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Investigating Teaching Strategies for Braille Beginners in Special Pre-Primary Schools

Upendo Gabriel Komba, Theodora Bali, Reuben Sungwa*

University of Dodoma, Tanzania
Correspondence: E-mail: upendo.komba1@gmail.com

ABSTRACT

This study investigated the learning readiness skills taught to braille beginners in special pre-primary schools in Tanzania. Adopting a qualitative phenomenography design, data were collected from three selected schools through interviews, observations, and focus group discussions. The findings revealed that teachers utilize learner-centered strategies, including role-plays, songs, real objects, direct teaching, tactile exploration, extra teaching time, and questioning. Due to learner variabilities, these strategies require differentiation within a single class. Specifically, role-plays and songs enhance listening and communication, while tactile exploration improves motor skills. The study recommends that the government establish centralized guidelines and curricula for braille beginners nationwide.

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1. INTRODUCTION

The instruction of learning readiness skills traces back to the 1800s when Louis Braille developed tactile communication, fundamentally establishing literacy for blind and visually impaired individuals. Before this invention, no system existed that allowed blind people to read and write independently. In the context of this study, braille beginners are defined as visually impaired learners who are just beginning their educational journey through the braille medium. Globally, education for persons with visual impairments has seen substantial progress, driven by international conventions and legal frameworks. Notable among these are the 1989 Convention on the Rights of the Child (CRC), the 2006 Convention on the Rights of Persons with Disabilities (CRPD), the 1990 Education for All (EFA) framework, and the 2000 Dakar Framework for Action. Historically, countries colonized by the British utilized Louis Braille's format to develop Standard English Braille (SEB), which encompassed literary, scientific, mathematical, and computer codes. To simplify the system, the International Council on English Braille was established in 1991, merging these diverse codes into a single format known as Unified English Braille (UEB). UEB has significantly streamlined the conversion between print, braille, and speech using software such as Job Access with Speech (JAWS) and Non-Visual Desktop Access (NVDA).

A fundamental step for any braille beginner is receiving proper instruction on how to read and write in this format. The lack of access to visual cues (such as gestures, facial expressions, and written materials) often impedes their comprehension of non-verbal signals and contextual information. Consequently, Braille beginners require extensive sensory training that leverages their remaining senses of touch and hearing to effectively acquire information (Dogbe, 2020). The most frequently utilized methods for teaching early literacy include the phonics approach, the "touch and say" method, or a combination of both. Teaching braille readiness skills requires a holistic approach that integrates tactile and auditory learning methods, along with residual-vision support when applicable. Literature indicates that engaging multiple sensory modalities can significantly enhance the learning experience for students with visual impairments. Furthermore, group activities that promote collaboration and communication enable braille beginners to learn from one another and build confidence, as peer learning fosters a supportive environment that alleviates the anxiety associated with learning braille.

Drilling exercises play a crucial role in teaching these readiness skills to beginners by focusing on reinforcing abilities through repeated practice, which is vital for developing both proficiency and confidence in braille literacy. Consistent drilling helps solidify the tactile and motor skills necessary for reading and writing. Through repeated practice, learners internalize the Braille alphabet and the positioning of dots, thereby fostering automaticity in character recognition. This pattern of drilling enhances memory consolidation, enabling beginners to recall braille patterns and signs more effectively. As learners become increasingly familiar with the tactile representations of letters and words, their anxiety decreases, ultimately leading to improved literacy competence. Braille literacy requires not only knowledge of braille symbols but also spelling, tactile discrimination, repeated practice, and confidence in using braille as a literacy medium (Argyropoulos and Martos, 2006; Chestnut and Asaro, 2019; Meyer and Davie, 2021). Multisensory instruction, consistent tactile practice, braille learning applications, and systematic reading and writing support are also important for strengthening braille literacy among learners with visual impairments (Goodman, 2020; Kromer, 2018; Nahar et al., 2015; Susanti and Rudiyati, 2019; Tobin and Hill, 2015). Therefore, developing

