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Department of Speech-Language Pathology and Audiology

Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

**A RESEARCH ARTICLE IN PARTIAL FULFILMENT FOR THE DEGREE BA
SPEECH-LANGUAGE PATHOLOGY**

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1. DECLARATION OF ORIGINALITY / PLAGIARISM

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PLAGIARISM DECLARATION

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I declare that this thesis/ dissertation/ mini dissertation is my own original work. Where secondary material is used and has been carefully acknowledged and referenced in accordance with university requirements.

I understand what plagiarism is and am aware of university policy and implications in this regard.



Signature

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Date

2. TRANSFORMATION IN HIGHER EDUCATION: (AUTHOR GUIDELINES)

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TECHNOLOGY USE BY UNDERGRADUATE SOUTH AFRICAN SPEECH-LANGUAGE THERAPISTS IN CLINICAL PRACTICE: WHAT WE KNOW AND WHERE DO WE GO?

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4. LIST OF ABBREVIATIONS / ACRONYMS:

- Applications (apps)
- Artificial intelligence (AI)
- Health Professions Council of South Africa (HPCSA)
- High-Income Countries (HIC)
- Low-Middle income countries (LMIC)
- South African Speech-Language and Audiology Association (SASLHA)
- Speech and language therapists (SLTs)

5. ABSTRACT

Background: Technology is transforming speech-language therapy by enhancing accessibility and client engagement through tools, such as telehealth and therapy applications (apps). Most tools were developed in high-income countries, limiting their relevance in South Africa's diverse linguistic and cultural context. Undergraduate students face barriers, including limited training and uncertainty about app quality.

Objective: This study described factors influencing South African SLT students' selection and use of technology in clinical practice, and explored their perceived benefits, challenges, readiness, and self-assessed competence.

Method: The study was conducted at a South African university among senior undergraduate SLT students with clinical experience in resource-limited environments. A descriptive cross-sectional survey was administered to 31 participants using a 27-item online questionnaire. Quantitative data were analysed statistically, and qualitative responses thematically.

Results: Limited use of digital tools (48.4%), with reliance on social media (87.1%). The majority (90.3%) of participants reported no use of telehealth or therapy applications. Benefits included improved client engagement (64.5%) and easier access to resources (58.1%), although most agreed that digital tools cannot replace in-person therapy (83.9%). Confidence in technology use was moderate (64.5%), with few feeling competent (12.9%) and nearly all expressing a strong need for further training (96.8%).

Conclusions: The study highlights the gap between the availability of digital tools and the preparedness of South African SLT students to use them effectively, underscoring the need for structured training and contextually relevant resources in undergraduate curricula.

Keywords: digital health, clinical education, undergraduate students, speech-language therapy, South Africa, telehealth, therapy apps.

6. INTRODUCTION AND LITERATURE REVIEW

In the past decade, Speech-language therapy has seen a substantial digital revolution and the use of technology in speech-language therapy has evolved significantly (American Speech-Language-Hearing Association 2024). In the 1970s and 1980s, early technologies such as tape recorders and audio equipment were commonly used (Du et al. 2023). Today, technology has transformed SLT service delivery, making it more effective, efficient, and accessible (Ramkumar et al. 2024). Speech-language therapists (SLTs) now have access to a wide range of technological resources, including software that supports assessment and intervention, internet resources for telehealth and electronic devices, such as tablets and smartphones (Albudoor & Peña 2021). The number of references to “technology” and “speech-language therapy” in the literature has increased by 536% in the last ten years, which is indicative of this development (Albudoor & Peña 2021). Additionally, there has been a 342% surge in the number of searches for “speech therapy apps” on well-known search engines, indicating a growing interest in technology-based solutions in the field (Albudoor & Peña 2021).

These technological advancements have led to the design of a range of content-specific resources for assessing and intervening in communication disorders, along with general resources related to education or healthcare, which have become valuable tools supporting all aspects of clinical practice (Fitzpatrick 2023). SLTs benefit from these tools that support continued education, data collection and documentation, as well as assessment and treatment implementation (Law et al. 2004). Building on these advancements, there is a growing focus on using artificial intelligence (AI) and machine learning to create more personalised and adaptive therapy experiences (TheraPlatform 2025). Wearable technology is also becoming more popular, providing new ways to monitor and support speech therapy goals in real-time (American Speech-Language-Hearing Association 2024). Additionally, adding gamification to therapy tools makes the process more engaging, particularly for children, by incorporating game-like elements that enhance motivation and adherence to treatment plans (Calvano et al. 2023).

In addition to these advancements, telehealth, which involves delivering health care remotely through digital technologies, has become a widely used method of service delivery in speech-language practice. The COVID-19 pandemic significantly increased its usage across healthcare

settings, and according to ASHA (2021), telehealth has proven to be as effective as in-person therapy, while offering additional advantages such as improved accessibility, increased patient participation, and greater flexibility. Shankar et al. (2022) highlight that SLTs use telepractice to overcome service gaps, especially in rural areas where access to in-person services is limited. Although telepractice is user-friendly, its widespread adoption is still hindered by limited availability and assigned for SLTs have emerged in the past decade, therapy apps are usually developed in high-income countries (HIC) and are often designed in widely spoken languages, such as English (Bornman et al. 2021). This poses significant challenges for implementation in countries like South Africa, which has 12 official languages. These technologies have not been standardised for diverse linguistic and cultural contexts, limiting their effectiveness. The materials provided by these apps may not be relevant or culturally appropriate for South African populations. Therefore, to ensure their effectiveness, these tools must be adapted to suit the linguistic and cultural needs of the population they serve.

The use of technology in SLT practices holds clear benefits, from increased accessibility to services, to enhanced client engagement, and flexible delivery methods. Individuals in rural areas can particularly benefit from the improved service availability and cost-effectiveness offered by technology-based interventions (Karrim et al. 2022). Synchronous teletherapy enables immediate feedback, while asynchronous methods provide flexibility in task completion (Simacek et al. 2021). Despite these benefits, challenges remain, including confidentiality, adapting traditional methods to digital formats, and, in South Africa specifically, issues like load shedding, high costs, and technology scarcity (Tar-Mahomed & Kater 2022). Additionally, resistance to change, privacy concerns, and inadequate training may hinder technology adoption among SLTs (Gallant et al. 2023).

As qualified SLTs increasingly adopt digital tools, SLT students face unique challenges in integrating these tools into their training. Limited exposure and experience may affect their readiness and confidence in using technology in clinical settings. The rapid advancement of technology, particularly within telehealth and speech therapy applications, can outpace the evolution of educational curricula, potentially leaving students underprepared (Gagnon et al. 2016).

To ensure ethical and successful therapy, understanding SLT students' preparedness to select and use technology is essential. Research indicates that students' perceptions and use of technology are often shaped during their undergraduate training, influencing their integration of digital tools in clinical practice and their future employability (Mowery & McHugh 2022). SLT students may lack sufficient exposure to digital technology, limiting their comfort and competence with tech-supported services, especially given the ongoing emphasis on evidence-based practices and the lack of empirical support for some tools (Mowery & McHugh 2022).

Limited research on apps used in SLT practices furthermore creates uncertainty for students. Although many qualified SLTs express satisfaction with SLT apps, issues with excessive screen time, app quality, and the lack of empirical evidence supporting their effectiveness can hinder their adoption in clinical practice (Mowery & McHugh 2022). This uncertainty may deter students from using technology in clinical practice, as they may lack confidence in advocating for tools without strong evidence of its therapeutic benefit.

Interestingly, while it is often assumed that younger generation students naturally possess an advantage in adapting to new technologies due to their early exposure to digital tools, research suggests that this is not always the case (Lin et al. 2021). Comfort and familiarity with digital tools may vary considerably and are influenced by various factors including prior experience, access to resources, digital literacy training, and personal attitudes towards technology (Lazar et al. 2020). While students may indeed feel comfortable with certain digital tools used regularly in non-academic contexts, such as social media and smartphone apps, they may encounter challenges when working with specialised software or clinical technology. The concept of a "digital native" does not necessarily equate to digital competence in professional settings, where the complexity and purpose of technology differ substantially from everyday digital interactions (Smith et al. 2020). Consequently, developing technological competence in clinical settings often requires targeted training and support (Gagnon et al. 2016). Nonetheless, younger students may possess a relative advantage due to early and immersive digital exposure, fostering a sense of curiosity and eagerness to explore new advancements.

It is evident that as SLT students' progress through their training, they may receive mixed messages about technology use and may also lack the resources and training to implement it

effectively. To better prepare South African SLT students for modern clinical practice, it is crucial to understand the factors influencing their technology use, such as their competence, preparedness, and confidence (Watermeyer et al. 2023). Future SLTs can then be equipped to use technology effectively, ultimately enhancing patient care and better meeting the evolving needs of the populations they serve (Koehler & Koul 2020).

