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READ WRITE EASY:
Research, practice and innovation in deaf multiliteracies
Volume 2

Jenny Webster &
Ulrike Zeshan (Eds.)

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READ WRITE EASY: Research, practice and innovation in deaf multiliteracies

(Volume 2)

Jenny Webster & Ulrike Zeshan (Eds.)

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Preface

This publication, appearing in the form of two related volumes, is the result of a substantial process of research in the field, analysis of data, and coordinating the writing of chapters with many contributors. The several successive research projects that are the basis for the two volumes are described in the introductory chapter.

We would like to thank each of our expert contributors and all of the project participants, research team members and partner institutions who made this book possible. The respective individuals and institutions are acknowledged in the relevant chapters of both volumes. We also acknowledgethe Vidya Bhawan Society, who have been our partner in India during the production phase of the books.

To make these publications possible, each author gave their time and expertise generously throughout 2020 and 2021, despite the many unprecedented challenges and disruptions caused by the COVID-19 pandemic. We would also like to express our appreciation to all of our learner participants and, in the case of participating children, their caregivers for granting us permission for the use of all of the images that appear in this volume and its counterpart.

We are delighted that across these two volumes, both deaf and hearing authors are represented, and there is a balance between authors from the Global South and North. Six deaf and 11 hearing authors have worked on the various chapters, with most of the deaf authors being based in Southern countries. Out of the 17 authors, 10 are based in the Global South. It is very encouraging to have had the involvement of more contributors from the Global South than the North, as the balance is often the other way around in similar publications. We hope that this balance and deployment of outstanding Global South scholarship will be repeated in future published works in deaf studies, literacy studies, education, and related fields.

Finally, we wish to thank all those who have contributed their effort and commitment to bringing this book project to fruition. We are very grateful to the anonymous reviewers for their expert guidance. We also acknowledge everyone who has contributed to the technical realisation of the two volumes, from typesetting to sourcing pictures and working with proofs and formatting. In particular, we are most grateful to the series editor Nick Palfreyman, who has gone the extra mile many times to support us as the books were developing through the necessary stages. His role in undertaking and coordinating the peer reviews for

both volumes has been absolutely essential, and we thank him for the incredible amount of assistance he has provided throughout the editing process.

Jenny Webster and Ulrike Zeshan, December 2021

Introduction: From research to practice in deaf multiliteracies

Jenny Webster and Ulrike Zeshan

This book,[1] along with a first volume, presents a strand of innovative research with, by and for deaf people in countries of the Global South that led to new learning opportunities in the field of language and literacy. This work builds on decades of research in the education of deaf children and youth, in particular in the area of sign bilingualism, that is, the acquisition of a sign language and a spoken language primarily in its written form alongside each other (e.g. Wilbur 2000; Marschark, Tang & Knoors 2014; O'Neill 2017).

Tang (2017) traces the development from 'traditional' sign bilingualism that arose in the 1980s in specialist schools for deaf children as a consequence of sign language linguistics, to more recent attempts at integrating sign bilingualism into regular schools. The latter includes models such as co-enrolment, where a critical mass of deaf students integrate with a larger group of hearing students, and teaching staff communicating through both spoken/written language and sign language are present in the same setting. Tang (2017) argues that sign bilingualism and co-enrolment have shown promising results, including deaf learners' competences in literacy. An active debate continues among researchers and practitioners about ways forward in deaf education, and further literature is discussed in the individual chapters of both volumes.

The research presented in this book and its companion first volume diverges from the focus on literacy by extending the discussion to the acquisition of skills in multiliteracies. This means developing a complex range of semiotic resources that are multilingual and multimodal, including sign language(s), reading and writing, drawing and other visual representations, and technology-mediated communication, as well as metalinguistic and meta-cognitive skills (New London Group 1996; Cope & Kalantzis 2015). There is a conceptual overlap with translanguaging, which denotes 'the complex language practices of plurilingual individuals

1 Part of this introduction is identical to that of the first volume of *READ WRITE EASY*. Sections 2 and 3 are different as they summarise the chapters in this volume, while sections 1 and 2 are the same as in Volume 1 because they provide the context of the overall research programme that both volumes build on. The text in section 4 is partly the same and party different in order to integrate with the rest of the text in each introduction.

and communities, as well as the pedagogical approaches that use those complex practices' (García & Wei 2014: 19). Translanguaging has been applied to deaf sign language users and their communicative strategies both inside and outside classrooms (e.g. Swanwick 2017; Safar 2017; De Meulder, Kusters, Moriarty & Murray 2019). The notion of linguistic and semiotic repertoires that are deployed in communication is central to both multiliteracies and translanguaging. In addition to the focus on multiliteracies, another particularity of the research presented here is that it is based entirely in countries of the Global South, namely South Asia and sub-Saharan Africa.

Work reported in the individual chapters speaks to the long-standing issue of deaf learners' insufficient access to quality education, resulting in a lack of employment, income, fulfilment and quality of life. Working with young deaf people in India, Ghana and Uganda, the research team has facilitated the acquisition of reading, writing and multiliteracies skills through sign languages in programmes led by deaf peer tutors.

This work has followed a learner-centred approach, aiming to use deaf communities' own resources and making full use of accessible communication in a deaf-friendly environment. After the initial approach was validated in research with young deaf adults (Zeshan et al. 2016; Waller, Jones & Webster 2021), the work was extended to deaf primary school children. Rather than implementing individual interventions, the research team sought to establish new ecosystems of learning where different elements of the learning situation come together and support each other in novel ways (Fan 2018). In these ecosystems of learning, the content, the pedagogy, and the supporting technology interact in order to stimulate learning, and multiple factors combine in a holistic way. For instance, the content may consist of authentic learner-generated materials (instead of a standard textbook), alongside learning led by deaf peer tutors with a sign language as the medium of classroom communication, and supported by multimedia technologies. Different aspects of this work appear throughout these volumes.

The immediate goal has been to improve educational attainment and professional development for deaf sign language users, increasing their access to literacy and multiliteracies learning. However, capacity building has been equally important, with a particular focus on South-South collaboration. The team have trained an international group of young deaf professionals as resource persons and created curricula to qualify deaf people for teaching roles. Within the research team, young deaf researchers were supported in their professional development, including the presentation and publication of their own research.

In this introductory chapter, the trajectory of this research is discussed in section 1. Then a short description of each research chapter in the current volume is provided, situating the chapters in the context of the overall research programme (section 2) and setting out the thematic focus of this volume. Themes that are covered include learner engagement, capacity building, and educational systems. Next, a preview is given of four 'innovation sketches', which are short reports of innovative practices that have arisen in the context of this research (section 3). These sketches are not based on data analysis but are relevant for practitioners and for researchers with an interest in methodologies. In this volume, authors report on the use of English grammar games for learner engagement, a bespoke language support process to facilitate the first-time academic contributions of deaf authors, capacity building with young deaf professionals, and a collaboration with the National Institute of Open Schooling in India that established a secondary school course in Indian Sign Language. Finally, section 4 describes the overall impacts of the research and the measures being taken to ensure its future sustainability.

This volume has two main parts: Part 1 includes four research chapters, while Part 2 presents the innovation sketches. This book is the second of two volumes. The first volume likewise includes research chapters and innovation sketches, but with a different thematic focus, namely tracking and testing of learners, pedagogical issues as seen from teachers' perspectives, and issues related to curricula. Where relevant, cross-references are made to the first volume throughout this book.

1 Research trajectory

This research is the result of three successive international projects led by the International Institute for Sign Languages and Deaf Studies (iSLanDS) at the University of Central Lancashire in collaboration with partner organisations in the UK, South Asia and sub-Saharan Africa. All three projects were funded by the UK's Economic and Social Research Council (ESRC) and the Foreign, Commonwealth & Development Office[2] (FCDO), through their joint scheme 'Raising Learning Outcomes in Education Systems'.

All three projects have involved fieldwork in the participating countries, including work with both deaf adults and deaf primary school children. As part of the ethics procedures, consent for the use of data was obtained from the participants, either from the individuals themselves or

2 The original funder was the Department for International Development (DfID), which merged with the Foreign Office to form the FCDO in 2020.

from the children's parents or schools (in the case of boarding schools, it is common for the school to act *in loco parentis* in some countries). The pictures used in this volume are covered under this informed consent provision. Where consent is in place and individual authors have felt it appropriate, real names (first names only) may have been retained, or authors may have used alias names.

The first project was a pilot in cooperation with Lancaster University and partner organisations in India called 'Peer-to-Peer Deaf Literacy' (P2PDL; 2015–2016).[3] It explored innovative ways to teach literacy to deaf adults in India through sign language, peer tutoring, and a bespoke online platform called Sign Language to English by the Deaf (SLEND). A central element was the focus on 'real literacies' (Papen & Tusting 2019), that is, working with texts that the learners would come across in their daily lives ('Real-Life English'). The aim was to design, implement, and evaluate English literacy instruction, using Indian Sign Language as the medium of communication between tutors and learners; deaf peer tutors delivering the interventions with deaf learners; and multimedia online learning materials, designed by the groups of learners themselves. As well as deaf research assistants and peer tutors, the project involved academics across multiple disciplines including applied sign language linguistics, ethnography, digital literacy, and teaching English to speakers of other languages (TESOL), together with deaf-led NGO partners in India. The project also employed individual deaf research assistants working in sub-Saharan Africa (Ghana and Uganda) on exploring the feasibility of such an approach through stakeholder workshops.

The second project was a three-year study called 'Peer-to-Peer Deaf Multiliteracies' (P2PDM; 2017–2020), which maintained the main elements from the pilot – sign language as medium of communication, deaf tutors, 'real-life English' and ICT resources – but extended the approach in several ways. Firstly, the investigation moved on from a focus on literacy to a wider perspective of deaf learners' use of 'multiliteracies'. This means that the targeted skills are not limited to reading and writing but extend to other modes of expression such as sign language (including fingerspelling), drawing, and technology-enabled and multimodal communication. The broadening of focus from literacy to multiliteracies was motivated by the findings from the pilot research, which indicated that important learning took place across a range of skills related to different types of literacies (see section 1.2).

3 Within the text, we use shortened project names for easy reference. For the full names, see the acknowledgements at the end of this chapter.

Secondly, whereas the pilot project only involved young adult learners, P2PDM also worked with deaf primary school children. As disadvantage of deaf learners in education already begins at primary school level (Murray et al. 2016), the team wanted to extend the logic of the multiliteracies approach to primary school children, introducing the same principles of learner-centric teaching methods delivered by local deaf tutors and supported by deaf research assistants. Finally, the P2PDM teaching interventions were expanded to Ghana and Uganda, supported by local partner organisations, in addition to continuing work in India. Extension workshops were also conducted in Nepal and in Burundi but without implementing any teaching activities.

The third project was a collaboration with Uganda's Makerere University and several partner NGOs in India to increase the impact of the research by building capacity among deaf tutors and creating bilingual teaching, training and learning resources. This impact project was called 'South-South collaboration in realising the impacts of Peer-to-Peer Deaf Multiliteracies research in India, Uganda, and Nepal' (2019–2021). Again, this project relied on the outcomes of the previous research, aiming to turn research findings into pedagogical practice. A combination of capacity-building training and materials development resulted in a set of instructional videos in Indian, Ugandan, and Nepali Sign Language, as well as curriculum designs for training deaf professionals in deaf education. This project was particularly fruitful in producing a number of innovations in practice and methodology. These are summarised in the innovation sketches of both volumes and notably include several innovations that are based on Serious Games, that is, activities that have the form of games but have non-entertainment purposes such as training or awareness (cf. Zeshan 2020).

Across the three projects, the partners based in India included the National Institute of Speech and Hearing (NISH), the Delhi Foundation of Deaf Women, the Rural Lifeline Trust, the Haryana Welfare Society for Persons with Speech and Hearing Impairment, and Vidya Bhawan Society. The African partners were the University of Ghana, Uganda's Makerere University, and the Uganda National Association of the Deaf, and the UK partner was the Literacy Research Centre at Lancaster University. In addition, a range of local organisations providing education to deaf students worked with the project team to set up learner groups as field sites for the research.[4]

4 Local partner organisations are acknowledged in the individual chapters in this volume.

Across these three projects, the research team was able to develop the work by cascading the approach to a wider variety of deaf learners in different countries (1.1) and by moving from the concept of 'literacy' to that of 'multiliteracies' (1.2).

1.1 Cascading to multiple countries

The seeds for this work were planted in 2009, about six years before the pilot project, when the iSLanDS Institute established a BA course in Applied Sign Language Studies (BAASLS) in India. This course equipped a pool of deaf graduates with the capabilities needed to carry out the pedagogical approach that the team developed in the later research programme. BAASLS was the first university-level course on sign language in India and graduated 70 students from several countries in the Global South, including all the countries that subsequently became involved in the deaf literacy/multiliteracies research, with the exception of Ghana.

Based on the P2PDL pilot, the second project P2PDM was able to roll out teaching interventions to other educational institutions in India, Ghana and Uganda, as well as exploring the approach with further countries through workshops in Nepal and Burundi. The impact project then focused on the professional capabilities for deaf people to act in teaching roles, setting up a programme for deaf trainees from India, Nepal and Uganda. Engaging with more systemic interventions through the creation of curricula and learning resources for language and literacy was another focus of the impact project (cf. Akanlig-Pare, Mugeere, Singh & Zeshan, this volume). Figure 1 illustrates the trajectory from 2015 to 2021, with each dot representing a partner location. Work has included interventions with schools and adult learning centres (in blue), exploration with communities (in red), and professionalisation with deaf tutors (in green). These phases correspond to the three successive projects.

PHASE 1: Interventions in India; exploration in Uganda and Ghana

PHASE 2: Interventions in India, Ghana and Uganda; exploration in Nepal and Burundi

PHASE 3: Professionalisation for language and literacy education in Uganda, Nepal and India

Figure 1: The trajectory of the peer-to-peer deaf literacy and multiliteracies initiatives from 2015 to 2021

This cascading of work to multiple countries is not to be seen purely in numerical terms, that is, in terms of the number of locations and institutions involved. Roll-out here does not imply working with more partners in each phase. Instead, the qualitative progression is just as important, as this work has moved from running exploratory workshops to implementing classroom interventions to targeting professionalisation of teaching roles. In some cases, there has been a continuous trajectory, but this was not always possible. For instance, work in Uganda has gone through all three phases. Throughout the entire period, India has taken a lead role and involved a wider network of partners compared to other countries. This is due to the long-standing embedding of work by iSLanDS in the country, as exemplified by the introduction of the BAASLS degree course.

However, there has been expansion over time with respect to the number and diversity of learners involved. In the pilot, the learners were all adults, and they focused on functional aspects of English, which means using the language to do everyday things such as sending WhatsApp messages. Classes were implemented at five field sites across India, with a total of 46 deaf learners between the ages of 18 and 35. The project employed three deaf research assistants and five deaf peer tutors in India. The team also carried out small-scale investigative fieldwork in Ghana and Uganda, with the help of two more deaf research assistants, to look at transferability across contexts.

For the P2PDM project the team included groups of children as well as adults. By the end of this phase, 124 young adults and 79 primary school children had been involved. The P2PDM project provided 13 posts for staff in India, Ghana and Uganda, and it revealed that new ecosystems of learning can be developed and adapted for use with groups of deaf children and youth in different countries of the Global South.

In order to go a step further towards introducing key elements from the research into concrete educational contexts, the third project concentrated on capacity-building with young deaf professionals. It was not possible for reasons of feasibility and resources to involve all countries from P2PDM in the impact project, so work was carried forward in India, Uganda and Nepal. A group of 12 trainees participated in a six-month training programme organised in India in 2019–2020.[5] The project

5 The impact project was heavily affected by the COVID-19 pandemic. Although the main objectives were fulfilled, the amount and quality of stakeholder engagement was much reduced as activities moved online. Part of the training programme had to shift to an online mode, and efforts towards exploring accreditation options for the new curricula were adversely affected.

also generated a range of materials including curricula in the area of language and literacy provision, teachers' handbook materials, teaching and learning materials, and prototypes for alternative learning. Some of these materials are discussed in the chapters of this volume, as well as in Volume 1. They underpin newly arising roles for deaf professionals, and indeed have been co-created with the group of trainees and with the project staff. The curriculum and materials design has arisen directly from the experiences of the preceding projects.

Another aspect of the research trajectory is the involvement of individuals from the target countries in the different phases. Involving the same people across different phases has given continuity to the research programme and facilitated the capacity-building aspects, as deaf project members increasingly gained research skills and pedagogical experience. Table 1 illustrates some of this continuity, showing how people progressed individually.

Table 1: Continuity of people from India (IN), Uganda (UG) and Ghana (GH) across the research trajectory

BAASLS		**P2PDL**		**P2PDM**		**Impact project**
Lecturer (IN)	→	Lecturer (IN)	→	Consultant (IN)	→	Consultant (IN)
Student (UG)	→	Research Assistant (UG)	→	Research Assistant (UG)	→	Research Assistant (UG)
		Research Assistant (GH)	→	Research Assistant (GH)		
				Peer Tutor (UG)	→	Research Assistant (UG)
Student (IN)	→	Peer Tutor (IN)	→	Research Assistant (IN)	→	Research Assistant (IN)
		Peer Tutor (IN)	→	Peer Tutor (IN)	→	Research Assistant (IN)
Student (IN)	→	Peer Tutor (IN)	→	Peer Tutor (IN)		

These kinds of continuities are rare but seem to offer valuable opportunities for deaf individuals to build their knowledge and skill-sets. McEwan (2021) analyses the peer support networks among deaf peer tutors and research assistants from the three countries involved in P2PDM. The findings indicate a rich set of interactions between project staff at different levels and in different locations. For instance, out of 218 instances where peer tutors reported receiving assistance with skills or tasks from others in the project context, assistance came from research assistants 28% of the time. Skills transfer was horizontal from one peer tutor to another in 22% of

cases, and help was provided by senior project staff 23% of the time. Two of the peer tutors also gained considerable support from interacting with colleagues in another project country (McEwan 2021: 190–195).

1.2 Literacy to multiliteracies

The pilot project aimed to explore new ways of teaching English to deaf learners in India, with a view to improving the quality of educational outcomes for learner groups who do not adequately benefit from traditional interventions. Instead of traditional language teaching, this project took a learner-driven, functional and ethnographic approach, exploiting a virtual/mobile learning platform and supporting deaf peer tutors to develop their own materials and strategies co-creatively with their learners, including teaching through sign language.

The pilot project's theoretical and methodological underpinnings comprised an ethnographic approach based on authentic identification of literacy needs ('real literacies approach', Street 2012) and a transformative mixed methods paradigm (Mertens 2010) towards social justice and the furtherance of human rights (see Ahereza et al. 2016; Gillen et al. 2016; and Zeshan et al. 2016). The P2PDL project also drew on standardised language testing using the Common European Framework of Reference for Languages, CEFR, level A1/A2 (Council of Europe 2001), adapted for deaf people (see Waller, Jones & Webster 2021) and qualitative data analysis from focus groups, interviews, and observations.