robust memory, speaking, writing, and listening skills should be prioritized as a prerequisite for using Braille code, as these foundational skills contribute significantly to overall communication abilities. Active listening, facilitated through guided discussions, audiobooks, and verbal comprehension exercises, can greatly enhance comprehension. It is highly commendable for braille beginners to develop these listening skills through activities such as following oral instructions, identifying specific sounds, and using audiobooks. In the context of braille beginners, the quality of teaching and learning conditions is particularly important because weaknesses in instructional environments may affect language development, classroom participation, and overall educational quality (Emelogu et al., 2021). In addition, listening skills, peer interaction, language development, and self-advocacy are important components in supporting communication and literacy development for learners with visual impairments (Kopeny, 2020; Nelson and Bruce, 2019; Peters, 2020; Smith, 2020).

When applying the phonics teaching strategy, teachers instruct learners on the alphabet and numbers by naming and singing about the braille dots, their shapes, and the sounds they represent. The subsequent step involves blending two, three, or four dots to form complete words. Teaching braille beginners may also involve early numeracy and subject-specific readiness, since visually impaired learners often require tailored instructional models and additional support when learning music, mathematics, and other structured academic skills (Chen et al., 2024; Iqbal et al., 2020; Vandana, 2022). This phonics strategy utilizes an auditory-verbal technique, encouraging braille beginners to rely heavily on their listening and speaking capabilities to grasp new concepts. Listening, defined as the ability to attend to and distinguish environmental and speech sounds, encompasses identifying sound sources, memorizing spoken words, recognizing voice inflections, and perceiving rhythmic patterns. These auditory abilities are critical for the development of expressive language and early literacy. Phonemic awareness strengthens letter-sound relationships and supports early reading development among braille beginners (Day et al., 2008; Barlow and Rinaldi, 2020). Additionally, reading aloud helps learners improve fluency, allowing teachers to listen continuously and correct them as they read through words, lines, or paragraphs.

Another essential strategy is the "touch and say" method, where teachers allow learners to touch an alphabet character and verbalize its meaning. Mastering learning readiness skills enables learners to successfully navigate and comprehend Braille codes. For blind braille beginners, tactile perception through the hands is central to exploring objects, identifying shapes, and developing early braille-related skills. Fine motor development skills crucial for this process include wrist and finger strength, two-hand coordination, effective and discriminative touch, tactile perception, line tracking, and proper hand positioning. Soft motor skills are developed through activities that strengthen hand, palm, and finger coordination. To cultivate these skills, both teachers and beginners should engage in practical activities such as sorting mixed items (like sand and beans), handling three-dimensional objects, punching and hole tracing, playing with sand, threading beads, filling containers, assembling bolts and nuts, playing musical instruments, and tracking lines from various directions. In pre-primary and early primary contexts, teachers need to support pre-reading skills, tactile readiness, and expanded core curriculum competencies for learners with visual impairments (Kao and Mzimela, 2019; Opie, 2018; Phutane et al., 2022).

Ultimately, readiness skills serve as critical interventions that promote tactile awareness and enhance the reading abilities of blind learners. These interventions equip braille beginners with the capacity to read and write codes, identify alphabets, understand braille

writing mechanics, use braille materials, differentiate sizes and shapes, correct hand movements, and refine listening skills. Consequently, learning readiness lays the foundation for effective literacy development and overall academic success, helping learners transition smoothly into the complexities of braille by fostering motivation, awareness, and the necessary cognitive and physical abilities (Barlow and Rinaldi, 2020; Ng'wandu, 2020). Foundational skills such as phonemic awareness, vocabulary recognition, and motivation for literacy are important prerequisites for mastering braille. Establishing these skills directly supports the transition from non-braille to braille literacy, thereby enhancing a student's ability to decode and comprehend written content. Moreover, these readiness skills empower braille beginners to take an active, self-directed role in their learning process, fostering independence. To be most effective, readiness skills must be paired with meaningful literacy experiences, integrating pre-braille tactual perceptions with whole-language activities like storytelling and reading books.