The research question guiding this study is: *What factors influence South African Speech-Language Therapy (SLT) students' selection and use of technology for clinical practice?*

7. METHOD

7.1 Aim

The aim of this study was to describe the factors influencing South African speech-language therapy students' selection and use of technology in clinical practice and to explore the perceived benefits, challenges, readiness, and self-assessed competence in technology use.

7.2 Design

A descriptive cross-sectional mixed-methods survey design was employed to capture both qualitative and quantitative data, allowing for a comprehensive understanding of the factors influencing technology use among Speech-Language Therapy students. This approach enabled the exploration of findings from multiple perspectives, thereby strengthening the overall interpretation and depth of the results through data triangulation.

Necessary permissions were obtained from the Department of Speech-Language Pathology and Audiology (Appendix A and B). Ethical clearance for the study was granted by the Faculty of Humanities Research Ethics Committee at the University of Pretoria (Reference number: (HUM018/0325) (Appendix C). Informed consent (Appendix D) was obtained from all participants prior to survey completion. The study adhered to the highest ethical standards, ensuring integrity, transparency, and participant protection.

7.3 Participants

A non-probability, purposive sampling method was used. This approach ensured that the participants had appropriate experience with technology in clinical practice, enabling in-depth insights aligned with the research questions. Non-probability sampling, which relies on subjective selection instead of randomisation, was also used due to its efficiency and cost-effectiveness, as motivated participants tend to respond more quickly (Fleetwood 2024).

The aim was to recruit at least half of the target sample for the survey, a goal that was achieved with 31 students participating, representing 77.5% of the intended sample and establishing a strong dataset for comprehensive statistical analysis (Memon et al., 2020). All 32 participation were female senior South African SLT students in their third year (n= 14) and fourth/final year (n= 17) enrolled for the BA Speech Language Pathology degree at the University of Pretoria, registered with the Health Professions Council of South Africa (HPCSA), and aged 18 years or older to ensure legal capacity for informed consent. Students who did not complete the full survey or provide consent were excluded. Senior students were selected due to their prior exposure to clinical tools, technology-related decision-making, and experience in resource-limited environments. This exposure offered valuable insight into their adaptability to technological challenges and readiness for future clinical practice.

7.4 Materials

The data for this study were collected through an online questionnaire that was hosted on the Qualtrics database. It was chosen for its efficiency, time-saving benefits, cost-effectiveness, and ability to provide participant anonymity, which encouraged more honest responses (Brink, Van der Walt & Van Rensburg 2018). The questionnaire was developed through a structured process involving the adaptation of existing instruments, contextualisation for the South African student population, and expert validation.

The questionnaire incorporates and adapts items from validated instruments used in similar studies focused on technology use in clinical education and practice selection (Albudoor & Peña 2021; Julaeha & Solikhathi 2021; Jabour et al. 2021; Xu et al. 2022). These items covered domains including technology selection, perceived barriers and facilitators, self-assessed competence, and

attitudes towards digital tools. These items were modified to reflect the South African context, especially experiences related to the clinical training in resource-limited public and academic healthcare environments. The questions were developed specifically for senior speech-language therapy students to align with the local educational and clinical framework.

The survey's content validity was established by a panel of three SLTs with experience in both clinical practices and academia. Using the Content Validity Index (CVI), the questionnaire obtained a CVI value of at least 0.80, therefore met the accepted level for content validity as proposed by Yusoff (2019). Before distribution, a pilot study of the survey was conducted. Based on the feedback received, several changes were implemented: participants were required to give consent before proceeding, 5 questions were refined for better clarity, examples were added to illustrate facilitators and barriers, and the questions were numbered to improve structure and support data analysis.

The final survey comprised 27 questions, covering demographics (year of study, age, home language), technological use (current use in SLT sessions, frequency), selection factors (accessibility, cost, client needs, ease of use, peer and/or supervisor influence), perceived benefits (e.g. client engagement, variety of resources, efficiency), perceived challenges (e.g. technical issues, linguistic/ cultural acceptance, preparation time) readiness and self-assessed competence (confidence, preparedness, training needs), and open-ended questions (qualitative input on experience, suggestions and attitudes) (Appendix E).

Most of the questions were closed-ended questions using multiple choice or a 5-point Likert scale, supplemented by open-ended questions to capture richer qualitative data. The estimated completion time was 10-15 minutes, and the survey was administered in English.

7.5 Data collection procedure

After obtaining ethical clearance, department, and all other necessary approvals (see ethical approvals in Section 2.6.4), recruitment took place over a three-month period from June to August 2025. A pre-approved infographic (Appendix F) containing the survey link and QR code was shared, along with the names and contact details of the researchers and supervisors for queries or access to results after the study, via WhatsApp on the official third- and fourth-year Speech-

Language Therapy student group. To improve the response rate, weekly reminder messages were sent on WhatsApp as well as in-class reminders by the tutors and lecturers. When participants accessed the link or scanned the QR code, they were presented with an information letter that reassured them of their anonymity and informed them of their right to withdraw at any time before submitting the survey. Consent was provided electronically before participants proceeded with the survey. All responses were stored on a secure, password-protected server using the Qualtrics platform, which is accessible only to the research team. In accordance with the University of Pretoria's research data management policy, data will be stored for five years.

7.6 Data Analysis

Quantitative Data analysis was conducted in IBM Statistical Package for the Social Sciences (SPSS) version 30. Descriptive statistics included frequencies and percentages for demographic information and the Likert-scale ordinal responses. For the latter, measures of location (mean [M] and median [Mdn]) and measures of spread (standard deviation [SD] and interquartile range [IQR]) are reported as well. The Mdn and IQR are reported alongside the M and SD, as they are more appropriate descriptive statistics for ordinal data because the M and SD treat the data as if it is continuous. Descriptive statistical analyses were conducted to compare participants' mean and median scores with the midpoints of the Likert scales, thereby identifying patterns in how demographic factors related to technology. This approach was appropriate for interpreting the participants' training needs, technology use, and preferences.

Open-ended responses for qualitative data were analysed using thematic analysis, which is used to identify and interpret themes or patterns in a data set, leading to fresh insights and understanding (Naeem, Ozuem, Howell & Ranfagni 2023). Coding and theme development were conducted independently by two researchers, with supplementary assistance from an AI language model (ChatGPT) to support idea refinement, thematic wording and clarity. However, the final theme was agreed upon through discussion between the researchers, ensuring that analytical decisions were made by human coders.

This method was ideal for the study, as part of the aim was to explore the attitudes, perceptions, and experiences of South African SLT students regarding the use of technology in clinical practice.

Thematic analysis was also well-suited due to its flexible nature in handling the different types of qualitative data obtained through the surveys. Responses to open-ended questions were analysed thematically to reveal patterns and insights into SLT students' experiences and attitudes toward technology. It helped identify key factors influencing technology use, selection, training needs, and preferences. Finally, the qualitative and quantitative results were integrated through triangulation, comparing themes and statistical trends to identify areas of convergence and divergence.

8. RESULTS

The 31 participants were female and ranged in age from 20 to over 23 years, with the largest group being 22 years old (41.9%). More than half (54.8%) reported English as their home language, followed by Afrikaans (25.8%), isiZulu and Setswana (6.5% each), and Sepedi and Venda (3.2% each). Furthermore, over half of the participants (54.8%) were in their fourth year of study, with the rest in their third year (45.2%). The demographic characteristics of the participants are summarised in Table 1.

Table 1: Demographic characteristics of participants (n=31)

Variable	Category	Frequency (n)	Percent (%)
Age (years)	20	4	12.9
	21	10	32.3
	22	13	41.9
	>23	4	12.9
Sex	Female	31	100.0
Home language	Afrikaans	8	25.8
	English	17	54.8
	IsiZulu	2	6.5
	Sepedi	1	3.2
	Setswana	2	6.5
	Venda	1	3.2
	Year of study	Third year	14
Fourth year		17	54.8

8. The Selection and Use of Technology

Less than half of the participants (n=15; 48.4%) reported using technology tools in SLT sessions. Despite this, the majority of the participants (n=27; 87.1%) indicated that they use social media platforms as a source for SLT ideas and resources. Instagram and Pinterest were identified as the most prominent platforms, with each mentioned by 17 participants (54.8%). The participants reported using these platforms to gather ready-made activities and resources, as well as to follow other SLTs to learn new approaches and enhance their session delivery. A smaller group of participants used Short-form video (TikTok) (n=6, 19.4%) or YouTube (n=4, 12.9%) for demonstrations. Lastly, a small group of participants reported using ChatGPT as well as paid and downloaded resources.

