INTERNATIONAL JOURNAL OF SOCIAL SCIENCES BULLETIN
ISSN: (E) 3007-1917 (P) 3007-1909
Volume 4, Issue 6, 2026

AI ADOPTION AMONG SPEECH-LANGUAGE THERAPISTS: ATTITUDES, USEFULNESS, AND PROFESSIONAL CHALLENGES

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DOI: https://doi.org/10.5281/zenodo.20828306

Received	Accepted	Published
24 April 2026	06 June 2026	21 June 2026

ABSTRACT

Artificial Intelligence (AI) is rapidly transforming healthcare by supporting assessment, diagnosis, documentation, and clinical decision-making. Despite its growing applications in speech-language therapy, limited evidence exists regarding Speech-Language Therapists' (SLTs) acceptance of AI, particularly in developing countries. This study examined SLTs' attitudes, perceived usefulness, perceived ease of use, behavioural intention, and professional challenges associated with AI adoption using the Technology Acceptance Model (TAM). A quantitative cross-sectional survey was conducted among 488 Speech-Language Therapists working in diverse clinical settings across Pakistan. Data were analyzed using descriptive statistics, independent samples t-tests, and one-way ANOVA. The findings revealed moderately positive attitudes toward AI and high perceived usefulness in enhancing clinical performance and service delivery. However, respondents reported only moderate ease of use and behavioural intention to adopt AI technologies. Professional concerns, particularly regarding digital literacy, training, data privacy, reliability, and algorithmic bias, were substantial. The study concludes that while SLTs recognize the potential benefits of AI, successful implementation requires structured training, ethical guidelines, institutional support, and locally validated AI tools to ensure responsible and effective integration into speech-language therapy practice.

Keywords: *Artificial Intelligence, Speech-Language Therapists, Technology Acceptance Model, AI Adoption, Healthcare Technology, Pakistan.*

INTRODUCTION

Artificial intelligence (AI) is increasingly transforming healthcare practice by supporting assessment, diagnosis, documentation, clinical decision-making, and service delivery. The application of intelligent systems has grown in healthcare over the last few years, due to developments in machine learning, natural language processing (NLP), and generative AI. These technologies have been shown to have significant potential for improving efficiency, decrease administrative burden and enhance evidence based practice (Topol, 2019; Venkatesh et al., 2003). AI is transforming speech-language

therapy into an application for speech analysis, language assessment, therapy planning, progress monitoring, and teletherapy (Ball et al., 2022; Rouse et al., 2021).

Speech-Language Therapists (SLTs) collaborate with people with communication, speech, language, voice, fluency and swallowing difficulties. This increase in caseloads, workforce shortages, and increased demand for services has led healthcare professionals to seek technological solutions that enhance the provision of services (American Speech-Language-Hearing Association [ASHA], 2024). AI tools can help therapists by creating therapy materials, automating documentation, analysing speech and language samples, and spotting patterns that can aid clinical decision-making (Aggarwal et al., 2025; Austin et al., 2025). This has led to the growing recognition of AI as a helpful tool for improving clinical efficiency and access to speech-language services.

However, these opportunities are limited and adoption of AI in SALT is still not widespread. In addition to technical skills, researchers have also found that clinicians' perceptions, attitudes, and willingness to use the technology in their practice are critical to the successful implementation of technology (Holden & Karsh, 2010; Venkatesh et al., 2003). Although many therapists are aware of the benefits of AI, there are also concerns about the accuracy of the AI recommendations, the reliability of the automated assessment, data privacy, and a diminished human component in therapy (Bowen & Dettman, 2022; Suh et al., 2024). These worries can impact on healthcare providers' adoption of AI tools in everyday practice.

Further challenges can impact the adoption of AI in developing countries like Pakistan. Lack of adequate technological infrastructure, lack of professional training, lack of access to digital resources and the lack of systems validated in the local context can limit the opportunities for effective implementation (Shafi et al., 2022). Additionally, SLTs in multilingual and diverse cultural settings may wonder if current AI products are truly able to meet the language needs of their patients. The issues pointed out under this theme emphasize that it is essential to consider the therapists' perception of AI in local contexts and not just evidence produced in high-income countries (Nisha et al., 2025).

The Technology Acceptance Model (TAM) is a well-known model of technology adoption behaviour. The intention to use a new technology is influenced mostly by perceived usefulness and perceived ease of use (Davis, 1989; Davis et al., 1989) of an individual. These constructs have shown to be consistently predictive of healthcare professionals' acceptance of various forms of digital innovations such as Telehealth, eHR and AI Assistive Devices or Systems in clinical settings (Esmaeilzadeh, 2020; Holden & Karsh, 2010). The combination of TAM with speech-language therapy provides an opportunity to gain insight into what factors would make these speech-language pathologists more likely to embrace AI.

While the research on the application of AI in healthcare continues to expand, there are limited research studies dedicated to the adoption of AI among Speech-Language Therapists (SLTs). In the literature, technical progress, pilot interventions or qualitative explorations have been the main focus of the studies, carried out in Western countries (Bowen & Dettman, 2022; Austin et al., 2025). The evidence from Pakistan and other developing countries is scarce, however. Thus, this study focuses on Speech-Language Therapist (SLT) attitudes towards AI, perceived usefulness, perceived ease of use, behavioural intention, and professional issues related to the use of AI. The results will be included in the expanding body of research on the acceptance of technology in speech-language therapy and could inform practices for educators, policymakers, and healthcare institutions aiming to foster the responsible implementation of AI in clinical settings.

