

The role of sign language instructions in improving literacy skills among deaf learners in Tanzania: Insights from Patandi secondary school in Arusha Region

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Recommended Citation: Stanislaus, E. (2026). The role of sign language instructions in improving literacy skills among deaf learners in Tanzania: Insights from Patandi Secondary School in Arusha Region. *African Quarterly Social Science Review*, 3(3), 976–986. <https://doi.org/10.51867/AQSSR.3.3.97>

ABSTRACT

This study examined the role of sign language instruction in improving literacy skills among deaf learners in Tanzania, focusing on Patandi Secondary School in Arusha Region. The study was guided by the recognition that deaf learners often experience communication barriers that affect their acquisition of essential literacy competencies, including reading, writing, vocabulary development, and comprehension. Therefore, the study sought to explore how sign language instruction contributes to literacy development among deaf learners and identify its implications for inclusive education practices in Tanzania. Bilingual–Bicultural (Bi-Bi) Model of Deaf Education to complement the study. The study employed a qualitative research approach guided by a phenomenological research design to obtain an in-depth understanding of participants' lived experiences regarding the use of sign language in teaching and learning. The study was conducted at Patandi Secondary School, which was purposively selected due to its provision of education services to learners with hearing impairment and its extensive use of sign language as a medium of instruction. Participants were selected through purposive sampling, involving teachers, head of schools, and deaf learners with direct experience of sign language-based instruction. Data were collected through semi-structured interviews, allowing participants to provide detailed accounts of their experiences, perceptions, and views regarding the contribution of sign language to literacy development. The collected data were analyzed using thematic analysis following Braun and Clarke's six steps framework. The findings revealed that sign language instruction plays a significant role in enhancing literacy skills among deaf learners through five major areas: language development, reading comprehension, writing skills, vocabulary acquisition, and learner engagement. The study found that sign language improves learners' ability to understand concepts, develop communication competence, interpret written texts, organize ideas, and express themselves confidently through writing. Also, findings revealed that sign language-based instruction increased classroom participation, learner confidence, and academic engagement by creating an inclusive and supportive learning environment. The study concludes that sign language instruction is an essential pedagogical strategy for improving literacy outcomes among deaf learners and promoting meaningful inclusion in education. The study recommends strengthening teacher training programmes in sign language, integrating sign language approaches into inclusive education policies, and providing adequate instructional resources to support effective literacy instruction for learners with hearing impairment in Tanzania.

Key words; Deaf Learners, Improving Literacy Skills, Sign Language Instructions, Tanzania

I. INTRODUCTION

Literacy skills are fundamental to learners' academic achievement, social participation, and lifelong learning. For deaf learners, the development of literacy depends largely on access to an effective language of instruction that supports communication, reading, and writing. International frameworks such as the UN Convention on the Rights of Persons with Disabilities (UNCRPD), the Salamanca Statement, and Sustainable Development Goal 4 (SDG 4) recognize the right of every learner to equitable and quality education regardless of disability (Elfert, 2015; Huang et al., 2020). Within this framework, sign language has increasingly been recognized as the natural language of deaf people and a critical instructional medium for promoting literacy development. Research from different countries shows that learners who receive systematic sign language instruction demonstrate improved language acquisition, reading comprehension, vocabulary development, writing ability, and classroom participation compared to those taught through communication approaches that inadequately support their linguistic needs (Raknes et al., 2024). Despite this global recognition, many developing countries continue to experience significant challenges in effectively integrating sign language into classroom instruction, limiting literacy outcomes among deaf learners.

Historically, education for deaf learners has evolved from exclusion and segregation towards inclusive and rights-based approaches (Mbunda, 2017). Earlier educational systems in many parts of the world emphasized oralism, which discouraged the use of sign language in favor of speech and lip-reading (Tungaraza, 2010). However, growing linguistic and educational evidence has established sign language as a complete natural language capable of supporting

cognitive, linguistic, and academic development among deaf learners (Tang, 2015). Consequently, many countries have incorporated sign language into educational policies and teacher preparation programmes to improve learning outcomes for deaf students. Nevertheless, successful implementation remains uneven because of shortages of qualified sign language teachers, inadequate instructional materials, inconsistent pedagogical practices, and limited institutional support (Savolainen, 2009; Raknes et al., 2024). These challenges continue to affect the quality of literacy instruction despite policy commitments toward inclusive education.

