

UNICEF Eastern and Southern Africa Regional Office

Sign Language for Deaf Children's Education and Guidance on its Use in Accessible Digital Teaching & Learning Materials

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Acronyms

ADT - Accessible Digital Textbook
CHAVITA - Tanzania Association for the Deaf
CRPD - United Nations Convention on the Rights of Persons with Disabilities
ESA - Eastern and Southern Africa
ESIP- Education Sector Implementation Plan
ESP - Education Sector Plan
EthSL - Ethiopian Sign Language
ICT - Information and Communications Technology
KICD - Kenya Institute for Curriculum Development
KSL - Kenyan Sign Language
MINEDUC - Ministry of Education (Rwanda)
MOEST - Ministry of Education, Science, and Technology (Malawi)
OPD - Organization of Persons with Disabilities
RSL - Rwandan Sign Language
SDG - Sustainable Development Goals
SEE - Signing Exact English
SE - Signed English
SL - Sign Language
SNE- Special Needs Education
TSL - Tanzanian Sign Language
UDL - Universal Design for Learning
UN - United Nations
USAID - United States Agency for International Development
USL - Ugandan Sign Language
WFD - World Federation of the Deaf
WHO - World Health Organization
UNESCO - United Nations Educational, Scientific and Cultural Organization
UNICEF - United Nations Children's Fund

Glossary

Accessible Digital Textbook - a digital tool that gives all learners, including those with disabilities, access to information in multiple accessible formats such as narration, sign language video, interactivity, audio descriptions of images and more to suit different learning preferences and access needs. Through these formats, printed books which were previously inaccessible can be made accessible to learners who are blind or have low vision, learners who are deaf or hard of hearing, and learners with intellectual disabilities, learning disabilities, or any learners who need to access information beyond what a printed page allows. Accessible digital content allows children with different learning styles to access the same content, participate in the same curriculum-based activities inside and outside the classroom, and have the same opportunities to achieve positive educational outcomes as their peers. Accessible digital textbooks are adapted versions of curriculum books used in classrooms and they differ by being digital, accessible and versatile, allowing users, including teachers, to customize and combine diverse formats. The textbook requires installation on an electronic device (tablet, computer, smartphone) or, in some cases, it can be downloaded from a source and installed using an internet connection. Once installed, the learner can use the textbook offline on the device (UNICEF, 2019, p. 8).

Deaf - refers to individuals who identify with and participate in the language, culture, and community of deaf people, based on a signed language. Deaf community/culture does not perceive hearing loss and deafness from a pathological point of view but rather, a socio-cultural linguistic perspective.

National Sign Language - A national sign language is one that is used by the deaf community in a country, whether it has been legally recognized or not. In the context of this document, this includes Ethiopian Sign Language (EthSL), Kenyan Sign Language (KSL), Malawian Sign Language (MSL), Rwandan Sign Language (RSL), Tanzanian Sign Language (TSL), Ugandan Sign Language (USL), and Zambian Sign Language (ZSL).

Sign Language - a full, complex natural language, perceived and produced in a visual-manual modality. They have similar linguistic properties as spoken languages, including phonemic (not sound-based but consist of the parameters: hand shape, movement, location (of production), orientation (of the palm), and (optional) non-manual characteristics), morphological, syntactic, discourse, and pragmatic levels of organization. They are the natural languages of deaf children. They are the vector of the inclusion of deaf children both in the deaf community and in society, fostering the building of their own identities and communities (WFD, 2019, p. 1-2).

Universal Design for Learning (UDL) - an educational framework recognizing that all children learn differently and benefit from differentiated teaching and learning techniques in the classroom. Essentially, UDL uses practices, space, and materials that engage all of the learning strengths mentioned above. UDL seeks to accommodate individual learning differences and styles by developing and making use of flexible learning environments. Such approaches particularly accommodate children with different types of disabilities and facilitate their inclusion in the classroom (UNICEF, 2019, p. 23).

1.0 Introduction

This guidance note has been developed under the United Nations Partnership on the Rights of Persons with Disabilities (UNPRPD) multi-country initiative, “Promoting Inclusive Education through Accessible Digital Textbooks.” Its purpose is to enhance inclusive education for deaf learners by advancing:

- (a) the use and the official recognition of national sign languages as the natural and most accessible first languages. Sign language supports deaf children in their linguistic, cognitive, and social-emotional development. They need sign language as a mode of instruction, and
- (b) the consistent use of national sign languages in the development of accessible digital teaching and learning materials for children who are deaf.

While the guidance note focuses on countries in the Eastern and Southern Africa (ESA) region primarily, it may also help to inform efforts to develop accessible digital teaching and learning materials in other countries.

The guidance and recommendations in this document stand on a bedrock of policies which include, but are not limited to, the following:

- 1) The **Universal Declaration of Human Rights** (1948) affirms that education is a fundamental human right;
- 2) The **UN Convention on the Rights of the Child** (1989) ensures that the disabled child has effective access to and receives education;
- 3) The **UNESCO Salamanca Statement and Framework for Action on Special Needs Education** (1994) proposed a policy shift from special education to inclusive education models that require schools to serve all children. The shift recognized that sign language access for deaf learners is essential to upholding the right to education for all;
- 4) The **UN Convention on the Rights of Persons with Disabilities** (2006) obliges governments to secure the human right to a signed language in legislation, and mandates and clarifies that deaf children should not only be provided with the opportunity to learn sign language but also that their education be delivered in the most appropriate language that is fully accessible to them (Article 24 and General Comment 4); and,
- 5) **UN Sustainable Development Goal 4** (2015) promulgates “inclusive and equitable quality education and lifelong learning opportunities for all.”

Broad consensus among established UN policies, the worldwide deaf community represented by the World Federation of the Deaf (WFD), and scientific evidence all strongly support the fact that natural signed languages are essential for the cognitive and psychosocial development of deaf children.

In order to develop guidance that would effectively target gaps in the development of accessible digital learning materials for deaf learners, consultations were held with deaf teachers, parents of deaf children, and National Associations of the Deaf (NAD) from 5 ESA countries. These groups advocate for the use of a natural sign language as the primary language of instruction for deaf learners, especially for early grade learners for reasons discussed in Section 2. Their insights were critical to linking the importance of the national recognition of sign language to its value as a language of instruction in the classroom—and therefore to the critical need for digital teaching and learning materials to be accessible for deaf and hard of hearing learners.

UNICEF’s Accessible Digital Textbook, which uses Universal Design for Learning¹ (UDL) as a framework for realizing inclusive education in teaching and learning materials, aligns with these practices and aims to reinforce them. The goal of making learning accessible, engaging, and successful for all children with and without disabilities underpins the Accessible Digital Textbook project. For readers of this document who are not familiar with UDL, the concept of “universal design” originated in the universal design architecture movement of the 1970’s that proceeded from the premise that when you design your building in a way that is inclusive of diversity, your building works better for everyone. In terms of education, UDL seeks to provide opportunities throughout the teaching and learning process that allow all learners to succeed.