Findings from the pilot indicated a positive response regarding the real-life English approach and highlighted the use of Indian Sign Language as essential to improving English literacy (Zeshan et al. 2016; Fan 2018). The learners appreciated that working with real texts gave them opportunities to learn many useful new words and expressions, which equipped them with a vocabulary that could support them in other situations and activities in their everyday lives. Learners felt that their knowledge was positively recognised, and in the lessons, their sign language skills were valued and expanded as they jointly made sense of a text or prepared a contribution to the SLEND. They valued opportunities to connect with other student groups, the diversity of activities, and the multimodal learning resources. The peer tutors were seen as supportive, raising learners' confidence. Respondents also commented on difficulties, most crucially, issues with access to the SLEND and some concerns regarding varieties of Indian Sign Language.

The second project, P2PDM, intended to examine how to change some of the dynamics that contribute to the disadvantages faced by deaf learners at all levels due to widespread disregard for their accessible

linguistic modality (sign language), as well as their specific resources and capacities, such as peer support and visual learning styles. As in the pilot, it was important to involve deaf individuals in the design of new teaching approaches, and to use children and young people's everyday experiences and existing literacy practices as the basis for their learning. However, one of the main lessons taken forward from P2PDL was that the learners not only developed English literacy, but *multiliteracies*, i.e. skills in sign languages, written English, drawing and other forms of visual representation, editing of multimodal productions, and forms of technology-mediated communication that combine different modalities.

The basis for this approach is the idea that being 'literate' in the modern world involves a complex set of practices and competencies and engagement with various modes, increasing one's abilities to act independently (New London Group 1996). For instance, young adult learners might discuss a topic with the peer tutor, create an annotated diagram related to the topic, then film and edit a video explaining the diagram in sign language, and eventually read a related text found online, with the help of signed explanations from the tutor. This multimodal engagement involves far more than mere encoding and decoding of written text.

When working with young deaf children who are making their first inroads into a written language, other forms of expression likewise support the development of multimodal and multilingual skills. For instance, on the basis of a picture book, children may sign a story, act out the roles of its characters, produce drawings with or without integrated words, and use fingerspelling as a bridge between signing and reading/writing. In all these activities, integrating the different modalities and engaging learners with visual material has been particularly important, and several chapters illustrate how multiliteracies have been deployed in the classroom (Ahereza, this volume; Manavalamamuni, this volume; and Nankinga 2021).

The P2PDM project's emphases on active learning, contextualised assessments and building portfolios to document progress were intended to increase the benefit to deaf learners in terms of their on-going educational journeys and, for the young adults, employment capacity. Compared with a narrow scope of literacy in terms of reading and writing texts, the chapters in this book show that a focus on multiliteracies creates many opportunities to develop abilities, motivation and confidence, and to equip students with the communicative repertoires that will help them realise their potential.

2 Overview of research chapters

All of the research chapters in the first part of this volume are based on data and analyses from the above-mentioned projects, with a focus on several themes, namely learner engagement and classroom practice, capacity building, and systemic issues in deaf education. All chapters in this volume relate to the second and third projects, except for the one by Panda, which is about the first project (P2PDL). Author Manavalamamuni from India (in addition to Pal and Nankinga whose chapters appear in Volume 1) is a deaf project member who had no experience with academic publishing prior to joining the project. Webster (this volume) describes the process that the team used to support their production of formal English as well as that of deaf author Ahereza, who already had some experience with academic English and was further developing his analytical skills.

Panda's chapter evaluates learners' engagement in the pilot project by analysing the patterns of how they used and accessed the online platform, SLEND (Sign Language to English by the Deaf). He studies the quantitative log data on users' uploading of materials and viewing of posts that was automatically collected from the SLEND, and separately analyses the patterns of two groups, the 57 learners and eight deaf project staff (five peer tutors and three research assistants), in order to draw conclusions about the engagement with the programme.

The chapters by Manavalamamuni and Ahereza by are mostly based on analysing qualitative data and likewise address issues of learner engagement and classroom practice. Both authors coded data from various narrative project reports, including research assistants' and peer tutors' reports, as well as micro-case studies. In Manavalamamuni's chapter, he uses his analysis to examine the impact of visual materials on the participation of deaf primary school children in India. He describes the types of interactions between learners that occur when creating and using visual materials, the role of teachers in using visual materials, and the impact of collaborative activities on social behaviour in the learning context. The interplay of visual materials with repeated exposure to learned content is also explored.

Ahereza's chapter highlights the ways in which deaf peer tutors sequence different multiliteracies skills in their classroom practice. He investigates the arrangement and co-occurrence of the various multiliteracies skills that occurred in teaching sessions with deaf primary school children in Uganda and in India. Ahereza has been involved in every step of the trajectory described above, having graduated from the BA in Applied Sign Language Studies in 2014 and taken up a central role

in all of the work in Uganda across the three projects. He also contributed to scholarly papers during the research (e.g. Ahereza et al. 2016).

The final research chapter by Akanlig-Pare, Mugeere, Singh and Zeshan speaks to the theme of systemic issues and compares educational systems across the countries involved in the deaf literacy/multiliteracies work, namely Ghana, India and Uganda, looking at the structural causes of disadvantage and marginalisation of deaf students. The chapter presents the conclusions of the researchers who have been analysing the systemic barriers to deaf people's success in education and focussing on finding leverage points for the improvement of language and literacy learning in systems of deaf education.

3 Overview of innovation sketches

The three projects enabled several innovations under the themes of capacity building, classroom practice and systemic issues. These include a gamified approach to learning English grammar, a bespoke language support process to facilitate the first-time academic contributions of deaf authors, the development of a course on Indian Sign Language as a secondary school subject, and capacity building with sign language users aspiring to professional roles in deaf education. These four innovations are covered in the sketches in the second part of this volume, while four other innovations (learner portfolios, creating storybooks with deaf children, the creative facilitation of learning through the use of a 'reverse curriculum' approach, and co-creative curriculum development in the area of language and literacy through sign language) are covered in Volume 1.

The first sketch, by Papen and Zeshan, describes the invention of 'English grammar games', an experiment aimed at overcoming the long-standing problem of learning about English grammar that is experienced by deaf learners in the project's target countries. This involves the gamification of grammar learning in small manageable chunks based on authentic English texts that are identified by deaf learners themselves. The ethnographic framing of English language learning that has characterised our research throughout is brought together with a game choreography that allows learner groups to encounter grammatical constructions in meaningful contexts. Papen and Zeshan report on the underlying design features and on the development and field testing of the English grammar games.

Turning from the engagement of learners in innovative pedagogical practice to the theme of capacity building, the second sketch by Webster

offers a self-reflective explanation of the way the members of the research team worked together. It describes the language support procedure that was developed during the latter stages of the research to enable the deaf project members to transform their expertise into written contributions for this book. Across the two volumes of *READ WRITE EASY*, there are six deaf authors. While McEwan (Vol. 1) is a PhD candidate and Panda (Vol. 2) is an experienced researcher, both having extensive experience with scholarly writing, the other four deaf authors (Pal, Nankinga, Ahereza and Manavalamamuni) are new to academia, and three of them are contributing to an academic publication for the very first time. The innovation sketch describes the process of language support that enabled these authors to publish their own original research.

The theme of capacity building continues in the next innovation sketch by Zeshan with a description of a capacity-building programme for deaf professionals in deaf education. This six-month programme was part of the activities of the third project on 'South-South collaboration' to further the impacts of research carried out under P2PDM. The 12 participants from Nepal, India and Uganda worked on skills development in multiple ways while also producing teaching and learning materials. The innovation sketch particularly focuses on the integration of skills through learning journeys that led to the creation of video lectures in sign languages.

Finally, Singh and Mahapatra report on a systemic innovation resulting from collaboration of the P2PDM research group with the National Institute of Open Schooling (NIOS) in India. The resulting secondary school course in Indian Sign Language (ISL) at the level of the important 10th grade board exams provides a boost to the recognition of sign language in India. The policy change introduced by the NIOS validates ISL as a regular school subject on a par with spoken languages at the national level. The innovation sketch reflects on this as well as on the development of a video dictionary and educational videos in ISL to provide access to various subjects at secondary level, highlighting how these initiatives may support deaf learners in India.

4 Impact and future work

Through P2PDL and P2PDM, project members have aimed to translate their new skills into enhanced educational opportunities for their deaf peers at each stage. They have done so through an approach carefully tailored and tested across the project trajectory, in which deaf tutors

facilitate learning by using sign language as a bridge to other literacy and multiliteracies skills.

These projects have also highlighted the importance of capacity building through research, creating career opportunities and skills development for the team members. Two PhD theses (Fan 2018; McEwan 2021) have been embedded into the projects,[6] in addition to the pedagogical training for the international deaf group that was part of the 'South-South collaboration' impact project. Importantly, the project has enabled young deaf research assistants to undertake and publish their own research, thereby increasing their academic skills considerably. The addition of these scholarly, peer-reviewed citations to their CVs is likely to attract material benefits in terms of career advancement as well as creating potential opportunities for the further cascading of knowledge and skills. The chapter by Nankinga in Volume 1 highlights barriers and opportunities in relation to the journey of deaf sign language users to become professional educators.

Intertwined with capacity building, the development of accessible teaching and learning resources to be used by deaf professionals working in deaf education contexts has been particularly important. A major output is the teaching handbook for language and literacy trainers that was created as part of the 'South-South collaboration' impact project. Two aspects of this work deserve to be highlighted here. Firstly, the production of materials in several sign languages in parallel within the same project reflects our strong commitment to South-South collaboration. Similar projects where users of different sign languages work together on instructional materials are known from the EU (e.g. the Signs2Go and Signs2Cross projects), but not, to our knowledge, from the Global South.

Secondly, the opportunity for deaf project members with different skill levels to collaborate closely and over a longer time period on the same work packages is a defining feature of the entire research trajectory (as explored in detail in McEwan 2021) and is particularly associated with the teaching handbook. For less experienced group members, this presents opportunities to interact with and be inspired by highly skilled peers. For those with more advanced skills, there are opportunities for practising their pedagogical and leadership skills (for details see Zeshan, this volume).

Another line of development has been the new policy in India to implement ISL as a school subject at secondary level at the NIOS and

6 A third PhD thesis is in progress. Two of the three PhD candidates are deaf academics.

integrate the sign language course into their systems (Singh & Mahapatra, this volume). Once implemented, ISL is set to become available as a subject to take for the 10th standard board exams, which are among the most important public examinations in India. The Indian branch of the P2PDM project has created lessons in sign language for the new programme, which constitute the core theory materials. Other course resources include a textbook in English based on the signed lessons and signed instructions for practical assignments. Three project members have served on the curriculum committee.

Finally, it is important to note that the ethnographic, learner-centred, and multimodal/multiliterate approaches that characterise this entire research portfolio were often at odds with the educational systems in the partner countries, and this is something that should be explored more in future research. Although these approaches were taken up in different ways in the project locations, they were not always fully in line with the students' own expectations, which may be shaped by their experiences of formal schooling and by a desire to be taught 'the basics', specifically grammar. In this regard, the 'English grammar games' innovation has considerable potential to address the needs of deaf learners with respect to catching up with standard English language curricula in an accessible way.

More generally, the researchers sometimes observed clashes with existing educational systems. For example, two groups of young adults in formal education institutions in Ghana and India asked the team to use multiliteracies sessions to support their regular mandatory classes, rather than following the team's original approach. These young people are under tremendous pressure to perform within the formal educational systems, while classes that take place in NGO settings (e.g. with young adults in Uganda) do not face this issue to the same degree.

Consequently, a key way of sustaining the impact of these projects will be to investigate how learners' experiences and expectations of formal schooling in different countries affect their readiness to adopt novel approaches to teaching and learning, and how to develop culturally-specific training that addresses these expectations. Likewise, the readiness of existing teacher training systems to integrate resources and curricula that enable deaf sign language users to qualify as professionals in the area of language and literacy/multiliteracies is an unresolved issue that needs more attention in the future.

Acknowledgements

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PART - I

Learner engagement and access patterns in a programme using a sign-bilingual online learning environment

Sibaji Panda

1 Introduction

This chapter reports on findings from the 'Peer-to-Peer Deaf Literacy Project' (P2PDL). The project developed a new ecosystem of English literacy learning among young deaf adults in India (Gillen et al. 2016) and was led by the International Institute for Sign Languages and Deaf Studies (iSLanDS) in the UK. The iSLanDS Institute has been directly involved in a number of capacity-building measures in India. Among other initiatives, the delivery of India's first BA programme in Applied Sign Language Studies together with Indian partners has been particularly impactful, as this programme was aimed entirely at deaf students and delivered with Indian Sign Language as the mode of instruction. The BA programme operated from 2009 until 2015, and the P2PDL project (2015–2016) employed several of its graduates.

The P2PDL project continued the approach of the BA programme, as the fieldwork in India was carried out by deaf sign language users. The project's philosophy was for deaf communities to decide their research priorities, including what and how they would like to be taught. Hence in April 2014, the iSLanDS Institute organised a two-day workshop with Indian deaf community leaders. India has one of the largest communities of sign language users in the world, estimated to include at least two to three million deaf signers (Devy et al. 2014). However, the National Sample Survey of India estimates the number to be 50 lakhs, or five million (MoSPI 2016), and the National Association of the Deaf says that the number is 18 million, so there is little certainty as to the precise size of this population (Panda et al. 2013) There is a high level of self-organisation in this community, with several major deaf associations at national, state and regional levels, and an even larger number of formal and informal local branches. Over the past few decades, deaf organisations being run by deaf people themselves have become more common, following increases in the attainment of educational qualifications and capacity-building skills among this group.

The 2014 deaf leaders' workshop was conducted by myself, as a deaf Indian academic and native user of Indian Sign Language (ISL). The aim of the workshop was to identify priorities of development work among the Indian deaf community through a collaborative approach. The 30 participants, from deaf-led organisations all over India, included 16 deaf staff and 14 service users. This consultation workshop led the way toward designing the P2PDL project, and resulted in the following list of priorities:

- Improving the quality of educational programmes by offering quality standard curricula and teaching materials;
- Building the capacity of deaf trainers and offering online learning solutions;
- Providing distance learning of English to deaf students;
- Increasing the availability of online (web content) information in sign language; and
- Offering a sign-bilingual e-library for deaf people.

Interestingly, the provision of sign language interpreting did not appear on the list of priorities at all. This is in sharp contrast with what policy-makers usually perceive as the greatest need. Across countries that have robust institutionalised rights for deaf sign language users, the provision of sign language interpreting is usually at the forefront of legislation or other forms of regulation (cf. Wheatley & Pabsch 2012 on sign language legislation across Europe). Instead, the list of priorities focussed on bilingual teaching with sign language as the medium of instruction, and the development of high-quality taught programmes as well as libraries with bilingual resources. This shows that the participants placed the greatest importance on increasing the accessibility of educational programmes and materials by providing them in sign language, and facilitating this through the direct involvement of deaf signers as tutors.

For the P2PDL project, five learning groups in India were supported with a virtual learning environment (VLE) and chat on WhatsApp, using multimedia communication with English text, ISL videos, and visual content. The research team collected quantitative data on the uptake of the learning activity and progress with English literacy benchmarked against the Common European Framework of Reference for Languages (Council of Europe 2001), alongside qualitative data relating to the design features of our approach (see Fan 2018). In this chapter, I use quantitative data from the VLE to investigate the engagement of the learners and the teaching/research team in the context of some of the project's design features.

The next section gives an overview of the P2PDL project and its design features. Then, section 3 describes the field site setting, participants, and data, leading on to the analysis and discussion in section 4. Finally, section 5 provides some conclusions and perspectives for further research.

2 Peer-to-peer deaf literacy

The project's main aim was to develop a new ecosystem of learning among young deaf adults, focusing on the acquisition of English literacy. The main project activities, involving extensive fieldwork with groups of learners, were situated in India, with smaller exploratory sub-projects in Ghana and Uganda (for an overview of the P2PDL work in Ghana and Uganda, see Ahereza et al. 2016).

This chapter focuses on engagement with the virtual learning environment that was constituted for P2PDL. However, the learning context involved much more than a VLE. The actual learning proceeded via a combination of face-to-face work in a classroom and online interaction with a VLE called 'Sign Language to English by the Deaf' (SLEND).[1] The online environment was designed by e-learning software specialists in the UK and then populated with material by the five peer groups of learners and the peer tutors, assisted by deaf research assistants.

2.1 Theoretical framing of the project

The project has pursued an ethnographically-based approach to literacy. That is, the kind of literacy provision to be established was to be based on ethnographic research into the actual uses of literacy among the deaf target population, and the programme itself was to be based on the acquisition of literacy for purposes that are relevant to the real-life requirements of deaf learners. The project team called this aspect 'real-life English'(RLE).

According to Street (2012), an ethnographically-based approach to literacy suggests that literacy is best viewed not as learning programmes but as activities which everyone engages in during the course of operating within their life worlds. The 'real literacy' approach (Papen & Tusting 2019) which targets the adult literacy learners, advocates that learning is most useful if it is based on authentic texts and practices. With respect to deaf learners, this also means that the learners choose

1 The project philosophy is reflected in the VLE's name, that is 'by the deaf' rather than 'for the deaf'.

culturally and visually appropriate learning materials that are significant to their life and communication contexts.

Poor levels of literacy are common in the deaf adult population in India. Most deaf school graduates end up semi-literate, which makes their day-to-day lives difficult. As a result, many deaf adults flock to deaf-led organisations to attend English classes to gain general knowledge as well as basic communication skills (Bhattacharya & Randhawa 2014). The ethnographic approach to learning and literacy was used in P2PDL to facilitate both real-life world knowledge and literacy because young deaf people in India have substantial gaps in both areas. As part of an everyday activity, deaf learners would search, study, and review a specific item where literacy is used, and where they need to have a clear grasp of the item, such as an electricity bill, a job advertisement, a notice board with a caution, etc. The learners would engage in discussions of what kind of activity could be developed for each idea and what kind of test, quiz or homework could be integrated into the learning. A co-creative strategy was adopted during face-to-face contact hours, which further strengthened the peer-to-peer learning strategy. Those real-life materials which interested learners and were part of their day-to-day literacy barriers became part of the self-designed learning materials. Thus the project underlined the notion that literacy does not only involve learning how to read or write in terms of encoding and decoding a script, but must also encompass clearly understanding and comprehending something which is part of daily life.

2.2 Key design features of the project

The project employed unique design features based on the skills and capacities of deaf adults in India. Traditionally, pre-existing externally developed materials have been presented for tutors to teach in the context of deaf literacy (Marschark, Lang & Albertini 2006). These materials often do not match the skills and capacities of the tutors and students. Employing an innovative grassroots design approach in line with the authentic needs and interests of deaf learners enabled us to empower them to use their existing skill set to generate new capabilities and innovate new learning materials. In previous studies, Sahasrabudhe (2010) and Denmark (2013) concluded that enhanced learning of literacy is established through peer tuition, technology-enabled online learning, and materials that are developed and designed from a deaf perspective.

Within the overall framework of an ethnographic approach to literacy, the focus here is on three interrelated key design features of the project:[2]

- Peer teaching and learning: Instead of formally qualified teachers of English, the programme employed deaf peer tutors. Their role was to lead peer learning groups and facilitate the progression of steps through the programme.
- A learner-generated curriculum: No pre-established syllabus was used. Instead, learner groups led by peer tutors had autonomy over what they wanted to cover in their sessions (for details, see Waller, Jones & Webster 2021).
- Learner-generated content (cf. "Freirean Literacy" in Archer & Cottingham 1997): Instead of a prescribed textbook or other given resources, learners brought materials to the classroom for discussion in the learning groups, and these groups generated most of the learning resources themselves.