In Tanzania, the government has demonstrated commitment to improving educational opportunities for learners with disabilities through the Persons with Disabilities Act of 2010, the National Strategy on Inclusive Education (2009–2017), and the Education and Training Policy of 2014, all of which advocate equitable access to quality education (United Republic of Tanzania [URT], 2017). The expansion of special and inclusive schools has increased educational access for deaf learners. However, improving access alone has not translated into improved literacy achievement. Studies indicate that many schools continue to experience shortages of qualified teachers proficient in Tanzanian Sign Language, limited teaching and learning resources, inadequate instructional technologies, overcrowded classrooms, and insufficient professional development opportunities for teachers working with deaf learners (Kapinga, 2014). As a result, many deaf learners continue to experience difficulties in reading comprehension, vocabulary acquisition, written expression, and overall academic performance despite being enrolled in school.

Existing literature like those by United Nations Environmental, Scientific and Cultural Organization [UNESCO] (2020), Tang (2015), Kapinga (2014), Mahlo (2011) and Mbunda (2017) to mention a few, further demonstrated that teacher competence in sign language instruction plays a central role in determining literacy outcomes among deaf learners. Effective literacy development requires teachers who possess not only fluency in sign language but also pedagogical knowledge on how to integrate sign language with reading, writing, vocabulary instruction, and comprehension strategies (HakiElimu, 2008). However, previous studies in Tanzania have consistently reported inadequate teacher preparation, insufficient in-service training, limited instructional materials, and weak institutional support for teachers serving learners with hearing impairment (Kapinga, 2014; Mbunda, 2017). While these studies have documented general challenges affecting special and inclusive education, they provide limited empirical evidence on how specific sign language instructional practices influence literacy development among deaf learners (Ntombela, 2022). Consequently, the mechanisms through which sign language instruction contributes to improved literacy remain insufficiently understood within Tanzanian secondary schools.

Furthermore, much of the available research has concentrated on broad issues such as inclusive education implementation, educational policy, teacher attitudes, infrastructure, access to education, and challenges facing learners with disabilities (Mutatembwa et al., 2024, Msumanje, 2025, Omoro & Possi, 2024). Although these studies have contributed significantly to understanding inclusive education, they rarely examine the instructional processes occurring inside classrooms where literacy learning actually takes place (Ntombela, 2022). Specifically, limited attention has been given to the effectiveness of sign language instructional strategies, teacher proficiency in sign language, learner-teacher communication, classroom interaction, availability of sign language learning resources, and their combined influence on literacy skills such as reading, writing, vocabulary development, and comprehension among deaf learners (Chaula, 2024). In addition, few studies have focused specifically on secondary schools for the deaf in Tanzania, where literacy demands become increasingly complex. This creates a substantial empirical and contextual knowledge gap regarding how sign language instruction contributes to literacy improvement within real classroom settings.

Previous studies in Tanzania have mainly focused on the challenges of inclusive education while giving limited attention to how sign language instruction directly improves literacy skills among deaf learners (Batsche, 2006; Costantine et al., 2025; Costantine et al., 2026). Furthermore, there is little context-specific evidence from Patandi Secondary School in Arusha Region regarding instructional practices, teacher competence, learning resources, and their influence on learners' literacy outcomes (Charles & Otieno, 2023). This knowledge gap limits evidence-based decision-making for improving deaf education. Therefore, this study investigates the role of sign language instruction in improving literacy skills among deaf learners at Patandi Secondary School to provide context-specific evidence that can inform policy, teacher professional development, and instructional practice in Tanzania.

1.1 Research Objective

The study is designed to explore the role of sign language instruction in improving literacy skills among deaf learners at Patandi Secondary School in Arusha Region, Tanzania.

1.2 Research Question

What is the role of sign language instruction in improving literacy skills among deaf learners at Patandi Secondary School in Arusha Region, Tanzania?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Bilingual–Bicultural (Bi-Bi) Model of Deaf Education

