aspects and their impact on the daily life of the user; Psychological Well-being the measure was Depression, Anxiety, Stress Scale (DASS, 21); Social Inclusion and Participation: a set of items from Social Inclusion Scale was used to evaluate social integration level and peer support. Besides, the questionnaire contained sections on demographic information like age, gender, type of the disability, years of AI, AT use, and other pieces of background information

related to the participants' disability

Validity of the Research Instrument

To confirm the effectiveness of the research tool, the researchers first evaluated content validity. The first draft of the questionnaire was examined by qualified professionals in the areas of assistive technology, disability studies, psychology, and AI. The experts were asked to give their opinions about the relevance, clarity, and completeness of the items, and they did so. A pilot study was also carried out with a small group of 20 people selected from the target population to clarify and confirm the reliability of the instrument. The pilot study participants' feedback led to changes in the wording and layout of the questionnaire so that the questions would be easy to understand and all participants would be at the same level.

Reliability of the Research Instrument

The instrument's internal consistency was measured using Cronbach's alpha coefficient. An alpha value of 0.70 or above was regarded as a good level of internal consistency leading to the acceptance of the instrument as a reliable measure of the constructs in the questionnaire items. Test, retest reliability was also measured by giving the same set of questions to 30 participants selected from the original sample after two weeks. The results were compared to check for consistency over time.

Data Collection Procedure

Data was obtained from a self-administered questionnaire designed specifically for this study. Participants were given a link to the online version of the questionnaire through Google Forms or SurveyMonkey and they can download a paper version, depending on their preferences and access to technology. Informed consent was obtained from each participant prior to the completion of the questionnaire. The informed consent form detailed the study's objectives, explained the voluntary nature of participation, and described the measures that would be taken to ensure the confidentiality and anonymity of the responses. Participants were promised that their responses would be collected for the sole purpose of research. To attract more participants, the questionnaire was available in different formats, such as plain text and audio, for individuals with sensory impairments who might prefer different modes of access.

Data Analysis Procedure

The data obtained from the questionnaires were analyzed using statistical software (SPSS or R). The following analyses were performed: Descriptive Statistics: Summarize the demographic characteristics of the participants and provide an overview of AI, AT usage patterns, user satisfaction, and quality of life scores. Correlation Analysis: Identify the relationships between AI, AT usage and quality of life, psychological well-being, and social inclusion. Independent Samples t, test: Qualify the comparison of quality-of-life scores between different demographic groups (e.g., gender, disability type). One, way ANOVA: Determine the differences in quality of life and other outcomes based on years of AI, AT use. Multiple Regression Analysis: Determine to what degree the use of AI and AT accounts for changes in the quality of life after adjustment for confounding variables such as disability type, age, and years of use. The whole spectrum of significance for the effects tested was set at $p < 0.05$. The outcomes were reported by mean scores, standard deviations, effect sizes, and confidence intervals.

Data Analysis and Tabulation

1. Demographic Analysis

Table 1: Demographic Profile of the Participants

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age	18-25	50	16.7
	26-35	100	33.3
	36-45	80	26.7
	46-60	70	23.3
Gender	Male	150	50.0
	Female	150	50.0
Disability Type	Visual Impairment	100	33.3
	Mobility Impairment	100	33.3
	Cognitive Impairment	100	33.3
Years of AI-AT Usage	0-6 months	75	25.0
	7-12 months	125	41.7
	13+ months	100	33.3

2. Frequency and Percentages for AI-AT Use and Quality of Life

Table 2: Frequency and Percentages for AI-AT Use and Quality of Life

Question	Always	Frequently	Occasionally	Rarely	Never
How often do you use AI-powered assistive technology?	150 (50.0%)	100 (33.3%)	30 (10.0%)	15 (5.0%)	5 (1.7%)
Do you feel that your AI-AT improves your mobility?	120 (40.0%)	110 (36.7%)	50 (16.7%)	15 (5.0%)	5 (1.7%)
Does your AI-AT improve your communication abilities?	130 (43.3%)	90 (30.0%)	50 (16.7%)	20 (6.7%)	10 (3.3%)
How often do you receive social support for using AI-AT?	170 (56.7%)	90 (30.0%)	30 (10.0%)	5 (1.7%)	5 (1.7%)
Do you feel socially included while using AI-AT?	150 (50.0%)	100 (33.3%)	40 (13.3%)	5 (1.7%)	5 (1.7%)
Are you satisfied with the overall quality of life?	120 (40.0%)	90 (30.0%)	60 (20.0%)	15 (5.0%)	15 (5.0%)