Each of these features on its own is not new, but is underpinned by previous research. Street (2012) discuss ethnographic approaches to literacy, though not in the context of deaf learners. Sahasrabudhe (2010) and Denmark (2013) focus on peer tutoring, including with deaf learners in India, and Archer and Cottingham (1997) discuss the notion of a learner-generated curriculum. Our specific work lies in situating these and other design features in the specific context of deaf sign language users, so that the emerging ecosystem of learning results in a holistic educational innovation.

3 Research field sites and data

3.1 Structure of the project team

P2PDL was a consortium project carried out by two university partners (University of Central Lancashire, the home of iSLanDS, and Lancaster University's Literacy Research Centre) together with six partner institutions in India as well as the Lancaster University Ghana campus and the Uganda National Association of the Deaf. The partnership structure is shown in Figure 1. In India, the National Institute of Speech and Hearing (NISH) hosted three research assistants and five study centres at four deaf-led NGOs and one private deaf school, which are staffed by one peer tutor each. All five of these institutions use sign language as the mode

2 For a complete discussion of all of the design features of P2PDL, see Fan (2018).

of instruction. The study centres were the field sites for data collection, operating with between seven and 15 deaf learners. One research assistant each worked in Ghana and Uganda on small-scale pilots. The blue circles represent deaf project members; hearing project members were active at the level of the UK universities only.

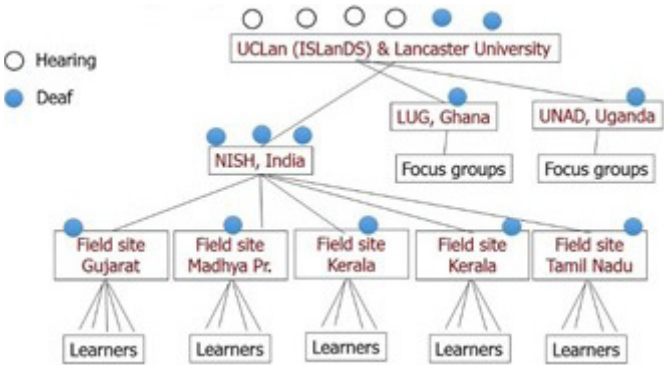

Figure 1: Deaf professionals in the P2PDL project

As the entire project was realised in a deaf-centric environment on the ground, where all communication is through a sign language, deaf staff and participants are not at any disadvantage. In fact, if anyone was disadvantaged, it was the non-signing project members when they were interacting with the field site setting. This was apparent in the initial project training period in June 2015, where a sign language interpreter was provided to facilitate communication for one of the non-signing UK researchers from Lancaster University, the only non-signer present during this period. In addition, the project team at the ground level preferred to use video-based communication via WhatsApp groups to highlight and resolve problems.

3.2 Field site set-up

The five field sites were located in different parts of India, at locations that facilitated coordination and visits by the researchers and research assistants (see Figure 2). A pre-designed set of criteria was used to select the study centre hosts. Among the criteria, importance was given to those that were deaf-led organisations, where sign language was used as the medium of communication (i.e., where everybody signs), and where computers and internet facilities were available. A screening test was done for the aspiring students before admission to the programme, and eventually 57 students were selected to join in the five centres starting

from September 2015. Five peer tutors were employed to facilitate the learning, one for each of the five centres.

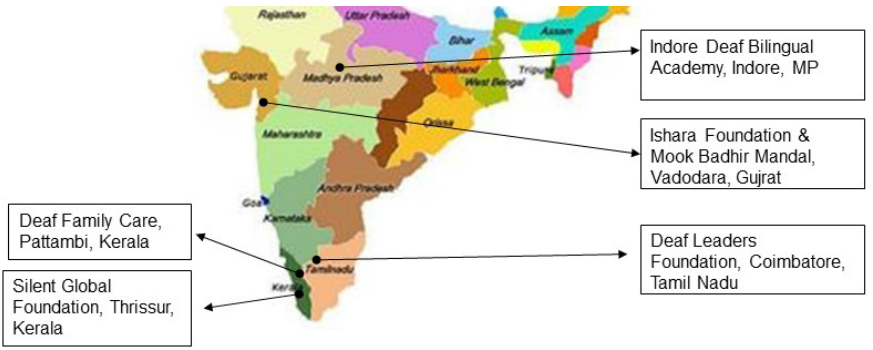

Figure 2: The P2PDL field sites

The field sites were equipped with internet connections and at least five computers for use by the project. At some centres Wi-Fi services were available, and most students with smartphones were able to access the learning platform on their phone as well. Research assistants were assigned the responsibility of overseeing the centres and communicating with the heads of institutions about project-related issues. The field sites not only hosted the classes but also facilitated regional dissemination events to create awareness among the deaf community.

3.3 The learning platform

The project employed a Virtual Learning Environment (VLE) that was implemented using MOODLE (Modular Object Oriented Dynamic Learning Environment), an online platform which can track usage patterns, access duration and other logs. These can then be extracted to capture the movement of learners and tutors across various materials. The VLE was designed using customised add-ons to enable maximum possible activities through easy fill-in forms and file uploads and to fit into the project design with visuals, buttons and drag-and-drop features for media files and form-filling functions (see Figures 3 and 4). All learners and tutors were given a user ID and password to access the learning platform with rights to upload new content and edit existing material.

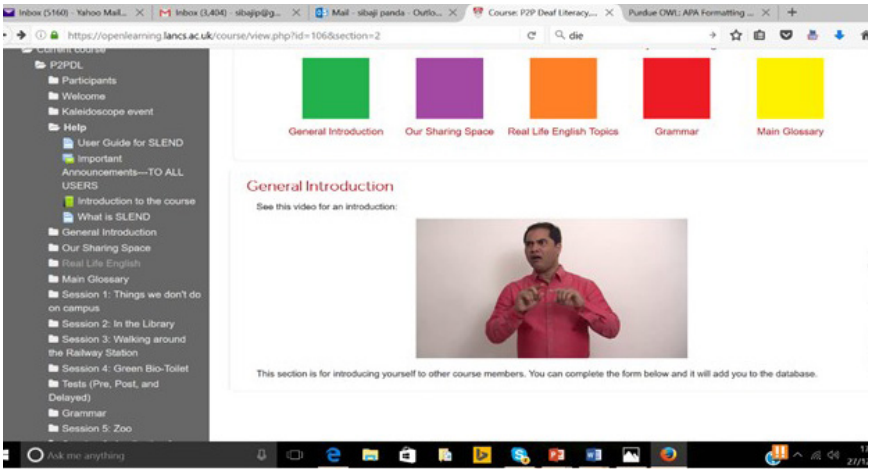

Figure 3: A screenshot of activities on the home page of the VLE

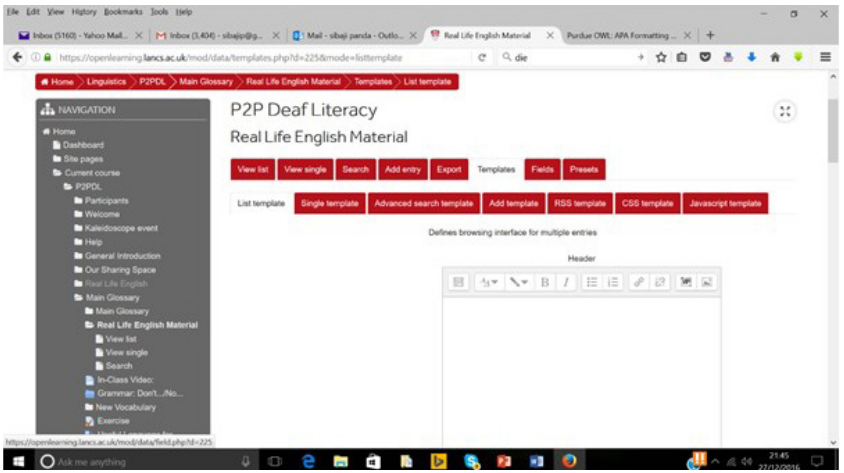

Figure 4: A screenshot of the customised visual add-on functions

The VLE was initially set up in March 2015 for the testing and validation of various tools. After the actual launch at the field sites in July 2015, there was time to modify and adjust it further to meet the users' needs. Technical staff were on hand for trouble shooting and assistance. During the testing period, various video formats for media files were evaluated, as was the VLE's mobile phone compatibility. The video standard was set to the lowest possible level to enable access at slower internet connection speeds.

3.4 The data

Across the project, a wide range of both quantitative and qualitative data were collected, including pre- and post-tests, self-assessment questionnaires, field observations, and focus group interviews with deaf learners and project team members (see Fan 2018). For the present chapter though, the focus is on the log data that was automatically collected from the VLE. These logs contain data on uploading of materials and viewing of posts from all users including the learners, tutors and research assistants. Though Moodle generated a vast amount of data related to various thematic extractions of digital usage, only the cumulative logs showing the contributions to learner-generated materials and the total number of views are used here for the analysis.

4 Data analysis

The data of the 57 learners is investigated separately from that of the five peer tutors and three research assistants (sections 4.1 and 4.2 respectively), and then a comparison between the two groups is undertaken (section 4.3). The usage patterns recorded over a span of several months indicate the involvement of the two groups in the programme of learning and also allow conclusions to be drawn about the accessibility and compatibility of the programme with respect to the deaf learners.

4.1 The data from the learners

The monthly patterns of posts and views extracted from Moodle logs are analysed here in order to make inferences about the learners' experiences when engaging with the VLE. As shown in Figures 5 and 6, data were tabled from July 2015 to September 2016. The results from the data are described stage-wise below.

Figure 5: Learners' usage patterns: views per month

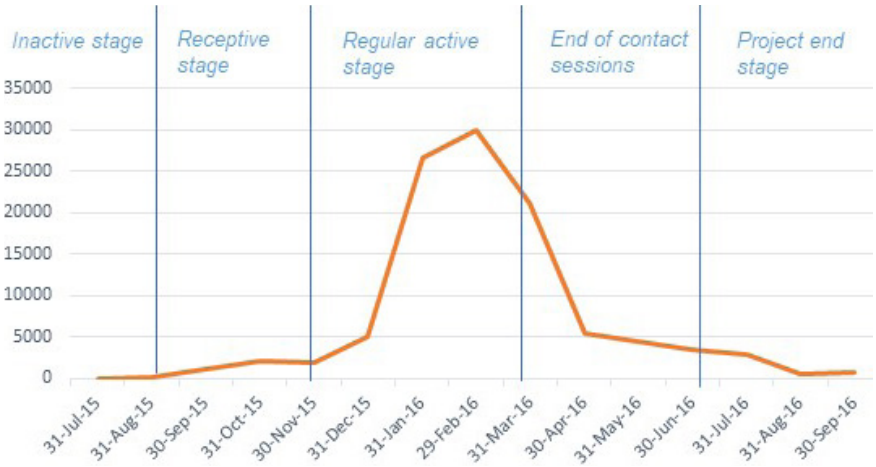

Figure 6: Learners' usage patterns: posts per month

Inactive stage: During this stage, before the start of initial sessions, user IDs and passwords were given to most of the learners. We anticipated that they would open the platform and start familiarising themselves with the tools. However, there were virtually no activities noticed during this period, except for a very low number of views. These data suggest that it is only when deaf students gather in a group and interact with each other within a support system that activities commence. Aiming for independent online learning in the absence of specific tailored support may not work in the case of deaf learners, who are already disadvantaged

by not having enough literacy in English. Thus face-to-face contact along with an accessible online platform works better than a platform alone.

Receptive stage: When the programme was launched at the beginning of August 2015, a receptive stage emerged while the learners found out more about the learning programme and their role as contributors, and understanding the tools and techniques on the platform. This resulted in a high number of views until October, when there were almost 12,000 more views in Jan-Feb 2016 than posts. This means that students' contributions to the platform were limited during this stage. This specially interesting that traditionally Indian students expect to be taught by a teacher, and thus at the beginning of classes, they did not expect to actively contribute to the materials development themselves.

Regular active stage: After the first three months of the programme, the learners entered an active stage at the beginning of December. They started to contribute to the platform regularly and the number of posts hit a high of 30,000 in February 2016. Thus the sessions from December to February were very active, with learners generating materials to the best of their ability. The views peaked at around 20,000 in January, which interestingly is much lower than the peak number of posts in February, maybe because there was a preference for contributing over watching other posts, or learners prioritised uploading over viewing due to the end of the intervention approaching soon.

Overall, the patterns of increase and decrease in views and posts show an interesting relationship. There was no point in time when the learners were only interested in viewing or only interested in posting. This seems to indicate that the VLE's content was accessible enough to enable learners to contribute as well as explore others' contributions. Moreover, there is an interesting parallel here with the data from the peer tutors and research assistants, that is, a similar rise and fall of views and posts, though there are some exceptions (see section 4.3). The data suggest that collaboration and contributions in the new ecosystem of learning increased due to the provision of face-to-face contact sessions with peer tutors.

During this stage, it is evident from the number of views and posts those learners were no longer primarily in a receptive mode but were also contributing material while viewing others' posts. That is, accessibility was not in terms of externally generated information made accessible in sign language for the learners. Instead, it is the entire content and process which was organised in a manner that interested the learners. A key

element is cultural significance of the content, that is, the applicability of learning in real life in order to survive in a world of literacy. For learners, the intervention was like a very interesting first-time journey into this world, enabling them to get to know things that they had never come across before. In fact, as the materials which are uploaded are 'real-life English' selected by learners, their interest is built into the process from the start. Most materials are part of the learners' first-hand experiences of literacy barriers, such as bank forms, application forms, cashpoint slips, bills and invoices.

End of contact sessions: Access to the learning platform started to decline from the beginning of March 2016, when the face-to-face sessions stopped and learners were no longer in an environment with live peer interaction. Although there was a sharp fall in both views and posts during April, after posts had already declined during March, learners continued to engage with the content at a lower level. Learners from some centres continued to assemble without a tutor and discuss various posts among themselves, so that the lower level of views was sustained through May and June. However, the number of posts continued to decline, first sharply at the end of the intervention, and more slowly thereafter as the summer holiday season approached.

4.2 The data from the peer tutors and research assistants

The data from the five peer tutors and three research assistants (Figure 7) covers a longer time period, as they already had access to the VLE from March 2015. Moodle logs for this group end at the same time as for the learners, in September 2016. Again, the analysis of the patterns of views and posts suggests that the data can be described in terms of several stages.

Inactive stage: When the VLE was first set up in March 2015 for testing and evaluation, the peer tutors were not part of the process, as they started to work from 1st June 2015 when the first initial training was held. They were assigned a password in advance of the training, but there was virtually no activity recorded. Designing and uploading materials in Moodle is certainly a task which needs hands-on experience for tutors to get familiar with it. During the inactive stage, however, UK technical staff were occupied with development and design testing, and no introduction to the platform was offered yet to the peer tutors and research assistants.

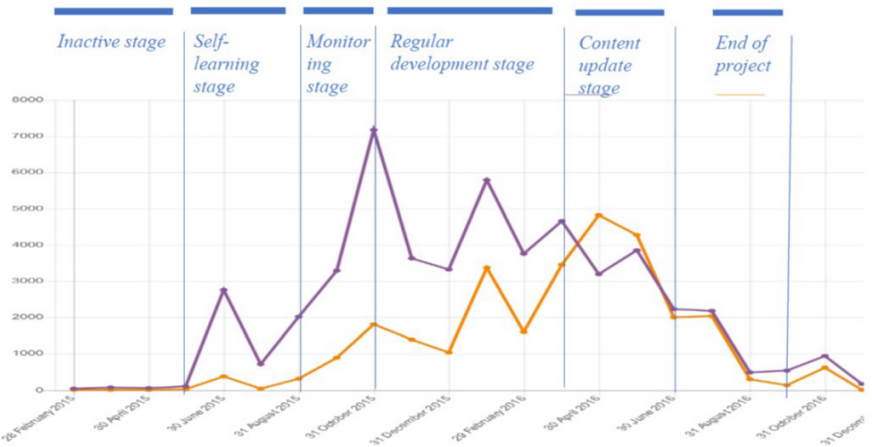

Figure 7: Usage logs from research assistants and peer tutors: views (in purple) and posts (in orange)

Self-learning stage: During the project-initial training at the beginning of June 2015, all eight Indian deaf staff members received technical training on familiarisation with the design of the VLE and how to make individual contributions. During the first phase of engagement with these eight staff members, they started to navigate across the demo materials and testing materials uploaded prior to the training. This led to higher views than posts until around the end of September. This somewhat unstable period covered the deaf staff members' initial exploration until they got to know and understand the design features of the learning platform and started to contribute materials.

In addition, during this period several supporting tools, screen shots, and help guides were provided in a designated area of the VLE, for each function and activity involved in navigating the platform. The Indian staff were able to refer to the support materials when needed. After the initial training, there were also several Skype and email support interventions from UK-based staff and the present author, who was based in India. This stage was specifically dedicated to self-learning and the designing of temporary activities including quizzes and tests.

Monitoring stage: The data show a sharp rise in views during September and October 2015. During this time, the eight staff members were responsible for checking all uploaded materials. The goal was to have a standardised flow of information across individual posts. The active output in terms of the number of posts continued to be low until the end of October, despite the training in June 2015 that was intended to enable

the staff to upload materials onto the VLE. During this phase, viewing and posting are somewhat out of sync, as there is intensive checking and monitoring of existing material on the platform but not yet an intensive phase of posting to the platform. In comparison with the self-learning stage, the number of posts increased somewhat but not to the extent that was intended by the programme.

Regular development phase: Posting to the VLE slowly picked up from September 2015 onwards. However, a turning point in terms of more active use of the platform with substantial posting did not really occur until January 2016. This pattern has to do with the second phase of technical training for the peer tutors and research assistants which took place in November 2015. This training was additional to the original project plan and was organised because the learner groups struggled with uploading content due to the considerable complexity involved in using Moodle to design activities. During the training, staff were given tips and advice on this, and they became capable of generating more activities on the VLE, including various types of quizzes. These new skills acquired by the staff were then transferred to the learners, whose number of posts rose sharply in January 2016, in parallel with the rise in posts by the project staff.[3] It is also evident here that the more the learners contributed, the more views were generated from both learners and tutors. It is not the case that tutors were initially just reviewing posts; they were actually learning new skills themselves and getting engaged with learners productively during face-to-face sessions.

Content update stage: The data shows another substantial increase in posts by the tutors between April and June 2016, peaking in May 2016. This happened while usage data from learners declined at the same time. During these months the contact sessions with learners had ended but the peer tutors were employed beyond the end of classes to update content, particularly videos and images. This was necessary because the learners often uploaded videos in unsuitable formats, or did not compress them properly, resulting in video files that were too large or too blurry. These media were replaced by the tutors during April and June, and thus there is a rise in posts during that period. After the end of their contracts in

3 Note that there is a time lag between the training provided and the rise in active posting to the platform. Possibly, this is because after returning from the training, the peer tutors were initially busy with other tasks such as managing their groups, and needed additional time to turn the training into action.