UDL has three main principles which this document applies specifically to the education of deaf learners. However, the principles themselves are general and apply to all learners with and without disabilities. The three UDL principles are:

1. Provide multiple means of **engagement** - to recruit and sustain learners' interest
2. Provide multiple means of **representation** - to make knowledge accessible to learners according to their various abilities and learning preferences
3. Provide multiple means of **action & expression** - to help learners internalize, communicate and master what they are learning

The Accessible Digital Textbook project provides standards and working examples of accessible digital learning materials developed with multiple means of engagement, representation, and action and expression including the national sign languages. For example, the Accessible Digital Textbook for Kenya incorporates Kenyan Sign Language (KSL), a national language that is recognized in the Constitution of Kenya. The Accessible Digital Textbook for Rwanda incorporates Rwandan Sign Language (RSL), which is in the process of gaining formal recognition by the Government of Rwanda. The incorporation of the national sign languages into learning materials is critical for a deaf child’s learning journey as they ensure materials are accessible to all deaf children within the country, money is saved because materials are being made in one common sign language, children are presented with similar signs throughout the country so they can communicate better with each other, and teachers and children better understand one another in secondary

¹ More information about the UDL principles, theory and practices is available at CAST.org.

and higher education. The use of national sign language in learning materials will further strengthen the national sign language and its continued development.

The application of these principles to the development of accessible digital content for deaf learners not only offer guidance on good practices for deaf education, which is indeed central to the purpose of this document, but also, sheds light on how to harness technology for inclusive and equitable quality education that is sustainable and scalable for all, leaving no one behind. However, we do not want to dilute the importance of well-educated deaf educators who are highly skilled in the national sign language and school facilities that promote quality learning for deaf students.



“It is important for Malawian Sign Language (MSL) to be available in educational content because, just as with other languages of the world, MSL is the language of the deaf Malawian child, the language that s/he understands, and that will go a long way to improve literacy, the education of deaf learners, and reduce language deprivation.”

Sekerani Kufakwina

Chairperson

Malawi National Association of the Deaf (MANAD) Advocacy Committee

2.0 Sign Language as a Key Component of Inclusive Education

The WFD declares that “there are hundreds of natural local sign languages in our world today, all of which are unique and independent from spoken languages. For instance, American Sign Language (ASL) and British Sign Language (BSL) are very different, even though both countries speak English” (WFD, 2016). Sign languages are full, complex languages that are as real and valid as oral languages and need to be fully recognized as such for the inclusion of deaf children in education and deaf persons in society.

Challenges at Hand

Unfortunately, persistent misconceptions abide in education policies and among teachers, often among hearing teachers, regarding how education should be delivered to deaf and hard of hearing learners. Artificial signing systems, such as Signing Exact English (SEE), are often favored by hearing people who are speakers and/or teachers of English. The problem with this approach is that such systems, which exist in many countries, are not natural languages used in communities of persons who are deaf, but are invented coding systems for visually representing spoken English.² They deprive deaf children from learning actual content and concepts that are more appropriately conveyed through the national sign language.

Such systems differ by country depending on the natural sign language used for the signs. For example, SEE in Kenya differs from SEE in Malawi: while both use English word order, Kenyan SEE takes its signs from Kenyan Sign Language, while Malawian SEE takes its signs from Malawian Sign Language. For countries whose mother language is not English, such systems are a double barrier for deaf learners who need a first language of expression and communication that they can use and understand in common with others in their communities.

The signing systems demand a lot from the user including:

- Having both language modalities active/on (lexicon, grammar, pragmatics of both languages)
- Both languages have to be produced at the same time, while making a sign takes one and a half times longer than pronouncing a word.
- Trying to stick a sign to a word often leads to a too slow pronunciation (of the spoken part). This slow pronunciation is often difficult to understand, because the short-term memory cannot process the information.
- Moreover, the cognitively difficult task of combining two language modalities leads to an omission or simplification of the lexicon and grammar - both in the spoken and sign part of a sign system.

² Or Spanish (Signed Spanish), French (Signed French) or other written/spoken languages.

- In many sign languages, the sentence order is different than in the spoken language. The 'sticking of a sign to a word' thus results in ungrammatical and often incomprehensible signs in the visual channel.

Deaf learners need natural sign languages as their mother language, a foundation for bilingual learning in English or any other language.³ The use of artificial signing systems risks a child becoming semilingual (Knors, 1992).

Regarding the misconceptions that have led educators in some countries to endorse SEE over national sign languages, Humphries, et al. (2015) state in the clearest possible terms:

“We expose these misperceptions as based in prejudice and urge institutions involved in educating professionals concerned with the health care, raising, and educating of deaf children to include appropriate information about first language acquisition and the importance of a sign language for deaf children” (p. 2).

To root out misconceptions and inappropriate use of signing systems in place of natural sign languages, policymaking must involve Organizations for Persons with Disabilities (OPDs), such as National Associations of the Deaf, parents and caregivers of deaf learners, deaf teachers and other deaf adults—as well as deaf learners themselves. Furthermore, in designing accessible digital learning materials, including textbooks, to improve learning outcomes inclusively and effectively, it is necessary to include a range of users and stakeholders who are deaf.

Sign Language as a Human Right

Deaf children have historically faced many barriers to quality education, including the lack of instruction in sign language, which constitutes a denial of their human rights (WFD, 2016). Article 24(3)(c) of the CRPD requires that deaf children be educated in “the most appropriate languages and modes and means of communication for the individual, and in environments which maximize their academic and social development” (CRPD, 2006). Murray, Hal, & Snoddon further stipulate that educational settings should promote deaf children’s linguistic identity and facilitate learning of a signed language employing deaf teachers who are fluent in the national signed language (2019).

³ “The use of signs to support spoken English is often referred to as ‘sign language,’ but it is not. Sign languages are natural languages with grammars independent of spoken languages. This has been demonstrated by scores of researchers beginning with Stokoe (1960). This research has shown that sign languages like ASL are natural languages because (1) they develop naturally over time among a community of users, (2) they are acquired through an ordinary course of language acquisition by children exposed to them, and (3) they are grammatically organized according to principles found in all other human languages but exhibit independent patterns of organization that make each sign language unique.” Johnson, R.E., Liddell, S.K., & Erting, C.J. (1989) *Unlocking the Curriculum: Principles for Achieving Access in Deaf Education*. Gallaudet Research Institute Working Paper, 89-3, 10, <https://files.eric.ed.gov/fulltext/ED316978.pdf>

Time and Timing are Critical in Language Acquisition for Deaf Learners

Less than 5% of deaf children have at least one deaf parent (Mitchell & Karchmer, 2004) from whom they can gain early exposure to sign language. Moreover, early exposure to a natural language is vital for the neurocognitive and linguistic development of any child. Early acquisition of sign language before entering into school is essential for the deaf child's overall language development and facilitates subsequent acquisition of spoken and written languages. Furthermore, “natural signed languages have the same neurocognitive benefits as a natural spoken language while being fully accessible to deaf children” (Murray, Hal, & Snoddon, 2019, p. 711). However, less than 2% of the 34 million deaf children worldwide gain access to a signed language in early childhood and therefore deaf children overwhelmingly experience delays in their cognitive and language development throughout those critical development years (Murray, Hal, & Snoddon, 2019, p. 712; ACR, 2021). Deaf children also typically join school later than their hearing peers. In combination, these factors result in the deaf child's first regular practice in language acquisition, that is, building competence in a first language of expression and communication for a full life and for educational and academic development, occurring only at the time they join lower primary school. In the best circumstance, once they enter school, they should begin learning with the support of teachers who are fluent, native signers. This initial period of language acquisition is of vital importance for deaf children to acquire natural sign language.

It is therefore the recommendation of this guidance document that instructional policies for deaf learners who enter school without prior access to sign language concentrate on supporting national sign language acquisition at least in the early years of schooling, i.e., through grade 3, before introducing instruction in other languages. Furthermore, teaching and learning in the national sign language should continue throughout primary and secondary school years for full comprehension. Sign language proficiency plays a role in learning to read, as reading is a sound-based activity, where letters and words have to be decoded. A different approach to teaching literacy is required for deaf learners, and this includes using sign language to give meaning to words. (Sign) language skills must be developed before literacy skills can be added.