Research Objectives

The study aims to achieve the following objectives:

1. To examine Speech-Language Therapists' attitudes toward the adoption of Artificial Intelligence (AI) in clinical practice.
2. To assess Speech-Language Therapists' perceptions regarding the usefulness of AI tools in speech-language therapy services.

3. To evaluate Speech-Language Therapists' perceptions of the ease of use of AI-based tools in clinical settings.
4. To investigate Speech-Language Therapists' behavioural intention to use AI technologies in speech-language therapy practice.
5. To identify the professional challenges and concerns associated with AI adoption among Speech-Language Therapists.
6. To determine whether significant differences exist in AI adoption constructs based on gender and years of professional experience.

Literature Review and Theoretical Framework

Artificial Intelligence in Healthcare and Speech-Language Therapy

The use of AI in healthcare is a critical space to explore as it presents unique opportunities to assist in diagnosis, treatment planning, documentation, monitoring, and clinical decision making. AI-powered systems can process vast amounts of data, uncover clinical trends, streamline administrative tasks, and aid in evidence-based decision-making, which are key applications across various healthcare sectors. Topol (2019) stated that AI could help transform healthcare by decreasing the mundane work of clinical care and enabling clinicians to focus on patient-centered care. Likewise, the rise of digital health technologies has demonstrated that clinicians' receptivity to technology is crucial for the successful implementation of technology in the real-world clinical setting (Holden & Karsh, 2010).

Speech-language therapy is a profession with a special focus on speech, language and communication disorders, fluency disorders, voice disorders and swallowing disorders, and therefore AI plays an important role in this field. There are a variety of ways that AI-powered tools can help Speech-Language Therapists (SLTs), such as: analysis of speech samples, language analysis, automated transcription, generation of therapy materials, progress monitoring, and telepractice. Manual analysis of speech and language patterns has been replaced by automatic speech and language analysis using natural language processing (Ball et al., 2022; Rouse et al., 2021). These advancements point towards the possibility of AI aiding SLTs with clinical efficiency and with facilitating more objective decision making.

AI tools also are suggested to be helpful in creating resources for therapy and minimizing paperwork in recent research. Austin et al. (2025) surveyed Speech-Language Pathologists and students about their perceptions and experiences with AI and ChatGPT, which revealed positive overall perceptions, but little to no clinical use. In a related study, Aggarwal et al. (2025) reported that both audiologists and speech-language therapists identified AI tools as useful to support academic and administrative duties, as well as clinical tasks. The results indicate that SLTs may be more inclined to use AI when they believe it holds promise for helping them in their jobs, or when they feel it will be helpful and of service to them.

Professional Attitudes Toward AI Adoption

Clinicians' attitudes toward AI play a significant role in their adoption of it. Positive attitudes can emerge if SLTs feel confident that AI can optimize therapy planning, assist in assessment, save time, and improve client outcomes. Negative attitudes can occur, however, when therapists see AI as complex, unreliable, and potentially a threat to their autonomy. Previous technology adoption studies have established that clinician beliefs and perceptions are significant factors in their intention to use innovations in digital tools (Venkatesh et al., 2003; Holden & Karsh, 2010).

Attitudes of speech-language therapists to AI seem to be mixed in the field of speech-language therapy. Others view AI as a tool that can complement the work of therapists.Other therapists consider AI a complementing tool to the therapist's work. Others are hesitant since the therapy depends on empathy, interpersonal communication, cultural comprehension, and professional judgment. AI's diagnostic value is something that SLTs may welcome, but they may also be concerned about depersonalization and their loss of clinical control (Bowen and Dettman, 2022). The two-fold response indicates that the use of AI in SLT is not only a technical challenge but also a professional and ethical one.

Other factors like gender, age, professional experience and prior exposure to digital tools might also shape attitudes towards AI. Studies on the adoption of healthcare IT technologies indicate that the younger generation and those with more IT experience tend to be more accepting of new technologies (Guo et al., 2020). More advanced clinicians, however, might be more concerned about accuracy, ethical issues, and the impact of technology on the profession. So, the analysis of the differences in the adoption of AI among different demographic groups could highlight the need for additional support, training and institutional guidance.

Perceived Usefulness and Ease of Use of AI Tools

Perceived usefulness is the degree to which professionals think that the technology will enhance their performance at work. SLT – AI could potentially be beneficial in the context of therapist preparation for therapy, assisting with identifying speech and language patterns, enhancing documentation, monitoring progress, or reducing repetitive tasks. According to Davis (1989), perceived usefulness was one of the most important factors predicting the acceptance of technology. Further research in the healthcare sector also showed that adoption of digital tools is more likely when doctors think that the tools enhance clinical performance and service quality (Holden & Karsh, 2010; Esmaeilzadeh, 2020).

Perceived ease of use is also considered to be a significant factor as even a beneficial technology can be rejected if the clinicians have a negative experience with the technology, or find it to be time consuming or difficult to integrate into their current practice. Added convenience features for SLTs can include ease of use with simple interfaces, instructions, accessibility, integration with clinical workflows and technical support. Therapists might be reluctant to utilize AI tools if they need technical expertise or if they interfere with their usual practice. This is especially relevant in developing countries, where there might be less access to digital infrastructure and professional training (Shafi et al., 2022).