The Bilingual–Bicultural (Bi-Bi) Model of Deaf Education emerged prominently in the late 1980s as a response to the limitations of oral and total-communication approaches that often provided deaf learners with inadequate access to language and the curriculum. A particularly influential formulation was provided by Mayer, and Akamatsu (1999), through their work *Unlocking the Curriculum: Principles for Achieving Access in Deaf Education*. Their model proposed that deaf children should have early and full access to a natural sign language as their first language (L1), while the written/spoken majority language is developed as a second language (L2). The model is based on the assumption that deaf learners are capable of learning effectively when they have full linguistic access to instruction, and that sign language is a complete, natural language rather than merely a substitute for speech (Mayer & Akamatsu, 1999). It further assumes that a strong first-language foundation supports cognitive development, conceptual understanding, communication, and subsequent acquisition of literacy in the majority language. The model assumes that sign language is the first language (L1) of deaf learners, while the written or spoken majority language is learned as a second language (L2). It also assumes that deaf culture and identity should be respected and that strong sign-language proficiency provides a foundation for developing literacy, academic skills, and effective participation in both Deaf and hearing communities (Mayer & Akamatsu, 1999). The model also incorporates a bicultural dimension, recognising the cultural identity and experiences of Deaf communities alongside participation in the wider hearing society. Thus, rather than expecting deaf learners to acquire literacy primarily through spoken language that they may not fully access, the model advocates using an accessible sign language to mediate learning and deliberately teaching the written majority language.

In the context of the proposed study at Patandi Secondary School in Arusha Region, the Bi-Bi Model provides a direct framework for examining how Tanzanian Sign Language (TSL) instruction contributes to literacy development among deaf learners. Its practical application would involve examining whether teachers use TSL effectively to explain concepts, introduce vocabulary, facilitate classroom interaction, support reading comprehension, explain written texts, and guide learners in writing Kiswahili and English. The model would also guide investigation of the availability and use of visual materials, finger spelling, written stories, graphics, videos and other multimodal resources that connect TSL with written language. Importantly, Tanzania's own guidelines for facilitating learning among deaf and hard-of-hearing students explicitly emphasise the Bi-Bi approach, involving TSL together with Kiswahili and English to promote literacy, signing and communication; they also recommend TSL and finger spelling as components of multimodal reading instruction. Therefore, the model allows the study to conceptualise TSL instruction as the independent factor, with reading and writing competencies as key dimensions of literacy outcomes, while considering teacher signing proficiency, instructional strategies, learning materials and classroom language practices as factors that may strengthen or constrain this relationship. In this way, the Bi-Bi Model is not merely a general theory of deaf education but provides a particularly strong lens for explaining how accessible sign-language-mediated instruction can facilitate deaf learners' access to curriculum content and the development of literacy in written Kiswahili and English.

2.2 Empirical Review

At the global level, empirical evidence increasingly demonstrates that access to an appropriate and accessible language is central to literacy development among deaf learners. The historical dominance of oralism often restricted deaf learners' access to classroom communication because instruction depended heavily on speech and lip-reading. In contrast, contemporary bilingual approaches position natural sign languages as legitimate languages of instruction and as foundations for acquiring written majority languages. For example, evidence from Kenya, which is particularly relevant because it shares linguistic and educational characteristics with Tanzania, found a positive and significant relationship between Kenyan Sign Language (KSL) proficiency and English literacy among 60 upper-primary deaf learners in four residential schools; learners with stronger KSL proficiency performed better in English literacy, suggesting that competence in a first sign language can provide an important foundation for second-language literacy (Charles & Otieno 2023). Similarly, international literature emphasises that deaf learners require systematic opportunities to develop both signed and written languages rather than being expected to acquire literacy through communication modes that they cannot fully access. Recent evidence from Africa also shows that disability remains associated with substantial educational inequalities, reinforcing the importance of appropriate pedagogical approaches and specialised learning resources rather than interpreting low achievement as an inherent consequence of deafness (Fakudze, 2012). However, the global evidence also suggests that sign language alone does not automatically produce literacy. Its effectiveness depends on early language exposure, teacher proficiency, appropriate pedagogy, suitable learning materials and systematic connections between sign language and written language. This distinction is important because it shifts the empirical question from whether deaf learners should use sign language to how sign language is actually used instructionally to produce measurable literacy gains.