As much as possible, exposure to a national sign language should include hearing learners, too, as it is useful in developing their cognitive skills as well (Daniels M, 1994) and further promotes inclusion, although it is recognized that learning conditions are different for deaf and hearing learners. For all deaf learners, natural sign language is not only a language of lifelong learning, but also an entry point for inclusion into the deaf community, both locally and globally. Language—regardless of whether it is spoken or signed—is a predictor of success in learning (Mayberry et al., 2010, p. 281-291). Deaf children need adequate time to build competencies and gain mastery of basic sign language communication, including social and emotional skills.

For deaf children, early access to a signed language is an important precondition for learning since spoken language is not fully accessible to them (Murray, Hal, & Snoddon, 2019). Even if deaf children attend a school, all too often they miss out on receiving education in a natural sign language. When a deaf child is not exposed to a natural sign language, they are also limited in their ability

to learn a second written/spoken language (ACR, 2021). Furthermore, deaf children with sign language role models learn the grammatical structures, context, and meanings of signs just as hearing children learn from speakers; therefore, the earlier they are exposed to native sign language users, the better off they are in terms of their language and socio-emotional development (WFD, 2016). Families and caregivers who learn a national sign language alongside their deaf children also support children's language acquisition and socio-emotional development.

In short, abundant scientific evidence has made clear, on the one hand, the positive learning outcomes for deaf learners when they have been taught in natural sign language and on the other hand, the negative consequences of language deprivation for deaf learners who do not receive early access to natural sign language (Hall et al., 2019). For all the reasons above—including policy, good practices endorsed by the global deaf community, and authoritative evidence from scientific research that has stood the test of time—UNICEF promotes the use of national sign languages in its Accessible Digital Textbook project.

Sign Language as a Language of Instruction

The CRPD encourages and promotes sign languages in a deaf child's education (WFD, 2016). It is important to clarify the difference between a natural signed language and artificial signing systems which are often mistaken for sign languages but are not, due to several key differences (see table below). UNICEF's "Accessible Digital Textbooks using Universal Design for Learning" articulates that artificially developed signing systems such as Signing Exact English, Signed Spanish, or Signed French, are lacking in the three characteristics of natural sign language. These signing systems:

- (1) have been developed in large part not through regular use by a *community*, but by *committee*. *In global South countries, these sign systems have often been imported by missionaries and non-governmental organizations to impose a colonial language;*
- (2) they tend to be *taught by educators who are not fluent in national sign languages rather than acquired;* and
- (3) their grammatical organization is based on that of spoken languages but do not convey the same grammatical information in either a natural spoken language or natural signed language.

Although people using a "signed" system are using their hands, they are not using a natural signed language. This signing does not follow the grammatical, morphological, phonological or lexical structure of a natural sign language or natural spoken language. Moreover, despite following the word order of a spoken/written language, such systems are not classified as languages. In fact, because

sign languages have a different structure from spoken languages, they do not lend themselves to word-for-word translation in written/spoken languages. Such word-for-word translations result in both of the languages being rendered largely incomprehensible, incomplete, and often contradictory to the intended meaning. For example, if someone uses signs borrowed from American Sign Language (ASL) and speaks at the same time in English, both languages are subject to distortion (UNICEF, 2019). Several National Associations of the Deaf consulted for this guidance document noted that this is often the practice one observes in a classroom where deaf students are learning.

| What are the differences between a natural sign language and an artificial signing system? | |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Natural Sign Language (SL) (examples: Rwandan Sign Language (RSL), Kenyan Sign Language (KSL)) | Artificial Signing System e.g., Signed Exact English (SEE) |
| Developed through regular use by a community of signing people | Developed in large part through a committee and imported to global South countries by missionaries and NGOs as a form of colonialism |
| Tends to be acquired from one deaf person engaging with other deaf people | Tends to be taught by educators who are not fluent in national sign languages |
| A language unto itself with its own vocabulary, grammar, syntax as well as historical and regional variants even within a single country | Not its own language, but a manual expression of English that does not convey the full grammar of English or of national sign languages |
| Signs do not have a 1:1 correspondence with words in spoken languages | Each sign in an artificial signing system represents only one spoken language word, and sometimes different components within a single word like -ing, -ly, etc., and the word order follows the spoken language sentence order, but the same grammatical information is not conveyed. |

Access to Bilingual Education

Even in high-income countries there is little data on deaf children's access to bilingual education where sign language is the primary language of instruction. However, findings from research in the area of bilingual education include a strong, positive correlation between early access to natural sign language and academic achievement. Strengthening a deaf child's ability to understand and use a natural sign language is critical to improve their reading comprehension of a spoken/written language (ACR, 2021). For deaf children, being bilingual in a signed language and a spoken/written language mutually encourages the development of both languages and leads to academic achievement in both (Johnson et al., 1989, p. 10, WFD, 2016, p. 5). Language milestones are achieved by bilingual children (sign language & written spoken language) and monolingual children at similar ages, debunking a myth that learning signed languages delays/prevents the learning of spoken/written languages (Fish & Morford, 2012, p.3). The UNESCO GEM Report (2020, p. 124) notes "teaching reading in a way that is not primarily sound-based but centres on sign language helps deaf children understand the meaning of and remember written words (Wauters et al., 2001). Such teaching requires specific teaching skills and reading materials (Royal Dutch Kentalis, 2019)." In this context, it is worth noting that natural sign languages and written/spoken languages are different languages and should be respected as such—not treating sign language as merely a transitional step to a written/spoken language of hearing persons.



“Teachers often make decisions for deaf children based on what they are comfortable with and not what would serve their deaf students better. Sign languages are complete, natural and visual languages which should not be written and cannot be used simultaneously with spoken language. SEE is easier for the hearing to learn as compared to natural sign languages. We need to note that easier does not mean better.”

Margaret Odhiambo
Kenyan Sign Language Instructor
Kenya Institute of Special Education

3.0 Key Features of Effective Accessible Digital Content for Deaf Learners

Technical knowledge is required to educate the diverse learners in schools today, and educators must incorporate that technical knowledge into the design of instructional materials and tools (Burke et al., 1998). Two approaches exist for making content accessible that should be considered for deaf learners. The first is the adaptation of already existing materials. Many countries in their efforts to implement inclusive education policies have taken adaptation of already existing content as part of their strategy. The second approach is to design content from the outset with accessibility in mind. This approach is increasingly known as “born accessible” publishing (ABC, 2011), which aims to make content accessible to all. Overall, content for deaf learners, particularly in early grades, should be designed to build language and communication skills in a national sign language— a deaf learner’s first language of expression and communication—and to prepare deaf and hearing children for bilingual learning. It should include:

| Key Feature | Description |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Video | <p data-bbox="405 704 1896 837">The video should be oriented so that the signer should be placed in the forefront of the screen with the book/page in the background. Although television has popularized a small “inset box” in the bottom corner of a screen, this approach is not recommended for early grade learners. The signer and the hands of the signer in an inset box are too small and too difficult for children to follow even if the box itself is resizable.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="405 889 1129 1417" style="width: 45%;">  <p data-bbox="531 1230 951 1255">Mara nyingi humsumbugua Nia kila anapojificha.</p> <p data-bbox="405 1292 1129 1390">Recommended: full screen background with the signer in the foreground, taking up to half of the space on the page.</p> </div> <div data-bbox="1140 889 1896 1417" style="width: 45%;">  <p data-bbox="1245 1243 1734 1260">where we use sports as a powerful tool to promote the enrolment and</p> <p data-bbox="1140 1279 1896 1409">Not recommended: the signer is limited to an inset box at the bottom of the screen. Even when such boxes are floating and resizable, this approach is more difficult for early grade learners to use, follow, and comprehend.</p> </div> </div> |