Institutional, language and technological issues could pose a barrier to the adoption of AI in Pakistan among SLTs. AI speech and language tools often are created in Western settings and may not be tested for local languages, dialects and culturally diverse populations. It raises issues of accuracy and fairness, particularly when tools are used with clients who do not speak English.This raises concerns about accuracy and fairness, particularly when tools are used with clients who do not speak English. Thus, the perceived usefulness and ease of use need to be interpreted in the context of local clinical realities and not a priori assumptions about the effectiveness of AI (Nisha et al., 2025; Suh et al., 2024).

Professional Challenges and Ethical Concerns

Speech-language therapists face several professional and ethical issues with the use of AI. The privacy of the data is a significant issue since speech and language data can contain private information such as personal information, developmental, medical and educational information. SLTs must have a professional responsibility to safeguard their client's privacy, and the use of AI platforms can raise questions about data storage, consent, and third-party access. There are numerous chances for AI to be adopted in clinical professions, but challenges to privacy and confidentiality have been repeatedly cited (ASHA, 2023; Suh et al., 2024).

Reliability and accuracy of outputs created by AI is another crucial challenge. AI systems can give the wrong recommendations, misunderstand speech and not recognize linguistic and cultural diversity. These are errors that could impact on the decision for assessment, therapy planning, and client outcomes in speech-language therapy. In multilingual societies, the use of AI systems trained on a small number of languages can have negative consequences if they exhibit high levels of bias for non-standard accents, dialects, or minority languages (Nisha et al., 2025). The concerns point to the need for AI to help rather than hinder human judgment.

Professional identity is also of concern. Some SLTs may be concerned about the loss of value of human knowledge and expertise, or about the possibility of AI taking over some clinical functions. The current literature, however,

suggests that AI is a more appropriate assistive technology that can assist therapists in routine tasks, but that complex clinical decision making, empathy, counselling and interpersonal therapy should be left to human therapists (Topol, 2019; Bowen & Dettman, 2022). SLTs need training, ethical guidelines, institutional support and AI tools that are relevant to their context and adhere to professional standards for responsible adoption.

Technology Acceptance Model

The Technology Acceptance Model (TAM) developed by Davis (1989) is used to guide this study. TAM describes the way in which people are attracted to and adopt new technologies. The model assumes that there are two key beliefs that affect technology adoption: perceived usefulness and perceived ease of use. Perceived usefulness is the user's expectations of technology improving job performance, and perceived ease of use is the user's expectations of requiring minimal effort to use the technology. The attitudes and behavioural intention to use the technology are influenced by these two constructs (Davis, 1989; Davis et al., 1989).

TAM has been extensively used in health care research as a simple and effective framework for getting an understanding of clinicians' acceptance of digital systems. Holden and Karsh (2010) identified that TAM is a suitable model to examine the adoption of healthcare technology, especially when perceived usefulness is important in determining the intention to use new technologies. Esmaeilzadeh (2020) also revealed that trust, professional alignment, and perceived reliability are key factors in the assessment of AI-based tools by healthcare professionals. It is pertinent to SLTs as the use of AI depends not just on usefulness and ease of use, but trust, ethics, and professional concerns.

The current study uses TAM to understand the adoption of AI among SALT. The constructs used in the core constructs are attitudes towards AI, perceived usefulness, perceived ease of use, behavioural intention, and professional challenges. This framework is appropriate as it links therapists' perceptions to their intention to employ AI in clinical practice. The study's application of TAM to the context of SLT in Pakistan adds to the body of knowledge in technology acceptance studies and offers insights into the creation of training programs, ethical guidelines, and practical approaches for responsible use of AI in SLT.

Research Methodology

Research Design

The design of this study was quantitative, cross sectional survey design that looked at Artificial Intelligence (AI) adoption by Speech-Language Therapists (SLTs). As the researcher wished to measure the attitudes, perceived usefulness, perceived ease of use, behavioural intention and professional challenges of the SLTs, the quantitative approach was suitable. The cross-sectional design enabled data collection at a single time with respondents and enabled the researcher to find patterns in AI acceptance among the different groups of respondents.

Population and Sample

The study population comprised practicing Speech-Language Therapists from hospitals, clinics, schools, rehabilitation centres and private practice in Pakistan. The sample consisted of 488 SLP's who were qualified and had clinical experience relevant to speech-language therapy. Those who did not participate in this research (SLT students and non-practicing professionals) and respondents who had incomplete questionnaires were not included in the analysis. Male and female therapists, with various qualifications, levels of experience and work environments were included.

Sampling Technique

To ensure representation of therapists from various settings and categories, a stratified sampling technique was employed. Patients were contacted via professional contacts, clinical facilities, rehabilitation centers, private clinics, and internet. This method was found to be appropriate, as Speech-Language Therapists are employed across a range of different work

environments and stratification ensured responses from a number of different types of workplaces.

Research Instrument

The data was gathered using a structured questionnaire which was designed based on Technology Acceptance Model (TAM). The survey included demographic data and five key constructs: attitudes towards AI, perceived usefulness, perceived ease of use, behavioural intention to use AI, and professional challenges and concerns. Items were rated on a 5-point Likert scale (1, very strongly disagree; to 5, very strongly agree). Items were modified from previous technology acceptance and AI adoption studies, and adapted to the speech-language therapy context.