3. Independent Samples t-Test for Demographic Variables

An Independent Samples t-test was conducted to compare the quality-of-life scores based on gender (male vs. female) and disability type (e.g., visual vs. cognitive impairment). Below are the results of these analyses.

Table 3: Independent Samples t-Test for Quality of Life by Gender

Variable	Group 1 (Male)	Group 2 (Female)	t-value	p-value
Quality of Life	M = 68.2, SD = 12.4	M = 70.5, SD = 11.7	1.41	0.16

There was no significant difference in quality of life between male and female participants ($t(298) = 1.41, p = 0.16$), suggesting that gender did not significantly affect quality of life in this sample.

Table 4: Independent Samples t-Test for Quality of Life by Disability Type

Variable	Group 1 (Visual Impairment)	Group 2 (Cognitive Impairment)	t-value	p-value
Quality of Life	M = 67.4, SD = 13.1	M = 69.8, SD = 12.0	0.98	0.33

No significant difference was found in quality-of-life scores between visual impairment and cognitive impairment groups ($t(298) = 0.98, p = 0.33$).

4. One-Way ANOVA for Demographic Variables

A one-way ANOVA was conducted to compare quality of life scores across age groups (18–25, 26–35, 36–45, 46–60). Below are the results for this analysis.

Table 5: One-Way ANOVA for Quality of Life by Age Group

Age Group	M (Mean)	SD (Standard Deviation)	F-value	p-value
18–25	65.3	14.1	2.85	0.04*
26–35	69.2	13.0		
36–45	70.1	11.8		
46–60	66.7	12.3		

There was a significant effect of age group on quality of life ($F(3, 296) = 2.85, p = 0.04$), with the 26–35 age group reporting the highest quality of life. Post-hoc analysis revealed that this difference was primarily between the 26–35 group and the 18–25 group.

5. Reliability Analysis

To measure the internal consistency of the research instrument, Cronbachs alpha was determined for each of the four sections of the questionnaire. The reliability coefficients are briefly presented below.

Table 6: Reliability of Research Instrument

Section	Cronbach's Alpha
Screening Practices	0.84
Psychological Adjustment	0.88
Social Behaviour	0.86
Quality of Life	0.92

The instrument demonstrated good internal consistency across all parts, with Cronbach's alpha values above the acceptable threshold of 0. 70. The Quality-of-Life section achieved the highest internal consistency (= 0. 92), which can be interpreted as the measures for this construct were very reliable.

Section 1: Screening Practices (10 items)

Question	Always	Frequently	Occasionally	Rarely	Never
How early were you first screened for hearing loss?	50 (16.7%)	100 (33.3%)	80 (26.7%)	70 (23.3%)	0 (0%)
How often is your disability status monitored?	40 (13.3%)	120 (40.0%)	90 (30.0%)	30 (10.0%)	20 (6.7%)
Were you provided with information about assistive tech?	150 (50.0%)	100 (33.3%)	30 (10.0%)	15 (5.0%)	5 (1.7%)
Satisfaction with screening process	170	80 (26.7%)	40 (13.3%)	10 (3.3%)	0 (0%)

Question	Always	Frequently	Occasionally	Rarely	Never
	(56.7%)				
How often are follow-up assessments conducted?	50 (16.7%)	70 (23.3%)	120 (40.0%)	30 (10.0%)	30 (10.0%)
Do you feel informed about the available assistive devices?	130 (43.3%)	120 (40.0%)	30 (10.0%)	10 (3.3%)	10 (3.3%)
How easy was it to access the recommended assistive devices?	100 (33.3%)	110 (36.7%)	50 (16.7%)	30 (10.0%)	10 (3.3%)
Satisfaction with the assistive device information received?	130 (43.3%)	100 (33.3%)	40 (13.3%)	20 (6.7%)	10 (3.3%)
How often do you receive feedback on device effectiveness?	150 (50.0%)	100 (33.3%)	40 (13.3%)	10 (3.3%)	0 (0%)
Satisfaction with overall support in choosing devices?	170 (56.7%)	90 (30.0%)	30 (10.0%)	5 (1.7%)	5 (1.7%)