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|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Signers</p> | <p>Sign Language narration should be done by certified, deaf persons who are fluent in and have natural knowledge of a national sign language. The signers should have experience teaching in sign language and should also be fluent in reading and writing the local language. They should also be lively, engaging storytellers. As noted by UNICEF, “it is highly recommended that the narrator be a deaf person, which will ensure that the content is not just transmitted in a linguistically effective way, but that it reflects a way of understanding the world according to a deaf person and employs important visual behaviours. This is especially important in places that have no associations for the deaf or groups of deaf adults who can serve as linguistic role models (UNICEF, 2019).”</p> <p>Signers should be dressed in plain clothing in a solid color, no patterns, to contrast clearly with skin and background colors for the purpose of accentuating the signer’s hands, expressions, and body movements. Factors such as gender balance and inclusion of signers of different age groups are also important to reinforce positive role models and relatability for deaf learners, teachers, parents and caregivers who engage with the materials.</p> |
| <p>Images</p> | <p>All images should be high resolution, with at least one image per page or screen, and sized to ensure the image is easy for the viewer to see and understand. An image can be the entire background of the page as in the example below or can fill only part of the page with a plain background behind the signer. Sufficient time should be given for a child to divide their visual attention between the sign language and the footage.</p> <div data-bbox="695 833 1604 1279" data-label="Image"> </div> |

Captions

Captions or subtitles should be short, in local spoken and written language, using vocabulary and sentence construction that is appropriately leveled for the learner. Captions should never be moving or cover the signer. Fonts should be easy to read and displayed in a large font size. Sentences should use sentence cases and avoid unnecessary capitalization of words. The color of the written words should contrast sharply with the background. One good approach for displaying captions is to show white text on a black background or box, as in the example above. Ideally, the videos can be displayed with or without captions at the option of the viewer. Captions should include non-spoken audio, such as musical notes when music is playing or while someone is signing ensure that captions are within musical notes so that the learner knows these are lyrics, not spoken words.



Regarding the recommended length of each caption, the design and leveling approach of the book may be the best guide; however, research in leveled reading materials suggests the following: for pre-primary learners approximately 3 - 4 words per line; for grade 1 learners approximately 4 - 6 words per line; for grade 2 learners approximately 6 - 8 words per line; for grade 3 learner approximately 8 - 10 words per line (USAID, 2014, p. 9).

Regarding synchronization of captions with signing, captions, in general, should follow the signer in the spoken/written language. The simplest approach and the one least likely to confuse learners is to display each caption all at once where there exist longer sentences.

| | |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Glossary/dictionary | <p>A glossary or dictionary of words used in the book is highly recommended to supplement the language and literacy skills of learners. Words can be highlighted in the text of the book allowing learners and teachers to click to access glossary entries. Each glossary entry should contain five main elements:</p> <ol style="list-style-type: none"> 1. A video of a person signing the sign 2. An image illustrating the word/sign 3. Examples of sentences using the sign 4. The definition of the word 5. Explaining that the sign is linked to the written word “...” 6. The captioned word being fingerspelled <p>All definitions and examples should be in a national sign language and also in written language on the glossary page. If the word has multiple alternative signs that define it based on context (i.e. homonyms), then more than one sign should be provided, provided that the first sign shown in the glossary entry should match the sign used by the signer on the original page and context in which the word was used. The length and complexity of glossary entries also needs to reflect the reading level and vocabulary development of the learner using the content.</p> |
| Audio | <p>Audio to accompany the sign language and captions should be present with on/off options for the user. Recorded audio should be made using human voices, in local language with local accents, spoken by a fluent and engaging local language speaker, and synchronized with the sign language on the screen—following the signer and matching the written captions. Where any significant timing differences arise between signing and audio, UNICEF recommends waiting for the longest media element to finish playing before continuing (UNICEF, 2019, P. 67).</p> |
| Lighting | <p>Ensure lighting is properly placed and at the right level. Too little light and the signer is not visible, while too much light can also cause a problem.</p> |
| Interactive elements | <p>Deaf students are often visual learners who respond positively to accommodations that engage them through visual means, and also give them visual means to act on their learning and express themselves, for example, through communication in sign language. Deaf learners are not unique in this regard, as many hearing also have diverse learning styles and often demonstrate strong learning preferences for visual representations, such as pictures, graphs, models, or symbols to help them understand and internalize knowledge. Digital learning materials can offer a wide variety of visually oriented activities for individual and/or group work, including teachers and engaging students</p> |

with interactive exercises, questions, puzzles and challenges that suit the visual learning preferences of deaf and hearing learners alike.

The frontiers of what software, devices, content and connectivity can do, individually and in combination, to engage users of all ages, abilities and disabilities are vast and still growing. Their power to recruit and sustain interest is formidable beyond television, radio and printed means. Approaches such as sign language video, electronic braille, text-to-speech rendering and Augmentative and Assistive Communications (AAC), are a few of many proven and emerging examples of how digital technologies can help bridge gaps in access and accessibility in education for persons with disabilities. However, as the March 2021 EdTech Hub Systematic Literature Review of educational technology for learners with disabilities in primary school settings observes: “Research is needed to understand how and which technology is the most useful when it comes to facilitating the learning process (Lynch, Singal, & Francis, 2021, p. 79).” Rigorous evidence—of inclusion of children with disabilities in quality education and improved learning outcomes for all children—is the best guide for content developers, publishers and policymakers.

With the confidence of both scientific evidence and lived experience, the following four considerations are paramount regarding integration of technology, including interactive elements, in digital teaching and learning materials:

- 1. Prioritize accessibility first;** otherwise, such materials may themselves be barriers for inclusive education, widening already severe gaps in access for the most marginalized.
- 2. Ask how the technology facilitates improved learning outcomes,** including academic as well as social and emotional development of children. As a framework, UDL offers many answers to the question: how does any given technology option promote improved learning outcomes? For example, sign language video provides a means of *representation* that opens up access to knowledge for deaf learners. Sign language video also has demonstrable power to *engage* and sustain the interest of deaf and hearing learners alike. Finally, video in national sign language has proven power to equip deaf learners with means to *act on* their learning *and express* themselves in a rich natural language shared by vibrant communities all over the world.
- 3. Take into account the role of teachers** in designing accessible digital teaching and learning content. Since time—including class time and time on task in learning activities—is perhaps the most important resource of all in relation to learning, teachers have an important role in meeting the challenge of utilizing edtech to enable children with and without disabilities to learn (Lynch, Singal, & Francis, 2021, p. 21-22).
- 4. Note that interactive elements can be tools for formative assessment** in ways that are engaging, can be self-directed, and can also provide feedback to learners, teachers and developers on accessibility, utilization, progress, sticking points and needs.

Further, in alignment with the UDL principle: *to provide multiple means of action and expression*, it is necessary to design and incorporate activities that reflect real learning environments where, if devices are present at all, then utilization of devices and content most often occurs with more than 1 pupil per device at any given time. Collaboration, teamwork, and communication are essential skills learners can build through activities that encourage cooperation outside the strict context of a 1:1 interaction with a machine. Such activities can include interactions among deaf learners, interactions among deaf and hearing children together, and interactions among children and teachers as well as parents, caregivers and siblings.

A final note to ensure utilization of the materials: it is necessary to have instructional support by a teacher fluent in a national sign language, for example, to:

- Teach decoding skills using signs, fingerspelling, writing, speech reading, pronouncing, and visualization
- Guide activities such as shared book reading for comprehension (Hayes, Moran & Turnbull, 2019)
- Develop Individualized Education Plans (IEP) for learners
- Conduct formative assessments in sign language acquisition and progression in education



Simon, a deaf primary school learner was shown 3 different videos where a) a teacher and an interpreter were both on screen, b) the signed stories were delivered in KSL, and c) the signed stories were delivered in SEE.