Globally, statistics indicate that over 1 billion people live with various forms of disabilities, and the World Health Organization (WHO) reports that 253 million people (3.2% of the global population) experience some form of visual impairment. In Tanzania specifically, approximately 6 million individuals face moderate, severe, or profound vision difficulties. This demographic includes a large number of primary school pupils who are blind and were once braille beginners. Currently, the country has an estimated 523 typical braille beginners enrolled in special and inclusive pre-primary schools.

The history of education for braille beginners in Tanzania began in the 1950s when the Anglican Church established the Buigiri primary school in Dodoma for individuals who were blind. Initially, instruction focused heavily on religious concepts, but general education was later introduced. Following this, the Swedish Free Mission established the Furaha residential primary school for blind girls in Tabora in 1962 (becoming coeducational in 1964), and the Lutheran Church founded the Irente School for the Blind in Lushoto in 1963. Today, Irente, Buigiri, and Furaha continue to operate as special primary schools, complete with pre-primary sections dedicated to braille beginners. In Tanzania and other inclusive education contexts, the teaching of learners with disabilities is shaped by national policy, teacher preparation, resource availability, and the broader history of special and inclusive education (Opini and Onditi, 2016; Possi and Milinga, 2017).

Although learning readiness skills are foundational for the core curriculum, in Tanzania, they are currently embedded within the regular, generalized syllabus. Braille beginners and their sighted peers follow the same curriculum, which exposes them to activities designed to build fine motor and pre-writing skills. These foundational elements include tactile and auditory discrimination, fine motor skills, and basic literacy concepts. However, a significant challenge remains: there is a pressing need for more qualified teachers specializing in braille. Many current teachers lack formal professional training in this area, often relying on their own life experiences as former blind braille beginners to guide their instruction. While special education teachers in pre-primary schools are tasked with teaching these skills, they frequently depend on personal initiative to adapt generalized instructional strategies and materials to fit the needs of their visually impaired students. Furthermore, research indicates that very few teachers utilize adequate accommodations, such as moving progressively from concrete, real-life objects to abstract concepts. Many struggle to improvise effectively due to systemic issues like large class sizes, insufficient instructional materials, and restrictive timetables. The demands of adapting a general curriculum to enable braille beginners to

participate fully often lead to teacher frustration. Effective support for learners with visual impairments also depends on school-family-community collaboration, teacher professional development, and inclusive literacy practices across school settings (Epstein, 2002; Korir, 2015; Mangione et al., 2016; Roe et al., 2014). Therefore, this study was designed to specifically investigate the teaching of learning readiness to braille beginners in special pre-primary schools across Tanzania.

2. METHODS

The philosophical assumption underpinning this study is interpretivism, which seeks to uncover the meanings and interpretations that individuals attach to their experiences and social interactions. This study was shaped by a relativist ontology, subjectivist epistemology, naturalistic methodology, and balanced axiological stances, all of which are fundamental aspects of the interpretivism paradigm. The interpretivist philosophical perspective posits that every participant experiences existing realities individually (Goldkuhl, 2012). Consequently, different individuals may possess varied understandings of a situation based on their unique experiences. In this study, teachers, headteachers, and braille beginners from various schools held different understandings and experiences regarding the teaching of learning readiness; thus, their diverse views were honored and carefully considered.

2.1. Research Approach

This study adopted a qualitative research approach, as it was conducted in a naturalistic setting (schools). Qualitative research aims to interpret and make sense of the complexities of human behavior and social contexts, particularly the subjective meanings of participants' experiences (Cowan and Allen, 2007). To uncover a wide range of perspectives, this study collected multiple views from teachers, headteachers, and braille learners concerning the teaching of learning readiness to braille beginners. A qualitative technique is uniquely suited for this, as the researcher constructs knowledge based primarily on the varied interpretations of personal experiences that are socially and historically shaped.