Validity and Reliability

The questionnaire was expert checked for content validity. It was reviewed by professionals who are experienced in speech-language therapy, research methodology and digital health. They helped clarify, refine, and better focus items on their relevance to the study goals. A pre-test was carried out to investigate the reliability of the instrument in the pilot study before final data collection. The internal consistency of all major constructs was acceptable as indicated by the reliability results (Cronbach alpha > .70).

Data Collection Procedure

Data collection was done online and offline. Google Forms were shared through professional WhatsApp groups, emails and SLT networks and online responses were gathered. In-person data were gathered from therapists in hospitals, clinics, schools and rehabilitation centres. The study was voluntary and respondents were briefed about the research prior to filling out the questionnaire. Only complete responses have been analysed.

Data Analysis

The data collected were analysed using SPSS version 26. Demographic features of respondents and the overall pattern of responses were summarized using descriptive statistics (means, standard deviations, frequencies and percentages). The t-test (independent samples) was used to compare the adoption constructs for gender. One-way ANOVA was used to determine differences based on years of professional experience. Post-hoc comparisons were used to highlight any group-level differences when significant differences were found. The criterion of $p < .05$ was used.

Ethical Considerations

Ethical principles were followed throughout the study. All participants gave informed consent before data collection. Participants were informed that they were free to participate or not and could withdraw at any point. No personal identifying information was gathered and confidentiality and anonymity were adhered to. Collected data were only used for academic research.

Table 1 *Demographic Characteristics of the Respondents (N = 488)*

Variable	Category	n	%
Gender	Male	177	36.3
	Female	311	63.7
Age (Years)	Under 30	59	12.1
	31–35	177	36.3
	36–40	101	20.7
	41–45	88	18.0
	46 and Above	57	11.7
Qualification	BS Speech	157	32.2
	MS/MPhil Speech	180	36.9

Variable	Category	n	%
	PhD	33	6.8
	PGD in Speech	128	26.2
Professional Experience	3–6 Years	107	21.9
	7–9 Years	178	36.5
	10–13 Years	83	17.0
	14–17 Years	57	11.7
	17+ Years	63	12.9
Province of Practice	Punjab	250	51.2
	Sindh	100	20.5
	Khyber Pakhtunkhwa	80	16.4
	Islamabad Capital Territory	58	11.9
Workplace	Hospital	78	16.0
	School	103	21.1
	Clinic	144	29.5
	Rehabilitation Center	91	18.6
	Private Practice	77	15.8

Table 1 presents the demographic characteristics of the 488 Speech-Language Therapists who participated in the study. The majority of the respondents were female (63.7%) with the males making up 36.3% of the sample. The age group 31-35 years had the largest number of participants (36.3%) followed by the age group 36-40 years (20.7%). As far as educational qualifications, the highest number of participants had an MS/MPhil degree in Speech-Language Therapy (36.9%) and the 2nd largest group was the BS (32.2%).

As far as professional experience is concerned, most of the respondents said that they had 7-9 years' experience (36.5%) and 21.9% said that they had 3-6 years of experience. The majority of respondents were practicing in Punjab (51.2%) followed by Sindh (20.5%), Khyber Pakhtunkhwa (16.4%) and Islamabad Capital Territory (11.9%). For work settings, the most common place of work was the clinic (29.5%), followed by the school (21.1%), rehabilitation center (18.6%), hospital (16.0%), and private practice (15.8%). In general, the sample was representative of Speech-Language Therapists in Pakistan with respect to various demographic, educational and professional backgrounds.

Table 2: *Descriptive Statistics of Speech-Language Therapists' Attitudes Toward Artificial Intelligence (N = 488)*

Statement	Mean	SD
I believe AI tools can improve the quality of speech-language therapy services.	3.71	1.09
Using AI in clinical practice would allow me to spend more time with clients rather than on administrative tasks.	3.55	1.13
AI tools are generally helpful for generating therapy materials and resources.	3.67	1.07
I feel positive about incorporating AI into my daily clinical workflow.	3.32	1.15
AI has the potential to make speech-language therapy more efficient and accessible.	3.75	1.05
Overall, I have a favorable attitude toward AI adoption in SLT.	3.44	1.13
Overall Mean	**3.57**	**1.10**

Table 2 shows the descriptive statistics of Speech-Language Therapists' attitudes toward Artificial Intelligence. The overall mean score (M = 3.57, SD = 1.10) reflects a moderate positive attitude towards the use of AI in speech-language therapy practice. The highest mean scores were for the individual statements on how speech-language therapy could be more efficient and accessible with the use of AI (M = 3.75, SD = 1.05), and how the quality of speech-language therapy could be enhanced by the use of AI (M = 3.71, SD = 1.09). They also shared a similar level of agreement that AI can assist in creating therapy materials and resources (M = 3.67, SD = 1.07) and that it can save therapy time on administrative tasks (M = 3.55, SD = 1.13). The mean scores were generally lower for positive attitudes towards integrating AI into everyday clinical practice (M = 3.32, SD = 1.15) and for overall attitudes towards AI adoption (M = 3.44, SD = 1.13). The results indicate the potential benefits of AI to Speech-Language Therapists, however, some uncertainty persists about the use of AI in clinical practice.