The participants' reported use of technology in clinical practice is shown in Table 2. Since a 4-point Likert-scale was used (1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Frequently) and the midpoint is 2.5, if the mean/median is below 2.5, the participants tended towards "Never" or

“Rarely”. On the other hand, a mean/median above 2.5 suggests that the participants leaned toward “Occasionally” or “Frequently”. Telehealth or telehealth platforms were the most commonly used, though still limited overall (M = 2.06, Mdn= 2.00), with 35.5% (n=11) reporting that they never used them and 29.0% (n=9) indicating occasional use. SLT-specific apps (M = 1.68, Mdn= 1.00) and gamified therapy tools (M = 1.65, Mdn= 1.00) were indicated to be rarely used, while more than half of participants reported that they never used these tools (n=14; 54.8% in both cases). The use of traditional digital tools such as tablets was limited (M = 1.90, Mdn= 2.00), with 41.9% (n=13) never using them and only 6.5% (n=2) reporting frequent use.

In contrast, AI-based tools for personalised therapy were reported somewhat more often (M = 2.74, Mdn = 3.00), with some participants (n=9; 29.0%) using them frequently and others (n=11, 35.5%) only occasionally. Wearable devices recorded the lowest engagement (M = 1.13, Mdn = 1.00), with most participants (n=28, 90.3%) reporting that they have never used such devices. Other specified technologies (e.g., individual platforms or tools) were also rarely reported (M = 1.52, Mdn = 1.00), with the majority (n=24; 77.4%) reporting no use of them.

Findings from open-ended questions further supported these quantitative results (Table 2). The majority of the students (n=27, 87.2%) did not specify any additional technologies other than those listed above. A few participants highlighted specific tools, including AI-based applications such as ChatGPT (n=1; 3.2%), tablets and audio equipment (n=2; 6.5%), or online educational resources, including “Pinterest, Teachers Pay Teachers, Twinkl” (n=1; 3.2%), confirming the limited range of technology use in clinical practice.

Table 2: Technological use in clinical practice (n = 31)

Technology	Frequentl y (n, %)	Occasion al-ly (n, %)	Rarely (n, %)	Never (n, %)	M (Mdn)	SD (IQR)
Telehealth/Teletherapy platforms	2 (6.5%)	9 (29.0%)	9 (29.0%)	11 (35.5%)	2.06 (2.00)	0.96 (2.00)

SLT apps	1 (3.2%)	5 (16.1%)	8 (25.8%)	17 (54.8%)	1.68 (1.00)	0.87 (1.00)
AI-based tools for personalised therapy	9 (29.0%)	11(35.5%)	5 (16.1%)	6 (19.4%)	2.74 (3.00)	1.09 (2.00)
Wearable technology (e.g., devices)	0 (0.0%)	1 (3.2%)	2 (6.5%)	28 (90.3%)	1.13 (1.00)	0.43 (0.00)
Gamified therapy tools	1 (3.2%)	4 (12.9%)	9 (29.0%)	17 (54.8%)	1.65 (1.00)	0.84 (1.00)
Traditional digital tools (e.g., tablets)	2 (6.5%)	6 (19.4%)	10 (32.3%)	13 (41.9%)	1.90 (2.00)	0.94 (2.00)
Other (specified by students)	3 (9.7%)	3 (9.7%)	1 (3.2%)	24 (77.4%)	1.52 (1.00)	1.03 (0.00)

8.2 Perceived Challenges in Technology Use

Challenges encountered when implementing technology in practice are presented in Table 3. Since a 7-point Likert scale was used (1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Somewhat Disagree, 4 = Neutral, 5 = Somewhat Agree, 6 = Moderately Agree, 7 = Strongly Agree) and the midpoint is 4, if the mean/median is below 4, the participants tended towards disagreement. On the other hand, a mean/median above 4 suggests that the participants leaned toward agreement. The most prominent challenges identified by the participants were a lack of patient access to devices or technology (M = 5.23, Mdn= 5.00) and concerns about the cultural and linguistic suitability of available resources (M = 5.00, Mdn= 5.00). The time required for setup and training was also frequently highlighted (M = 4.23, Mdn= 4.00), with 11 participants (35.5%) somewhat agreeing and another 11 (35.5%) remaining neutral.

Other challenges received moderate endorsement. Financial constraints (M = 4.65, Mdn= 4.00) were acknowledged by 7 participants (22.6%) who somewhat agreed and 5 participants (16.1%) who moderately agreed. Difficulty adapting traditional methods to online formats was also noted

(M = 4.42, Mdn= 5.00), with 10 participants (32.3%) somewhat agreeing and 4 participants (12.9%) moderately agreeing.

Lower levels of engagement were reported for technical issues (M = 4.10, Mdn= 4.00) and a lack of client engagement in virtual sessions (M = 4.03, Mdn = 4.00), both receiving high proportions of neutral responses (35.5% and 54.8%, respectively). Additional challenges raised by participants showed a similar trend, averaging at neutral to somewhat agreed levels (M = 4.03, Mdn= 4.00).

The analysis of the open responses indicated that most respondents (n=27; 87.1%) did not mention any additional barriers to the use of technology in clinical practice. Among those who identified challenges, three key themes were identified. Infrastructure-related barriers were described in terms of poor internet connectivity, limited data availability, lack of access to devices, and the financial cost of technology. Human and contextual barriers were also evident, which included challenges linked to users' age and motivation, limited digital knowledge and skills, as well as concerns that available resources were not culturally relevant. Overall, although most participants reported additional obstacles, a smaller subset identified structural, personal, and contextual challenges that could impede the effective integration of technology into practice.

Table 3: Challenges encountered when implementing technology in practice (n=31)

Type of challenges	Strongly Disagree (n, %)	Moderately Disagree (n, %)	Somewhat Disagree (n, %)	Neutral (n, %)	Somewhat Agree (n, %)	Moderately Agree (n, %)	Strongly Agree (n, %)	M (Mdn)	SD (IQR)
Technical difficulties	1 (3.2%)	3 (9.7%)	4 (12.9%)	11 (35.5%)	9 (29.0%)	2 (6.5%)	1 (3.2%)	4.10 (4.00)	1.300 (2.00)
Financial constraints	0 (0.0%)	1 (3.2%)	4 (12.9%)	11 (35.5%)	7 (22.6%)	5 (16.1%)	3 (9.7%)	4.65 (4.00)	1.279 (2.00)
Lack of patient access to devices/technology	0 (0.0%)	0 (0.0%)	0 (0.0%)	11 (35.5%)	8 (25.8%)	6 (19.4%)	6 (19.4%)	5.23 (5.00)	1.146 (2.00)

Language and cultural appropriateness of resources	0 (0%)	1 (3.2%)	2 (6.5%)	8 (25.8%)	8 (25.8%)	9 (29.0%)	3 (9.7%)	5.00 (5.00)	1.238 (2.00)
Time required for setup and training	0 (0.0%)	1 (3.2%)	6 (19.4%)	11 (35.5%)	11 (35.5%)	2 (6.5%)	0 (0.0%)	4.23 (4.00)	0.956 (1.00)
Difficulty adapting traditional methods to online formats	0 (0.0%)	2 (6.5%)	7 (22.6%)	6 (19.4%)	10 (32.3%)	4 (12.9%)	2 (6.5%)	4.42 (5.00)	1.363 (2.00)
Lack of client engagement in virtual sessions	0 (0.0%)	3 (9.7%)	4 (12.9%)	17 (54.8%)	5 (16.1%)	0 (0.0%)	2 (6.5%)	4.03 (4.00)	1.140 (0.00)
Other (please specify)	3 (9.7%)	0 (0.0%)	1 (3.2%)	18 (58.1%)	7 (22.6%)	2 (6.5%)	0 (0.0%)	4.03 (4.00)	1.197 (1.00)

8.3 Perceived Benefits of Technology Use

Analysis of participants' responses to three opened questions revealed several interrelated benefits of technology in speech-language therapy. These benefits were grouped into three overarching domains: resource and efficiency, client engagement and adaptability, and accessibility and wider service delivery.

The most commonly reported benefit, considering resources and efficiency, was the ease of accessing resources, therapy ideas, and materials (n=23; 74.2%). Participants described how online platforms made it easy to locate and adapt printable materials, picture cards, and design tools such as Canva: *“It gives you access to a variety of resources from around the world....it gives you ideas for therapy”* (P7). Closely related were efficiency and cost-saving benefits (n=5; 16.1%), with using technology, preparation time, paperwork, and reducing printing expenses: *“It saves a lot of*

time!" (P10). Overall, these responses suggest that technology not only supports clinical creativity but also streamlines playing and delivery.

Considering client engagement and adaptability, participant responses highlighted the impact of technology on engagement and interactivity, particularly with children (n=10; 34.5%). Respondents noted that devices, visual and gamified activities were seen to help with sustaining attention and motivation: "*Children like to work on tablets.... they are very invested in trying to understand it*" (P25). Several participants also pointed out its value for person-centred, relaxed therapy, particularly for adult clients: "*It allows for you to create more person-centred therapy*" (P3)." However, engagement was not universally seen as positive. Some of the participants emphasised that its effectiveness depended on client characteristics. Including factors like age, diagnosis, and motivation: "*Depends on the type of client...ASD might become hyper fixated ADHD, it might help*" (P10). Others expressed concern about distraction and reduced physical interaction: "*The physical touch is sometimes required to maintain attention*" (P23).