At the African and East African levels, the evidence reveals both the potential of sign language and persistent implementation problems. In Kenya, Charles and Otieno (2023) argues that KSL should function as the mother tongue and medium of instruction for deaf learners because it provides a linguistic foundation for learning additional languages and academic content. He critically observes that although KSL has constitutional recognition, its use as a classroom language has not always been adequately implemented, with oral approaches continuing to influence deaf education. More direct empirical evidence comes from Omoro and Possi (2024), whose correlational study of 60 deaf learners established that KSL proficiency was positively associated with English literacy, supporting the proposition that a strong sign-language foundation can facilitate written-language development. Similarly, a recent doctoral study involving seven schools for deaf learners in eastern and central Kenya examined teachers' actual literacy-teaching practices through interviews, classroom observations and document analysis, demonstrating that literacy instruction for sign-language-using deaf learners involves complex pedagogical issues that cannot be reduced to teacher signing ability alone (Mahlo, 2011). Evidence from Rwanda likewise shows increasing attention to sign-language-rich environments and the development of foundational language and literacy in both signed and written languages, but policy implementation remains a challenge. Uganda also provides evidence that literacy assessment among deaf learners can be conducted through sign-mediated procedures, while parental and school factors influence educational outcomes. Collectively, East African evidence indicates that sign-language proficiency, early exposure, teacher competence, bilingual pedagogy and appropriate learning resources are interconnected determinants of literacy, but there remains limited longitudinal and school-level evidence demonstrating precisely which classroom sign-language practices generate improvements in reading, vocabulary, comprehension and writing. This limitation is especially important for Tanzania because evidence from neighbouring countries cannot automatically be generalised to Tanzanian Sign Language (TSL), whose linguistic development and educational implementation have its own historical and institutional context.

In Tanzania, empirical evidence increasingly confirms the importance of sign language while simultaneously revealing a significant gap between language policy, classroom practice and literacy outcomes. Tanzania's deaf education system has historically experienced tension between speech-oriented approaches and sign-based communication, while contemporary initiatives increasingly promote Tanzanian Sign Language (TSL) and bilingual education. The Tanzania Association of the Deaf (CHAVITA), for example, identifies the development of TSL and improving access to deaf education through bilingual education as important priorities. More directly, Mutatembwa et al (2024) investigated language comprehension among 162 deaf pupils in four Tanzanian special primary schools in Dar es Salaam, Njombe, Kagera and Tabora. Their findings showed that a chaining strategy significantly improved learners' ability to generate meaning from individual words and short sentences, although it did not significantly improve comprehension of longer sentences and texts; importantly, the researchers recommended early exposure to sign language and greater teacher competence in sign language. Recent evidence from Njombe Secondary School for the Deaf further strengthens this concern: Kayombo and Walubita (2026) found that English-only instruction restricted deaf learners' understanding, engagement and classroom performance, while teachers experienced difficulties explaining complex concepts and learners reported frustration, passive learning and memorisation. The study consequently recommends recognizing TSL as a co-medium of instruction and strengthening teachers' bilingual pedagogical competence. In addition, current initiatives in Tanzania are developing TSL-based educational materials, including the translation of primary-school textbooks into TSL, demonstrating growing practical recognition of sign language as an instructional resource. Nevertheless, a clear empirical gap remains. Tanzanian studies have tended to examine general barriers, language comprehension, medium of instruction, or inclusive education rather than systematically establishing how specific sign-language instructional practices, teacher TSL proficiency, classroom interaction, visual resources and bilingual teaching strategies influence specific literacy outcomes such as reading fluency, vocabulary, reading comprehension and written expression at the secondary-school level. Moreover, there is little published empirical evidence specifically from Patandi Secondary School in Arusha Region. Therefore, the proposed study is justified because it moves beyond documenting the general challenges of deaf education to investigate the actual instructional mechanisms through which sign language may improve literacy among deaf learners in a Tanzanian secondary-school context.

III. METHODOLOGY

3.1 Research Approach

This study adopted a qualitative research approach guided by a phenomenological research design to explore the role of sign language instruction in improving literacy skills among deaf learners at Patandi Secondary School in Arusha Region, Tanzania. The qualitative approach was considered appropriate because the study sought to gain an in-depth understanding of how sign language instruction facilitates the development of literacy skills from the perspectives of teachers, deaf learners, and school administrators. Rather than relying on numerical measurements, the study focused on capturing participants' lived experiences, perceptions, and interpretations regarding the use of sign language as the

primary medium of instruction and communication in the teaching and learning process. This approach enabled the researcher to explore how sign language influences learners' abilities in reading, writing, vocabulary acquisition, comprehension, and classroom participation, while also identifying contextual factors that either facilitate or hinder literacy development among deaf learners.

3.2 Research Design

The study employed a phenomenological design because it emphasizes understanding the meanings individuals attach to their everyday experiences. In the context of this study, phenomenology enabled the researcher to examine how teachers experience the implementation of sign language instruction in literacy lessons and how deaf learners perceive its contribution to their academic development. The design provided an opportunity to explore participants' firsthand experiences regarding instructional practices, classroom interactions, communication effectiveness, and learning outcomes within a natural educational setting. Consequently, the study generated rich contextual information that explains not only whether sign language instruction supports literacy acquisition but also how and why it contributes to improving literacy skills among deaf learners in Tanzanian secondary schools. The findings therefore provide practical evidence that can inform the development of inclusive instructional strategies, teacher preparation programmes, and educational policies aimed at strengthening literacy outcomes for learners with hearing impairment.