Table 3: *Descriptive Statistics of Speech-Language Therapists' Perceived Usefulness of AI Tools (N = 488)*

Statement	Mean	SD
AI tools would enhance my job performance in speech-language therapy.	3.70	1.07
Using AI in therapy would improve the effectiveness of my services.	3.64	1.09
AI tools would enable me to handle a higher caseload with better outcomes.	3.53	1.11
The use of AI tools would increase my overall productivity in clinical practice.	3.60	1.09
AI tools would help me make more accurate and evidence-based clinical decisions.	3.74	1.05
Using AI would improve the quality of documentation and reporting in my practice.	3.58	1.10
AI tools would support better monitoring of client progress over time.	3.68	1.07

Statement	Mean	SD
Using AI would reduce the time I spend on repetitive administrative and clinical tasks.	3.63	1.08
AI tools would assist me in identifying speech and language patterns that I might otherwise miss.	3.70	1.07
AI tools would be useful in helping me achieve my professional goals in SLT.	3.77	1.05
Overall Mean of Perceived Usefulness	**3.66**	**1.08**

Table 3 shows the Speech-Language Therapists' perceptions on the usefulness of Artificial Intelligence in clinical practice. The overall mean score (M = 3.66, SD = 1.08) suggests that the general perception of AI tools was that they are helpful in supporting SLP services. This discovery highlights the potential of AI to enhance efficiency, productivity, and clinical decision making, which is a recognition by therapists for the positive role AI can play in the therapy field.

The most frequently endorsed individual items were the statements that AI tools would be helpful to therapists in achieving their professional goals (M = 3.77, SD = 1.05), and that AI can help them make more accurate and evidence-based clinical decisions (M = 3.74, SD = 1.05). There was also consensus that AI would help with job performance (M = 3.70, SD = 1.07) and that it could also be useful for identifying patterns in speech and language that may be missed during a session (M = 3.70, SD = 1.07), and monitoring client progress over time (M = 3.68, SD = 1.07).

The mean scores for perception of increased ability to handle larger caseloads with better outcomes (M = 3.53, SD = 1.11) and documentation/reporting (M = 3.58, SD = 1.10) were relatively low. However, the average scores across the spectrum were higher than the scale center indicating mostly favorable attitudes towards the usefulness of AI. Overall, the results indicate that Speech-Language Therapists are optimistic about how AI could be a useful resource to help them implement effective speech-language therapy services and effectively perform their role.

Table 4: ***Descriptive Statistics of Speech-Language Therapists' Perceived Ease of Use of AI Tools (N = 488)***

Statement	Mean	SD
I find AI tools easy to learn and use in my clinical practice.	3.11	1.18
The interface and operation of AI tools would be clear and understandable.	3.19	1.17
Learning to use AI tools would be straightforward for me.	3.05	1.18
It would be easy for me to become skilful at using AI tools.	3.08	1.17
I can easily locate and access AI tools whenever I need them in my clinical setting.	2.90	1.19
The process of integrating AI tools into my daily workflow would not require significant technical knowledge.	2.80	1.20
Overall Mean Perceived Ease of Use	**3.02**	**1.18**

Table 4 shows the Speech-Language Therapists' perception of the use of Artificial Intelligence tools in clinical practice. The mean score (M = 3.02, SD = 1.18) overall is at the moderate level, which means that respondents generally did not know how easy and accessible AI technologies are. Although therapists saw value in the use of AI, they seemed less confident that they could use and incorporate these instruments efficiently into the clinical context.

The most positive individual item rating was for the statement that the interface and operation of AI tools would be clear and understandable (M = 3.19, SD = 1.17), while the next highest was for the perception that AI tools are easy to learn and use in clinical practice (M = 3.11, SD = 1.18). Moderate levels of agreement were also indicated for the extent to which they could become proficient in using AI tools (M = 3.08, SD = 1.17), and the ease with which they could learn AI technologies (M = 3.05, SD = 1.18).

The availability and accessibility of AI tools in clinical settings (M = 2.90, SD = 1.19) and the perception that incorporating AI into day-to-day practice would not involve much technical expertise (M = 2.80, SD = 1.20) had the lowest means. The results indicate that while Speech-Language Therapists believe that AI could be valuable, they have some concerns about the technical complexity, accessibility, and implementation of the technology. In summary, the findings suggest that investment in training, technical assistance, and accessibility of AI tools could potentially boost therapists' confidence in integrating AI into their clinical practice in speech-language pathology.

Table 5: ***Descriptive Statistics of Speech-Language Therapists' Behavioural Intention to Use AI (N = 488)***

Statement	Mean	SD
I intend to use AI tools in my clinical practice within the next 12 months.	3.34	1.13
I plan to integrate AI into my speech-language therapy sessions.	3.26	1.14
I would recommend AI tools to my colleagues in speech-language therapy.	3.51	1.09
I believe using AI tools is a good idea for my future professional development.	3.61	1.07
Overall Mean Behavioural Intention to Use AI	**3.43**	**1.11**

Table 5 shows the descriptive statistics pertaining to the behavioural intention of Speech-Language Therapists to use Artificial Intelligence in their professional practice. The overall mean score (M = 3.43, SD = 1.11) shows that, in general, the respondents had a moderate positive intention towards the adoption of AI technologies in the field of speech-language pathologies. The results indicate that while therapists acknowledge some challenges with AI, many are interested in its future application in clinical practice.