Another open-ended question wanted to get input regarding accessibility and wider service delivery. Participants identified ways technology enhanced the reach and organisation of therapy services. Several noted its role in improving accessibility through telehealth, making services available to clients in rural and underserved areas: "*Technology can make speech-language therapy accessible to people... who are unable to travel*" (P14). Others described how digital tools supported organisation and carry over, for example, through WhatsApp or recorded videos to extend therapy beyond the session. Less frequently mentioned but still significant are the use of AAC and specialised digital tools (n = 2; 6.5%) for clients with complex needs and the potential for creativity and innovation, including AI-based supports: "*It has opened us up to lots of resources and materials*" (P7).

When asked about the effectiveness of technology on clinical outcomes, most participants agreed that digital tools can more effectively monitor a client's progress (n=20; 64.5%). However, more than a third of the participants (n=11; 35.5%) disagreed with this statement.

The participants' opinions on teletherapy as a replacement for in-person services were mainly negative (n=26, 83.9%). Many participants agreed that digital methods should serve as a

supplement rather than replacing traditional therapy (n=18; 58.1%). Participants noted that teletherapy can improve access and equity for clients in rural or underserved areas, but participants mostly highlighted its “*limitations*” compared to in-person sessions, including reduced tactile input, limited ability to observe and model, and challenges in maintaining engagement, especially with children. The therapeutic relationship was considered stronger in-person, and a hybrid approach, using teletherapy alongside face-to-face sessions, was widely recommended. Effectiveness was seen as client dependent, varying by age, diagnosis and support, while several participants emphasised that in-person therapy remains the gold standard, with one participant commenting that “teletherapy is better than no therapy, but personal connection may lack online”.

When asked about their motivation for using technology in SLT, participants identified several reasons (Figure 2). The most frequently reported motivator was that technology saves time and effort (n=26; 83.9%). This was followed by improved availability of resources (n=22; 71.0%), as well as better cost-effectiveness (n=20; 64.5%). Almost half of the participants (n=14; 45.2%) reported that they believe that technology can improve client outcomes in therapy. Additionally, more than a third of the participants highlighted its benefits for enhanced patient engagement (n=12; 38.7%) as well as supporting professional development (n=12; 38.7%). One participant (n = 1; 2.3%) noted that technology motivated them to complete administrative tasks and plan therapy sessions, while another (n = 1; 2.3%) reported no motivators for using technology.

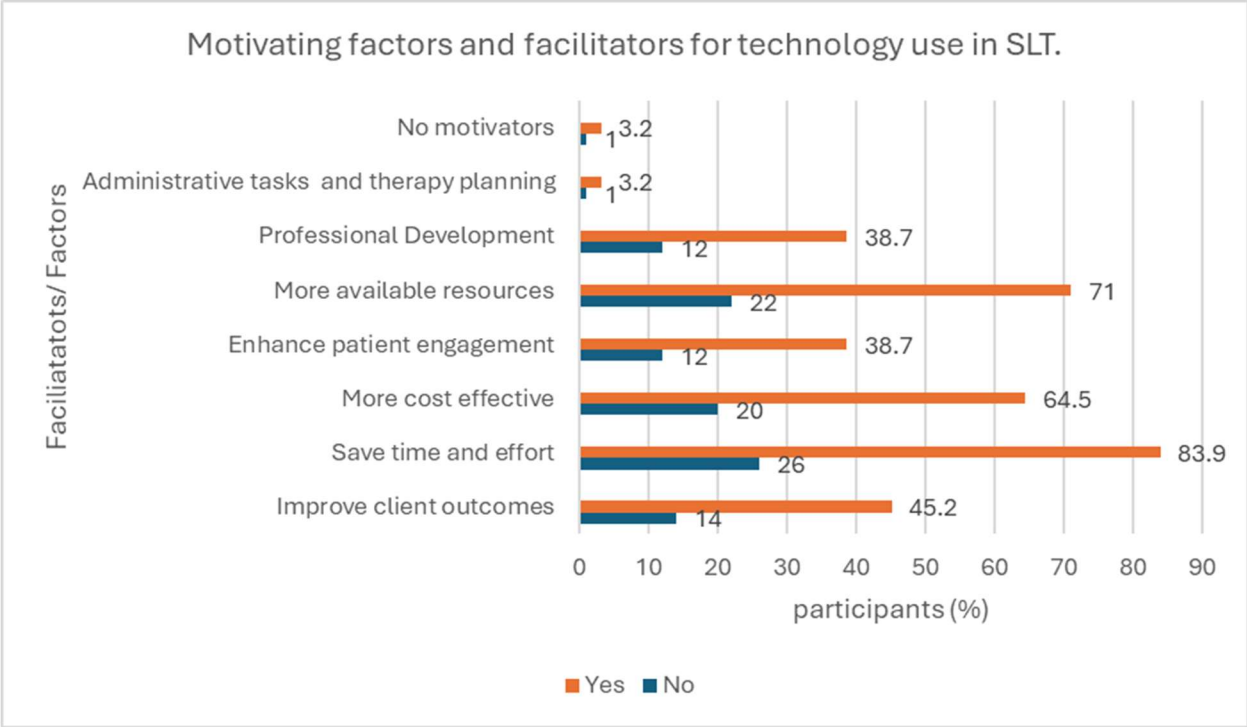


Figure 1. Motivating factors and facilitators for technology use in SLT.

However, the views on cultural and linguistic appropriateness were more reserved. Only a small number of the participants felt that available technology was completely culturally and linguistically appropriate (n=1; 3.2%), while the majority of the participants’ responses were neutral (n=11; 35.5%). Others rated the content as somewhat culturally and linguistically inappropriate (n=11; 35.5%).

Participants’ perceptions and intentions regarding technology use in speech-language therapy are presented in Table 4. Again, since a 7-point Likert-scale was used, mean/median values below 4 indicate participants leaned toward disagreement, whereas values above 4 suggest they leaned toward agreement. For perceptions (Q25), most participants agreed that technology enables them to accomplish tasks more quickly (M = 5.32, Mdn= 6.00) and increases productivity (M = 5.16, Mdn= 6.00). The ease in using technology was highly rated, with strong agreement that “*learning to use technology is easy*” (M = 5.71, Mdn= 6.00), “*interaction with technology does not require much effort*” (M = 5.68, Mdn= 6.00), and “*technology is easy to use*” (M = 5.77, Mdn= 6.00). Lower mean scores were observed for “*people who think I should use technology*” (M = 4.42,

Mdn=4.00) and “*when I encounter difficulties, I know where to seek assistance*” (M = 4.77, Mdn = 5.00).

For intention-related outcomes, participants reported that technology improves performance (M = 5.10, Mdn = 5.00) and enhances effectiveness (M = 5.29, Mdn = 6.00). Skill acquisition was also positively rated by the participants: “*It is easy for me to become skilful in technology*” (M = 5.61, Mdn = 6.00). In contrast, lower ratings were given for the availability of assistance, including that “*a specific person is available to help*” (M = 4.06, Mdn = 4.00) and that timely assistance is provided (M = 4.00, Mdn = 4.00). Future intentions were strongly endorsed with high agreement for “*I intend to continue to use technology for clinical purposes*” (M = 5.55, Mdn = 6.00) and “*I plan to use technology for clinical purposes in the future*” (M = 5.58, Mdn = 6.00).

Table 4: Participants’ perceptions and intentions regarding technology use in speech-language therapy

Benefits	Strongly Disagree (n, %)	Somewhat Disagree (n, %)	Moderately Disagree (n, %)	Neutral (n, %)	Somewhat Agree (n, %)	Moderately Agree (n, %)	Strongly Agree (n, %)	M (Mdn)	SD (IQR)
Using technology enables me to accomplish tasks more quickly	2 (6.5%)	2 (6.5%)	0 (0.0%)	3 (9.7%)	5 (16.1%)	13 (41.9%)	6 (19.4%)	5.32 (6.00)	1.600 (1.00)
Using technology increases my productivity	1 (3.2%)	3 (9.7%)	0 (0.0%)	7 (22.6%)	4 (12.9%)	10 (32.3%)	6 (19.4%)	5.16 (6.00)	1.508 (2.00)
Learning to use technology is easy for me	0 (0.0%)	1 (3.2%)	1 (3.2%)	2 (6.5%)	8 (25.8%)	9 (29.0%)	10 (32.3%)	5.71 (6.00)	1.270 (2.00)