Regarding the video where a teacher and an interpreter were both on screen, Simon said “when there is an interpreter inset and a teacher is also teaching, who should I follow... the teacher or the interpreter? It is very confusing.”

Regarding the signed stories in Kenyan Sign Language Simon said “the stories are easy to understand and follow. I love them a lot!”

Regarding the signed stories delivered in SEE, Simon said “these are confusing. I don't understand anything.”

For more information regarding technical standards, tools and techniques:

- UNICEF’s [Accessible Digital Textbooks Using Universal Design for Learning for Learners With and Without Disabilities](#) addresses the development of accessible digital content for use with all children including learners who are blind or have low vision, learners who are deaf or hard of hearing, and learners with intellectual or developmental disabilities
- All Children Reading’s [Sign Language Storybook Development: Video Minimum & Gold Standards](#) focuses on standards for design and production of sign language video storybooks
- Gallaudet University’s Visual Language and Learning Lab (VL2): <https://vl2.gallaudet.edu/resources> has a variety of tools and templates for sign language video storybook development with high quality examples
- eKitabu’s Accessible EPUB Toolkit: <https://toolkit.ekitabu.com> provides step-by-step instruction in the development of accessible materials according to major open technical standards for accessibility: EPUB 3.2 and WCAG 2.1

4.0 Recommendations for Implementing Digital Teaching and Learning Materials and Strengthening the Enabling Environment

It is important to acknowledge that each country has its own journey to inclusive education for all learners—including deaf and hard of hearing learners. In developing accessible digital teaching and learning materials, “reasonable accommodation” for deaf learners means access to quality education in the national sign language. The following recommendations build on scientific evidence, as well as the lived experience of deaf persons in countries of Eastern and Southern Africa.

1) Recognize sign languages at national level

National sign languages need to be officially recognized at national level through a legal instrument as official languages and languages of instruction, and their role in education of deaf learners should be emphasized. Lack of sign language recognition denies deaf children their right to education with both short-term and long-term consequences for their overall development and inclusion in society. In the context of standards for curriculum content, recognition of national sign languages ensures that they can be integrated into the development of accessible digital teaching and learning materials for use by teachers and children in and out of schools. It is also important to reemphasize the significant language delay that most deaf learners experience at the beginning of their lives, necessitating a curriculum that is mindful of those delays. Some skills, such as reading, will take a deaf child longer because they would not have learned words or developed linguistic knowledge through social interaction and incidental learning in the same way that hearing learners would have. They might have missed out on key information about the world around them than hearing learners. The curriculum must take this into account. It is also worth noting that the national curriculum should be inclusive of deaf learners and should therefore include the national sign language as a subject but a curriculum that is specific to deaf learners is not recommended.

The availability of a digital dictionary of a country's natural sign language is helpful in making the national sign language available more broadly, including documenting regional variations of signs within a country, and also in encouraging government recognition of sign language as an official language with the benefits that entails for all.



The legal/official recognition of Rwandan Sign Language (RSL) is consistent with Rwanda's legal framework which respects every human being, his/her self-worth, identity, and freedom of choice without discrimination.

Samuel Munana
Executive Director
Rwanda National Union of the Deaf (RNUD)

2) Use the national sign language as a language of instruction and in development of accessible digital teaching and learning materials

For deaf learners to have access to educational content, it should be available in their national sign language. Instructional policies for deaf learners who enter school without prior access to sign language should concentrate on supporting national sign language acquisition at least in the early years of schooling, i.e., through grade 3, before introducing instruction in other languages, teaching and learning in the national sign language should continue throughout primary and secondary school years for full comprehension. A national sign language should be the primary language of instruction for deaf learners, and teaching and learning materials that support classroom instruction should be developed with sign language built in (UNICEF, 2019). Instruction of all subjects should be conducted in sign language, not the use of an artificial signing system. Sign language facilitates the process of learning a second written language in a bilingual classroom (Mason et al., 1996).

3) Facilitate early access to national sign language

Deaf children and their families and caregivers need early access to a “visual language,” a natural sign language, from birth and early childhood (0-5 years). This enables linguistic, cognitive, and communicative development in a mother language, that is, a first language of expression and communication (WFD, 2016). Most deaf learners are born to hearing parents who do not know sign language and are therefore not able to develop linguistic skills naturally from their parents. Parents and caregivers also need access to high-quality sign language instruction and deaf mentors who can teach them how to best engage with their child. Deaf children often face stigmatization in school settings, among family members and within their communities. Parents and community members who know sign language can begin communicating with these children as early as from birth, laying critical foundations for learning and more meaningful relationships between the deaf child, their families and communities (Moeller, 2000). Research shows that access to sign language fosters language learning and supports deaf learners to develop competencies in spoken/written languages of the world (Madden, 2008).

In most African countries, early hearing screening or assessment are not common practices. Most families of deaf children discover their child is deaf when the child is already within or beyond the critical window of early language development. Numerous studies have found that early screening and identification is an important factor to facilitate language intervention (Moeller, 2000). This needs the attention of specialists and deaf mentors who are knowledgeable in both signed and spoken/written language development.

WFD strongly encourages governments to implement programs to support the teaching of the national sign language to family members, caregivers for deaf children, NGOs, and OPDs in cooperation with deaf communities and deaf sign language teachers to foster more inclusive communities for deaf children.

4) Ensure an inclusive education system at all levels

UNCRPD Article 24 specifies: “States Parties shall ensure an inclusive education system at all levels... facilitating the learning of sign language and the promotion of the linguistic identity of the deaf community; ensuring that the education of persons, and in particular children, who are blind, deaf or deafblind, is delivered in the most appropriate languages and modes and means of communication for the individual, and in environments which maximize academic and social development.”

CRPD General Comment Number 4 (2014) on the Right to Inclusive Education states that progressive realization of CRPD article 24 is "not compatible with sustaining two systems of education: a mainstream education system and a special/segregated education system." Moreover, CRPD General Comment Number 6 (2018) on Equality and Non-discrimination (par. 65) states, “To ensure equality and non-discrimination for deaf children in educational settings, they must be provided with sign language learning environments with

deaf peers and deaf adult role models.” The World Federation of the Deaf (WFD) advocates for “inclusive education for deaf learners that is of high quality education with direct instruction in sign language, access to deaf teachers and deaf peers who use sign language, and a bilingual curriculum that includes the study of sign language (WFD 2018). The International Disability Alliance (2021) emphasizes: “education laws should protect the right of all learners to be taught in their language, including national sign language.”

5) Teacher training

Training (both pre-service and in-service training) and professional development of teachers for the deaf should move away from “special education” and understand that deaf children are emerging language learners who require learning environments that are culturally and socially accessible (Humphries & Allen, 2008) and language rich. Teacher training colleges should give preference to deaf candidates who are fluent in a national sign language. For hearing teachers, colleges should provide courses in the national sign language to ensure that teacher trainees are equipped with the proper language skills and appropriate pedagogy to effectively teach deaf learners. Training should promote the use of bilingual approaches for teaching deaf learners (Akamatsu & Steward, 1987) in both the national sign language and the national spoken/written language (UNICEF, 2019). Training should not, however, promote the use of methods such as “oralism,” “total communication,” or “simultaneous communication” (using signs borrowed from a sign language and an oral language simultaneously), and/or the use of signing systems such as SEE in place of the national sign language. Teachers should also be trained on how to use accessible digital materials effectively to engage deaf learners.