3.3 Study Area

The study was conducted at Patandi Secondary School in Arusha Region, Tanzania, which was purposively selected because it is one of the specialized public secondary schools that primarily serves learners with hearing impairment and extensively uses Tanzanian Sign Language as the medium of classroom instruction. The school provided an ideal setting for investigating the contribution of sign language instruction to literacy development since both teaching and learning activities are conducted through sign language, allowing the researcher to observe authentic instructional experiences. Furthermore, Patandi Secondary School has accumulated considerable experience in educating deaf learners, making it an appropriate environment for exploring instructional practices that directly influence literacy acquisition. The selection of this setting ensured that the findings were grounded in real educational experiences and reflected the practical realities of sign language-based instruction within Tanzania's inclusive and special education system.

3.4 Target Population

The population of this study comprised deaf learners and teachers involved in the instruction of deaf learners at Patandi Secondary School in Arusha Region, Tanzania. Deaf learners constituted the primary population because they directly experience sign language instruction and its influence on their literacy skills, including reading, writing, vocabulary development, and comprehension. Teachers were included because they provide sign language instruction and possess relevant information regarding instructional strategies, their competence in Tanzanian Sign Language (TSL), classroom interaction, and challenges affecting literacy development among deaf learners. Together, these groups provided the relevant population for examining the role of sign language instruction in improving literacy skills among deaf learners.

3.5 Sampling Procedure and Sample Size

Purposive sampling was employed to select participants who possessed direct knowledge and practical experience regarding sign language instruction and literacy development among deaf learners. Participants included teachers of deaf learners, school administrators, and selected deaf learners who had substantial experience in sign language-based teaching and learning process, with a sample size of 15 participants. Their inclusion enabled the study to obtain diverse yet complementary perspectives concerning classroom instruction, communication practices, literacy acquisition, and institutional support. Purposive sampling ensured that participants could provide detailed, information-rich accounts relevant to the research objectives. The sample size was determined using the principle of data saturation rather than statistical representation. Data collection continued until no additional ideas, experiences, or themes emerged from subsequent interviews. This approach ensured that the collected information was sufficiently comprehensive to explain the role of sign language instruction in improving literacy skills among deaf learners. The emphasis on data saturation enhanced the credibility, depth, and richness of the findings by ensuring that participants' experiences adequately reflected the phenomenon under investigation. In the context of this study, this methodological choice allowed the researcher to uncover practical insights into effective sign language instructional practices, learner engagement, and literacy development that may not have emerged through large-scale quantitative sampling.

3.6 Data Collection

Data for this study were collected using semi-structured interviews with teachers, school administrators, and selected deaf learners to explore their experiences and perceptions regarding the role of sign language instruction in improving literacy skills. The interviews allowed participants to discuss how sign language supports reading comprehension, vocabulary development, written communication, classroom interaction, learner confidence, and academic participation, while also identifying challenges such as inadequate instructional materials, limited teacher training, differences in sign language proficiency, and insufficient parental support.

3.7 Data Analysis

The collected data were analyzed using thematic analysis based on Braun and Clarke's (2006) six-step framework, familiarising with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This approach enabled the identification of key themes related to sign language instruction, literacy development, classroom communication, learner engagement, instructional challenges, and institutional support. The findings generated practical insights that can inform improvements in teaching practices, school support systems, and educational policies aimed at enhancing literacy outcomes among deaf learners.

3.8 Ethical Considerations

Ethical principles were strictly observed throughout the study to ensure the protection of participants' rights and welfare. Informed consent was obtained from all participants, participation was voluntary, confidentiality and anonymity were maintained through the use of pseudonyms, and all data were securely stored for academic purposes only. These ethical measures promoted trust and openness during data collection, thereby enhancing the credibility, authenticity, and trustworthiness of the study findings.

IV. FINDINGS & DISCUSSION

4.1 Findings

The findings are based on the basic themes emanated from the informants on five basic roles of sign language instruction in improving literacy skills among deaf learners in the selected secondary school. Those themes include enhancing language development, improving reading comprehension, strengthen writing skills, facilitating vocabulary acquisition, and increasing learners' engagement. These themes emanated from responses from deaf students, head of schools and the entire teachers teaching deaf students, as they are tabulated bellow basing on their sub themes and categories, and they are thoroughly explained one after another.