My interaction with technology does not require much effort	0 (0.0%)	3 (9.7%)	0 (0.0%)	1 (3.2%)	8 (25.8%)	10 (32.3%)	9 (29.0%)	5.68 (6.00)	1.222 (2.00)
I find technology easy to use	0 (0.0%)	3 (9.7%)	0 (0.0%)	1 (3.2%)	7 (22.6%)	9 (29.0%)	11 (35.5%)	5.77 (6.00)	1.257 (2.00)
People important to me think I should use technology	2 (6.5%)	4 (12.9%)	0 (0.0%)	11 (35.5%)	7 (22.6%)	5 (16.1%)	2 (6.5%)	4.42 (4.00)	1.432 (1.00)
When I encounter difficulties, I know where to seek assistance	1 (3.2%)	5 (16.1%)	1 (3.2%)	4 (12.9%)	11 (35.5%)	4 (12.9%)	5 (16.1%)	4.77 (5.00)	1.543 (2.00)
Once I start using technology, I find it hard to stop	2 (6.5%)	3 (9.7%)	4 (12.9%)	7 (22.6%)	6 (19.4%)	6 (19.4%)	3 (9.7%)	4.32 (4.00)	1.739 (3.00)
I expect to use technology for clinical purposes in the future	0 (0.0%)	2 (6.5%)	0 (0.0%)	2 (6.5%)	6 (19.4%)	10 (32.3%)	11 (35.5%)	5.84 (6.00)	1.186 (2.00)
Using technology improves my performance	0 (0.0%)	3 (9.7%)	0 (0.0%)	8 (25.8%)	7 (22.6%)	9 (29.0%)	4 (12.9%)	5.10 (5.00)	1.221 (2.00)
Using technology enhances my effectiveness	0 (0.0%)	4 (12.9%)	0 (0.0%)	5 (16.1%)	6 (19.4%)	10 (32.3%)	6 (19.4%)	5.29 (6.00)	1.321 (2.00)

I find it easy to use technology to do what I want to do	1 (3.2%)	2 (6.5%)	1 (3.2%)	4 (12.9%)	11 (35.5%)	4 (12.9%)	8 (25.8%)	5.16 (5.00)	1.551 (3.00)
It is easy for me to become skilled at using technology	0 (0.0%)	2 (6.5%)	0 (0.0%)	2 (6.5%)	10 (32.3%)	9 (29.0%)	8 (25.8%)	5.61 (6.00)	1.145 (2.00)
People who influence my behaviour think I should use technology	3 (9.7%)	3 (9.7%)	1 (3.2%)	14 (45.2%)	5 (16.1%)	5 (16.1%)	0 (0.0%)	4.03 (4.00)	1.402 (1.00)
When I encounter difficulties, a specific person is available to provide assistance	2 (6.5%)	7 (22.6%)	4 (12.9%)	6 (19.4%)	4 (12.9%)	5 (16.1%)	3 (9.7%)	4.06 (4.00)	1.750 (3.00)
When I encounter difficulties, I am given timely assistance	2 (6.5%)	7 (22.6%)	2 (6.5%)	7 (22.6%)	10 (32.3%)	2 (6.5%)	1 (3.2%)	4.00 (4.00)	1.414 (2.00)
I look forward to aspects of my job requiring technology	1 (3.2%)	2 (6.5%)	4 (12.9%)	8 (25.8%)	5 (16.1%)	5 (16.1%)	6 (19.4%)	4.65 (5.00)	1.762 (2.00)
I intend to continue to use technology for clinical purposes in the future	0 (0.0%)	1 (3.2%)	2 (6.5%)	3 (9.7%)	6 (19.4%)	10 (32.3%)	9 (29.0%)	5.55 (6.00)	1.434 (2.00)
I plan to use technology for clinical purposes in the future	0 (0.0%)	1 (3.2%)	2 (6.5%)	1 (3.2%)	10 (32.3%)	7 (22.6%)	10 (32.3%)	5.58 (6.00)	1.409 (2.00)

8.4 Readiness and Self-Assessed Competence

Participants' readiness and competence in using technology in clinical practice were mixed. While 64.5% (n=20) reported confidence in using technology in therapy sessions, 35.5% (n=11) felt uncertain or lacked confidence. Self-reported knowledge was similarly varied: just below one-third (n=9; 29.0%) described their experience as limited or minimal, whereas only a few (n=4; 12.9%) felt confident using specific applications. Preparedness ratings were generally low, with 41.9% (n=13) feeling slightly prepared, 29.0% (n=9) moderately prepared, 25.8% (n=8) well prepared, and 3.2% (n=1) completely unprepared. Despite these gaps, nearly all participants (96.8%; n=30) expressed interest in expanding their knowledge of technology tools, but only 12.9% (n=4) had received formal guidance in using these tools during therapy.

9. DISCUSSION

The study findings illustrated that South African undergraduate Speech-Language Therapy student participants recognised the potential benefits of technology to improve therapy outcomes, but their actual use thereof was limited, as the results revealed that less than half of the participants (48.4%) used technology tools in therapy. Many participants reported relying on social media platforms such as Instagram and Pinterest (54.8%) to obtain their clinical ideas, instead of specialised SLT applications or teletherapy platforms. This suggests that despite students' familiarity with informal, widely accessible digital resources, they are less likely to use structured clinical tools such as therapy platforms, wearable devices, or gamified interventions, likely due to their limited exposure and training to use these tools during their undergraduate studies (Mowery & McHugh, 2022). These findings are consistent with those of Gagnon et al. (2016), who emphasise that confidently using digital tools for therapy depends on formal, structured training rather than informal engagement with the tools. Interestingly, the study showed that many student participants disclosed using AI-based tools (87.2%), which aligns with global trends showing how AI can help clinicians personalise therapy and support clinical practice (Calvano et al. 2023).

The most significant obstacles included limited access to technological devices and the internet, with $M = 5.23$ and $SD = 1.13$, while 22.6 % reported financial constraints as a hindrance. These findings highlight the socio-economic realities of South Africa, where many clients lack reliable

internet connections or technological devices. This aligns with previous findings from Tar-Mahomed & Kater (2022), who explain that the widespread use of telepractice and digital tools within South Africa is restricted through barriers such as high costs, technology scarcity, loadshedding and limited availability or access of technology in underserved areas.

Furthermore, another significant barrier outlined was the lack of cultural and linguistic applicability of digital resources. This aligns with earlier research by Bornman et al. (2021), which indicates that many therapy tools are developed in high-income countries and often lack multilingual and multicultural responsiveness, reflecting a broader concern that most digital resources are created without consideration of the South African context, limiting their relevance and usability.

Moreover, the time required for training and setting up technologies was reported as an obstacle among student participants (35.5%). This is consistent with broader literature that explains insufficient training as an obstacle to technology adoption among SLTs (Gallant et al. 2023). The rapid growth of technology can potentially outpace the growth of educational curricula, which could result in students feeling unprepared (Mowery & McHugh, 2022). Student participants found it difficult to adapt traditional methods to online platforms (32.3%), which is in line with results from Tar-Mahomed & Kater (2022).

Evidence shows that students are digitally literate in daily contexts but struggle to use these skills in clinical practice. Students require additional skills, targeted support and contextually relevant tools to strengthen their confidence and expertise to provide culturally and linguistically relevant digital resources, accessible training and institutional support to integrate technology into clinical practice more effectively. This will improve the client's outcomes and foster meaningful technological change in the field.

Even though existing barriers were recorded, notable advantages of incorporating technology into clinical practice were acknowledged by the student participants, as most participants (74.2%) found that digital tools provided quick and easy access to therapy resources and materials. In comparison, many (64.5%) found it useful to track client progress. Technology supports personalised and adaptable treatment, as platforms are designed to be tailored for different languages, ages and ability levels. Some participants (34.5%) highlighted children as exceptionally

responsive to interactive and game-like features, as they assist with sustaining attention and make therapy an enjoyable activity. This aligns with findings of Ramírez Ruiz et al. (2024) and Saedi et al. (2022), who showed that game-based and interactive approaches enhance children's attention, engagement and motivation to learn within the academic and therapeutic contexts. Students observed, however, that the impact of technology is client-specific as it encourages engagement for some, while causing distraction for others. This aligns with Baker et al. (2023), who described that teletherapy poses a barrier to maintaining children's attention.

Most of the student participants (96.8%) further recognised that technology can increase access to services, especially in rural and underserved areas. Shankar et al. (2022) emphasised this perspective as their research demonstrated the effectiveness of digital tools in broadening therapeutic services to populations with limited access to resources. Remote technological platforms are anticipated to help sustain continuity of care outside formal sessions through tools such as apps and structured home programs. However, the potential extension of these services is hindered by challenges within the South African context. As highlighted by the student participants and Tar-Mahomed & Kater (2022), limited access and availability of technology, reliable internet connection, and increased expenses remain significant barriers, especially in underserved areas. Furthermore, the lack of cultural and linguistic applicability of these digital tools further limits the extension of these services, as it limits effective use.

Despite this contrast of the acknowledged benefits of technological use and the resource limitations thereof, most participants (83.9%) still stressed that teletherapy cannot replace in-person formal therapy services and should be used as an additional support instead, to increase client engagement, individual adaptability and flexibility. These findings are consistent with international evidence that shows that telepractice is most effective when embedded in hybrid service models (ASHA 2021).