June and July, we then see a further drop in both views and posts down to nearly zero, signalling the end of the project.

4.3 Comparing usage patterns of learners with those of peer tutors and research assistants

As the previous sections suggest that the peer learning environment is an important factor to understand engagement with VLE, it is pertinent to compare the VLE usage patterns of learners on the one hand with those of the peer tutors and research assistants (PTs/RAs) on the other hand (see Figure 8).

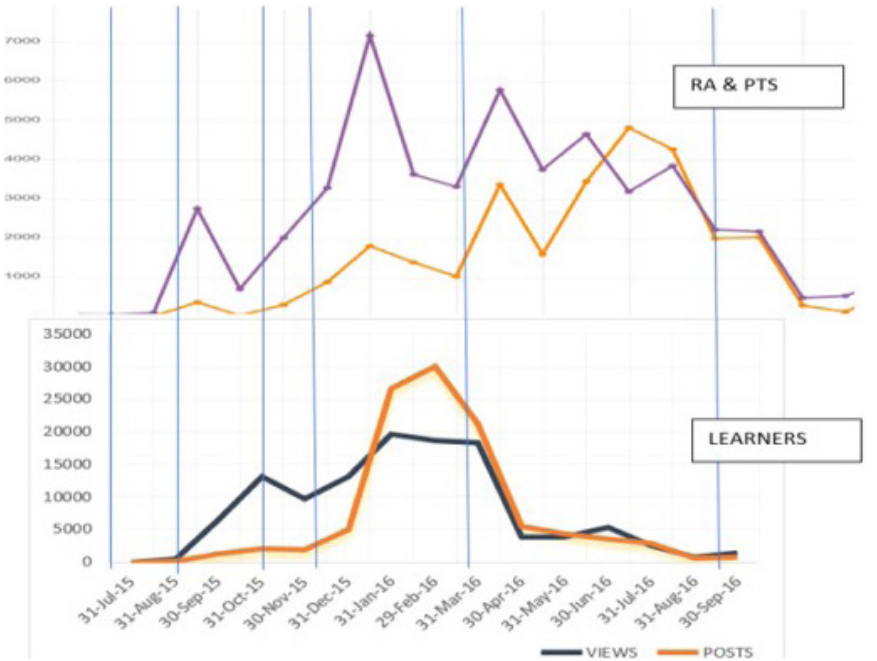

Figure 8: Comparison of usage patterns between learners and PTs/RAs

For this comparative graph, the initial period before learners were given access to the VLE has been deleted from the PT/RA data, so that the timescales align. To read the graph, it is important to be aware of the different vertical scales; for learners, the number of posts and views goes up to 30,000 while for the PTs/RAs the scale only goes up to 7,200. Therefore, we can compare the general up-and-down movement of the data curves directly in Figure 8, but the extent of increases and decreases is skewed by the different vertical scales.

Looking at the time period when classes were going on (June 2015 to March 2016), we see a largely parallel pattern between the two user groups for both views and posts. Activity first rises in September and October, as learners have by then become familiar with the learning platform and engage in viewing and posting alongside the PTs/RAs. Until September, there is no activity from the learners as they were not yet ready to engage with the platform. The rise in September and October is followed by a fall in activity in both groups in November and December. This corresponds to a period with several longer holiday breaks, including Diwali (a major Hindu festival) in mid-November as well as Christmas and New Year. In addition, the PTs and RAs were receiving technical training in November 2015.

In September and October, the PTs/RAs are comparatively much more active than the learners. In fact, the total number of posts is at a similar level for the PTs/RAs and for the learners, even though the learner group is much larger. This is to be expected, as the project staff were already trained in how to create posts before the beginning of classes, while the learners initially needed to gain experience with uploading materials. However, learner participation does rise in this period for both views and posts.

As discussed above, we then see a major uptake of activity from January 2016 onwards, due to the additional training provided to the PTs/RAs. The only difference in the general pattern across both groups is in February 2016, when there is a drop in PT/RA activity. This is because they were engaged in dissemination activities at this time. Dissemination workshops took place on 20 February in Indore and on 28 February in Vadodara. All of the PTs and RAs attended these events, so they were absent from their field sites. In addition, preparation for these events took up much of their time in the first half of February.

Interestingly, the learner groups keep up a high level of VLE participation during February 2016, although support from their peer tutors is much lower. In fact, this is the month with the highest level of activity for both views and posts. This pattern suggests that learners had taken ownership of the peer learning process by this time and were able to sustain their activities without the usual tutor support. Moreover, in February and March 2016 posts exceed views in the learner group by a large margin. This is the peak time of VLE usage by the learners.

From April 2016 onwards, the general usage patterns of learners and PTs/RAs are no longer in parallel. With the end of classes, both views and posts fall away in the learner group until there is almost no activity by September 2016. During this time, the VLE remained fully accessible to

the learners. On the one hand, it is quite natural that user engagement should drop after the end of organised activities. However, the very sharp fall in the curve immediately after the end of classes suggests that most of the learners were not able to sustain learning activities on the VLE without a supportive environment, including both support from tutors and engagement with other learners in the group.

It would be interesting to investigate in more detail whether the temporary stabilisation of usage in May and June 2016 at a much lower level is due to a sub-group of learners remaining engaged with the VLE, while others ceased their participation with the end of classes. This would fit in well with the observation that only 17 learners took a delayed post-test three weeks after the end of classes (see Waller, Jones & Webster 2021). This suggests that a minority of learners remained engaged with the learning platform after the end of the programme, and this late engagement could well have lasted several months longer.

For the PTs and RAs, the activity curve from April 2016 onwards is very different. Their activity on the VLE continues to be high. In particular, this is the only time when posts exceed views for this group. They were tasked with consolidating the learning materials on the platform, and no longer needed to monitor the learners' posts to the same extent. Their consolidation work involved a lot of re-uploading and filling in of gaps in materials, resulting in the highest peak of posts during this time.

5 Conclusions and outlook

5.1 Peer learning for deaf literacy

A major lesson to be learned from this research and the data analysed in this chapter is in relation to validating the peer learning approach for deaf literacy. The data clearly show how the learners and the teaching/research team (i.e. the PTs and RAs) worked closely in tandem with each other. This is evidenced, for instance, in the overall patterns of views and posts, which are largely in parallel during the time when classes were running. The intuition that deaf learners will respond to a peer learning environment is borne out by these data. The user access patterns clearly show that learners responded to actions initiated by the peer tutors, and peer tutors responded to actions initiated by the research assistants and UK research team. For instance, the learners' engagement with the VLE platform gradually intensified, with increasing views followed by increasing posts, as their interaction with the PTs and with each other progressed, and the PTs responded to the training they received.

In addition, we have also seen some preliminary evidence that learners develop some ability to take over responsibility for learning from tutors if they have been supported by tutors initially, as mentioned in section 4.3. However, the data that are indicative of learners taking ownership of their learning process are limited, and it would be important to undertake further research into this aspect of the peer learning process. This is particularly pertinent in the Indian context, where there is a severe shortage of teaching professionals who are fluent in Indian Sign Language.

The validation of the peer learning approach, which also includes learner-centred curriculum and materials development, also needs to be seen in the context of actual gains in literacy levels. In other research published by the P2PDL team, researchers have evidenced a significant increase in learners' English literacy skills according to standard pre- and post-testing aligned to the framework of the Common European Framework of Reference (see Gillen et al. 2016; Fan 2018; Waller, Jones & Webster 2021). Alongside these findings, the quantitative data discussed in this chapter suggest that learning content specific to deaf people and designed and moderated by deaf adults are apt to engage both learners and tutors as active participants in the learning journey. The high level of engagement as seen in the data is derivative of the sense of having accessible peers as leaders in learning.

5.2 Implications for 'deaf-led research'

The project structure described in section 3.1 represents a model where deaf people work independently with the help of technology to implement all aspects of the research on the ground. This model is in stark contrast with existing conceptions, in India and elsewhere, about the capacities of deaf communities. Deaf learners have been perceived as difficult to educate for generations and are harmed badly going through various interventions which affect their language acquisition and development (Lane 1999). The findings from this project provide evidence that deaf learners can learn effectively in groups, facilitated by deaf tutors, and by being engaged in communication with fellow deaf peers using their natural sign language.

It is therefore pertinent to ask how the P2PDL project relates to the notion of 'deaf-led research' in recent literature (see Kusters et al. 2017) and to the notion of 'deaf capital' (Hauser 2013), which speaks to utilising the capacity available within the deaf peer groups in this project. These concepts are clearly aligned with the spirit of P2PDL in terms of the perspective on the people involved in the project. In particular,

rather than perceiving deaf learners as 'difficult to teach', we focus on the in-group empathy and understanding among deaf tutors, learners, materials developers, and researchers creating a unique set of positive dynamics.

When the lens of 'deaf-led research' is applied to P2PDL, it seems that it matters who is looking through the lens. Seen externally as a whole, hearing people were in important lead positions, including the PI, the literacy test developer and the learning technologist. However, from the point of view of the field sites in India, the project was led by deaf professionals. The closer the team members were to the grassroots setting in the field, the less direct involvement was felt from the UK team. It could therefore be argued that 'deaf-led research' is not a simple yes-or-no condition but a matter of degree that depends on the perspective of those experiencing the environment. In the field in India, with the lead researcher (the present author), RAs and PTs all being deaf sign language users, there were few if any barriers or frustration due to communication difficulties during the project period. The learners themselves were only aware of the UK-based researchers with respect to the source of funding but did not have any direct contact with hearing team members. For them, learning and teaching was entirely a matter among 'deaf peers', thus enabling them to develop a sense of belonging and much-needed confidence to communicate and get engaged in learning.

5.3 Implications for 'accessibility'

Another implication from P2PDL is the notion of accessibility. In general practice, accessibility is often defined as an end product; that is, it is seen as providing additional features to inaccessible pre-existing content (Wheatley & Pabsch 2012). Moreover, access to the curriculum for deaf learners has often been discussed in terms of recommending strategies to 'fix the problem' (cf. Knoors & Marschark 2012). However, the present research suggests that we need to establish new features of accessibility. Within P2PDL, accessibility is not a final 'add-on' to other materials but is built into the entire project design from the start. Accessibility is not merely a matter of the language of presentation or a matter of technology or platforms. Instead, accessibility as understood in the context of P2PDL includes the way in which information is organised and a whole array of cultural preferences (cf. Ladd and Lane 2013), as well as a transformative paradigm of research in the sense of Mertens (2010).

The accessible design in P2PDL begins with the identification of needs within the target deaf community, as exemplified by our workshop with deaf leaders (section 1), and carries on via the recruitment of deaf

staff, with full acceptance of the community's culture and communication preferences (e.g. WhatsApp groups with embedded videos). A more detailed rationale for a notion of accessibility 'both in terms of what it is that is being accessed, and in terms of who has agency in the process of creating this access' is discussed in Zeshan et al. (forthcoming), in the context of the P2PDL's successor project on 'Peer-to-Peer Deaf Multiliteracies' (see Zeshan & Webster, this volume). Further research is needed to work out how the conditions under which this accessible model of literacy education would be suitable for large-scale dissemination, especially for implementation in deaf schools where sign language is the medium of instruction. However, the necessary pool of peer tutors is not readily available in India. Instead, there is a need to prepare for specific training of tutors with a view to large-scale implementation.

Thinking of agency in the process of creating accessibility, a key feature is the fact that the content itself is co-designed by deaf learners and their tutors in the field. The UK team only provided the technical resources via the Moodle VLE as well as establishing the theoretical framing and training for the research team on the ground. Co-designing the curriculum and learning materials with deaf learners is very different from adding sign language materials to an existing curriculum or translating study materials into sign language for deaf learners. This also implies that materials in this context are designed with a focus on how students can learn (learner-centred), rather than how a subject matter should be taught (teacher-centred).[4] In the P2PDL project, learners supported by their tutors decide what should be learned and how it should be presented, with the deaf perspective fully embedded.

4 The entire peer learning process is captured in a video documentary entitled 'Deaf literacy from the grassroots', available at https://islandscentre.wordpress.com/2019/02/18/deaf-literacy-from-the-grassroots-release-of-documentary-film/

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The influence of visual learning materials on learners' participation

Deepu Manavalamamuni

1 Introduction and background

This chapter discusses deaf learners' use of visual materials in the research project entitled 'Peer-to-Peer Deaf Multiliteracies: Research into a sustainable approach to education of Deaf children and young adults in the Global South'. The Peer-to-Peer Deaf Multiliteracies project introduced teaching methods for deaf learners in different age groups based on peer learning with guidance from tutors. In its work with primary school children, the project tackles the issue of supporting the early development of reading and writing skills, along with other literacies, with deaf children who use a sign language along with acquiring the surrounding spoken/written languages as second languages. 'Multiliteracies' are the many different multimodal ways of literacy, for example, reading, writing, signing, gesturing, drawing, typing, emojis, and video editing (Cope & Kalantzis 2015; see also Zeshan & Webster, this volume). This is much broader and more inclusive than the traditional concept of literacy as meaning only reading and writing (ibid.).

The multiliteracies approach is designed to maximise deaf children's functional literacy, which is one of the main keys to their future educational, professional and personal success. In this approach, deaf tutors are employed to work with deaf children, and emphasis is placed on the use of sign language as a bridge to multiple literacies. The study follows a strength-based approach where the linguistic and cultural resources of local deaf communities are highly valued, and deaf children's real-life uses of language and literacies (Street 2016) form the basis of learning. Bilingual education is intended to provide deaf students with a way of learning through using sign language as medium of instruction. Using sign language as the medium of instruction enhances deaf children's development of literacy and their ability to participate in interacting, higher-order thinking, and problem solving, and supports the idea of using this approach in the wider education system to improve life outcomes for deaf children and adults (Birinci & Sariçoban 2021).

The deaf teachers' strategies involve extensive use of visual materials such as pictures, videos, drawings, and real objects, and interactive methods such as role-playing and games, to help deaf learners attend to,

comprehend, and remember the topics more easily. This can be applied to hearing children as well because visual and learner-created materials are often common in schools generally. However, due to deaf people's visual orientation and lack of access to auditory modes of perception, the use of such materials is more likely to be pivotal in the education of deaf children. The tutors know from their own experience that deaf people tend to struggle with understanding abstract concepts when the explanation is not linked to something visual such as a drawing or photo. Therefore, in the deaf multiliteracies approach, the tutor's explanation of new concepts was usually accompanied by visual materials and visual, interactive methods. While teachers in other contexts, including those using traditional approaches, often make ample use of visual materials in their classrooms, the multiliteracies approach differed in that the materials were often generated by the learners themselves with guidance from the deaf tutors, and were harnessed in games and role play activities. The visual materials therefore were given a more central role in the learning strategies and classroom culture than would tend to be the case in a traditional teaching context.

The aim of this chapter is to explore the work that the deaf tutors, including the author, carried out with a group of 33 deaf primary school children in Uganda and India, with a particular focus on our approach to the visual learning materials and how these materials influenced the children's participation. In the classes in India, the children ranged in age from 6 to 10, while in Uganda they were aged 8 to 12. In India, the school where the teaching took place has deaf tutors, so the Indian children in this project had already been taught through sign language previously and had also acquired some English words. On the other hand, the Ugandan children had only been taught by hearing teachers prior to attending the classes orchestrated by the deaf multiliteracies project. For them, learning from deaf teachers with native sign language competence was a new experience. These contrasts in prior learning experiences meant that the topics, visual materials and activities differed slightly across the two countries, with the Ugandan children needing more guidance from the tutor initially, and focusing more on reading and writing than other multiliteracies skills. It is also worth pointing out that the impacts of the visual materials and interactive methods on the Ugandan children in particular are difficult to isolate from that of the novelty of learning from deaf teachers through sign language.

The tutors guided and encouraged the children to get involved in various activities using the visual materials. Most schools across India and Uganda do not have materials that are fully accessible for deaf children,

so we worked with the children to produce effective materials that will help teachers and learners in these contexts and design methods that match the children's skills (cf. Kaswa 2015). For an example of adapting a set of storytelling materials to our work with deaf children, see Gillen and Papen (2021).

The work in this project is intended to influence systemic changes in education systems, to help improve deaf people's access and attainment, and change their lives for the better. Importantly, the model that we used opens up possibilities for reaching deaf children in Uganda and India who are currently not in accessible educational settings. Kuntze, Golos, and Enns (2014: 208f) report that:

> Deaf children have the same potential as other children for language development, but their communication needs have often gone unmet simply because a fully accessible (i.e., visually based) language is not present in their environment and because the language that *is* in their environment (i.e., auditory based) is not fully accessible. Deaf children need access to adults and peers with whom communication will easily flow back and forth and without hesitations or misunderstandings.

To investigate how the visual materials influenced the deaf children's learning, first it was necessary to look at the different types of visual materials that the tutors found to use during the teaching, and how they planned to use the materials in the lessons. After the children and/or tutor decided what topic they wanted to learn (see Webster & McEwan 2021), the tutor found pictures and videos on the internet; gathered together storybooks, animal figurines, crafting supplies and toy alphabet letters and numbers; and created handouts with drawings and exercises that were suited to the topic, often with the children's active participation.

The most important responsibility of the tutor or teacher[1] is encouraging the children to learn, so in our approach it was vital for the tutors to understand how the visual materials influenced the children's levels of enthusiasm and interest in learning. We found that the visual materials often helped the children to enjoy and engage in learning activities such as games, stories and role-playing as well as making the

1 In the deaf multiliteracies project, the deaf teaching staff were referred to as 'tutors'. This is because of the project's orientation toward peer learning and the use of 'deaf peer tutors', and also because during the project there was not yet any way for deaf people in the Global South to acquire qualified teaching status. However, these project staff members were performing the role of teachers, so in this chapter both 'tutor' and 'teacher' are used interchangeably, and mean the same thing.

creative materials themselves. Rather than trying to learn while sitting in the same place for long periods of time, the learners were frequently moving around the classroom and having fun whilst making the materials and using them to play the games and act out the stories. These activities also have the potential for a positive impact on learners' memory, and give them motivation to improve their retention and recall. The children often find it difficult to understand and remember the topics, so it helps to use a teaching strategy that exploits interaction and repetition supported by learning materials such as pictures, video clips and games. This strategy harnesses the enjoyment and fun that they tend to experience when partaking in iterated activities with visual materials and interactions with the teacher. It also facilitates cognitive connections between the activity at hand and their previous knowledge.

To describe the research on how the use of visual materials influenced the learners, this chapter is presented in five main sections. Following a description of the data and method in section 2, the impact of visual materials on human behavior and psychology is explained in section 3, which looks into the impact on the children's social behaviour of collaborating with each other and with the tutor to create and work with visual materials. The sub-sections of section 3 examine the effect of learner-created materials on children's learning (3.1); the types of interactions between learners that occur when creating the materials (3.2); and the potential for improved classroom engagement when using visual materials (3.3). Next, section 4 looks into teaching and learning strategies when visual materials are involved. The aim is, firstly, to consider the role of teachers, including how teachers take responsibility for guiding and encouraging the students in creating and working with these materials (4.1). Secondly, the interplay of visual materials with repetition of learned content is considered, as this can have positive effects on retention (4.2). Section 5 offers some conclusions about the influence of visual materials on the learning of deaf children.