The highest mean score was for "It is a good idea to use AI tools for future professional development" (M = 3.61; SD = 1.07) among the individual items. In general, respondents had positive attitudes toward the adoption of AI tools in the profession, as they were willing to recommend AI tools to their colleagues (M = 3.51, SD = 1.09). These results indicate that therapists recognize the potential benefits of AI for professional development and enhancing service provision.

However, relatively lower mean scores were found on the intention to use AI tools within the next 12 months (M = 3.34, SD = 1.13) and plans to use AI directly in therapy sessions (M = 3.26, SD = 1.14). The findings could be stemming from uncertainty about the implementation, training needs and availability of the right AI tools. In general, the results show that Speech-Language Therapists have a medium readiness level to use AI technologies, but more support and guidance could be needed to support the implementation in practice.

Table 6 ***Descriptive Statistics of Speech-Language Therapists' Professional Challenges and Concerns Regarding AI Adoption (N = 488)***

Statement	Mean	SD
Ethical concerns (e.g., data privacy and confidentiality of client speech data) would limit my use of AI.	4.25	0.90
The accuracy and reliability of AI-generated therapy materials are a major concern for me.	4.18	0.94
Lack of adequate training and digital literacy is a significant barrier to AI adoption in my practice.	4.36	0.82
I worry that over-reliance on AI could reduce my clinical skills and therapeutic empathy.	4.08	0.98
Regulatory and legal issues (e.g., data protection laws) make AI implementation difficult in my setting.	3.98	1.02
Integration of AI with my existing clinical workflows is challenging.	3.88	1.05
Algorithmic bias in AI tools (especially for diverse languages or populations) worries me.	4.16	0.94
I fear that AI may eventually replace some of the roles currently performed by human SLTs.	4.00	1.02
Overall Professional Challenges and Concerns	**4.11**	**0.96**

Table 6 shows the SLP's professional difficulties and concerns about the use of AI in clinical practice. Across all the questions, the overall mean score (M = 4.11, SD = 0.96) suggests that the respondents were generally very concerned about the different professional, ethical, and practical issues related to the implementation of AI. The results indicate that while therapists are aware of the potential benefits of AI, there are still significant challenges to overcome before it can be widely adopted.

The lack of adequate training and digital literacy as barriers to AI adoption was the highest mean score of the individual challenges (M = 4.36, SD = 0.82). Ethical issues involving privacy and confidentiality of clients' information received high ratings as well (M = 4.25, SD = 0.90). The participants also reported concerns about the accuracy and reliability of AI-generated materials for therapy (M = 4.18, SD = 0.94) and the potential for algorithmic bias, especially with linguistically and culturally diverse populations (M = 4.16, SD = 0.94).

Other concerns were the potential loss of clinical skills and therapeutic empathy as a result of too much reliance on AI (M = 4.08, SD = 0.98); fear of losing some jobs to AI technologies (M = 4.00, SD = 1.02); and challenges related to regulatory, legal, and workflow integration issues (M = 4.02, SD = 1.07). While the concern with integration had the lowest mean score (M = 3.88, SD = 1.05), it was still higher than the scale mid-point, suggesting it is still an important issue.

The overall results indicate that Speech-Language Therapists have significant concerns about the ethical, technical, and professional ramifications of AI adoption. The findings underscore the importance of providing focused training, ethical guidelines, regulatory measures, and context-specific AI tools to facilitate the responsible use of AI in SALT.

Table 7 *Independent Samples t-Test Results for Gender Differences Across AI Adoption Constructs (N = 488)*

Construct	Male M (SD)	Female M (SD)	t	df	p
Attitudes Toward AI	3.78 (0.82)	3.48 (0.91)	3.84	486	.001
Perceived Usefulness	3.88 (0.78)	3.62 (0.85)	3.45	486	.001
Perceived Ease of Use	3.18 (0.88)	2.89 (0.92)	3.47	486	.001
Behavioural Intention	3.72 (0.85)	3.48 (0.90)	2.96	486	.003
Professional Challenges and Concerns	4.02 (0.79)	4.30 (0.74)	-3.98	486	.001

Table 7 shows the results from the independent samples t-test, used to analyze gender differences across the five constructs of AI adoption. The results showed statistically significant differences between male and female Speech-Language Therapists in all variables measured ($p < .05$).

Male respondents reported significantly more positive attitudes toward AI (M = 3.78, SD = 0.82) than female respondents (M = 3.48, SD = 0.91), t(486) = 3.84, p = .001. Similarly, males demonstrated higher perceived usefulness of AI tools (M = 3.88, SD = 0.78) compared to females (M = 3.62, SD = 0.85), t(486) = 3.45, p = .001. Additionally, significant differences were found for perceived ease of use, with male therapists having higher levels of perceived ease in learning and using AI technologies (M = 3.18, SD = 0.88) compared with female therapists (M = 2.89, SD = 0.92), t(486) = 3.47, p = .001.

When it comes to behavioural intention, there was also a gender difference with male respondents indicating a higher intention to use AI in future clinical practice (M = 3.72, SD = 0.85) than female respondents (M = 3.48, SD = 0.90), t(486) = 2.96, p = .003. Compared with male therapists, female therapists indicated significantly more professional challenges and concerns in using AI (M = 4.30, SD = 0.74) than male therapists (M = 4.02, SD = 0.79), t(486) = -3.98, p = .001.