Student readiness and self-assessed competence in using technology were varied. While 64.5% of participants expressed confidence, over one-third (35.5%) felt unprepared, and only 25.8% described themselves as “well prepared” or higher, compared to 41.9% who felt only “slightly prepared”. Despite this, almost all participants (96.8%) expressed a desire to be educated, highlighting a strong motivation for further training to use technology within clinical practice.

These findings suggest that being theoretically informed or having general digital literacy does not result in competence in using the tools. As Smith et al. (2020) explain, being a “digital native” does not result in digital competence. This further suggests that inadequate training can result in being hesitant to adopt new digital tools, which can result in hindered effective integration thereof into clinical practice, as explained by Gagnon et al. (2016), who emphasised the importance of targeted, structured training to develop technological competence within clinical situations.

The results of the study highlight a clear gap between students’ enthusiasm for technology and their confidence in using it, suggesting that if students graduate feeling unprepared, they would be less likely to confidently use these digital tools available to their benefit, which could limit their ability to provide adequate, accessible care. This, together with the mentioned barriers within South Africa, hinders the adoption of evidence-based technological practice, affecting client outcomes, especially in resource-limited areas, where technology integration could be life-changing.

This gap emphasises the urgent need for applied practice-focused training. Relevant resources should be developed locally within South Africa, which will address cultural and linguistic applicability and affordability and provide reliable support structures and educational programmes. This may equip students to integrate digital tools meaningfully and effectively, while expanding practical experience with telepractice, apps and AI-based technologies, which will further prepare future SLTs to meet the demands of modern service delivery.

Limitations of the Study

The insights of the study, while valuable, have certain limitations which could potentially affect the study’s generalisability and result in bias. Firstly, the findings are limited to a small group of students, as only 31 senior undergraduate Speech-Language Therapy students, from a single institution, were included. These participants were selected through a non-probability, purposive sampling method, based on their clinical experience in resource-limited environments. Representativeness is limited as the findings do not delve deeper into the experiences of the broader South African Speech-Language Therapy student population. In addition, data were collected through an online, self-completed questionnaire that relies on the participants’ perceptions and experiences reported by themselves. While this allows for convenience and

anonymity, it also suggests that certain biases could be introduced, such as social desirability, causing students to unintentionally respond in a more favourable light for researchers or recall inaccuracies, where participant memories may be imprecise. This could potentially affect the accuracy of reported technology use, perceived competence and challenges. Therefore, future research should include larger, multi-institutional samples that result in broader research findings. Objective measures to determine competence in applying technology alongside the self-reported data should be incorporated, if feasible, to enhance the research methodology to draw a comprehensive picture.

10. CONCLUSION

This study examined the factors influencing South African SLT students' use of technology in clinical practice and the perceived benefits, challenges, readiness, and competence. The findings revealed that students' actual use of specialised clinical tools was limited, although they acknowledged the importance of technology for enhancing engagement, efficiency and accessibility. The student participants identified significant barriers, including lack of access to devices, financial constraints and the absence of culturally and linguistically applicable resources. Most students expressed a strong motivation and a positive attitude towards learning how to use digital tools effectively within clinical practice. Still, they revealed inadequate preparedness and limited formal training during their undergraduate studies.

We recommend larger-scale, multi-institutional studies to address these gaps, alongside improved integration of structured, hands-on training within South African SLT curricula. The development of affordable, localised and contextually relevant digital resources and clear ethical and professional guidelines will be essential to support sustainable technology use in South African clinical practice.

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13. APPENDICES:

13.1 APPENDIX A: Permission from the Head of Department of Speech-Language Pathology and Audiology



Faculty of Humanities

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo

Department of Speech- Language Pathology and Audiology



Dear Prof van der Linde

Permission to conduct an undergraduate research project in the Department of Speech-Language Pathology and Audiology

We are final year speech-language students from the University of Pretoria, and we are conducting a study titled: 'Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?'. We formally request permission to conduct a study within the Department of Speech-Language Pathology and Audiology. The study involves surveying the 3rd and 4th-year speech-language pathology students of 2025 to gain insights into their experiences and their preparedness to use technology in clinical practice. We believe this study will provide valuable information to gain insight into the student's preparedness for the use of technology in clinical practices.

Study Overview:

The study will involve a survey link distributed to students within the department. The survey will include questions on their perceptions and preparedness for using technology in clinical practice. Participation will be voluntary, and should a student volunteer, no identifying information will be captured.

Objective and Relevance:

The study's primary aim is to describe the factors influencing South African speech-language therapy students' selection and use of technology in clinical practice. It will explore the perceived benefits and challenges associated with incorporating technology into speech-language therapy sessions, as well as SLT students' readiness and perceived competence to use technology in clinical practice.

Ethical Considerations:

This study will follow university guidelines on human subject research to protect the participant's rights, privacy, and well-being. The data that will be collected will be treated with a high level of confidentiality, will be stored securely in a password-protected electronic database, and will be accessible only to the researchers of the study. The participants will be informed about the purpose of the study, their right to withdraw at any time without any consequences, and how their data will be used. Informed consent will be obtained from the participants before they will participate in the study. No identifying information will be captured. The data obtained will be used exclusively for research purposes and will be destroyed after a specified retention period following ethical guidelines.

Thank you very much for considering our request.

Room 2-6, Level 2, Communication Pathology Building
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Email Jeannie.vanderlinde@up.ac.za | www.up.ac.za

Yours sincerely,

Joelene Haasbroek U21576166

Iva Grobler U22492811

Erika Vollmer U22507842

Danelle Rossouw U21652912



Supervisors:

Prof Van der Linde (HoD)

Dr Carmen Milton



Room xxx, Humanities Building
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Tel +27 (0)12 420 xxxx | Fax +27 (0)12 420 xxxx
Email xxx@up.ac.za | www.up.ac.za

PERMISSION BY THE HEAD OF THE DEPARTMENT TO CONDUCT RESEARCH

I, Prof Jeannie van der Linde, was informed about all the details of the study titled “Technology use by undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?” and have given permission to conduct the research with students from the Department of Speech-Language Pathology and Audiology, University of Pretoria.



Prof. Jeannie van der Linde
Head of Department (HOD): Department of Speech-language Pathology and Audiology

13.2 APPENDIX B: Permission from the Chairperson of the Departmental Research Committee at the Department of Speech-Language Pathology and Audiology



Faculty of Humanities

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo

Department of Speech- Language Pathology and Audiology



20 February 2025

Dear Researchers,

Project: Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

Researchers: Erika Vollmer (U22507842) Joelene Haasbroek (U21576166)
Danelle Rossouw (U21652912) Iva Grobler (U22492811)

Supervisors: Prof. Jeannie Van Der Linde, Dr Carmen Milton

Department: Department of Speech-Language Pathology and Audiology

Reference Number: SLPA2025/11

Thank you for the application submitted to the Research Committee of the Department of Speech-Pathology and Audiology, Faculty of Humanities. We have the pleasure of informing you that the above application was approved on 20 February 2025.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal.

We wish you success with the project.

Sincerely

A handwritten signature in black ink that reads 'L. Pottas'.

Prof Lidia Pottas
Chair: Departmental Research Committee

A handwritten signature in black ink that reads 'J. van der Linde'.

Prof J van der Linde
HEAD: DEPARTMENT OF SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY
UNIVERSITY OF PRETORIA

Room 3-6, Humanities Building
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Email lidia.pottas@up.ac.za | www.up.ac.za

13.3 APPENDIX C: Faculty of Humanities Permission



Faculty of Humanities
Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



08 August 2025

Dear Miss E Vollmer

Project Title: Technology use by undergraduate south african speech-Language therapists in clinical practice: what we know and where do we go?
Researcher: Miss E Vollmer
Supervisor(s): Prof J van der Linde
Dr C Milton
Department: Speech Language Pathology and Audiology
Reference number: 22507842 (HUM018/0325)
Degree: Honours

I have pleasure in informing you that the above application was **approved** by the Research Ethics Committee on 08 August 2025. Please note that before research can commence all other approvals must have been received.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.

Sincerely,

Prof Karen Harris
Chair: Research Ethics Committee
Faculty of Humanities
UNIVERSITY OF PRETORIA
e-mail: tracey.andrew@up.ac.za

Research Ethics Committee Members: Prof KL Harris (Chair); Ds S Abdoola, Mr A Bizos; Dr S Chigeza; Dr A-M de Beer; Dr A Dos Santos; Prof Salome Geertsema, Prof P Gutura; Ms KT Govinder Andrew; Dr D Krige; Mr A Mohamed; Dr T Nkholo-Ramunenyiwa; Dr I Noomé; Dr C Puttergill; Prof D Reyburn; Prof E Taljard

Room 7-27, Humanities Building, University of Pretoria, Private Bag X20, Hatfield 0028, South Africa
Tel +27 (0)12 420 4853 | Fax +27 (0)12 420 4501 | Email: pghumanities@up.ac.za | www.up.ac.za/faculty-of-humanities

13.4 APPENDIX D: Informed Consent



Faculty of Humanities

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



WHO Collaborating Centre for Prevention of Deafness and Hearing Loss



LETTER OF INTRODUCTION AND INFORMED CONSENT FOR PARTICIPATION IN ACADEMIC RESEARCH

Title of The Study:

Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

Researcher:

1. Erika Vollmer -U22507842
(0788291802)
2. Joelene Haasbroek-U21576166
(0745882266)
3. Danelle Rossouw-U21652912
(0715913437)
4. Iva Grobler -U22492811
(0746300056)

You are cordially invited to participate in an academic research study due to your experience and knowledge in the research area, namely Speech-Language Pathology. Each participant must receive, read, understand and sign this document *before* the start of the study.