2 Methodology and data

This section presents the research methodology that was used in the study. Sub-section 2.1 describes the data collection from peer tutor reports and micro-case studies (MCS). In order to collect data from activities with deaf children, the research team worked together with research assistants and tutors in India and Uganda. In addition to working cooperatively on data collection, researchers and peer tutors discussed how to progress the various teaching and learning activities. Research assistants were often

present in the classroom with the tutor to teach the children, and assisted the tutors with teaching methods and creative visual materials for the students. Sub-section 2.2 explains how the data were coded and analysed.

2.1 Data collection

This data collection involved three classes of deaf children in India and Uganda. In India, there are two groups, 'A' and 'B', which corresponded with two different grade levels taught at the project's partner school, Happy Hands School for the Deaf (see Pal, Webster & Zeshan 2021 for details on the children's background). Group A included 12 children at grade 2, and Group B had 10 children at grade 1. All children in both groups participated in the research. In Uganda, a single group with 19 children participated in the research. However, assessing and reporting on the entire group soon became an unmanageable workload for the tutor. Therefore, the tutor decided to report on a sub-group of 11 children for the remainder of the research period, making a total of 33 deaf children across all three groups (see Table 1).

Table 1: Number of children in the classes and types of data

Country	Peer tutor reports	Micro-case studies (MCS)	Number of deaf children
India (group A)	9	2	12
India (group B)	8	6	10
Uganda	9	8	11

As also shown in Table 1, the two data sources used were peer tutor reports and MCS. The tutor reports described what happened in the class and what topics were taught every month. For instance, the topics included food, animals, numbers, the alphabet, colours, clock time and stories such as *The Three Little Pigs*. The reports consist of several sections (see the Appendix for the report format) including summary of topics, sample portfolios, self-reflection from the tutors and feedback from the learners. The summary of topics section includes information on the length of time that the children spent on each theme. The sample portfolios of the students' work exemplify what activities were done and what materials resulted from the lessons. For the learner portfolios, the children created their own materials. There are individual, small group and whole group activities that were done with the guidance of the tutor. This section shows the learners' outputs, as evidence of their learning and progress.

The peer tutor reports also include feedback from the students and self-assessments of tutors, which were completed at the end of each topic.

Creating these reports was a new challenge for the peer tutors, and therefore, they were supported by research assistants in this task, particularly at the beginning. The first few reports were written by research assistants and peer tutors together, and the research assistants remained available to resolve any issues with report writing throughout the project. Moreover, the Indian peer tutors also needed support with their own level of literacy, whereas the Ugandan tutor already had sufficient English literacy. A member of the UK team supported the Indian peer tutors by editing the English texts in their reports, which was also a good skills development opportunity for them. Reports were completed on a monthly basis, and it could take up to a few days to compile all the information. Peer tutors also had a continuous teaching load, and difficulties with time management meant that report writing was somewhat delayed at times. Nevertheless, the peer tutor reports are the most immediate records of classroom activities.

Whereas the peer tutor reports are direct reports from the classroom, the MCS summarise work on a particular theme in retrospect, drawing on the peer tutor reports and learners' portfolios. The MCS track the teaching of each topic over a longer period of time, sometimes over more than a month.[2] In the MCS, all relevant types of data come together in a detailed case study, and source files are linked together, including peer tutor reports, learners' portfolios, videos and pictures of what happened in the classroom (see the Appendix for an example). Unlike the peer tutor reports, the MCS were not created from the start of the project but introduced later, beginning about seven months after the teaching interventions had started. The same support as for the peer tutor reports was available for creating the MCS.

In the MCS, there are sections about the learners' group, the documentation, the topic choice, the sequencing of activities and the in-class observations. The section about the learners' group shows the details of the children in India and Uganda, and the duration of the theme being covered. The documentation displays the relevant files that the information in the MCS draws on, including tutor reports and learners' portfolios. The topic section of the MCS explains what topic was chosen by the children and tutor and how this was decided. The sequence section

2 Selected MCS and peer tutor reports were filed as project documentation in the data repository of the Economic and Social Research Council at https://reshare.ukdataservice.ac.uk/, and excerpts from the MCS are available to read in Webster and McEwan (2021).

describes the process and order of teaching and learning by the tutor and children in the classroom. The tutor comments in the MCS about what types of activities the students did during learning, creating visual materials and games, etc. In the observation section, the tutor explains what learning outcomes were achieved, such as learning something for the first time, or that the children struggled with reading and writing, or that the tutor needs to adjust the lesson planning in future.

The MCS have several advantages in comparison with peer tutor reports. They draw together information from the different data sources and track theme-based learning rather than focusing on individual sessions, making the MCS richer in data and more coherent. There is also the opportunity for a deeper level of reflection as tutors think about their work in hindsight and answer questions that are somewhat more analytical, such as the sequencing of activities, differences between individual children, and learning successes as well as barriers.

On the other hand, an evident disadvantage is the length of time that often elapsed between teaching classes and reporting on them, as many of the MCS were written months after the teaching. Naturally, peer tutors had difficulties remembering exactly what had happened. It was also not easy for some of the peer tutors to understand this new format. Moreover, writing the MCS was even more challenging in terms of the English literacy level required, and initially, the MCS were written while classes were still ongoing. This increased the workload for tutors, as it took about a week to complete each MCS, including writing the text and identifying all the links to source data files in the project's online data collection platform.

As a remedy, research assistants were more heavily involved in creating the MCS together with the peer tutors, after teaching interventions had ended, so that peer tutors had time to work on them. These measures avoided the MCS becoming an onerous exercise that could have led the peer tutors to copy and paste sections, re-use the same phrases to save time and effort, or take the MCS to be a repetitive tick box exercise. Moreover, the validity of the MCS was also supported by cross-checking with the relevant peer tutor reports, portfolios, and other materials. When writing the MCS, peer tutors would re-read earlier reports and access learner portfolios again, which helped them remember some of the details. Although we must assume that the MCS do not reflect a perfect memory and a few points could have been misremembered or forgotten, the validity of the MCS overall does seem sufficient. This is important because much of the analysis in this chapter depends on sufficient validity and integrity of the MCS data.

2.2 Data coding and analysis

All peer tutor reports and MCS were uploaded into an online platform that I used to access and collate all the data for analysis. In my data analysis, I concentrated on studying the visual materials that were described in the peer tutor reports and MCS. I consulted the data to find instances where tutors had used materials, such as pictures, videos, and books, and where they had created posters or used stories or physical activities. I then created lists in an Excel table related to the visual materials, organised by coding category. The four main coding categories are as follows (see Table 2):

- WHAT type of materials / activities were involved
- WHO developed and used the materials
- HOW the activity was carried out
- What the aim or effect was (WHY)

I also entered into the Excel sheet a number of codes that applied to each of these categories. For example, in the WHO category, when the children made the materials themselves as a peer group, this was coded as CC, and when the teacher and children discussed the materials together, this was coded as TC. Sometimes the coding included multiple codes from a single category, for example where there was a mixture of the children working with each other and the teacher giving guidance and collaborating with the children. Because there were so many different activities in the tutor reports and MCS, I chose these larger overarching categories to make sense of the data.

WHAT codes include various materials like those prepared by the teacher ahead of classes (T), those made by the children and teacher together (CT), and materials that are intended for interactive activities in the classroom (INT). Those that are downloaded from the internet as pictures and videos by the teacher to show the children are coded as (D). The WHO category codes how the teacher and children were involved in preparing and using the materials. This includes children doing activities with the visual materials by themselves (C), children working in groups of peers (CC), and activities led by the teacher (T). The HOW codes indicate the activity that the students did, such as games (G), or individual and group exercises (E). The WHY codes signify the aim or effect of the activity, for example, enjoyment (EN), improved recollection or 'better memory' (BM), and improved social behaviour (SB) – although these are not necessarily mutually exclusive. In this context, 'improved social behaviour' means working together in teams, cooperating to achieve a goal, taking turns, sharing toys and art supplies, raising hands

before contributing, and being polite and considerate of each other when moving around the classroom.

Table 2: The coding categories and their meanings

Category	Codes	Meaning
WHAT type of material / activity was involved?	**D** (download; picture and video)	The teacher showed the pictures and videos from internet downloads.
	CT (made by children and teacher)	The teacher and children created the materials together at school.
	T (made by teacher)	The teacher created the materials before teaching the class.
	INT (interactive)	The children were playing, passing materials to each other, role-playing and taking part in games using the materials in the classroom.
WHO developed and used the materials?	**C** (children by themselves)	The individual child made and used creative materials.
	CC (children as peer group)	The children discussed as a peer group how to create materials and use them for activities in class.
	TC (teacher and children)	The children were interacting and creating the materials with guidance from the teacher.
	T (led by teacher)	The teacher led the children's learning with materials in the classroom.
HOW was the type of activity carried out?	**G** (game; small and whole group)	The class played games in small groups or as one large group using the visual materials. They also moved around and interacted with the teacher while using the materials.
	E (exercise; individual and whole group)	The teacher provided the children with exercises, both individual and whole-group exercises, related to the materials.

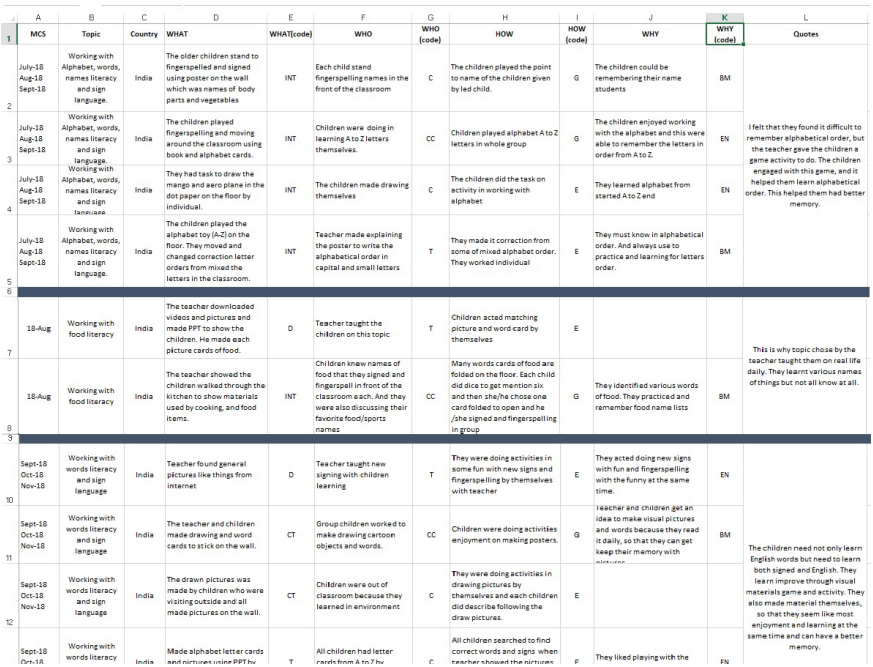
What was the aim/ effect of the activity? (WHY)	**EN** (enjoyment)	The children enjoyed using the creative materials.
	BM (better memory)	The materials influence and impact on the children's memory.
	SB (social behavior)	The children practised their social behaviour through games and physical activities in the classroom.

During the data coding process, I created data tables in Excel for all the codes, using tutor reports and MCS as data sources. These two data sources were used in different ways. I used the MCS as the principal source documents for coding, so all the teaching situations analysed and coded come from the MCS. Therefore, the quotes from reports that appear throughout the analysis sections also come from the MCS. The peer tutor reports, which are linked to the MCS, have served as background information in order to understand the details of what happened in classroom sessions. When reading an MCS, I usually accessed the linked peer tutor reports alongside in order to compare the information in both and understand the MCS fully. This process was essential in validating, cross-checking and specifying the summary information in the MCS. The coding of data in Excel then recorded what happened in the classroom related to the visual materials in terms of the WHAT, WHO, HOW and WHY categories (see Table 3). The data covers the period from July 2018 to December 2019.

There are 48 rows in the Excel data table, corresponding to the 48 instances of the use of visual materials in the classroom that were found in the MCS. All of the coded data were put into the main categories (WHAT, WHO, HOW and WHY) in the table, and the information in each row is linked to the data source on the left-hand side of the table. The right-most column is reserved for interesting quotes taken directly from the data.

The frequency distribution of all codes occurring in the data is summarised in Table 4.

Table 3: The Excel spreadsheet showing all data codes under the categories of WHAT, WHO, HOW and WHY, based on data collected from reports and MCS



	A	B	C	D	E	F	G	H	I	J	K	L
1	MCS	Topic	Country	WHAT	WHAT[code]	WHO	WHO (code)	HOW	HOW (code)	WHY	WHY (code)	Quotes
2	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	The older children stand to fingerspelled and signed using poster on the wall which was names of body parts and vegetables	INT	Each child stand fingerspelling names in the front of the classroom	C	The children played the point to name of the children given by led child.	G	The children could be remembering their name students	BM	
3	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	The children played fingerspelling and moving around the classroom using book and alphabet cards.	INT	Children were doing in learning A to Z letters themselves.	CC	Children played alphabet A to Z letters in whole group	G	The children enjoyed working with the alphabet and this were able to remember the letters in order from A to Z.	EN	I felt that they found it difficult to remember alphabetical order, but the teacher gave the children a game activity to do. The children engaged with this game, and it helped them learn alphabetical order. This helped them had better memory.
4	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	They had task to draw the mango and aero plane in the dot paper on the floor by individual.	INT	The children made drawing themselves	C	The children did the task on activity in working with alphabet	E	They learned alphabet from started A to Z end	EN	
5	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	The children played the alphabet toy (A-Z) on the floor. They moved and changed correction letter orders from mixed the letters in the classroom.	INT	Teacher made explaining the poster to write the alphabetical order in capital and small letters	T	They made it correction from some of mixed alphabet order. They worked individual	E	They must know in alphabetical order. And always use to practice and learning for letters order.	BM	
6												
7	18-Aug	Working with food literacy	India	The teacher downloaded videos and pictures and made PPT to show the children. He made each picture cards of food.	D	Teacher taught the children on this topic	T	Children acted matching picture and word card by themselves	E			This is why topic chose by the teacher taught them on real life daily. They learnt various names of things but not all know at all.
8	18-Aug	Working with food literacy	India	The teacher showed the children walked through the kitchen to show materials used by cooking, and food items.	INT	Children knew names of food that they signed and fingerspell in front of the classroom each. And they were also discussing their favorite food/sports names	CC	Many words cards of food are folded on the floor. Each child did dice to gat mention six and then she/he chose one card folded to open and he /she signed and fingerspelling in group	G	They identified various words of food. They practiced and remember food name lists	BM	
9												
10	Sept-18 Oct-18 Nov-18	Working with words literacy and sign language	India	Teacher found general pictures like things from internet	D	Teacher taught new signing with children learning	T	They were doing activities in some fun with new signs and fingerspelling by themselves with teacher	E	They acted doing new signs with fun and fingerspelling with the funny at the same time.	EN	
11	Sept-18 Oct-18 Nov-18	Working with words literacy and sign language	India	The teacher and children made drawing and word cards to stick on the wall.	CT	Group children worked to make drawing cartoon objects and words.	CC	Children were doing activities enjoyment on making posters.	G	Teacher and children get an idea to make visual pictures and words because they read it daily, so that they can get keep their memory with pictures	BM	The children need not only learn English words but need to learn both signed and English. They learn improve through visual materials game and activity. They also made material themselves, so that they seem like most enjoyment and learning at the same time and can have a better memory.
12	Sept-18 Oct-18 Nov-18	Working with words literacy and sign language	India	The drawn pictures was made by children who were visiting outside and all made pictures on the wall.	CT	Children were out of classroom because they learned in environment	C	They were doing activities in drawing pictures by themselves and each children did describe following the draw pictures.	E			
	Sept-18 Oct-18	Working with words literacy	India	Made alphabet letter cards and pictures using PPT by	T	All children had letter cards from A to Z by	C	All children searched to find correct words and signs when teacher showed the pictures	E	They liked playing with the	EN	

Table 4: Summary of all coded data

WHAT	number	**WHO**	number	**HOW**	number	**WHY**	number
CT	13	**C**	17	**E**	34	**BM**	20
D	11	**CC**	18	**G**	12	**EN**	18
INT	15	**T**	8			**SB**	5
T	10	**TC**	5				

The next step was to search through and sort the data. The Excel search and sort functions were used to sort and compile all data that were related to one of the codes, so that the data could be seen together as a group and generalisations could be made. Table 5 shows an example of how the data are displayed in Excel after grouping together all instances of the BM code under the WHY category. With such repeated sorting, I analysed and studied what happened in the classroom, using the codes. The same method was used to study all codes under each category in Excel.

Table 5: The Excel spreadsheet showing the codes under WHY after the data have been sorted for the BM code to look into the issue of 'better memory'.

	A	B	C	D	E	F	G	H	I	J	K	L
1	MCS	Topic	Country	WHAT	WHAT(code)	WHO	WHO (code)	HOW	HOW (code)	WHY	WHY (code)	Quotes
2	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	The older children fingerspelling and signed using poster on the wall which was names of body parts and vegetables	INT	Each child stand fingerspelling names in the front of the classroom	C	The children played the point to name of the children given by led child.	G	The children could be remembering their name students	BM	I felt that they find it difficult to take memory alphabetical order but teacher had given the children to do activity through the game. And children got engage through game and practice. They learnt it better.
3	July-18 Aug-18 Sept-18	Working with Alphabet, words, names literacy and sign language.	India	They had the alphabet toys from A to Z. They also wrote the papers given by giving the teacher	INT	Teacher made explaining the poster to write the alphabetical order in capital and small letters	T	They made it correction from some of mixed alphabet order. They worked individual	E	They must know in alphabetical order. And always use to practice and learning for letters order.	BM	
4	18-Aug	Working with food literacy	India	The visual pictures and real show things at kitchen to show the children	INT	Children knew names of food that they signed and fingerspell in front of the classroom each. And they were also discussing their favorite food/sports names	CC	Many words cards of food are folded on the floor. Each child did dice to get mention six and then she/he chose one card folded to open and he /she signed and fingerspelling in group	G	They identified various words of food. They practiced and remember food name lists	BM	
5	Sept-18 Oct-18 Nov-18	Working with words literacy and sign language	India	Teacher and children made drawing and word cards to stick on the wall.	CT	Group children worked to make drawing cartoon objects and words.	CC	Children were doing activities enjoyment on making posters.	G	Teacher and children get an idea to make visual pictures and words because they read it daily, so that they can get keep their memory with pictures	BM	
6	Sept-18 Oct-18 Nov-18	Working with words literacy and sign language	India	The drawn pictures and words was made by children and teacher like Apple, Ball, Car and Dog etc.	CT	Children had made some draw pictures to learn new signs and words by themselves	CC	There are many A to Z letters on the floor that each child picked all correct words to rush write on the blackboard when children showed the pictures.	E	They practically to find correct words and pictures by themselves with their remember words.	BM	
7	Oct-18	Working with improving knowledge on time rules and mathematics	India	The clock (time) made drawing the poster by the children	C	Teacher explained the meaning minutes and hours of clock on this topic	T	They did the match between numbers of minutes and hour cards in whole group.	G	They get know with memory challenge playing about the topic using game.	BM	The children learned the lesson topic to help improve their improve knowledge about time rule which is very useful. They seem enjoy and learn it well. Some of the children find it to difficult understand the lesson to face to face interaction several times. The teacher gave many activity method with the children are learning in the progress well.
	Oct-18	Working with improving knowledge on	India	The paper exercises downloaded from	INT			Teacher provided all papers out to the children doing their writing paper	E	Teacher knew their results help how to understand in teaching method for them. And then will more	BM	

This section has described how the data were sorted with Excel to support the analysis, using codes under each category (WHAT, WHO, HOW and WHY). This revealed in what ways and to what extent the use of visual materials such as pictures, videos, drawing, role-playing and creative materials was important for the learners. The next section sets out how visual materials can influence the students to learn and improve their knowledge and skills, and how the tutor and children can be more creative when working with the visual materials.