Table 1

indicating themes and sub themes resulted from the findings

Theme	Sub-themes	Categories
Sign Language Instruction Enhances Language Development	Communication competence	Language acquisition, grammar understanding, literacy foundation
Sign Language Instruction Improves Reading Comprehension	Reading comprehension development	Word recognition, text interpretation, critical thinking
Sign Language Instruction Strengthens Writing Skills	Written communication development	Sentence construction, vocabulary application, writing confidence
Sign Language Instruction Facilitates Vocabulary Acquisition	Vocabulary development	New word learning, concept retention, literacy vocabulary
Sign Language Instruction Increases Learner Engagement and Academic Achievement	Learner participation and achievement	Classroom participation, inclusive learning, academic performance, learner confidence

4.1.1 Sign Language Enhance Language Development

A dominant theme emerging from the interviews was that sign language instruction plays a fundamental role in enhancing language development among deaf learners. Most participants reported that the consistent use of sign language as the primary medium of instruction significantly improved learners' acquisition of vocabulary, sentence construction, comprehension, and overall communication skills. Participant explained that when lessons were delivered through sign language, learners were able to understand concepts more easily, express their ideas confidently, and actively participate in classroom discussions. This meaningful interaction strengthened their language foundation, which subsequently improved their reading, writing, and overall literacy development. One participant had this to say;

“Effective sign language instruction creates an accessible learning environment where deaf learners can develop language naturally, thereby enhancing their academic achievement and communication

competence. Sign language help us to develop skills of mastering language easier”(Student 2, on 12th May, 2026).

Another participant demonstrated;

“When learners use sign language in class, they understand lessons much faster because it is the language they know best” (Teacher1 on 13th May 2026).

This was also supported by another participant that;

“Sign language helps students to develop communication skills that later support reading and writing. Sign language helps deaf learners understand sentence structures and meanings before they begin writing. They become more confident in expressing ideas” (Head of school 1 on 12th May 2026).

4.1.2 Sign Language Instruction Improves Reading

Another dominant theme emerging from the interviews was that sign language instruction significantly improves reading comprehension among deaf learners. Most participants reported that the use of sign language during classroom instruction enabled learners to better understand the meaning of texts by connecting signs with written words and concepts. Participants explained that when teachers used sign language to explain reading materials, learners were able to interpret passages more accurately, identify key ideas, and answer comprehension questions with greater confidence. Participants had this to say;

Sign language facilitates meaningful interaction between teachers and learners, allowing difficult vocabulary and abstract concepts to be clarified effectively. As a result, learners developed stronger reading comprehension skills, increased confidence in engaging with written texts, and demonstrated improved overall literacy performance (Teacher 3 on 15th May 2026).

Another participant demonstrated;

When using sign language instructions, learners can better understand the meaning of written texts by linking signs with words, phrases, and concepts. This enhances comprehension, interpretation, and critical thinking while reading (Students 112th May 2026).

Similarly, another participant articulated;

Learners connect signs with printed words, making it easier for them to understand stories and classroom texts. When teachers explain passages using sign language, learners can identify the main ideas and answer comprehension questions correctly (Head of school 3 on 13th May 2026)

4.1.3 Sign Language Instruction Strengthens Writing Skills

A dominant theme emerging from the interviews was that sign language instruction strengthens writing skills among deaf learners. Most participants reported that the use of sign language during instruction enabled learners to better organize their ideas, expand their vocabulary, and construct meaningful sentences in written form. Participants further noted;

Sign language helped learners understand the meaning of words and concepts before expressing them in writing, thereby reducing errors and improving the clarity and coherence of their written work. As a result, learners demonstrated greater confidence in completing writing activities and showed noticeable improvements in their overall writing proficiency and literacy development (Teacher 2 on 13th May 2026).

Another participant had this to say;

Sign language helps learners organize and express their thoughts effectively before translating them into written language. As a result, they develop better sentence construction, vocabulary use, and overall writing proficiency (Student 3 on 14th May 2026)

Also, the head of school had this to say;

When teachers used sign language to explain grammar, sentence structure, and writing tasks, learners were able to translate their thoughts more effectively into written language (Head of school 2 on 15th May 2026).