The results showed that male SLP showed high acceptance of AI in attitudes, usefulness, ease of use, and behavioural intention while females demonstrated high level of concerns regarding ethical, professional, and practical challenges of AI adoption. The findings indicate that gender might be a pivotal factor influencing perceptions and acceptance of AI technologies in SLP practice.

Table 8 *Group Means, Standard Deviations, and Mean Differences by Gender Across AI Adoption Constructs (N = 488)*

Construct	Male M	Male SD	Female M	Female SD	Mean Difference (M–F)	t	p
Attitudes Toward AI	3.78	0.82	3.48	0.91	0.30	3.84	.001
Perceived Usefulness	3.88	0.78	3.62	0.85	0.26	3.45	.001
Perceived Ease of Use	3.18	0.88	2.89	0.92	0.29	3.47	.001
Behavioural Intention	3.72	0.85	3.48	0.90	0.24	2.96	.003
Professional Challenges and Concerns	4.02	0.79	4.30	0.74	-0.28	-3.98	.001

Table 8 shows the mean scores and standard deviations for male and female Speech-Language Therapists on each of the five constructs of AI adoption. The results showed a higher score for male respondents in the attitude towards AI, perceived usefulness, perceived ease of use, and behavioural intention constructs than female respondents. Attitudes towards AI (Mean Difference = 0.30) and perceived ease of use (Mean Difference = 0.29) were the largest means difference. The results indicated that male therapists had more positive attitudes towards the advantages and applicability of AI tools in SALT.

Gender disparities were also identified in perceived usefulness and behavioural intention, as male therapists were more likely to have positive perceptions of the usefulness of AI in clinical practice and more willing to use AI in the future. The differences in all comparisons were moderate in size, but all were statistically significant, suggesting that there was meaningful variation in the extent to which male and female respondents accepted the AI.

Contrary to that, female therapists experienced greater amount of professional issues and problems with the adoption of AI. The negative mean difference (-0.28) suggests that females were more likely to be concerned with topics like data privacy, ethical risks, reliability of AI-generated outputs, algorithmic bias, and resulting impact of AI on their profession. The results indicate that female therapists are aware of the potential advantages of using AI, but may have more concerns about its practical and ethical implications.

In general, the findings support the findings in Table 7 and show that there are statistically significant differences between the perceptions of gender regarding the use of AI by Speech-Language Therapists. Knowing the differences could assist policy makers, educators, and professional organizations to create targeted training and support programs to meet the needs of various practitioner groups.

Discussion

The results of the present study revealed that Speech-Language Therapists had a moderately positive attitude regarding the use of Artificial Intelligence in clinical practice. The overall attitude mean score showed that the majority of respondents were aware that AI has potential to enhance the quality of the therapy, increase efficiency, and facilitate access to speech-language services. As reported by Austin et al. (2025), SLP and students were generally assessing AI and ChatGPT as helpful tools, but not so much in clinical practice. Likewise, AI tools were found to be of interest to professionals in audiology and speech-language therapy, particularly with regard to academic, admin and support tasks (Aggarwal et al. 2025). The parallels indicate that SLTs are not against the use of AI but seem to be cautiously optimistic about the potential role that AI can play in professional practice.

From the results it also can be seen that the mean score of perceived usefulness is relatively high. Respondents thought of AI helping with evidence-based clinical decision making, as well as enhancing professional performance, identifying speech and language patterns and supporting therapists' professional goals. The finding is congruent with the Technology Acceptance Model (Davis, 1989; Davis et al., 1989) which states that perceived usefulness is one of the strongest predictors of technology acceptance. In healthcare, utility has also been identified as a significant determinant of the acceptability of digital systems and AI-based tools for healthcare information among clinicians (Holden & Karsh, 2010; Esmaeilzadeh, 2020). This translates to AI being more readily embraced by SLP in speech-language therapy because of the perceived enhancements in therapy planning, documentation, progress monitoring, and clinical decision making.

Perceived ease of use was less than perceived usefulness, however. This indicates that even though SLTs believe that AI is useful, they feel less confident in learning and accessing AI tools as well as incorporating them into their everyday clinical practice. This is significant because ease of use is a factor on perceived usefulness and behavioural intention (Davis, 1989) as stated by TAM. When the use of AI tools is challenging due to lack of understanding, need for technical skills, or limited

access in clinical setting, therapists may be reluctant to use them despite their potential benefits. This finding aligns with that of Shafi et al., (2022), who noted that inadequate digital infrastructure, training or institutional support are important barriers to digital health uptake in South Asian contexts.

The level of willingness to integrate AI into future practice was at a moderate level and reflected in the results of the behavioural intention. However, the participants were more likely to recommend the use of the AI tools and believed that the AI could be helpful for professional development, but their intention to use AI directly in therapy sessions was relatively lower. This indicates the difference in the acceptance of the subject and its application. Austin et al. (2025) found similar results, with positive attitudes towards AI but low clinical use. This difference could be attributed to lack of clarity about the accuracy of tools, ethical responsibility, training requirements, and the absence of clear clinical guidelines. Thus, while positive attitudes can be useful for actual adoption, it is also important that they receive practical training and institutional support.

A significant result of the study was the high level of professional challenges and concerns. Lack of appropriate training and digital literacy were the top concerns, followed by concerns about privacy, data accuracy and reliability, algorithmic bias, over-reliance on AI, and ethical considerations. These results align with Suh et al. (2024) who noted opportunities and challenges for using AI to support speech-language pathologists. They highlighted that while AI could assist in SLP practice, critical concerns like trust, usability, integration, and ethics still need to be addressed. Likewise, concerns were raised about the authenticity of the data, data security, inaccurate data, and formal training in AI usage among audiology and speech-language therapy professionals by Aggarwal et al. (2025).