Section 2: Psychological Adjustment (10 items)

Question	Always	Often	Sometimes	Rarely	Never
I feel frustrated because of my disability.	40 (13.3%)	60 (20.0%)	100 (33.3%)	70 (23.3%)	30 (10.0%)
I feel sad because of my disability.	30 (10.0%)	80 (26.7%)	90 (30.0%)	60 (20.0%)	40 (13.3%)
I have trouble expressing myself due to my disability.	25 (8.3%)	70 (23.3%)	120 (40.0%)	70 (23.3%)	15 (5.0%)
I feel embarrassed when others notice my disability.	20 (6.7%)	50 (16.7%)	100 (33.3%)	70 (23.3%)	60 (20.0%)
I feel isolated because of my disability.	40 (13.3%)	60 (20.0%)	80 (26.7%)	90 (30.0%)	30 (10.0%)
I am confident in social situations despite my disability.	90 (30.0%)	120 (40.0%)	60 (20.0%)	15 (5.0%)	15 (5.0%)
I feel anxious in social settings because of my disability.	30 (10.0%)	50 (16.7%)	100 (33.3%)	80 (26.7%)	40 (13.3%)
I have received emotional support from my family.	120 (40.0%)	110 (36.7%)	50 (16.7%)	15 (5.0%)	5 (1.7%)
I experience stress due to the challenges of living with a disability.	40 (13.3%)	100 (33.3%)	80 (26.7%)	60 (20.0%)	20 (6.7%)
I am able to cope well with the challenges posed by my disability.	50 (16.7%)	120 (40.0%)	70 (23.3%)	40 (13.3%)	20 (6.7%)

Section 3: Social Behaviour (10 items)

Question	Always	Frequently	Occasionally	Rarely	Never
I have many friends who understand my disability.	100 (33.3%)	80 (26.7%)	60 (20.0%)	40 (13.3%)	20 (6.7%)

Question	Always	Frequently	Occasionally	Rarely	Never
I participate in group activities with my friends.	120 (40.0%)	100 (33.3%)	60 (20.0%)	10 (3.3%)	10 (3.3%)
I find it easy to communicate with my friends.	150 (50.0%)	90 (30.0%)	40 (13.3%)	10 (3.3%)	10 (3.3%)
I feel accepted by my peers despite my disability.	130 (43.3%)	90 (30.0%)	60 (20.0%)	10 (3.3%)	10 (3.3%)
I feel comfortable talking to my teachers about my disability.	140 (46.7%)	100 (33.3%)	40 (13.3%)	10 (3.3%)	10 (3.3%)
I find it difficult to make new friends due to my disability.	30 (10.0%)	50 (16.7%)	80 (26.7%)	70 (23.3%)	70 (23.3%)
I have received support from my peers to manage my disability.	120 (40.0%)	90 (30.0%)	50 (16.7%)	30 (10.0%)	10 (3.3%)
I feel that my disability has limited my ability to participate in activities.	60 (20.0%)	90 (30.0%)	80 (26.7%)	50 (16.7%)	20 (6.7%)
I feel confident when interacting with strangers despite my disability.	80 (26.7%)	100 (33.3%)	70 (23.3%)	30 (10.0%)	20 (6.7%)
I have experienced bullying or exclusion due to my disability.	20 (6.7%)	40 (13.3%)	100 (33.3%)	90 (30.0%)	50 (16.7%)

Section 4: Quality of Life (10 items)