4.1.4 Sign Language Instruction Facilitates Vocabulary Acquisition

A dominant theme emerging from the interviews was that sign language instruction facilitates vocabulary acquisition among deaf learners. Most participants reported that the use of sign language enabled learners to acquire new words and concepts more effectively by providing clear visual representations of meaning. They explained that when teachers introduced new vocabulary through corresponding signs, learners were able to understand, remember, and apply words more easily in classroom discussions and written activities. Participants further highlighted;

Sign language helped bridge the gap between abstract words and their meanings, allowing learners to develop a broader vocabulary base and improve their language comprehension (Head of school 4 on 12th May 2026).



Another participant had this to say;

Learners became more confident in expressing themselves, interpreting learning materials, and participating actively in literacy-related activities, thereby strengthening their overall language development and academic performance (Student 5 on 17th May 2026).

Again, another participant demonstrated;

Sign language instruction introduces new concepts and words through visual representation, making it easier for deaf learners to understand and retain vocabulary. An expanded vocabulary contributes directly to improved literacy development (Teacher 5 on 17th May 2026)

4.1.5 Sign Language Instruction Increases Learner Engagement and Academic Achievement

A dominant theme emerging from the interviews was that sign language instruction increases learner engagement and contributes to improved academic achievement among deaf learners. Most participants reported that the use of sign language created an inclusive and interactive classroom environment where learners were more willing to participate, ask questions, express their opinions, and actively engage in learning activities. Participant explained that when teachers communicated effectively through sign language, learners became more confident in following lessons, responding to questions, and collaborating with their peers. Participants further emphasized;

Improved communication and active participation enhanced learners' understanding of subject content, motivation, and interest in academic tasks. As a result, sign language instruction not only increased learners' classroom engagement but also contributed to improved academic performance by enabling deaf learners to access educational content more effectively and participates fully in the learning process (Teacher 4 on 13th May 2026).

Another participant had this to say;.

Using sign language as the primary medium of instruction creates an inclusive and accessible learning environment. Deaf learners participate more actively in classroom discussions, understand lessons more effectively, and develop greater confidence, which positively influences their literacy skills and overall academic performance (Head teacher 5 on 14th May 2026)

Again, one deaf student noted;

Sign language help us to learn better and understand the subject topic. This help us to enhance our thinking capacity and develop skills needed for our future development (Student 4 on 15th May 2026)

4.2Discussions

The findings of this study revealed that sign language instruction plays a critical role in improving literacy skills among deaf learners through enhancing language development, reading comprehension, writing skills, vocabulary acquisition, and learner engagement. The findings demonstrate that sign language provides deaf learners with an accessible linguistic foundation through which they can understand concepts, communicate ideas, and participate actively in the learning process. This finding is consistent with Hameed and Corresponding (2016), who emphasized from the perspective of sociocultural theory that language development occurs through meaningful social interaction and communication within a learner's cultural environment. In the context of deaf education, sign language represents not only a communication tool but also a medium through which learners construct knowledge and develop cognitive abilities. The findings further support Donald et al (2002), who argued that effective learning occurs when educational environments accommodate learners' psychological, social, and developmental needs. Therefore, the use of sign language at Patandi Secondary School reflects an inclusive pedagogical practice that recognizes deaf learners' linguistic identity and creates conditions necessary for effective literacy development. However, these findings challenge the traditional assumption that spoken language-based instruction is the most effective approach for all learners, demonstrating that excluding sign language may limit deaf learners' opportunities to develop essential literacy competencies.

The study found that sign language instruction significantly improves reading comprehension among deaf learners by enabling them to connect visual signs with written words, interpret texts, understand concepts, and develop critical thinking abilities. This finding supports Al-Shammari et al.(2019), who highlighted that inclusive education practices require instructional approaches that respond to learners' diverse needs and provide equitable access to knowledge. In this regard, sign language functions as an instructional bridge that reduces communication barriers and allows deaf learners to engage meaningfully with reading materials. The findings also correspond with Hameed and Corresponding (2016), whose sociocultural perspective emphasizes that language is central to cognitive development because learners acquire understanding through interaction and shared meanings. Nevertheless, the findings suggest that the effectiveness of sign language in improving reading comprehension depends on teachers' competence in sign language and their ability to integrate visual communication with literacy teaching strategies. This observation aligns with Chaula (2014) and Kapanga (2014), who reported that inadequate teacher preparation remains a major challenge

affecting the implementation of inclusive education in Tanzania. Therefore, while sign language has strong potential to improve reading outcomes, insufficiently trained teachers may limit its full educational benefits.