2.2. Research Design

This study utilized a phenomenography design. This design aims to explore people's experiences and understandings of teaching learning readiness to braille beginners before they transition to the core curriculum in Tanzanian primary schools. Phenomenography maps the qualitatively different ways in which people understand various phenomena in the world around them. To accurately capture these views and experiences, teachers, school heads, and braille learners were engaged accordingly. Phenomenography is widely recognized as an interpretative methodology that focuses heavily on the participants' understanding and lived experiences of a particular event.

2.3. Study Location

This study was conducted in the Dodoma, Tabora, and Iringa regions of Tanzania. These selected regions host specialized schools catering to visually impaired learners, including braille beginners. This setting provided a concentrated sample of the target population, making it a prime location for collecting relevant data. Because braille beginners are central to this study, the selected schools in these regions offered readily available groups of learners within this category, thereby minimizing the time and effort required to identify suitable research participants. Furthermore, these schools employ experienced teachers, specialist

educators, and administrators equipped with deep insights into teaching methodologies for braille beginners. They offered a valuable source of qualitative data through interviews, observations, and focus group discussions.

2.4. Sampling Technique

A purposive sampling technique was adopted for the selection of special pre-primary schools. The guiding principle was to identify schools capable of providing rich, in-depth information about teaching learning readiness skills to braille beginners. The inclusion criteria for schools in each region stipulated that the school must: (i) accommodate braille beginners in separate classrooms; (ii) employ at least four specialist teachers in visual impairment; (iii) accommodate both boys and girls; (iv) have been in operation for at least seven years to ensure the availability of former braille beginners; and (v) be historically established compared to newer institutions.

Headteachers automatically participated in the study due to their leadership responsibilities and positions within the schools; it was assumed they possessed rich and precise information regarding day-to-day teaching activities and the availability of instructional materials for braille beginners before they embarked on the core curriculum. Teachers were also purposively sampled. The inclusion criteria required that the selected teachers: (i) actively teach learning readiness skills to braille beginners; (ii) possess special training in inclusive education or be visually impaired teachers utilizing their own lived experiences; and (iii) have taught braille beginners for a minimum of four years. The process of selecting teachers from the accessible population continued until data saturation was reached.

Additionally, blind learners who are former braille beginners were involved in the study. The inclusion criteria for these participants required that they had mastered learning readiness skills, were currently in upper primary classes, and were capable of articulating answers to questions. A snowball sampling protocol was employed to select these learners to share their experiences regarding how learning readiness was taught to them.

Data collection methods included interviews, observations, and Focus Group Discussions (FGDs). For data analysis, the study employed thematic analysis for both the interviews and FGDs. Thematic analysis is useful in educational research for exploring participants' experiences and perspectives (Nowell et al., 2017). Thematic analysis has also been used to explore educators' experiences in teaching braille to young learners, including themes related to individualized instruction and collaboration (Kearns and Morrow, 2022).

Finally, strict ethical protocols were observed. Interviews were conducted in designated, private spaces within the schools to ensure a suitable environment and secure participant anonymity. Furthermore, participants' identities were protected and maintained by replacing their real names with pseudonyms. Throughout the data presentation, the researcher assigned specific codes to identify the participants, ensuring complete confidentiality.

3. RESULTS AND DISCUSSION

This study aimed to examine the learning readiness skills taught to braille beginners in special pre-primary schools. Data gathered through interviews, focus group discussions (FGDs), and observations revealed six primary teaching strategies adopted by educators to impart these skills. These strategies include role-plays, the use of songs, real-object

manipulation (realia), direct teaching, the allocation of extra teaching time, tactile exploration, and questioning techniques.