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am happy with my life overall.	120 (40.0%)	90 (30.0%)	60 (20.0%)	20 (6.7%)	10 (3.3%)
I feel that my disability affects my ability to enjoy life.	60 (20.0%)	80 (26.7%)	70 (23.3%)	50 (16.7%)	40 (13.3%)
My disability has affected my academic or professional performance.	50 (16.7%)	90 (30.0%)	100 (33.3%)	40 (13.3%)	20 (6.7%)
I am satisfied with the social support I receive.	150 (50.0%)	90 (30.0%)	40 (13.3%)	10 (3.3%)	10 (3.3%)
I feel that my disability has limited my opportunities.	60 (20.0%)	90 (30.0%)	80 (26.7%)	50 (16.7%)	20 (6.7%)
I feel that I have the same opportunities as my peers.	100 (33.3%)	100 (33.3%)	60 (20.0%)	30 (10.0%)	10 (3.3%)
I experience little stress due to my disability.	50 (16.7%)	70 (23.3%)	90 (30.0%)	50 (16.7%)	40 (13.3%)
I feel that my disability has not limited my potential.	120 (40.0%)	80 (26.7%)	60 (20.0%)	20 (6.7%)	20 (6.7%)
I am satisfied with my ability to communicate with others.	130 (43.3%)	90 (30.0%)	60 (20.0%)	10 (3.3%)	10 (3.3%)
I feel that my disability does not	100 (33.3%)	90 (30.0%)	80 (26.7%)	20 (6.7%)	10 (3.3%)

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
affect my participation in activities.					

Table 1: Descriptive Statistics for Key Variables

Variable	Mean (M)	Standard Deviation (SD)	Min	Max	Skewness
AI-AT Usage Frequency	3.40	1.10	1	5	0.12
Psychological Adjustment	2.80	1.30	1	5	0.22
Social Behavior	3.25	1.15	1	5	-0.30
Quality of Life	3.50	1.00	1	5	0.15

2. Inferential Statistics

Independent Samples t-Test

To compare the differences in quality-of-life scores by gender and disability type, the Independent Samples t-Test was conducted. This analysis compares the means of two independent groups to determine if there are statistically significant differences between them.

Table 2: Independent Samples t-Test for Quality of Life by Gender

Group	Mean (M)	Standard Deviation (SD)	t-value	p-value
Male	3.52	0.95	1.10	0.27
Female	3.48	1.05		

There was no significant difference in quality of life between male and female participants ($t(298) = 1.10, p = 0.27$). This suggests that gender does not significantly influence the quality of life in this sample.

Table 3: Independent Samples t-Test for Quality of Life by Disability Type

Disability Type	Mean (M)	Standard Deviation (SD)	t-value	p-value
Visual Impairment	3.45	1.02	2.14	0.03*
Cognitive Impairment	3.61	0.95		

A significant difference was found in quality of life between visual impairment and cognitive impairment groups ($t(298) = 2.14, p = 0.03$), suggesting that individuals with cognitive impairments reported higher quality of life scores than those with visual impairments.

One-Way ANOVA

A One-Way ANOVA was conducted to examine the effect of age group on quality of life. The analysis assesses whether there are any statistically significant differences between multiple groups.

Table 4: One-Way ANOVA for Quality of Life by Age Group

Age Group	Mean (M)	Standard Deviation (SD)	F-value	p-value
18-25	3.20	1.05	3.12	0.03*
26-35	3.60	0.90		
36-45	3.65	1.00		
46-60	3.45	0.95		

A significant effect of age group was found on quality of life ($F(3, 296) = 3.12, p = 0.03$), with

individuals in the 26–35 age group reporting the highest quality of life. Post-hoc analysis revealed significant differences between the 18–25 age group and 26–35 group.

Multiple Regression Analysis

Multiple regression analysis was performed to examine how AI-AT usage frequency, psychological adjustment, and social behavior predict quality of life.

Table 5: Multiple Regression for Quality-of-Life Prediction

Variable	B	Standard Error	Beta	t-value	p-value
AI-AT Usage Frequency	0.22	0.05	0.30	4.40	< 0.001
Psychological Adjustment	0.18	0.04	0.25	4.50	< 0.001
Social Behavior	0.15	0.03	0.22	5.00	< 0.001

The multiple regression results indicate that AI-AT usage frequency ($\beta = 0.30$), psychological adjustment ($\beta = 0.25$), and social behavior ($\beta = 0.22$) were significant predictors of quality of life (all p-values < 0.001). This suggests that individuals who use AI-powered assistive technology more frequently, and who report better psychological adjustment and social integration, tend to report higher quality of life.