3 Visual materials: impact on human behaviour and psychology

This section discusses how visual materials impact on behaviour and psychology when students engage actively with creative materials while being supported by the tutor. The benefits of using visual materials have been reported by people working in countries of the Global South, which is particularly relevant because of similarities in terms of the relative lack of teaching resources. These people include researchers working with pre-school children in Kenya (Nyawinda 2015), secondary school pupils in Tanzania (Kazwa 2015), and learners in Pakistan (Shabiralyani et al. 2015).

Kazwa (2015) found that the teachers felt the use of visual materials had a positive impact on the students' ability to pay attention to texts, and that they performed well in exams when the materials were used. Similarly, the study by Shabiralyani et al. (2015) suggests that visual materials prompted more thinking and learning, and created a more pleasing environment in the classroom. Nyawinda (2015) reports that the use of visual materials influences motivation and achievement in learning activities, especially those related to numeracy skills, and enhances the learning processes of children. Where schools lack access to visual materials, there can be a negative impact on learning and achievement.

This section looks at the role of learners as (co-)creators of their own learning materials (3.1), the kinds of classroom interactions that we see when visual materials are used (3.2), and the evidence of engagement and enjoyment from visual materials in the data (3.3).

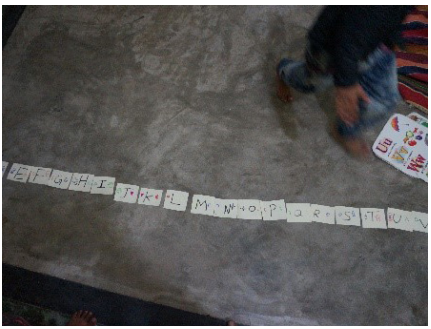
3.1 The effects of learner-created materials

The data from the MCS suggest that learner-created materials, including visual materials, can positively affect learners' confidence and skills. These could be creative visual materials made by the learners with guidance from the teacher. If the learners do not often create visual materials on their own, then they may not improve their confidence and skill, and this may limit their knowledge. Looking at the MCS, it appears that the learners found the visual materials to be interesting and supportive for developing their knowledge and understanding what is being taught in the lesson. There are many examples from MCS mentioned in this chapter that discuss these learner-created visual materials.

Some of the MCS in India and Uganda noted that the learners created the visual materials to help them to understand what the topic was. For example, the teacher and children cooperated to create materials on topics like animals and colours. The children worked on these through activities such as making posters to stick on the wall in the classroom with the support of the teacher (Sept-Oct-Nov18-India). They improved their knowledge with the help of the objects and visual materials. In another example, the children drew pictures on cards and wrote words on the other side such as *Apple*, *Ball*, *Dog* and *Car*. After this they learned new signs and words and discussed fingerspelling of the words in groups.

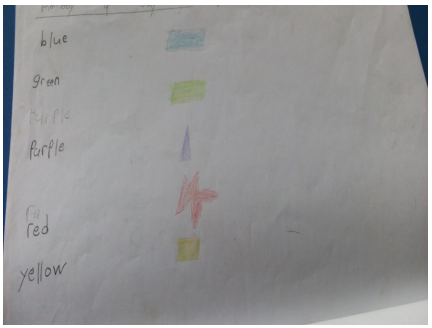
Another activity was to make A to Z letter cards. These cards were then mixed up and placed on the floor, and the children took turns choosing the correct letter corresponding to a picture shown by a classmate (e.g. 'D' for a picture of a dog). The children also created colour cards with words like *Red*, *Blue* and *Yellow* (Sept-Oct-Nov18-India). The MCS reveal that

they were able to create the materials themselves and work on their own with confidence. For example, in Uganda the children learned a lesson about colours. Some of the children drew and coloured in shapes and practised writing the names of the colours on the blackboard. And then some of their classmates supported them by correcting the words (Jul18-Uganda). Figure 1 shows some of these activities. Moreover, the students learned through being physically active in the class, moving around and writing on the board, rather than being seated the whole time (Oct18-India). The children were also able to enhance their comprehension of the 'time rules' topic by interacting with the teacher while making a clock face poster to stick on the classroom wall (see Figure 2).



The children chose the correct alphabet letters from a pile.

The children practised fingerspelling with each other and signing from a book.



In Uganda, the children drew various coloured shapes in this book.

Some children supported others by correcting the colour words on the whiteboard.

Figure 1: Children working with learning materials in India and Uganda

Figure 2: The children made a clock poster to place on the wall.

A particular benefit from doing such a task with materials is that the children appeared to feel proud of working on it themselves. The MCS mentioned that the children looked pleased with their work and gave each other applause for what they had produced. This suggests that they were building confidence through making and using the visual materials. The children's belief in their own abilities is known as 'self-efficacy' (Bandura 1997).

For the topic of numbers, the children had practised signing the numbers in sign language, and then they worked to make a long cartoon train to put on the numbers with guidance from the teacher (see Figure 3). The act of creating this, and having fun working together while doing so, helped them to improve their knowledge (Jan19-India). In another example, there were numbers placed on the stairs, so they threw a ball to the appropriate number when another child asked what the number was in sign language. This exercise used objects in a creative and fun way to help them get excited to learn and improve (Jan19-India). Zainuddin, Badioze Zaman, and Ahmad (2009) report that deaf learners have difficulties understanding complex subjects without visual materials due to their limited ability to read and write. They find that deaf students are more capable of understanding when they are using pictures and visual communication including sign language, fingerspelling, and drawing.

Figure 3: The children made a long cartoon train of numbers, and made drawings of numbers in sign language.

According to Rienties (2016), activities in which the students find satisfaction and happiness are those that enable them to learn well. This is supported by a quote from one of the MCS that 'the children wanted to draw the storybook because they loved the idea of creating different stories. This helped them make more creative stories to develop their skills in reading and writing' (Oct19-India and Nov-Dec19-India). This suggests that when the children are doing something that they want to do, this puts them in a frame of mind that is conducive to learning. It also helps them to remember the concepts they have learned.

The results showed some interesting differences between India and Uganda. Children in both countries loved to paint and act out stories, but in India, the deaf children liked to focus on the village environment and actually look around the village and base their materials on it, while in Uganda, the deaf children liked to focus on the culture of the school. The children in India spent more time on making the materials than those in Uganda, because the timetable in India was more flexible. The teacher in Uganda tried to adjust the timetable to allow more time for the children to enjoy making materials, playing games and learning outside the classroom.

In summary, the tutor reports and MCS data reveal that there were many visual materials created in class by the children with help from the teacher. The experience of creating these materials appears to have given the students more confidence and wellbeing. Another effect of the learner-created materials was that the students became more engaged in learning and gaining knowledge. Creating visual materials with the support of the tutors, often through working with the tutors, allowed them to not only learn more about the topics at hand, but also inspired more interaction and improvements in the children's communication

skills. The presentations that they gave to explain their drawings and stories also increased their sign language abilities.

3.2 Types of interactions between learners

It is important to look at the interaction that goes on when learners collaborate. The MCS mentioned that the learners interacted with each other in several ways such as by asking each other questions, playing games together, working together on a drawing or an exercise, and participating in discussions in pairs and small groups. Opportunities for interactions give students the chance to practise being supportive toward each other, and allow the teacher to model polite and cooperative behaviour. Shabiralyani et al. (2015) report that the use of materials stimulates interaction among the teacher and students by prompting more thinking and generating a pleasant and motivating learning environment. As mentioned above, they are excited to make visual materials and play games, and these activities result in positive interactions and collaboration between the teachers and children.

Some of the MCS comment on the children's discussions and cooperation within the group. For example, they worked together to choose cards from the floor and fingerspell the names of the different foods that were shown on the cards. They also shared their knowledge with each other to make lists of words for food and learn them all. When the teacher explained how to play a game, the children understood the game and followed the rules to play it well (Aug18-India). In another example, the teacher instructed them how to do word-matching activities, and they were very excited about these and good at choosing the correct word to match the picture that was shown. If they did not cooperate, then the learning would not proceed well in the classroom (Sept-Oct-Nov18-India).

One MCS from India mentioned that children could use visual materials to lead the group. The children watched and learned from a video about the times for breakfast, bath, lunch and dinner. Afterwards, an older student wanted to provide a quiz about time. She led the quiz, and she drew a clock on the whiteboard. She asked her fellow pupils about breakfast time, bath time and lunch time, and they pointed to the correct time on the clock on the whiteboard (see Figure 4). For example, what time do breakfast and lunch start? And what time does class start? The students all did the same exercise in turn. The older student was strongly confident and led the group to progress well. The peer group were very active in this question-and-answer interaction.

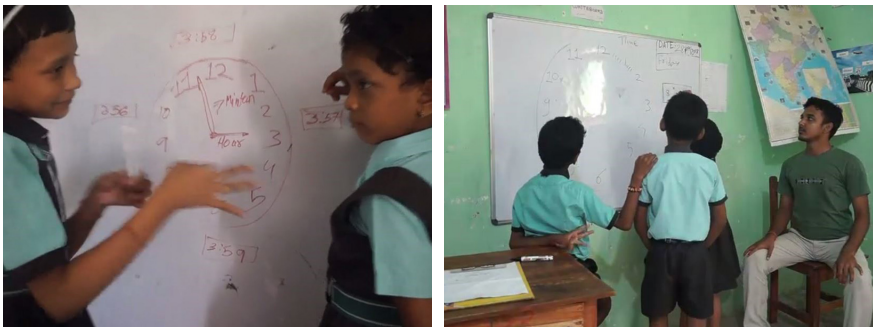


Figure 4: The children interacted with each other during the quiz about time.

Some of the MCS noted that a student interacted with the others by taking on the role of leader in relation to the topic. When one particular student showed a strong understanding of the topic, the tutor often gave this student the chance to lead the class in a discussion about the same topic while the tutor observed. The student would ask their fellow pupils some questions about the topic and give feedback on their answers. This increased the amount of learner interaction and helped the class understand the topic. For example, this happened with the aforementioned clock face and cartoon train activities, and the ball game in which numbers were placed on the stairs (Oct18-India and Jan19-India). These activities enabled the class to practise engaging in appropriate and polite social behaviour, such as taking turns, waiting in a queue, respecting group arrangements and remaining in their own group, and winning and/or accepting defeat gracefully. It appeared from the MCS that implementing these social behaviours led to faster progress in the class, greater interest in the topics, and increased motivation to learn.

Some of the MCS mention that the older children supported the learning of the younger ones, fostering a much better relationship between learners. For example, the teacher showed animal pictures to the children using PowerPoint. Some of older students already knew animals in sign language, and they taught new signs to the younger children as peer learning support. They also discussed new signs for animals using plastic animal toys (Feb19-India). In another example, the teacher encouraged the older children to tell stories. They shared and discussed various stories together and told the stories to the group. After that, they acted out the stories themselves in the front of the class (Oct19-India and Nov-Dec19-India).

One of the MCS (Oct18-India) mentioned that the teacher encouraged the children to make a film about the topic, which generated further

interaction. The children were able to explain timekeeping after the teacher gave a lesson on it. Some of the children signed on video about the facts and history of timekeeping, and they clearly explained the concepts around time, following the teacher's instruction. The teacher uploaded the video on the online platform that was used for collecting and sharing digital materials. The learning benefits from this activity are supported by a quote from the MCS: 'the children learned the lesson to help improve their knowledge about time rules which is very useful. They seemed to enjoy and learn it well. Some of the children found it difficult to understand the lesson, so the teacher did face to face interaction several times. The teacher gave many activities and used many methods with the children which helped them to progress well' (Oct18-India).

A particularly useful kind of classroom interaction is role-play in groups. In several of the MCS, it is noted that the children liked to engage in role-play in the classroom. The children enjoyed acting out stories themselves. For example, in Uganda, after being given prompts in sign language, some children performed actions using role-play while others wrote lists of action words on the blackboard. This idea encouraged the students to understand and remember the action verbs using sign language (Nov18-Uganda).

Role-playing can reinforce and interact with what is represented in visual materials such as picture books. Kingdon (2018) finds that role-playing supports both self-expression and self-development, and helps learners understand social behaviours and acquire cognitive, social, and emotional capacities. Role-playing can also generate opportunities for developing other skills like mathematics and literacy, for example because it gives them the chance to practise using new words and concepts in a meaningful context with support from visual materials (Van Oers 2013). According to the MCS, the children were excited to see the characters that they were role-playing also represented in the visual materials. Therefore it is not only the showing of picture books that seems to be important, but also the addition of acting and role-playing so that the children can better understand the meaning of a story or lesson. One of the MCS states that 'we would do a role-play to make learning interesting i.e. making the whole class take part in dramatic acting such as mom polishing kids' shoes, or kids brushing their teeth with each activity indicating the time i.e. breakfast at 8:00am. The children liked the acting so much that they started requesting it' (Oct18-Uganda).

3.3 Learner enjoyment and engagement through visual materials

It is apparent from the data that the use of visual materials supports the explanations given in sign language by the teacher, making the learners better able to understand the topic. This sub-section discusses the learners' enjoyment of and engagement with visual materials, and how the teachers encouraged them to get excited about learning through leading activities based on visual materials. These activities included working on and creating the materials themselves, playing games with the materials, and doing role-plays based on the materials. While making the materials, they learned about the topic of the lesson and improved their communication and literacy skills all at the same time. This had the effect of building their confidence, which in turn increased their enjoyment and engagement.

The following quotes from the MCS comment on learners' engagement and enjoyment:[3]

> The teacher was leading different activities in different ways to improve the children's learning. They learned English words and signs for colours through using **visual materials and interesting games**. There are many activities on colours and objects that help them remember it better. Practical activities are useful to the children to improve their memory of English words for colours.
>
> (Sept-Oct-Nov18-India)

> The children need to learn not only English words but need to learn both signs and English through visual materials, games and activities. They also made material themselves, **so that they can have fun and learn at the same time** and can have a better memory. The teacher provided various topics to the students using the exact materials. **They are eager to affect and improve their knowledge**. It is because they had less knowledge of animals before. In a different method, the students acted out roles in an activity with the support of the teacher, and they developed their knowledge.
>
> (Nov18-Feb19-India)

These examples illustrate how students engage in learning activities using visual materials. Three factors are important: Firstly, the children enjoy

3 The bold parts of the quote have been added by the author, to show where enjoyment has been pointed out in the MCS.

making the materials, and secondly, they play games with the materials. Third, the children create stories with guidance from the tutor.

The act of creating materials helps the learners enjoy the class. Children in our groups were often eager to prepare visual materials and enjoyed creating visual materials themselves. The MCS noted instances when the teacher and children made materials together to show another class what they had been learning. For example, the teacher in India found zoo stories in a book, but the children had never visited a zoo. After grasping the idea, the teacher and children decided to create animal masks using visual materials. They made many different ones like tiger, monkey and lion, etc. Then they role-played as animals for another classroom that they visited. They learned a lot from making the visual materials, working together and learning new signs. They were very interested in the zoo topic and in understanding better about the animals (Feb19-India).

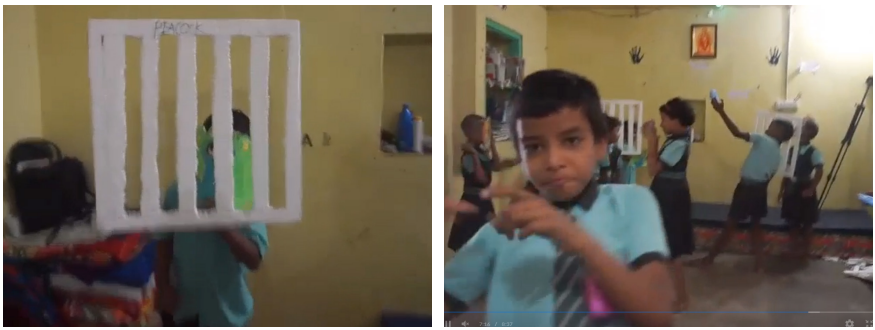


Figure 5: The children created animal masks with the tutor. They invited another classroom to enjoy a mock visit to the zoo.

The zoo example demonstrates how children interacted in interesting, creative ways with others and with the visual materials. Another learning opportunity arose when the teacher wanted to show the children what kinds of food are in the kitchen, so that they could understand foods like dal (lentils), rice, tea and wheat etc. The tutor taught them by showing them pictures of different foods, and then they fingerspelled their favorite food in front of the classroom. After this many cards with food items written on them were folded on the floor. Each child rolled dice to come up with the number of the card that the child should open, which revealed a food that the child then fingerspelled to the group. Each child did the same in turn (Aug18-India).

At times the activities were competitive rather than collaborative. In another example related to learning about clock time, the teacher held

a competition in which the children were divided into four groups to answer questions about clock time and write down each answer, e.g. 4.15 or 6.25, to match the clock time drawn on the whiteboard (Oct18-India). A different kind of activity began with a teacher showing the children the letters of the alphabet from A to Z using books. The teacher encouraged them to draw dot-to-dot pictures with alphabet letters, e.g. of a mango (see Figure 11 in section 4) and an aeroplane. They enjoyed this kind of activity. After that, the teacher encouraged them to decide to play an alphabet game. The students stood in a circle, and one student stood in the middle of the circle. He pointed at each of his peers in turn, asking them to fingerspell the next letter from the alphabet sequence. If they did not fingerspell the correct letter, then they were out of the game. The MCS confirms that the children were eager to join in the game (July18-Aug18-Sept-18-India).

In section 3.1, Figure 3 showed visual materials related to numbers, with drawings of number handshapes to put on the classroom wall. In addition, the children liked playing a number game in which they stood in a circle and threw a ball to each other in turn, while showing two or three numbers in sign language. One child stood in the middle of the circle and threw the ball to his/her peers, asking them to show three numbers in sign language (Jan19-India). The aim of this game was to teach students to quickly identify numbers, so that they could easily communicate about numbers in real-life contexts, e.g. in relation to costs in rupees or measurements of height or width.

In another game, the teacher showed the children various animal vocabulary words using picture books (Feb19-India). Then the teacher provided many plastic animals which were placed on the floor, so when a child signed DOG in sign language to a pair of players, the challenge was to pick up the toy animal quickly. The child who ran and picked up the toy animal first then fingerspelled its name. The children all took turns playing the same game. This game made them very enthusiastic about improving their signing. They also loved learning about different animals through pictures and videos on PowerPoint. The teacher and children discussed the animals and role-played as animals in a funny way. Learning and remembering the topic was enhanced because of all the different methods, activities and games supported by visual materials.