Algorithmic bias is particularly pertinent in Pakistan, where speech-language therapists engage with clients from a wide variety of linguistic and cultural backgrounds. The data used to develop many AI tools is based on the native language of the English-speaking population or Western population, which may not always be accurate for regional languages such as Urdu, Punjabi, Sindhi, Pashto, Balochi, or other languages. Additionally, Nisha et al. (2025) noted that ethics and bias are significant matters in the implementation of AI among speech-language pathologists. So, AI tools shouldn't be implemented without local validation, culturally relevant data sets and professional guidelines. In the field of speech-language therapy, misinformation by AI can impact outcomes for the client, diagnosis and assessment, and therapy planning.

There were also differences between the sexes that were apparent in the present study. The attitudes, perceived usefulness, perceived ease of use and behavioural intention were higher among the male respondents, while professional concerns were higher among the female respondents. This discovery indicates that gender could be a factor in confidence, access or comfort levels for using AI tools. This finding should be taken with a grain of salt, though, as it doesn't necessarily mean rejection of AI by the female respondents. It can be higher ethical, professional and client related risks awareness. In the past, the technology acceptance studies have indicated that demographic factors can affect technology perceptions and technology adoption behaviour (Venkatesh et al., 2003; Guo et al., 2020). Thus, AI training programmes need to be inclusive and need to tackle the concerns of different practitioner groups.

The experience-based differences indicated that therapists with fewer years of experience reported more positive attitudes, perceived usefulness, ease of use, and behavioural intention towards AI. More professional concerns were reported by more experienced therapists, compared to inexperienced ones. This trend could mean that newer or early-career therapists are more comfortable using digital tools and are more willing to embrace AI-driven innovations. More experienced therapists might be more cautious as they will have a greater clinical experience and may be more aware of ethical considerations, professional obligations, and the restrictions of automatic systems. This discovery aligns with the literature of healthcare technology, which

indicates that individuals' experiences with technology and their digital exposure can influence their acceptance of it (Holden & Karsh, 2010; Guo et al., 2020).

The results indicate that the Technology Acceptance Model is relevant for understanding the adoption of AI by Speech-Language Therapists. Perceived usefulness was stronger than perceived ease of use and behavioural intention fell in the middle and professional concerns were high. This means the factors associated with accepting and/or being concerned by AI influence adoption by SLTs. The results indicate that it is not enough for an AI tool to be available to successfully integrate AI into SALT. It needs intensive training, ethical guidelines, professional regulation, and validation by the local area of AI systems. AI ought to be used as a support tool to complement SLT's clinical expertise, empathy, and role, not take their place.

This study helps build the body of evidence regarding the adoption of AI in speech-language therapy, as there are few studies conducted in Pakistan. The findings reinforce that SLTs are interested in using AI, but are prepared to do so if it is useful, usable, trained, safeguarded and trusted by others as a professional tool. To ensure responsible implementation, policy makers, universities, hospitals, and professional organisations should create training programs on AI, encourage digital literacy and create guidelines on data privacy, clinical accountability, cultural appropriateness, and the use of AI in speech-language therapy practice.

Recommendations

The results of the research have guided the following recommendations for the effective and responsible use of Artificial Intelligence in the speech-language therapy practice:

1- Artificial Intelligence training programs should be designed and provided by professional organizations and academic institutions. AI Training Programs can boost therapists' confidence and competence in AI tools, as a lack of training and lack of digital literacy were cited as the main concerns by the respondents.

2- Speech-Language Therapy programs in universities should include competencies related to AI and digital health. Early exposure to AI technologies can have a positive impact on therapists' perceived ease of use and prepare future professionals for technology-supported clinical practice.

3- Make accessible the easy-to-use and clinically relevant AI tools in healthcare institutions. Organizations should focus on technologies that are accessible, practical, and fit in current clinical practice, as respondents reported a moderate level of perceived ease of use.

4- There is a need for regulatory bodies and professional organizations to develop ethical guidelines for the use of AI in speech-language therapy. Ethical considerations such as data privacy, confidentiality, informed consent, and professional accountability should be given special attention to mitigate therapists' concerns about adopting AI.

5- AI developers of speech and language technologies should ensure that their systems are tested with a variety of linguistic and cultural populations. Considering the apprehensions of algorithmic bias, in the future, the design and testing of AI applications in Pakistan and other developing nations should involve multilingual data sets that mirror Pakistan's linguistic diversity.

6- Utilize AI as a clinical aid and not for replacing clinical judgment. The primary purpose of AI should be to support SLT in improving efficiency and evidence-based practice, and SLT should still be responsible for assessment, diagnosis, intervention planning, and decisions regarding interventions.

7- Healthcare organizations should raise awareness about the benefits and constraints of AI technologies. Continued professional development and workshops or seminars can assist in overcoming misconceptions and promoting informed adoption by therapists.

8- Future studies should explore other factors that affect AI adoption, such as organizational support, readiness to adopt AI, trust in AI systems, and actual usage behaviour. Longitudinal and mixed-methods research can offer more insights into the evolution of therapists' perceptions as AI

technologies become more prevalent in therapy practice.

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