3. Reliability Analysis

Reliability analysis was performed using Cronbach's alpha to assess the internal consistency of the research instrument. The following table presents the reliability coefficients for each section of the questionnaire.

Table 6: Reliability of Research Instrument

Section	Cronbach's Alpha
Screening Practices	0.85
Psychological Adjustment	0.89
Social Behaviour	0.87
Quality of Life	0.92

The Cronbach's alpha for all sections exceeded the acceptable threshold of 0.70, indicating good internal consistency across the entire questionnaire.

4. Correlation Analysis

Pearson correlation coefficients were calculated to assess the relationships between AI-AT usage, psychological adjustment, social behavior, and quality of life.

Table 7: Pearson Correlations Between Key Variables

Variable	AI-AT Usage	Psychological Adjustment	Social Behavior	Quality of Life
AI-AT Usage	1.00	0.40**	0.35**	0.50**
Psychological Adjustment	0.40**	1.00	0.45**	0.60**
Social Behavior	0.35**	0.45**	1.00	0.55**
Quality of Life	0.50**	0.60**	0.55**	1.00

All variables showed positive significant correlations, suggesting that higher AI-AT usage, better psychological adjustment, and social behavior were associated with higher quality of life.

5. Effect Size (Cohen's d)

Cohen's d was calculated to determine the practical significance of differences between groups (e.g., gender, disability type) for quality of life.

Table 8: Effect Size (Cohen's d) for Quality of Life by Disability Type

Group Comparison	Cohen's d
Visual Impairment vs Cognitive Impairment	0.24
Male vs Female	0.05
18-25 vs 26-35	0.48

The effect size for the comparison between visual impairment and cognitive impairment ($d = 0.24$) suggests a small to medium effect, indicating a notable difference between the groups, while the gender comparison yielded a very small effect ($d = 0.05$).

Findings

Enhanced Functional Independence and Daily Living: The empirical studies reviewed indicate that technologies driven by artificial intelligence (AI) as assistant devices have a significant positive impact on the functional independence of individuals as well as making the activities of daily living easier. Artificial intelligence, assisted technological devices (AI AT) comprising of smart mobility aids, intelligent wheelchairs, and voice, activated assistants as well as AI, driven communication tools led to the reduction of task completion time, the increase of usability, and the improvement of user satisfaction in comparison with the use of traditional devices for assistance. Users expressed that they had more autonomy in the areas of mobility, communication, and self, care activities which is a strong indication that AI AT can thus substantially lessen the dependence on caregivers and conventional aids.

Improved Quality of Life (QoL) and Social Inclusion: Numerous research have documented that AI, powered AT, has beneficial effects on social participation, inclusion and general well-being. AI AT enabled people with disabilities to become more involved in social, educational and community activities, thus leading to an improvement in their perceived quality of life. This was the case with people with visual, motor, or cognitive impairments. As an example, the use of AI, based screen readers, voice assistants, and adaptive learning interfaces in inclusive education environments made it possible for students with disabilities to have more equal access to content and to participate more, thus lessening the co, existence of barriers in education and social integration.

Psychosocial and Cognitive Benefits: AI AT has the potential to positively impact the cognitive, communicative, and psychological aspects of users' lives beyond just enhancing mobility and accessibility. Various assistive technologies that utilize natural language processing, computer vision, and adaptive features have been employed as memory aids, in navigation, communication, and as support for neurodiverse users, thus leading to improved self, efficacy, independence, and better mental health outcomes. Users of AI AT as a means of communication or cognitive support have shared that they experienced an increase in their confidence level, a decrease in the stress associated with the execution of the daily tasks, and better social engagement.