Some of the MCS mention that the teacher narrated stories, and encouraged the children to create their own stories. For example, in India the teacher made the stories more vivid using role-playing, so that the children could become engaged through the facial expressions. This helped them to understand the meaning of the different stories, and they

wanted to be told more stories (Oct19-India). In another example in India, the teacher encouraged the children to create stories themselves. The children drew and wrote their stories with the guidance from the tutor. Each child acted out the stories themselves, interacted with others using questions and answers linked to the stories, and engaged in role-playing the stories (Nov19-Dec19-India). Similarly, in Uganda the children read a picture story, and some of the students added their own ideas to it. Then paragraph by paragraph, they retold the story in writing individually. They were interested in creating stories by themselves (Nov18-Uganda).

One of the peer tutor reports (from Uganda) documents the teacher and children working together both inside and outside the classroom. The teacher gave a lesson on building houses, and told the well-known story of *The Three Little Pigs* to illustrate how to make strong house. The children enjoyed role-playing following pictures in the storybook with help from the teacher. In addition, the teacher introduced a practical activity of constructing a house with materials like clay, grass and water. The children were very eager to work and build a house outside the classroom (see Figure 6); this helped them to learn the different ways in which houses are constructed in real life. The children and teacher both enjoyed this activity, because it is not only useful for the classroom but has a meaningful application in real situations (June19-Uganda).

Figure 6: House building – learning activities inside and outside the classroom

4 Teaching and learning strategies with visual materials

This section discusses some pedagogical strategies based on visual materials that can be used with deaf learners to motivate them to learn and retain their learning. As we saw in the previous sections, the deaf learners in our groups could understand lessons through being supported with visual materials, which include pictures, videos, drawings and games.

In some of the peer tutor reports and MCS, the data suggest that better memory is one effect of visual materials being used. Learning through visual materials allows learners to store images in their memory; hence such learning activities tend to help students improve their recall (Kratzig & Arbuthnott 2006). There are also kinesthetic activities in teaching that may have an impact on learners' memory. Physically moving during play-based activities can improve children's attention, build their confidence and provide them with rich experiences of language use, which can all contribute to increased memory capacity (Tomlinson & Masuhara 2009). Moreover, these kinds of activities often support students' motivation by offering various combinations of modalities for information processing to cater for different learning styles (Kratzig & Arbuthnott 2006).

In sub-section 4.1, we first take a closer look at the role of teachers in creating and using visual materials in our learner groups. Sub-section 4.2 investigates possible links between visual materials and improved retention of learning.

4.1 The role of teachers in using visual materials

In this sub-section, I discuss various ways in which teachers have made use of visual materials in their activities with our learner groups. Nyawinda (2015) states that 'the central role of learning materials is to support teaching by making ideas and concepts clear and making learning interesting and vivid'. Hence the tutors also take responsibility for encouraging and helping the students on creative materials development. The tutor teaches them how to use the materials, and they learn to do activities with the materials to help improve their knowledge. The visual materials cause them to get engaged and enjoy being in the classroom, as they play games and move around. Previous research in various contexts has focused on how teachers manage the use of visual materials. Teachers' work with deaf learners in relation to visual materials has been investigated by Coskun, Tosun and Macaroglu (2009); Kuntze, Golos and Enns (2014); and Birinci and Sariçoban (2021).

Some of the MCS in India and Uganda document how teachers tried out a wide variety of ways of using visual materials. For example, the

teacher made a poster that explained capital and lowercase letters, and then the children made A to Z letter cards. The teacher showed the letters to the children in a mixed order, and asked them to put the letters in the correct alphabetic order. He also explained the different colours with support of visual materials through PowerPoint (July-Aug-Sept18-India). In another instance, the teacher taught them a lesson about food using pictures and videos on slides, along with picture and word cards of names of food items. The children matched the pictures with the word cards when one child signed the words (Aug18-India). In a further example, the teacher explained to the children the meaning of minutes and hours in the time lesson with the support of visual materials (Oct18-India). In Uganda, the teacher showed the different colours and asked the learners to fingerspell them if they knew the words. The children drew different shapes with the colours. The teacher explained types of diseases in pictures using PowerPoint and then the students wrote lists of diseases on the whiteboard together with the tutor (Mar19-Uganda). This cycle of 'explaining', 'showing', and 'asking' suggests that the teacher can build on the visual materials by using them as a foundation on which to test and add to the children's knowledge and understanding.

A MCS from India (Feb19-India) noted that the teacher encouraged the group of the youngest children to learn new signs to develop their sign language. For example, the teacher taught new signs for animals using picture books as visual materials. Some of the older students already knew signs for animals, and they explained them to the younger children as peer learning. The teacher acted out signing the animal as role-play, and the children identified plastic animal toys in the classroom. In another example, the teacher taught new signs to the younger children using pictures on PowerPoint of animals, chairs, a spoon, a drinking glass and a house. This was followed by telling jokes to make the students laugh in relation to the new signing and fingerspelling. Hence the children also had fun signing the new signs and fingerspelling words (Sept-Oct-Nov18-India).

Figure 7: Tutors showing PowerPoint slides and pictures for children to learn vocabulary and signs

The documentation in MCS-Feb19-India provides an example of how the teacher tried showing real objects to the children. The teacher explained how a fish lives and brought a fish bowl to show to the children, for them to understand about the life of a fish. He also provided craft materials like scissors, glue and rulers. The children then made their own fish with help from the teacher. The MCS includes this comment:

> This topic has enough different learning methods and activities for the students to improve their knowledge. They had little knowledge of animals before. The teacher explained how animals live and eat and provided stories relevant to animals. The students did a role-play activity with the support of the teacher. They had fun playing the game, and this boosted their learning so that they could remember the animals in sign language from the activity methods. They were outstanding on the lesson (Feb19-India).

Teachers need to use materials to engage the students when explaining new words, to help learners read, spell and write the words. Real objects provide meaning to help them quickly understand the concept that the word relates to (Siima 2011).

For some activities, teachers downloaded visual materials from the internet. For example, in India a clock time exercise handout was downloaded from the internet to provide to the class (see Figure 8), so that the children could each write on it individually (Oct18-India).

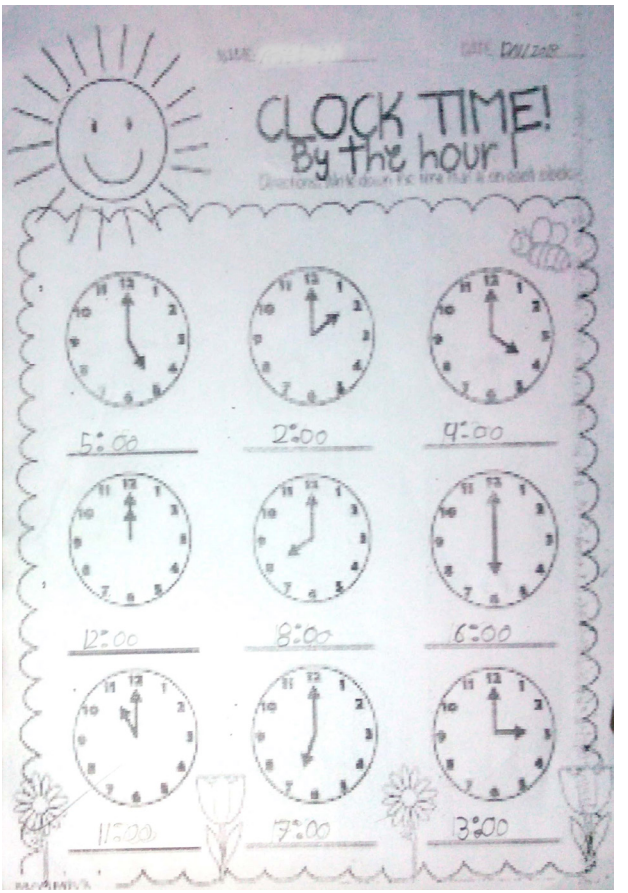


Figure 8: Clock exercise downloaded from the internet

In another example from Uganda (Mar19-Uganda), the tutor downloaded pictures of various kinds of diseases and showed them to the children to help them understand the types of disease. The children made a list of names of diseases to help them to learn and remember what the different kinds of diseases are (see Figure 9). The teacher explained the lesson and then found the picture materials from the internet with age-appropriate words for writing activities.

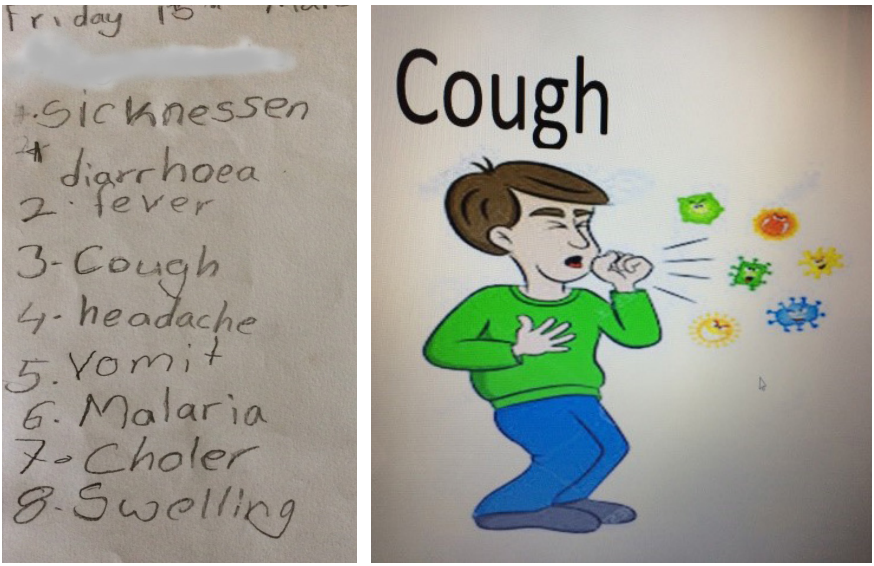


Figure 9: The tutor in Uganda explained various diseases through the slides, and the children wrote down lists with the names of diseases.

Some of the MCS from India and Uganda mention that the teacher encouraged the children to read stories together, so that the children could share and discuss together and think about the various stories. The teacher told stories to the children in sign language, and then asked them to express their stories to the class. They acted out the stories themselves in front of the class. Another approach was to give each child a book so that they could draw stories for their homework. They were supporting each other by sharing different parts of their stories as a peer group, and then they acted out the stories by doing role-playing in the class (Oct19-India and Nov-Dec19-India).

In one example from Uganda (see Figure 10) the teacher encouraged the children to read sentences from a picture book, discuss them in pairs and then sign the sentences to the class (Nov18-Uganda). The whole class then did a role-play of the story *Anna Goes to School* from start to end, too make it fun and interesting. For example, Anna and Dad rode a motorcycle, another motorcycle rider refused to take Anna and Dad to school, Anna had a brother at home, etc. The peer group participated in adding the characters themselves. The children were also given papers to practise writing from memory the sentences from the book (Nov18-Uganda).

Figure 10: The children read and wrote each sentence, and then did a role-play in the front of the class.

In another example, the children discussed as a peer group their learning of the English grammar patterns of *is* and *are*, e.g. whether *book* or *books* goes with *is* or *are*, guided by the tutor. After that, the tutor wrote sentences on the blackboard and the children filled in the blank spaces in the sentences related to *is* and *are* in English grammar (Feb19-India).

From the above discussion, we see that the teachers tried engaging the children in many different ways to help them improve their knowledge. If the teacher was always teaching in the same way, the students may not be interested in learning and may not improve. A change of activities seems to help retain the children's interest. If a teacher plans to teach the same topic again after a gap, s/he needs to plan to teach using a variety of activities, which can be supported by visual materials, as we see in a number of examples in this chapter. Teachers might think about how to use identical repetition, e.g. for routine learning such as the letters of the alphabet, and how to use modified repetition with diverse activities. Encouraging the students to develop and work with visual materials is a key responsibility of the teacher, because 'the effectiveness of the teaching and learning process depends on the excellence of the teacher in class which means that the teacher is the one who is responsible in ensuring and determining the success of their teaching and in ensuring that the students understand their lesson well' (Gilakjani 2012). In the case of our learner groups, the teachers often plan to teach new topics combined with using visual learning materials. However, the strict timetables of some schools could make it difficult for teachers to make these kinds of materials. The role of the schools in facilitating the creation of visual learning materials cannot be ignored, and might include for example providing art supplies, plenty of work space and display space (e.g. on walls), and computers with internet access and printers so that teachers can easily download images and generate handouts. It may also be necessary for schools to send their teachers to training courses to

better equip them to meet the needs of different age groups and levels of learning when exploiting visual materials.

4.2 Interaction of visual materials with repetition: improving memory and retention of learning

In many of the example learning activities discussed above, it is evident that diverse visual materials enable teachers to present the same content repeatedly in different ways. For instance, learning clock time involved constructing a clock face poster (Figure 2), doing a question-and-answer quiz using a clock drawn on the whiteboard (Figure 4), and playing competitive games about reading the clock.

Thalheimer (2006) and Baranov (2018) say that spaced repetition of learning over time makes people able to retain and remember content more successfully. Spaced repetition means that the same content is repeated but after a time gap rather than immediately. Using visual materials together with spaced repetition enables the deaf learners to store the information in their memory and improves their ability to recall the information. The link between spaced and modified repetition is very important for the children. In our learner groups, teachers taught various activities and provided exercises with visual materials by using modified and identical repetition. In modified repetition, the same content is re-introduced in a different way, and this can be an effective strategy. Many of the MCS mention that learners were doing different activities, which helped them remember content. For example, in India the children practised their fingerspelling with the support of older learners, and then they pointed out their peers whose names were fingerspelled in front of the classroom. In another session, the teacher gave plastic letters to the children and put the letters in alphabetic order. They then worked individually to correct the order of a mixed-up alphabet (July-Aug-Sept18-India). These activities represented different methods to repeat the content of the same lesson using visual materials, and this is an example of modified repetition. Accordingly, the MCS comments on memory: 'I felt that they find it difficult to memorise alphabetical order but the teacher had given the children an activity to do through the game. And the children got engaged through the game and practice. They had remembered better' (July-Aug-Sept18-India). Figure 11 shows a range of alphabet learning activities, each with different visual learning material.

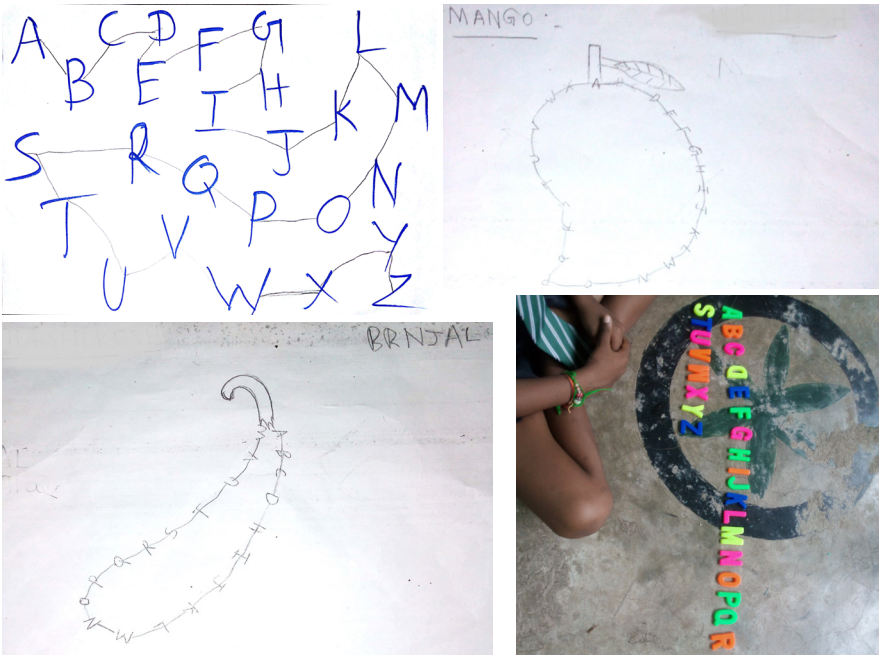


Figure 11: The children learned the alphabet through identical and modified repetition.

The present research suggests that spaced repetition, such as described in Kang (2016), benefits further from the use of a wide variety of activities involving diverse visual materials. A second benefit associated with visual materials is their permanence as a record of learned content. That is, visual learning materials can often be permanently displayed in and around the classroom. For example, in India the children made posters with object words such as animals, colours and objects to stick on the wall in the classroom. This means that they can re-read this daily during their leisure time (Sept-Oct-Nov18-India). The same potential is evident in many examples discussed in previous sections, such as the numbers train and the clock face poster in India, or the model house built with children in Uganda.

5 Conclusion

This chapter presented a discussion of the use of visual materials when teaching deaf learners, to examine what influence these have and how they can be designed and exploited in the classroom. The findings from the data showed that the learners are interested in participating actively

with the visual materials. They seemed to engage more in activities and receive more encouragement from the teacher when working with visual materials, and this appeared to help them to learn more effectively. Working with the materials also gave them a sense of achievement, and opened up opportunities for their interactions with each other as well as with the tutor.

In the data, there was a range of activities involving visual materials, including creating the materials, drawing, doing exercises, playing games, acting out stories, and watching videos. The study showed the children were very keen to make materials themselves, and an important role of the teachers was to closely work with the children to show them how to design their own materials. Featuring many visual posters, drawings and paintings on the walls of the classroom is also very important to stimulate visual learning for the children.

The use of visual materials provided opportunities for the teacher to encourage the children to learn together as a peer group, and create their materials together. The learners seemed to especially enjoy doing this when their teachers took responsibility for extracting learning from the activity, and provided guidance. The data also showed that the older children helped the younger children to learn as peer learning through making the materials. Importantly, the teachers need to have adequate space and time to prepare and plan for using the materials and interacting cooperatively with the children through sign language.

Using the visual materials has a positive influence on the learners' memory, especially when combined with spaced repetition. The teachers should be knowledgeable about how to apply an array of materials such as pictures, videos and real objects to the learning and teaching process in the classroom, to create opportunities for spaced repetition (Thalheimer 2006; Kang 2016; Baranov 2018). Learning is enhanced when the teacher knows how to use visual materials such as pictures, videos, maps, slides and real objects as tools to help make the lesson clearer and easier for the students (Shabiralyani et al. 2015). The deaf tutors needed to make sure the visual materials helped the children to engage in their learning, and one important way of ensuring this was by using materials that were developed by the deaf children and tutors themselves. Designing and producing visual materials, and drawing on them to support their learning, gave the children many opportunities for interaction with each other and with the tutor. The deaf tutors were able to provide clear guidance to them about using the materials. Being involved in making the materials and learning through interaction increased the children's confidence as well. They found that with some guidance from the tutor,

they could create visual learning materials themselves. These tangible products then became a source of pride for the children, as well as a means of improving their knowledge.

This research indicates that the deaf children could learn very well with the help of visual materials but this can be applied to hearing children as well because these materials are common at school. Visual materials are very important in building confidence and knowledge for all children, but the results showed that activities with visual materials led to enjoyment and supported learning and memory for deaf children in particular. Because these methods support deaf learners' attention, comprehension, and memory, they foster a feeling of rapid progress in the classroom which feeds into increased confidence and motivation to learn, forming a virtuous circle.