Upon completion of their training, hearing teachers should undergo a Sign Language Proficiency Interview (SLPI). This is a one-on-one conversation between an interviewer fluent in the national sign language and the candidate teacher. The SLPI should be required to assess teachers' proficiency in the national sign language before being recruited to teach in schools for deaf learners. Such assessments should not be done once only, but annually to ensure that teachers are encouraged to maintain and build their sign language proficiency through continuous professional development. Employment of deaf teachers is critical to the success of bilingual education for deaf learners and to supporting the language proficiency of hearing teachers.

Recruitment and advancement of teachers with disabilities, for example, deaf persons, who are fluent in their national sign language should be prioritized. Qualified deaf teachers not only deliver quality instruction in the national sign languages, but also they present role models for deaf learners in and out of school. Interaction with deaf role models nurtures linguistic development as well as socio-emotional wellbeing, which deaf children often lack (Golos et al., 2018). For deaf children, it also promotes communicating and interacting with deaf adults, not only with hearing adults. As mentioned above in Section 3 “Key Features of Effective Accessible Digital Content for Deaf Learners,” deaf adults should be included in the design and development of accessible digital learning materials in addition to being included as teachers in inclusive education systems.

6) Accessibility standards in education

A growing number of organizations are working on digital teaching and learning content, particularly to advance remote learning in light of the COVID-19 pandemic. As new accessible teaching and learning materials are created, it is imperative that standards be in place for designers and developers to prioritize accessibility first and build materials that are “born accessible” and apply UDL principles to include all children in quality education. Born accessible means the materials are developed taking into account accessibility from the outset. For example, an EdTech solution that uses SEE instead of the national sign language should not be accepted as a solution for deaf learners to use. Please refer to the table and the references provided in Section 3 for guidelines to follow in creating accessible digital content.

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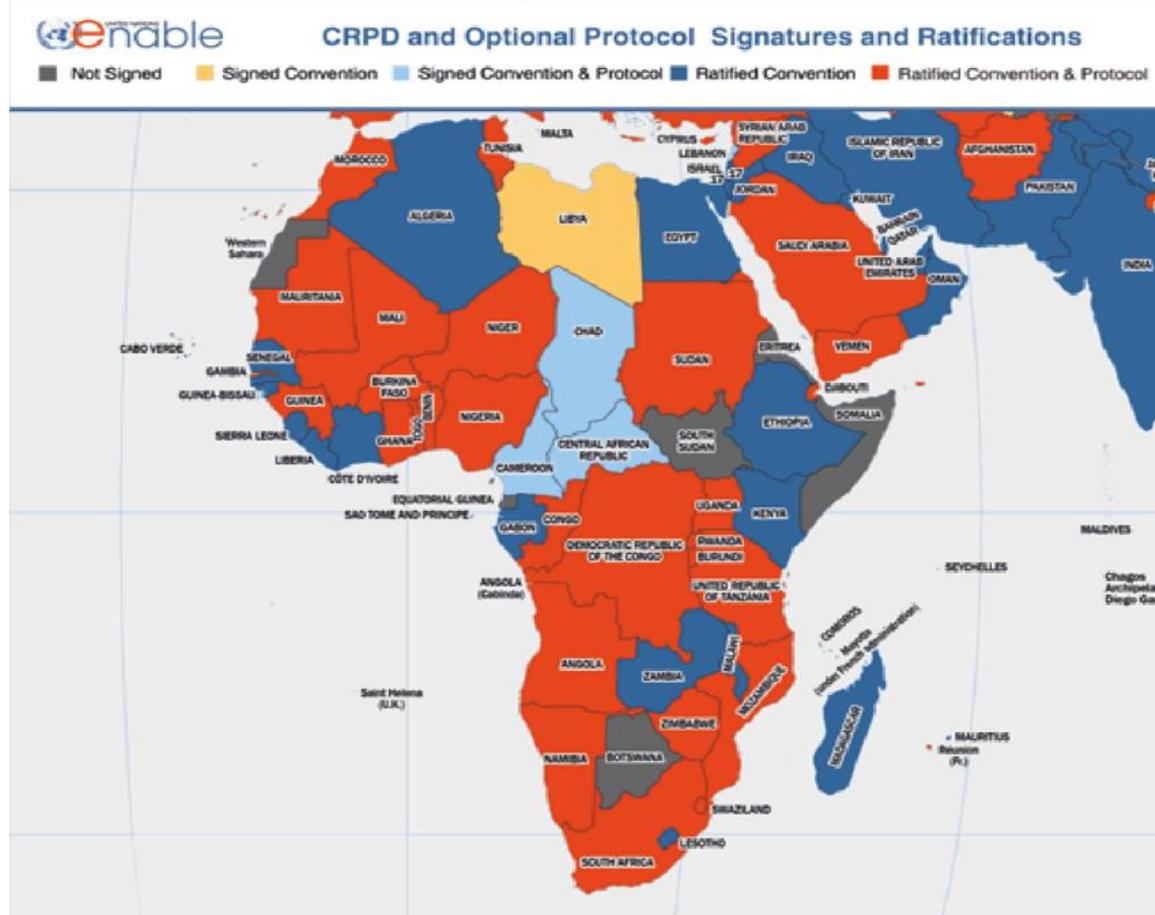
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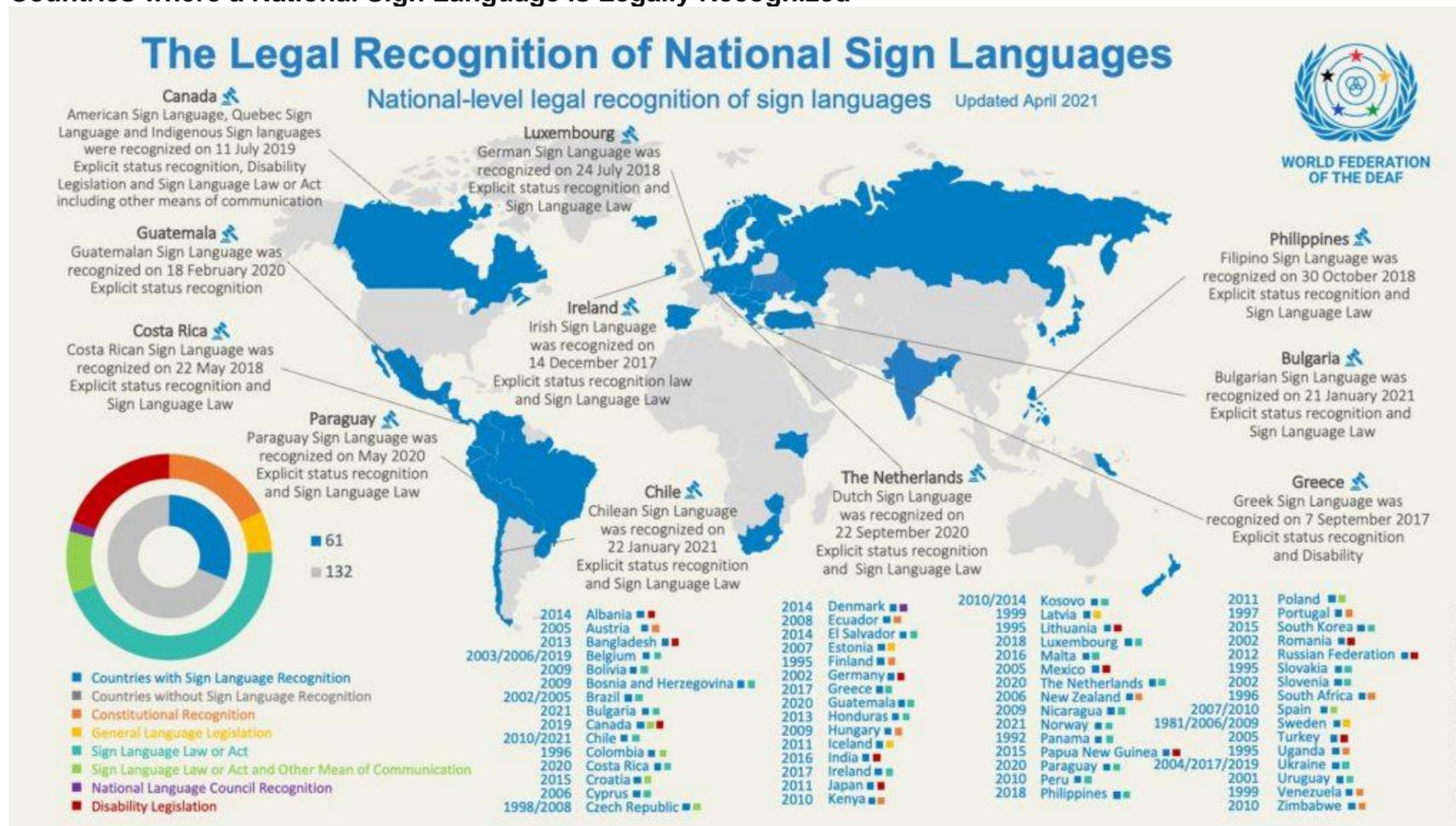
Appendix A