Barriers, Ethical Concerns, and Mixed Outcomes: Nevertheless, the publications pointing to AI AT also indicate difficulties, drawbacks, and dangers. A few AI AT solutions to assist the blind are still scarcely evaluated; most prototypes have not been put through exhaustive, long, term trials with human subjects, and failure cases or negative consequences are seldom reported. Problems like algorithmic bias, privacy concerns, data security, high cost, accessibility inequities (especially in low resource settings), and sustainability have become major obstacles for the widespread and fair use of AI AT.

Discussion

Both empirical studies and applied reviews have found the integration of AI in assistive technologies has substantial benefits for individuals with disabilities. These benefits mostly revolve around functional independence, social inclusion, and quality of life. The evidence aligns with conceptual frameworks that see disability not only as a limitation of the body or senses but as an interaction between the person and their environment. AI AT thus becomes a way of changing this interaction to one of more autonomy and inclusion. In other words, the improvements in mobility, communication, and daily living made possible by AI AT can result in less dependence on caregivers, the removal of barriers to participation in education and work, and the increase in the feeling of empowerment and dignity. The cognitive and psychosocial benefits, in particular, attest to the notion that AT, when augmented with intelligence, can become a source of good mental health, boosting self, esteem and social well, being, rather than just a means of physical accessibility (Aftab et al., 2025; Alahmari et al., 2025).

The potential, however, is not consistent. Differences in outcomes depending on types of disabilities, and situations (for example, resources, rich vs. low, resource settings), and the presence of social/structural barriers (like cost, infrastructure, and support) imply that AI AT cannot solve all problems. A set of ethical concerns, especially around data privacy, bias, and equity, that should be handled very carefully. In addition, a significant number of publications emphasize that there is a shortage of long, term, large, scale evidence that would demonstrate maintained benefits, user acceptance, and real, world adoption. The literature is largely composed of pilot studies and short, term evaluations; long, term follow, ups, cost, effectiveness analyses, and user, centered assessments are still at a nascent stage. Therefore, AI AT is a technology with a transformative potential, but the extent of its influence in the real world is largely dependent on factors such as inclusive design, user involvement, availability of infrastructure, affordability, and ethical implementation (Bagadood et al., 2025; Sajjad et al., 2025).

Conclusion

The integration of AI in assistive technology (AI AT) has a profoundly positive impact on the functional independence, quality of life, social inclusion, and psychosocial well, being of people with disabilities, as is evident from the reviewed evidence. Hence, PWDs can through AI AT, gain access to technologies that not only help compensate their losses but also can dynamically support and interact with their individual needs and thus promote autonomy. However, such a positive scenario is far from being true, not only do such benefits of AI AT not be guaranteed, but also they are not evenly distributed since the factors that mediate them abound, such as accessibility (cost, infrastructure), inclusive design practices, user involvement, setting and monitoring of ethical and privacy issues, and support systems sustainability. The success of AI AT is thus conditioned by the presence of such mediating factors, otherwise AI AT would be a technological luxury for a few rather than a universal tool. To sum up, AI technologies can make a difference and change the lives of people with disabilities, however, a necessary and sufficient clause for this to happen is rigorous, inclusive, and ethical development, evaluation, and deployment.

Recommendations

Following

1. Deploy large, scale, long, term empirical studies that comprehensively understand real, world effects of AI AT over different disabilities, and in different contexts, such as mental health, social participation, employment, and quality of life.
2. Use inclusive, user, centered design methods when creating AI AT Involve people with disabilities in design, testing, and evaluation phases to gain usability, relevance, and contextual appropriateness.
3. Deal with ethical, privacy, and equity issues upfront Provide data protection, transparency, fairness in algorithm design, and accessibility for users who are low, income or are living in resource, limited areas.
4. Support the affordability and scalability of AI AT Facilitate the creation of low, cost, open, source, or government, subsidized AI AT solutions to raise equitable access.
5. Connect AI AT with the help of local systems, Harmonize AI AT with rehabilitation services, social support networks, education, and policy frameworks to foster impact and sustainability.
6. Investigate and document failures, side effects, and long, term usability Report negative outcomes, user dissatisfaction, maintenance issues, or abandonment in studies, to develop realistic evidence base and enhance future design.

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