Purpose of the study: The purpose of the study is to describe the factors influencing South African speech-language therapy students' selection and use of technology in clinical practice. The perceived benefits and challenges associated with incorporating technology into speech-language therapy sessions and SLT students' readiness and perceived competence to use technology in clinical practice will be explored. The results of the study may be published in an academic journal. You will be provided with a summary of our findings on request. No participants' names will be used in the final publication.

Duration of the study: The study will be conducted over a period of 12 Months and its projected date of completion is October 2025.

Research procedures: The study is based on (Albudoor & Peña 2022), (View of MOBILE HEALTH APPLICATION UTILIZATION and E-HEALTH LITERACY among MEDICAL and HEALTH STUDENTS, 2024), (Jabour et al., 2021) and (Xu et al., 2022). The study will employ a descriptive cross-sectional survey design integrating both qualitative and quantitative data. It provides valuable insight into the factors affecting technology selection and usage among Speech-Language Therapy students. Data for this study will be collected through an online questionnaire hosted on the University of Pretoria's Qualtrics database

What is expected of you: We kindly request your participation in a questionnaire, about factors that affect your selection and use of technology, the perceived benefits and challenges associated with incorporating technology into speech-language therapy sessions, and your readiness and perceived competence to use technology in clinical practice as a student. Which should take approximately 10 minutes to complete. Once you have finished the online questionnaire on the Google form, it will be submitted to the research team. Rest assured that your responses will be kept confidential in a secure location. Please refrain from including your name on the questionnaire.

Your rights: Your participation in this study is very important. You may, however, choose not to participate and you may also stop participating at any time without stating any reasons and without any negative consequences. You, as a participant, may contact the

researcher at any time to clarify any issues about this research. The respondent as well as the researcher must each keep a copy of this signed document.

Confidentiality: All information will be treated as confidential in a secure location and will only be shared with the researcher, research supervisors, and a trusted statistician from the University of Pretoria. The relevant data will be destroyed, should you choose to withdraw. Please refrain from including your name on the questionnaire.

Remuneration: No money/fees, gifts or any form of reward will be awarded/offered / can be expected by co-researchers / respondents/participants at any time during the research.

In compliance with the South African government's Protection of Personal Information Act (*POPIA*; Act no. 4 of 2013), the information that will be collected will be kept secure at all times, according to the Information Technology Security Policy (Rt71/17) of the University of Pretoria. The information will not be used in any other way, other than directed.

WRITTEN INFORMED CONSENT

I hereby confirm that I have been informed about the nature of this research.

I understand that I may, at any stage, without prejudice, withdraw my consent and participation in the research. I have had sufficient opportunity to ask questions.

Respondent: _____

Contact number of the Researchers:

Erika Vollmer -U22507842
(0788291802)



Joelene Haasbroek-U21576166
(0745882266)



Danelle Rossouw-U21652912
(0715913437)



Iva Grobler -U22492811
(0746300056)



Supervisors:

Dr Carmen Milton

Prof Van der Linde (HoD)

Date:

13.5 APPENDIX E: Survey

Research Questionnaire



Study Questionnaire: Technology used by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

Informed Consent Letter

Dear Respondent,

Our research team invites you to participate in our research study aimed at determining Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

Your participation involves completing this online questionnaire, which should take approximately 10 to 15 minutes.

Please note the following:

1. Your responses will be anonymous.
2. Once you submit the questionnaire via the Google Form, your anonymised data will be securely stored.
3. The information obtained from your responses will be used for research purposes and publication.
4. Participation in this study is entirely voluntary, and you may withdraw at any time without any consequence.

By completing and submitting the questionnaire, you indicate that you have read and understood the purpose of the study and the terms of your participation.

Researchers:

Joelene Haasbroek: u21576166@tuks.co.za

Iva Grobler: u22492811@tuks.co.za

Erika Vollmer: u22507842@tuks.co.za

Danelle Rossouw: u21652912@tuks.co.za

Supervisors:

Dr C Milton: carmen.milton@up.ac.za

Prof J van der Linde: jeannie.vanderlinde@up.ac.za

Consent Declaration:

I, the respondent, hereby accept to participate in this study. I understand that my responses will be kept anonymous and used for research purposes and/or publications by the researchers.

- A. I acknowledge the information in the informed consent letter and agree to participate in the study.
- B. I acknowledge the information in the informed consent letter and decline to participate in the study.

1. What is your age? (in years)

- A. <18
- B. 19
- C. 20
- D. 21
- E. 22
- F. 23
- G. >23

2. What is your sex?

- A. Female
- B. Male

3. What is your home language?

4. In what year of study are you currently in?

- A. Third Year
- B. Fourth Year

5. Do you currently use any technology tools in your speech-language therapy sessions? (Yes/No)

- A. Yes
- B. No

6. Which of the following technologies do you use in your clinical practice, and how often?

Technology Usage in Practice	Frequently	Occasionally	Rarely	Never
Telehealth/Teletherapy platforms				
Speech-language therapy apps				
AI-based tools for personalized therapy				
Wearable technology (e.g. devices)				
Gamified therapy tools				
Traditional digital tools (e.g., tablets, audio equipment)				

Other (please specify) _____

7. How often do you use telehealth or teletherapy (Giving therapy from a distance via an electronic platform) services in your practice?

- A. Frequently
- B. Occasionally
- C. Rarely
- D. Never

8. Are you using social media as a resource for speech therapy ideas? (Yes/No)

- A. Yes
- B. No
- C. If "Yes", please specify below.

9. Barriers to Technology Adoption: What barriers (challenges) have you encountered when implementing technology in your practice?

	Strongly Disagree	Moderately Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Moderately Agree	Strongly Agree
Technical difficulties							
Financial constraints							

Lack of patient access to devices and/or technology							
Language and cultural appropriateness of resources							
Time required for setup and training							

Difficulty adapting traditional methods to online formats.							
Concerns about data security and privacy							

Lack of client engagement in virtual sessions							
Other (please specify)							

10. What do you think are the biggest facilitators of using technology in speech-language therapy?

11. Briefly explain why you believe technology does or does not enhance client engagement in speech therapy.

12. How do you think technology has enhanced or could enhance the way you conduct speech therapy

13. Do you feel confident in using technology during your therapy sessions? (Yes/No)

- A. Yes
- B. No

14. How would you describe your current knowledge and experience in incorporating technology into your speech therapy practices?

15. Have you found technology to be effective in tracking client progress? (Yes/No)

- A. Yes
- B. No

16. Do you believe that technology can replace in-person speech therapy sessions? (Yes/No). Please explain your answer below.

- A. Yes
 - B. No
-

17. Do you think technology has made speech therapy more accessible to clients? (Yes/No)

- A. Yes
- B. No

18. What factors motivate you to use technology in your practice? (Select all that apply)

- A. Improve client outcomes
 - B. Save time and effort
 - C. More cost-effective
 - D. Enhance patient engagement
 - E. More available resources
 - F. Professional Development
 - G. Other (Please Specify)
-

19. To what extent do you feel that the available technologies are culturally and linguistically appropriate for your clients in South Africa?

- A. Completely appropriate
- B. Somewhat appropriate
- C. Neutral
- D. Somewhat inappropriate
- E. Completely inappropriate

20. What type of support or training would help you integrate technology into your practice more effectively? (Select all that apply)

21. How would you rate your preparedness using technology for clinical practice?

- A. Unprepared

- B. Slightly prepared
- C. Moderately prepared
- D. Well prepared
- E. Fully prepared

**22. Would you like to learn more about new technology tools for speech therapy?
(Yes/No)**

- A. Yes
- B. No

23. Have you received any formal training in using technology during clinical practice?

- A. Yes
- B. No

24. What recommendations would you make to improve the use of technology in speech language therapy in South Africa?

25. How much do you agree or disagree with the following statements regarding your use of technology for work, clinical, or educational purposes?

	Strongly Disagree	Moderately Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Moderately Agree	Strongly Agree
Using technology enables me to accomplish							

tasks more quickly.							
Using technology increases my productivity.							
Learning to use technology is easy for me.							
My interaction with technology does not require much effort.							
I find technology easy to use.							

People who are important to me think that I should use technology.							
When I encounter difficulties							

in using technology, I know where to seek assistance.							
Once I start using technology, I find it hard to stop.							
I expect that I will use technology for clinical purposes in the future.							