A map of Africa with CRPD and Optional Protocol Signatures and Ratifications in Africa Identified by Country



Appendix B

Countries where a National Sign Language is Legally Recognized⁴



⁴ World Federation of the Deaf. *Legal Recognition of National Sign Languages* <https://wfdeaf.org/news/the-legal-recognition-of-national-sign-languages/>.

Appendix C

Country Level Laws and Policies on Sign Language

Kenya

Sign Language Recognition

The 2010 Constitution of Kenya laid the foundation for education for learners with disabilities. Enshrining the right to education for all (art. 43.1), it introduced the concept of reasonable accommodation (art. 54) and recognized KSL as an official language of the Kenyan Parliament. On the other hand, the Sector Policy recognizes KSL as the first or primary language of deaf children, used as a medium of instruction.

Curriculum and Assessment

In Kenya, the Sector policy for learners and trainees with disabilities advocates for appropriate adaptation and differentiation of the curricula, adequate and relevant educational resources, use of relevant pedagogical approaches, and accessible classroom communication. The Kenya Institute of Curriculum Development (KICD) is responsible for adapting the regular national curricula to the needs of learners with disabilities, including those with hearing impairments. The Sector Policy further emphasizes the need for a differentiated curriculum that meets all learners' diverse needs. Thus, the need to reform education assessments to effectively include differentiated modes suitable for learners and trainees with disabilities.

ICT Integration

To provide desired learning opportunities for students with disabilities, the National ICT Strategy for Education and Training encourages ICT integration in educational institutions to improve teaching quality and learning. Against this backdrop, the sector policy highlights the intention to provide and maintain assistive devices, including hearing aids, and adopt new technologies to improve learning and training for learners with disabilities. The Ministry of ICT offers a Digital Literacy Programme (DLP), executed through a multi-stakeholder approach with the ICT Authority as the implementing body.

Teacher Training

Different Universities and Teacher Training Colleges offer Training for Special Needs Education teachers with the Kenyan Sign Language, provided as pre-service and in-service training courses. Based on the Sector Policy, teachers are supposed to be involved in the capacity building enhancement.

Uganda

Sign Language Recognition

While Uganda was the second country to recognize sign language in its constitution in 1995, Ugandan Sign Language (USL) is not recognized as a language of instruction. The Disability Act of 2006 under Section 5 states that the government shall promote the educational development of persons with disabilities.

Curriculum and Assessment

The curriculum taught to deaf and hard of hearing learners is the general education curriculum without any adaptation or modification.

ICT Integration

Access to information shall be the duty of the responsible Government authority to promote the rights of persons with disabilities to access information (a) the development and use of sign language, tactile, sign language interpreters, in all public institutions and at public functions (b) brailing of general information, such as Government documents, government newspapers and other publications. Any person who owns a television station shall provide sign language inset or subtitles in at least one major newscast program each day and in all special programs of national significance. Telephone companies shall provide special telephone devices for the deaf and hard of hearing.

Teacher Training

There are government aided schools for deaf and hard of hearing children in Uganda with teachers who have qualifications in Special Needs Education. However, this is a general qualification, not specifically for deaf and hard of hearing learners. Teachers can communicate in Uganda Sign Language, although some teachers still have less interest in sign language, affecting classroom content delivery. According to the Uganda Education Sector Plan Implementation Review of 2019, teachers from 10 schools were trained in sign language (although it wasn't specified if this was Ugandan Sign Language). Teachers, however, shared that they have limited knowledge of educating hard-of-hearing students. Those who pursue a bachelor's degree (applies to primary, secondary, and higher education teachers) pass a brief course in psychology about Special Needs Education, but with no specifics on educating hard of hearing students.

Rwanda

Sign Language Recognition

While Rwandan Sign Language (RSL) is not officially recognized by the Government of Rwanda or its Ministry of Education (MINEDUC) as a means of instruction, Rwanda's Special Needs and Inclusive Education Policy aims to provide standardized RSL skills and related teaching materials to enable schools to accommodate learners with hearing and spoken language difficulties. Schools for deaf and hard of hearing learners are given the choice of communication mode for teaching and learning since RSL has not been standardized.

Curriculum and Assessment

The Rwanda Education Board (REB) is responsible for adapting the national regular curricula to the needs of learners with disabilities, including those who are deaf and hard of hearing. REB is also responsible for assessment.

ICT Integration

The Special Needs and Inclusive Education Policy provision of adapted software for such learners where possible and shall be standardized for teaching/learning purposes. It provides for different adapted software and hardware to schools to facilitate and ensure that they enhance quality in special needs & inclusive education services. It also promotes special needs & inclusive education training and ensures that it is accessible to learners and trainees with various special educational needs, through appropriate provisions and facilitations.

Teacher Training

According to Special Needs and Inclusive Education Policy, Rwandan Sign Language has not been integrated into teacher training programs. MINEDUC and the University of Rwanda's College of Education's School for Inclusive Education and Special Needs Education plan to build capacity on RSL.

Malawi

Sign Language Recognition

Malawian Sign Language is not officially recognized as a language in Malawi and not recognized as a means of instruction by the Ministry of Education, however, the Education Sector Plan 2008-2017 (ESP) recognizes the need to develop appropriate tools in sign language. The National Strategy on Inclusive Education 2017-2021 includes an activity to finalize and disseminate a sign language dictionary as well as to provide sign language interpreters where necessary.

Curriculum and Assessment

The 2006 National Policy on Equalization of Opportunities for Persons with Disabilities fosters equal access and inclusion in education by providing a strategy to review the national curriculum and examination system to better cater for the needs of learners with disabilities. The ESP prioritizes the enhancement of the relevance of the primary curriculum and improved delivery through diversified methods, such as sign language, through the Primary Curriculum Assessment Review which was scheduled to roll out in 2009/2010.

ICT Integration

The ESP aims to increase the provision of relevant equipment, teaching and learning materials for disability. The National Policy on Equalization of Opportunities for Persons with Disabilities also promotes equal access and inclusion of persons with disabilities in education through strategies focused on designing and developing appropriate technologies and providing them for free to assist persons with disabilities in their education.