During interviews regarding the instructional approaches employed, one headteacher (HTM) stated:

"Teachers use more collaborative strategies to engage braille beginners in learning. The strategies used include teaching by touching various objects, especially real objects, to enhance tactile perception and differentiate between objects. Since visually impaired learners learn slowly, teachers spend extra time explaining slowly until they understand. Sometimes, teachers introduce games and role plays to help visually impaired learners improve memory retention, build vocabulary, and enhance listening and verbal expression skills. For a new topic or concept, teachers directly teach new concepts and then use questions and answers to engage in the learning process."

Echoing this sentiment, another headteacher (HTF) remarked:

"Teachers use strategies that engage braille beginners in the learning process. They mostly use real objects from the nearby environment, allowing learners to explore them by smelling and touching them. They teach the new concepts directly to familiarize learners with the general understanding. Direct teaching is possible and appropriate when teachers teach new concepts in bits under a scaffolding protocol. The goodness of scaffolding is that the teacher uses the learners' prior knowledge about a particular concept. They also use songs, storytelling, and role plays to improve their listening and speaking capabilities."

These administrative perspectives align closely with Sociocultural Theory (SCT), as they position the learner at the center of the instructional process. For instance, allowing braille beginners to explore real objects not only strengthens their fine and gross motor skills but also aids in vocabulary building. Furthermore, the use of scaffolding reflects the assumption that prior knowledge is a critical factor in acquiring new concepts. Strategies such as role-plays and songs rely on language to communicate information; when this language is tied to material culture, it provides the necessary vocabulary and conceptual framework for effective learning (Akpan et al., 2020; Guanoluisa et al., 2022). This approach is consistent with emergent braille literacy perspectives, which emphasize that speaking, listening, tactile awareness, and early literacy experiences support braille literacy development (Day et al., 2008; Wiazowski, 2014).

Exposing braille beginners to realia can support hands-on learning and improve readiness skills through direct sensory experience (Jannok and Suppasetseree, 2020). Similarly, role-play allows learners to explore realistic scenarios through managed peer interactions, thereby developing their communication skills (Islam and Islam, 2012). Direct instruction can be suitable for learners with visual impairments when concepts are presented step by step and supported through appropriate instructional scaffolding (Rosenblum et al., 2018). This structured approach enables learners to master the intended knowledge and skills more efficiently.

Teachers, as the primary agents of curriculum implementation at the classroom level, were also interviewed. One teacher (BT2) shared:

"There are many teaching strategies; some you learn from colleges, but others you are forced to use in a real context. It is obvious that in my class with seven braille beginners, I have

seven different classes because they are all blind but have different learning needs. The first strategy is to use natural things so that he/she can touch and explore. The second is role plays and songs to strengthen listening and vocabulary-building skills, and the third one is to teach orientation and mobility skills to enhance the positioning and movement of braille beginners from one corner of the class to another."

This response highlights a crucial reality: every braille beginner within a single classroom presents distinct learning needs, necessitating the adoption of differentiated, mixed teaching strategies. Utilizing natural objects enhances communication skills, as the material culture provides a tangible foundation for learning new vocabulary (Guanoluisa et al., 2022).

Former braille beginners who had previously benefited from these teaching strategies were also interviewed. Participants in a focus group from School F recounted:

"We used the out-of-classroom environments to learn things by role-playing and reflecting on the plays. We also used songs and natural things to learn about the shapes of letters and numbers in Braille format. The teacher guided us in using counters for subtraction and addition in mathematics. To assess our understanding, the teacher used to ask us oral questions about what we had just learned, and in case we failed to produce the correct answers, he kept correcting us until we understood the concept very well."

These focus group findings confirm the active use of oral questioning by teachers. This technique improves listening and speaking skills, vocabulary building, and critical thinking by encouraging reflection and the mental organization of newly learned concepts (Rahmat et al., 2021).