26. How much do you agree or disagree with the following statements regarding your use of technology for work, clinical, or educational purposes?

	Strongly Disagree	Moderately Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Moderately Agree	Strongly Agree
Using technology improves my performance .							
Using technology enhances my							

effectiveness.							
I find it easy to use technology to do what I want to do.							

It is easy for me to become skillful at using technology.							
People who influence my behavior think that I should use technology.							
When I encounter difficulties in using technology, a specific person is available to assist.							
When I encounter difficulties in using technology, I am given timely assistance.							
I look forward to those							

aspects of my job that require the use of technology.							
I intend to continue to use technology for clinical purposes in the future.							
I plan to use technology for clinical purposes in the future.							

27. If there is anything else that you would like to share regarding the use of technology for speech-language pathology assessment or intervention, including your own experiences, thoughts, or opinions, please do so here.

Thank you for your participation in this study and for completing this survey.

Should you wish to know the results of this study upon its conclusion, feel free to contact the researchers or any of the research supervisors: Prof. Jeannie van der Linde (jeannie.vanderlinde@up.ac.za) and Dr Carmen Milton (carmen.milton@up.ac.za).

13.6 APPENDIX F: Information Brochure

The brochure is divided into three vertical panels. The left panel features a collage of colorful icons (heart, camera, globe, shopping cart, gear, music note, envelope, book, smartphone) at the top. Below them, the text reads: **ATTENTION**
Student
Speech-Language
Therapists
Graduating Between
2025-2026!
At the bottom of this panel is a cartoon robot with a screen on its chest showing a heartbeat line.

The middle panel has a light green background with a red ribbon at the top. It contains the text: **We invite you to participate in our research on:**
How the use of technology impacts speech-language therapy students in future practices.
Below this, it says: By sharing your experiences, you will play an important role in advancing the use of technology in speech therapy practices for future professionals in the field.
At the bottom, there is a clock icon and a signature.

The right panel has a light green background. At the top is a clipboard icon with three checkmarks. Below it, the text says: **Survey link:** followed by a red pushpin icon. There is a white rectangular box for the link. At the bottom, an orange box contains the text: We greatly value your participation and expertise in contributing to our research. Thank you for your involvement.

Survey link:

https://docs.google.com/forms/d/e/1FAIpQLSdBejsSR3A23QIKx3rvBM9jVOgsdlz1w3lpM8Skyi7SfkKITQ/viewform?usp=sf_link



13.7 APPENDIX G: Institutional Survey Application



Faculty of Humanities
Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



WHO Collaborating Centre for Prevention of Deafness and Hearing Loss



University of Pretoria

Faculty of Humanities

Department of Speech-Language Pathology and Audiology

Institutional Survey Coordinating Committee

SURVEY APPLICATION CHECKLIST

Document type: Checklist Document number: Policy Category: Governance and Compliance

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Purpose

The Institutional Survey Coordinating Committee must approve surveys that are within the scope of the University's Survey Policy.

The Institutional Survey Coordinating Committee meets once a month. Submissions for approval of proposed surveys must be submitted at least two weeks before the meeting takes place.

The meeting dates are available on the intranet under the Survey Policy. It is also important to note that the committee may request a revised research/survey proposal, and it is therefore recommended that applicants apply at least two months before the intended date of issuing the survey to its intended recipients.

Please submit this application with the research proposal, ethical approval letter and a copy of the survey instrument via email to carlien.nell@up.ac.za.

Project information

Name of the Project

Technology use by Undergraduate South African Speech-Language Therapists in clinical practice: What we know and where do we go?

Contact Name

Erika Vollmer U22507842:
 0788291802
 Joelene Haasbroek U21576166:
 0745882266
 Danelle Rossouw U21652912:
 0715913437
 Iva Grobler U22492811:
 0746300056

Supervisors:
 Prof Van der Linde (HoD)
 Dr Carmen Milton

2

Type of Project

Institutional management research project – Executive request	
Internal research request – Professional Services Department	
Internal research request – Academic Related Research	x
External research request – Academic Related Research	
External research request – Private/ Government	
Other - (Specify)	

UP Faculty/ Professional Services Department involved

Humanities

UP Ethics Committee involved

Faculty of Humanities

Data or Information Request

What type of data is being collected or created?

UP Student data	X
UP Staff data	
UP Alumni data	
UP other stakeholders (donors, service providers etc.)	
UP institutional information (policies, staff and student statistics, programme information etc.)	

3

Does this project overlap with other registered survey projects in UP?

No, this project does not overlap with other registered survey projects at UP.
--

--

Is the research data required already available or already collected in previous surveys?

No, our project has a distinct focus, target population, and research objectives, ensuring that it addresses unique questions and contributes different insights to the field.

Is the particular target market already involved in other surveys registered?

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
-----	--------------------------	----	-------------------------------------

Is there a chance of over-surveying this particular target group?

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
-----	--------------------------	----	-------------------------------------

Data Collection / Research Methodology

How will respondents be recruited?

Open Sources (Contact information on UP website, LinkedIn, etc.)	<input type="checkbox"/>
Email lists (Dept. of Institutional Planning)	<input type="checkbox"/>
Open invitation on social media/Facebook, etc.	<input type="checkbox"/>
Direct recruitment on campus	<input type="checkbox"/>
Open invitation on the UP intranet	<input checked="" type="checkbox"/>
Other: (Specify)	<input type="checkbox"/>

What research instrument will be used?

Online Survey Link	<input checked="" type="checkbox"/>
Paper questionnaires	<input type="checkbox"/>
Focus groups	<input type="checkbox"/>
Personal interviews	<input type="checkbox"/>
Other: (Specify)	<input type="checkbox"/>

Privacy Requirements

Will the research data need to be de-identified/anonymized?

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
-----	--------------------------	----	-------------------------------------

Is the respondent's anonymity protected if it is an anonymous survey?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
-----	-------------------------------------	----	--------------------------

Is it stated clearly that participation in the survey is voluntary and participants are free to opt out of any survey without being penalized in any way?

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
-----	-------------------------------------	----	--------------------------

Application of the Research Results

What will the research results be used for?

Accreditation Purposes	
Program Review / Assessment Purposes	
Institutional Management Reports	

5

Academic Research Publications	x
Conference Papers	
Regional/National Surveys	
Completion of a research requirement for an Undergraduate Degree Programme (Specify)	Requirements for the degree of Speech Language Pathology. Forms part of the modules of RHC 300 and KMP481.
Completion of a research requirement for a Postgraduate Degree Programme (Specify)	
For a commercial venture	
Other:	

Is the use clearly stated in the research proposal?

Yes	x	No	
-----	---	----	--

UP Reputational Considerations

Will the name of the University be revealed in any research publications that will be published?

Yes		No	x
-----	--	----	---

Is there any chance that the study results will have an impact on the reputation of the University, its staff or students?

Yes		No	x
-----	--	----	---

Will the name of the research participants be revealed in the final reports?

Yes		No	x
-----	--	----	---

6

Is the Intellectual Property of UP at stake in the research project?

Yes		No	x
-----	--	----	---

Access and Storage

Where will the data be stored?

The data will be stored on a secure password-protected computer as well as a secure password-protected drive for backup

How will the data be protected?

The data will be protected on a password-protected computer, a password protected file as well as on the UP-data repository

Who will have access to the data?

Only the researchers and their supervisors will have access to the data.

Is there an NDA in place if third parties have access to the data?

A Non-Disclosure Agreement (NDA) will be signed to safeguard participant confidentiality and prevent unauthorized data sharing.

For how long will the data be stored?

All data collected in this study will be securely stored in the University of Pretoria's Data Repository (Figshare) for a minimum of 10 years, ensuring compliance with the University's Research and Data Management Policy and the Protection of Personal Information Act.

Who will be responsible for the archiving or disposal of the data after the project ends?

The Principal Investigator (or the Head of Department if the Principal Investigator has left the University).

How and when will the data be disposed of?

The Principal Investigator (or the Head of the Department if the Principal Investigator has left the University) should request the Department of IT Services to destroy the research data, which was stored on the institutional Research Data Management System. After the end of the retention period (10 years or longer), research data should be considered for destruction. This must be done with prior approval from the relevant Head of Department.

UP Strategic Goals

Does the survey (if it is an internal non-academic or external, academic or non-academic project) support the goals of the UP's Strategic Plan, and will the results support the institutional management decision-making processes?

Yes		No	x
-----	--	----	---

Document metadata

Document number:	
Document version:	
Document approval authority:	<i>e.g. Executive</i>
Document approval date:	2025/02/20
Document owner:	<i>e.g. Registrar</i>
Document author(s):	<i>Erika Vollmer, Danelle Rossouw, Joelene Haasbroek, Iva Grobler, Prof Jeannie van der Linde and Dr Carmen Milton.</i>

Next review date:	
-------------------	--

8

Visibility: Display on staff intranet Display on the student intranet Display on the public web	
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9