Furthermore, the findings indicated that sign language instruction strengthens writing skills and facilitates vocabulary acquisition among deaf learners by helping them organize ideas, understand meanings, develop sentence structures, and apply newly learned words in written communication. These findings affirm the argument of Hameed and Corresponding (2016) that language development is interconnected with learners' ability to represent, interpret, and express knowledge. Through sign language, deaf learners are able to first conceptualize ideas visually before transferring them into written form, which improves confidence and reduces difficulties associated with writing. The findings also support Fakudze (2012), who emphasized that successful inclusive education requires instructional approaches that provide appropriate support and scaffolding according to learners' specific needs. However, the findings also reveal an important contradiction with situations reported by HakiElimu (2008) and Mbuda (2017), where learners with disabilities often experience limited access to appropriate learning resources and support services in Tanzanian schools. Although Patandi Secondary School demonstrates positive practices through the use of sign language, the broader educational context may still constrain literacy development where schools lack qualified sign language teachers, specialized materials, and supportive learning environments. Thus, improving writing and vocabulary skills among deaf learners requires not only the use of sign language but also systematic investment in teacher capacity building and inclusive educational resources.

Finally, the findings established that sign language instruction increases learner engagement and contributes to improved academic achievement by creating an inclusive classroom environment where deaf learners actively participate, express their views, and develop confidence in learning activities. This finding strongly supports Al-Shammari et al. (2019), who argued that inclusive education should promote participation, belonging, and equal learning opportunities for all learners regardless of disability status. The findings further align with Charles and Otieno (2023), who emphasized that learner participation is enhanced when teaching strategies accommodate learners' diverse communication and learning requirements. By allowing deaf learners to fully interact with teachers and peers, sign language reduces feelings of exclusion and strengthens their academic motivation. However, the findings also highlight a continuing challenge identified by Msumanje (2025), who reported that school leaders in Tanzania face difficulties implementing inclusive education due to limited resources, inadequate expertise, and institutional constraints. Therefore, although sign language instruction has demonstrated significant benefits in improving literacy skills and academic engagement at Patandi Secondary School, sustaining these outcomes requires stronger policy commitment, continuous professional development for teachers, adequate instructional materials, and broader institutional support. Overall, the findings confirm that sign language is not merely a communication alternative but a fundamental educational strategy for promoting meaningful inclusion and improving literacy achievement among deaf learners.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study concludes that sign language instruction plays a fundamental role in improving literacy skills among deaf learners at Patandi Secondary School in Arusha Region. The findings established that sign language serves as an effective medium through which deaf learners develop language competence, improve reading comprehension, strengthen writing abilities, acquire new vocabulary, and participate actively in classroom activities. By providing learners with an accessible means of communication, sign language enables them to understand concepts more effectively, express their thoughts confidently, and connect visual representations with written language. The study therefore confirms that sign language is not only a communication mechanism but also an essential pedagogical strategy that supports cognitive, linguistic, and academic development among deaf learners.

Furthermore, the study concludes that the effective use of sign language instruction contributes significantly to creating an inclusive learning environment where deaf learners can fully participate and achieve improved academic outcomes. However, the sustainability and effectiveness of sign language-based instruction depend on the availability of competent sign language teachers, appropriate instructional materials, and continuous institutional support. Therefore, strengthening teacher training in sign language, integrating sign language approaches into inclusive education policies, and providing adequate learning resources are necessary measures for enhancing literacy development among deaf learners in Tanzania. Overall, the study demonstrates that promoting sign language instruction is essential for reducing educational barriers and ensuring equitable learning opportunities for learners with hearing impairment.

5.2 Recommendations

Based on the findings, the study recommends that the Ministry of Education, school administrators, and teacher training institutions should prioritize the strengthening of sign language-based instructional practices in schools serving deaf learners. This can be achieved through continuous professional development programmes that equip teachers with

advanced Tanzanian Sign Language skills, effective strategies for integrating sign language with literacy instruction, and appropriate methods for teaching reading and writing to deaf learners. Schools should also ensure the availability of adequate instructional materials, including visual learning resources, adapted literacy materials, and digital tools that support sign language instruction and enhance learners' understanding of written concepts. Additionally, educational stakeholders should promote the inclusion of sign language within teacher education curricula to ensure that future teachers are adequately prepared to meet the communication and learning needs of deaf learners. School leadership should further establish supportive learning environments that encourage active learner participation, collaboration, and confidence development among deaf students. These measures would strengthen the effectiveness of sign language instruction, improve literacy outcomes, and contribute to achieving meaningful inclusion and equal educational opportunities for learners with hearing impairment in Tanzania.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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