All the identified strategies resonate strongly with the reviewed literature. Reciprocal teaching enhances scaffolding by breaking down instruction into manageable, bit-by-bit segments. Furthermore, these findings align with the established pedagogical sequence for visually impaired learners: teachers must first introduce activities to strengthen the fingers, followed by the use of simple instruments like the slate and stylus or Perkins brailler, and ultimately progress to the mechanics of reading and writing braille. This progressive facilitation reflects a scaffolding approach in which learners receive structured support before gradually moving toward independent performance. Role-play also supports speaking and social interaction because it allows learners to explore realistic situations through managed peer interaction (Islam and Islam, 2012).

The direct instruction strategy enables teachers to explain concepts using a step-by-step method. In this approach, teachers provide diverse learning activities that allow learners to practice individually or in groups until the targeted concept or skill is fully mastered. This study further observed that direct instruction offers a clear, structured pathway for mastering Braille, which helps prevent confusion and frustration. It affords teachers the flexibility to address individual learners' needs and pacing by adapting instructional strategies based on ongoing progress. Interacting with natural objects engages multiple senses, including touch, hearing, and smell, which helps braille beginners understand new concepts, develop language, and explore their environment more actively (Morrison et al., 2020). Providing extra time is important for braille beginners because they may need more time to process information and complete written assignments through tactile and auditory channels (Kamei-Hannan and Lawson, 2012). Because learners with blindness rely heavily on auditory input, they require additional time to integrate information gathered through hearing.

In summary, this study set out to explore the specific strategies used to teach braille beginners in Tanzania's special pre-primary schools. The impetus for this research stems from the fact that, despite the ongoing education of braille beginners in these settings, there is currently no specific national curriculum tailored for this vulnerable group. Consequently, many teachers advocating for braille beginners express deep concern regarding the lack of a centralized curriculum, strongly suggesting the development of standardized guidelines. The findings indicate that a single class of braille beginners may require differentiated instruction due to significant learner variability. Activities such as role-plays, songs, and questioning can improve listening and speaking skills, vocabulary acquisition, and critical thinking. Concurrently, the use of tactile materials like maize, bean seeds, small stones, and sand enhances fine motor and tactile skills, while purposive walking both inside and outside the classroom fosters essential orientation and mobility skills.

Furthermore, the study highlights that while the education of braille beginners persists, the absence of a dedicated curriculum creates substantial confusion. Without centralized guidance, the planning of teaching activities is inconsistent and varies dramatically among pre-primary teachers across the country. Finally, teachers face significant instructional challenges due to communication barriers. Many braille beginners arrive at school conversant only in their mother tongues, while some lack foundational language skills entirely because they were previously kept in isolation and denied the right to play with peers. This situation may be further complicated when some learners also have additional disabilities.

4. CONCLUSION

This study examined the teaching strategies used to develop learning readiness skills among braille beginners in special pre-primary schools in Tanzania. The findings show that teachers use various learner-centered strategies, including role-plays, songs, real objects, direct teaching, tactile exploration, extra teaching time, and questioning. These strategies are used to support listening, speaking, vocabulary development, tactile perception, fine motor skills, orientation, mobility, and early braille literacy. The study also found that braille beginners in the same classroom may have different learning needs, requiring teachers to apply differentiated instruction and flexible teaching approaches. However, the absence of a specific curriculum for braille beginners creates challenges for lesson planning, instructional consistency, and the selection of appropriate teaching activities. This situation is further affected by limited instructional materials, communication barriers, and the need for more specialized teacher preparation. Therefore, the study recommends the development of centralized guidelines and a dedicated curriculum for teaching learning readiness skills to braille beginners in pre-primary schools. It also emphasizes the need to provide adequate teaching materials, assistive devices, extra instructional time, and professional support for teachers. Strengthening these areas may improve the quality of braille readiness instruction and support a smoother transition into formal braille literacy.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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