Teacher Training

Currently, there is only one college that trains about 100 specialist teachers every two years. The Education Sector Implementation Plan II includes a plan to roll out an in-service training on inclusive education, including training specialists in Malawi Sign language, and to set up a dedicated special needs education institute.

Zambia

Sign Language Recognition

Zambia Sign Language (ZSL) is not yet recognized in the country. However, for the deaf and hard of hearing learners, ZSL is used as a medium of classroom instruction in schools as per the Education Act of 2011. An anecdotal report says that the majority of the teachers in schools for deaf and hard of hearing learners prefer using total communication.

Curriculum and Assessment

According to the Zambia Education Curriculum Framework of 2013, learners should be able to demonstrate literacy skills in English and a Zambian Language or Sign Language at the primary school level. One of the core learning areas at the lower primary and upper primary levels of education include Sign Language (although Zambian Sign Language, in particular, is not referenced specifically).

ICT Integration

So far, there is a ZSL dictionary available and a YouTube dictionary online that is accessible by the public. The dictionary was published by a deaf educator, McKenzie S. Mbewe.

Teacher training

Universities that offer sign language courses were lacking in content and skills development activities, according to teachers in training at two Zambian Universities.

Appendix D: Country Highlights: Policy vs. Implementation

The countries in the table below were the focus of this project as they are part of the Eastern and Southern Africa Region (ESARO) countries and given that UNICEF has already begun working or thinking of collaborating with the education sectors of those countries mentioned. The team had a meeting with the National Association of the Deaf (NADs) from those countries except Ethiopia, and Tanzania who did not participate in the meeting held on 11th of March 2021 via zoom/virtual channel. The NAD personnel shared the information pertaining to the situation around deaf education in their respective countries.

| Country | Kenya | Rwanda | Uganda | Ethiopia | Malawi | Tanzania | Zambia |
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| Policy landscape around sign language and education for deaf or hard of hearing learners | <p>Kenyan Sign Language (KSL) is recognized as an official language of Parliament in the Constitution (Kenya, 2010, Ch.8, Leg. 120)</p> <p>The Sector Policy for Learners and Trainees with Disabilities (2018) recognizes KSL as the primary/first language of deaf children,</p> | <p>Rwandan Sign Language (RSL) is not recognized as an official language in the Constitution (Article 8)</p> <p>RSL is not recognized as a language of instruction by the Ministry of Education (MINEDUC, 2018)</p> <p>MINEDUC recognizes the need for the provision</p> | <p>Ugandan Sign Language (USL) is recognized as an official language (Republic of Uganda Constitution, 2006, Article 6)</p> <p>USL is not recognized as a language of instruction according to the Special Needs Strategic Plan</p> | <p>Ethiopian Sign Language (EthSL) is not recognized as a language in the Constitution EthSL is recognized as a language of instruction for deaf children up to Grade 4. (Tedla & Negassa, 2019)</p> | <p>Malawian Sign Language (MSL) is not recognized as a language in the Constitution (Malawi Constitution Ch. 4, number 26)</p> <p>MSL is not recognized as a language of instruction by the Ministry of Education, Science, and Technology, however, the</p> | <p>Tanzanian Sign Language (TSL) is not recognized as a language in the Constitution (Constitution of the United Republic of Tanzania)</p> <p>TSL is recognized as the language of instruction for deaf children</p> <p>No existing policies on the use of TSL for instruction in schools of the</p> | <p>Zambian Sign Language (ZSL) is not recognized as a language in the Constitution (Constitution of Zambia, 1996)</p> <p>ZSL is not recognized as a language of instruction in any policies but schools for deaf learners recognize ZSL</p> |

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| | <p>which is used for instruction and communication (MOE)</p> <p>KSL is taught as a subject, just like English and Kiswahili (KICD)</p> | <p>of RSL teaching and learning materials (MINEDUC, 2018)</p> | | | <p>MoEST Education Sector Plan recognizes the need for materials in a sign language but does not specify further</p> | <p>deaf</p> | |
| <p>Teachers training and use of sign language</p> | <p>Teachers are partially trained on the use of KSL</p> <p>KSL, SEE, and Total Communication are all used in classrooms</p> | <p>No advanced training for teachers of the deaf</p> <p>RSL is not used for all subjects in classrooms</p> | <p>Teachers are trained in USL</p> <p>USL is not used for all subjects in the classrooms</p> | <p>Teachers and interpreters are trained in EthSL (Ministry of Education, 2012)</p> | <p>Teachers are trained to use oralism</p> <p>MSL is not used for all subjects in the classrooms</p> | <p>Interpretation courses nothing about teachers (DCW, 2019) of the deaf</p> | <p>Some teachers are trained in ZSL</p> <p>ZSL is not used for all subjects in the classroom</p> |
| <p>Subject Matter Assessments of deaf or hard of hearing learners</p> | <p>Students are not assessed in KSL, although KSL as a subject is examined (however in a written exam)</p> | <p>Students are not assessed in RSL</p> | <p>Students are not assessed in USL, however sign language interpreters are present to deliver examination instructions in USL</p> | | <p>Students are not assessed in MSL</p> | | <p>Students are not assessed in ZSL</p> |

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| | | | Follow general education curriculum with no modification or adaptation | | | | |
| Good practices for teaching deaf and hard of hearing learners | <p>Deaf teachers employed in various schools for the deaf.</p> <p>KSL dictionary available in DVD and hard copy (KICD)</p> <p>Relevant pedagogical approaches, accessible classroom communication (MOE, 2018)</p> <p>Adapted textbooks under CBC for learners</p> | Currently production of RSL dictionary (USAID) | <p>Deaf role models in schools to support deaf children learning</p> <p>Deaf Child Worldwide has produced books for parents and caregivers to learn USL (DCW)</p> <p>Qualified teachers in SNE (2019)</p> <p>Training of teachers in USL</p> | <p>Deaf children learn EthSL skills up to Grade 4</p> <p>Publication of EthSL dictionary by ENAD (Fikremariam & Tesfaye, 2008)</p> | <p>MSL dictionary is being developed (2014)</p> <p>Specialist teachers being trained in MSL (MoEST, 2008)</p> | | Deaf teachers recruited to be role models to deaf learners (Simbule & Chibesa, 2014) |

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| | with special needs including the deaf learners (KICD) | | | | | | |
| EdTech solutions that are accessible to deaf and hard of hearing learners | <p>Accessible Digital Textbooks for All (UNICEF, 2020) developed by eKitabu and aired by KICD EDU Channel TV</p> <p>KICD and partner has digitized KSL DVD dictionary (KICD)</p> <p>Adaptation of textbooks to interactive digital content (KICD)</p> | <p>Accessible Digital Textbooks for all (UNICEF and partners, 2020)</p> <p>Production of RSL dictionary (USAID, 2020)</p> <p>Soma Umenye (read and know) digitizing accessible early readers materials example video storybooks in RSL (USAID, 2020)</p> | <p>Accessible Digital Textbook project (UNICEF, 2020)</p> <p>Pilot on accessible digital contents (UNESCO)</p> <p>SPIDER is digitizing USL</p> | | eKitabu project on accessible textbooks (eKitabu) | | Educational TV programs with interpreters |
| Key features for ADTs for deaf or hard of hearing | Age-appropriate sign language | Sign language use or interpretation | Captioning in English | | Translation of textbooks in all Malawian | | Research on digital accessibility |

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| learners | modality Bilingual-bicultural (Bi-bi) approach (use of sign language and spoken/written language) Diagrams/pictures included Every textbook accompanied with KSL DVD | Captioning in English | | | languages (including MSL) | | |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|--|---------------------------|--|--|