The schools need to provide the appropriate resources to support learning through visual materials. Teachers must know what kinds of materials to ask the children to make, to ensure that they are pitched at the right level of difficulty for the target age group of their pupils. The data showed that the children started working with basic-level materials and moved toward advanced materials with support from the teachers. The school timetable should be flexible enough so that the teachers are able to design effective and appropriate creative materials for their learners. The strict timetables of some schools make it very difficult for teachers to produce these kinds of materials. Schools can support teachers by offering more flexibility and providing resources such as books, posters, art supplies, computers with internet access for downloading pictures and videos, and facilities for printing handouts. Ample wall space is also required for displaying the visual materials. The data showed that the deaf children moved around a great deal while participating in the materials-based activities, so plenty of space in the classroom is also needed. The teachers are responsible for matching the materials to the needs of different age groups, so the school needs to support training for teachers on how to use visual materials to give them the skills and confidence to use this as a teaching method with children and adapt the method to a variety of ages and levels of learning.

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Appendix

PEER TUTOR REPORT

Partner: ……
Training centre: ……
Peer tutor: …….. Date: ……..

PART 1

Weekly teaching hours: _____ Total students: _____

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	Total attendance
Class attendance	P: A:	P: A:	P: A:	P: A:	P: A:
Comments on attendance					
Comments					

PART 2 SUMMARY OF TOPICS

RLE topics	Pictures (small size)	Comments
WEEK 1		
WEEK 2		
WEEK 3		
WEEK 4		

PART 3 SAMPLES

SAMPLES of what students learned, for the PORTFOLIOS
Each month (or after the end of a unit of lessons), please collect one or two samples of an activity or task the students did. This is so we can see what they have learned. If your class is not too big, please collect a sample from each student. If you have a big class, try to collect samples from 8–10 learners, not more. Please make sure that each month you collect samples from the SAME learners. This is so we can see how they have improved and learned more things.

SAMPLE 1

Topic:

Learner output: Please explain how students did the work that you chose from the portfolios. For example, did they work on their own, or in pairs or in groups? How long did it take them to prepare this sample? What do the students think or feel about their work? Did they like the task? Are they happy with their learning? Do they think they learned well? Do they feel they know how to do this task now?
Why did you choose this sample from the portfolio?

	Pictures of outputs	Files names from portfolio data	Comments about this sample
INDIVIDUAL WORK			
SMALL GROUP WORK			
WHOLE GROUP WORK			

SAMPLE 2

Topic:

Learner output:

	Pictures of outputs	Files names from portfolio data	Comments about this sample
INDIVIDUAL WORK			
SMALL GROUP WORK			
WHOLE GROUP WORK			

PART 4 Self-assessment of peer tutors	
What was positive for you?	
What was difficult for you?	
How did you work with others in the research team?	
Part 5 Feedback from students	
What did students enjoy?	
Questions about learners' progress:	
How did students feel about progress with English?	
How did students feel about progress with sign language?	
How did students feel about progress with other skills (computers, world knowledge, etc.)	

PICTURES

Paste pictures here in large size:
Please add pictures in a large size. These pictures really help us here in England to understand what you have done with the students. We also like pictures of the classroom and of the students working together. If you write on the blackboard, please also include a few example pictures of the blackboard.

Example of a completed micro-case study (MCS):

"Working with number literacy and sign language"

A. The learner group.

School: Happy Hands School for the Deaf, Odisha

Peer tutor: ……..

The activities with number literacy took ca. 1 month, and we did these activities in January 2019. At this time, the new children had been in school for 5–6 months (some children had joined the school later than others).

1.	Child name	(PF)	Age 6
2.	Child name	(PF)	Age 6
3.	Child name	(PF)	Age 6
4.	Child name	(PF)	Age 9
5.	Child name	(PF)	Age 7
6.	Child name	(PF)	Age 8
7.	Child name	(PF)	Age 7
8.	Child name	(PF)	Age 9
9.	Child name		Age 9
10.	Child name		Age 5

This group also includes two children who were already at the school for 1 year [child name & child name], and [child name], who had been in the school for 2 years. They were slower learners, so we placed them together with the new children.

B. The documentation

This micro-case study includes the following files:

– 1 peer tutor report: https://[link]
– Individual portfolios of 8 children, and videos of group activities

- Child name : 27 Photos, 7 videos
  https://[link]
- Child name : 24 Photos, 7 videos
  https://[link]
- Child name : 27 Photos, 7 videos
  https://[link]
- Child name : 25 Photos, 4 videos
  https://[link]
- Child name : 17 Photos, 4 videos
- Child name : 25 Photos, 5 videos
  https://[link]
- Child name : 24 Photos, 4 videos
  https://[link]
- Child name : 7 Photos, 4 videos
  https://[link]
- Group work : 8 videos
- Tutor explaining : 5 videos
  https://[link]

C. The topic.

I chose it myself and a Deaf volunteer chose some creative activities for a few sub-topics. They like different games and creative activities and these are very useful to them in their social life.

Creative activities helped them improve using their hands by cutting with scissors and coloring with colored pencils.

Different games helped them improve their physical skills, for example: A peer tutor and each child each signed a number (e.g. '6') and asked the children to go to the corresponding stair step (e.g. the sixth step). They also signed a number and asked the children to throw a ball at the number on the stair step.

Different exercises helped them understand abstract and logical concepts.

This topic was chosen to work with the children on developing sign language skills and reading and writing numbers. English was not included in this topic.

D. The sequence.

- The portfolios were made at the end.
- In a first activity on the topic, I tried to ask the children how many wooden spoons there were, which I gave them, and I found that some of them knew how to write the numbers, but most did not know how to identify the number forms and signs, including 6, 7, and 8.
  https://[link]
- Some videos on funny numbers concept from Google were downloaded for the children to learn.
  https://[link]
  https://[link]
- With my teaching support, each child practiced writing and counting holes related to numbers on the blackboard and also practiced it with a caretaker's teaching during evening homework. They also learnt to count numbers on the long board created by the children and me in order to improve knowledge regarding the number system.
  https://[link]
- The new children were encouraged to be creative by cutting and coloring material with the older children and my support before learning how many balls related to each number on a long board showing a cartoon train. (It took 2 days to make the train.)
  https://[link]

https://[link]
https://[link]
https://[link]
https://[link]
https://[link]

- I wrote numbers which the children were interested in printing on the stairs they are used to walking up and down daily before learning a funny game.
  https://[link]
- They asked each other to point out each number on the stairs and then threw a ball if they knew the numbers in order to improve their throwing skills. Some of them learnt easily from their classmates who knew how to throw it properly.
- Then the younger children learnt number signs with objects on the lamination papers which three of the older children drew with a small amount of my support.
  https://[link]
- The volunteer guided the children to play some different games related to some sub-topics.
  https://[link]
  https://[link]
  https://[link]
  https://[link]
  https://[link]
- I gave each child a mathematical book containing more exercises on numbers which helps them learn concepts.
  https://[link]
  https://[link]
  https://[link]
  https://[link]
  https://[link]
  https://[link]
- Following the colored numbers they matched to the same numbers in the pictures, they colored the pictures themselves in order to improve their logic.
  https://[link]
  https://[link]
  https://[link]
- In an interesting mathematical game, they asked each other to find numbers in the complex mixed number circle while presenting so that they can get used to signing complex numbers and reading

number signs. The interaction is important as well as the searching in the number circle and both help to expand their minds.
https://[link]

- Another game was to sign a number, and a second child had to jump on the correct number drawn on the floor after learning number order on floor while jumping.
https://[link]
https://[link]
- A maths teacher taught them the topic during class and a caretaker taught it to them during evening homework every day for a few months.

E. The observations.

The strong learners could remember the order of numbers from 1–100; however, the youngest children found it a bit impossible to remember the order. Hence I did not need to focus on this with them again, but only let them learn number signs and read their peers' number signs so that they could understand both easily in the games and activities.

The strong learners could complete all the games and exercises; however the younger and weaker learners missed some as they were not ready to learn them yet.

I helped those who seemed ready to understand it and the older children also sometimes enjoyed teaching our young children.

[Names of four children] are very confident. [Names of three children] were struggling a bit; however, three of the youngest learners are a bit confident in number signs and number signs reading.

Another mathematical teacher already taught them; however, they could not understand the concepts completely.

So the topic was a great step for the P2P class. The strong learners had learnt the concepts of number, number signs, reading numbers, and number order as well as physical skills and hand-eye coordination.

I explained each activity in the practice books, and some children first struggled to understand but with repetition, they understood it better. At the end, they could do exercises in books without much explanation.

The physical games like jumping and throwing on the stairs were easier for the children to understand. I explained the activity, and if a younger child did not understand, he/she could watch the other children and then copy what they were doing.

The young children had learnt the concept of basic number, number signs and number sign reading as well as physical skills.

Deaf teachers' sequencing of multiliteracies skills in the classroom

Noah Ahereza

1 Introduction

This chapter seeks to show how deaf teachers sequenced multiliteracies skills during classroom work with deaf primary school children in India and Uganda. This work is an outcome of a three-year research project entitled 'Peer-to-Peer Deaf Multiliteracies (P2PDM): Research into a sustainable approach to the education of deaf children and young adults in the Global South' that was undertaken in India, Uganda and Ghana with outreach work in Nepal and Burundi (see Zeshan & Webster, this volume). The project was headed by the University of Central Lancashire in the United Kingdom and focused on 'multiliteracies', which means the multiple and multimodal instantiations of literacy-related practices, for example reading, writing, signing, gesturing, drawing, typing, using emojis, and editing videos. By engaging deaf learners in everyday literacies, the research was intended to inform a 'real-life' curriculum and methods that match deaf learners' skills and practices, and develop more effective ways of measuring their literacy gains. While sign language is often the primary mode of communication amongst deaf learners, very few teachers can sign, which means that deaf children have poor access to education through sign language. Because of this, the project employed deaf peer tutors who are fluent signers, so that all learning activities could take place through sign language.

The data were collected from peer tutors' reports, micro-case studies, and learners' portfolios. These sources highlighted the lesson content, teaching methods, learning activities and materials, and the outputs of the learners. For this chapter, the data from groups of primary school children in Uganda and in India were analysed with attention to the following question: 'How do deaf teachers sequence multiliteracies skills in the classroom, and with what frequency do they exploit these different skills during classroom activities?

By exploring the everyday learning experiences of deaf sign language users in multiple modalities, the chapter highlights how different skills were sequenced and emerged at different levels/time intervals of teaching and learning, and the reasons for certain sequencing decisions. This helps bring to light the flow of lessons and the logic behind the

sequencing of skills and their co-occurrences that could be the basis for the future teaching of deaf children. For example, the data show that writing was the skill most frequently targeted in the classroom, followed by fingerspelling. In contrast with writing, drawing and acting emerged as lead-in activities, preceding a more difficult task like reading or writing. On the other hand, fingerspelling was often used as the first skill on its own, possibly because of its role as a bridge between sign language and other skills. Unlike writing, which is consciously employed as a target skill for learning, fingerspelling can be said to be a supporting skill. Documenting such patterns is valuable for improving pedagogical practice with deaf children because considering these results can enable teachers to become more aware of how literacies in multiple languages and modalities can build on each other to foster learning.

The next section examines the details of the method such as how data were collected (2.1), organised and analysed (2.2). Then, section 3 explores the findings on the skills and their interactions with each other, including the patterns of skill sequencing (3.1), and the co-occurrence of skills together (3.2). Section 4 offers an explanation of these patterns, which involves grouping skills according to modality. Finally, section 5 considers the implications of the research.

2 Data

2.1 Details of data collection

The first activity of this work was the identification and collection of relevant and specific data that could shed light on the research question. A range of data from participants in two of the project countries (Uganda and India) were used. The participants were the peer tutors and their young learners, who were aged between 5 and 10 (see Table 1). As shown in Table 2, the data were collected from 12 peer tutors' (PT) reports and eight micro-case studies (MCS).

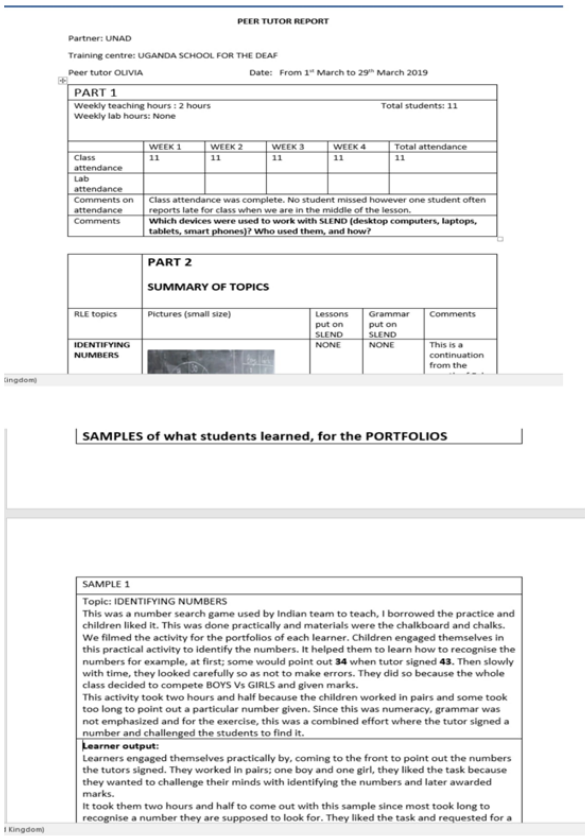
Table 1: Participants and data sources

Country	Number of learners	Number of peer tutors	Source of data
India	13	2	PT reports, MCS and learners' portfolios
Uganda	11	1	PT reports, MCS and learners' portfolios

The PT reports describe the events that took place in the classroom, and reveal the lessons' structure, topic, activities, methodologies, materials, and duration, along with the learners' output and the tutors' commentary or observations. For each month of classes, each peer tutor produced a report and shared it with the other members of the project team through their online platform. Figure 1 shows a two-page extract from a PT report.

Table 2: Data summary

Country	Number of PT reports	Number of MCS
India	7	2
Uganda	5	6
Total	12	8



PEER TUTOR REPORT

Partner: UNAD

Training centre: UGANDA SCHOOL FOR THE DEAF

Peer tutor OLIVIA Date: From 1st March to 29th March 2019

PART 1

Weekly teaching hours : 2 hours Total students: 11
Weekly lab hours: None

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	Total attendance
Class attendance	11	11	11	11	11
Lab attendance					
Comments on attendance	Class attendance was complete. No student missed however one student often reports late for class when we are in the middle of the lesson.				
Comments	**Which devices were used to work with SLEND (desktop computers, laptops, tablets, smart phones)? Who used them, and how?**				

PART 2

SUMMARY OF TOPICS

RLE topics	Pictures (small size)	Lessons put on SLEND	Grammar put on SLEND	Comments
IDENTIFYING NUMBERS		NONE	NONE	This is a continuation from the

SAMPLES of what students learned, for the PORTFOLIOS

SAMPLE 1

Topic: IDENTIFYING NUMBERS

This was a number search game used by Indian team to teach, I borrowed the practice and children liked it. This was done practically and materials were the chalkboard and chalks. We filmed the activity for the portfolios of each learner. Children engaged themselves in this practical activity to identify the numbers. It helped them to learn how to recognise the numbers for example, at first; some would point out **34** when tutor signed **43**. Then slowly with time, they looked carefully so as not to make errors. They did so because the whole class decided to compete BOYS Vs GIRLS and given marks.

This activity took two hours and half because the children worked in pairs and some took too long to point out a particular number given. Since this was numeracy, grammar was not emphasized and for the exercise, this was a combined effort where the tutor signed a number and challenged the students to find it.

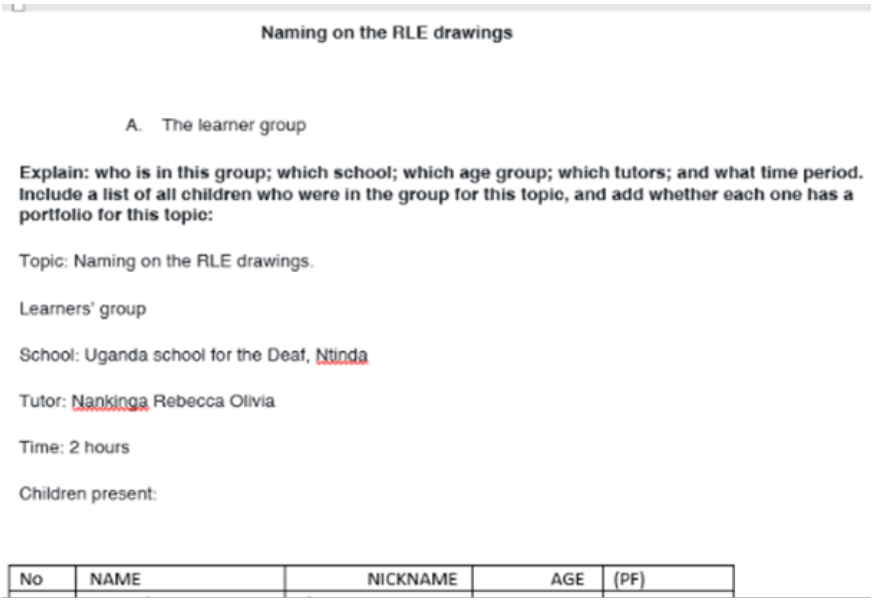
Learner output:

Learners engaged themselves practically by, coming to the front to point out the numbers the tutors signed. They worked in pairs; one boy and one girl, they liked the task because they wanted to challenge their minds with identifying the numbers and later awarded marks.

It took them two hours and half to come out with this sample since most took long to recognise a number they are supposed to look for. They liked the task and requested for a

Figure 1: Extract from a peer tutor report

The MCS are documents written by the peer tutors and research assistants that link together their reports, the learners' portfolios, and other relevant files, and explain in more detail what happened in the classroom and the decisions that they made (see Webster & McEwan 2021). These documents cover, for example, the identification and pre-planning of topics by tutors and/or learners, the sequence of activities during the lesson, descriptions of the learners' work, the tutors' observations of the learners' comprehension, the challenges that learners experienced, and proposed adjustments to improve the teaching and learning. Figure 2 shows an excerpt from a MCS.



Naming on the RLE drawings

A. The learner group

Explain: who is in this group; which school; which age group; which tutors; and what time period. Include a list of all children who were in the group for this topic, and add whether each one has a portfolio for this topic:

Topic: Naming on the RLE drawings.

Learners' group

School: Uganda school for the Deaf, Ntinda

Tutor: Nankinga Rebecca Olivia

Time: 2 hours

Children present:

No	NAME	NICKNAME	AGE	(PF)

Figure 2: Excerpt from a micro-case study

Along with the PT reports and MCS, the third source of relevant data is the learners' portfolios, which are comprised of the outputs they produced in the classroom such as written text, drawings, stories and role-plays. The learners were required to present their work while being filmed, so the portfolios include image files and PDFs as well as video clips. These were arranged in folders on a file-sharing platform called 'Box' according to school and file type and used by the peer tutors and research assistants as a reference while writing the PT reports and MCS. Figures 3 and 4 show examples of learners' output from two portfolios.

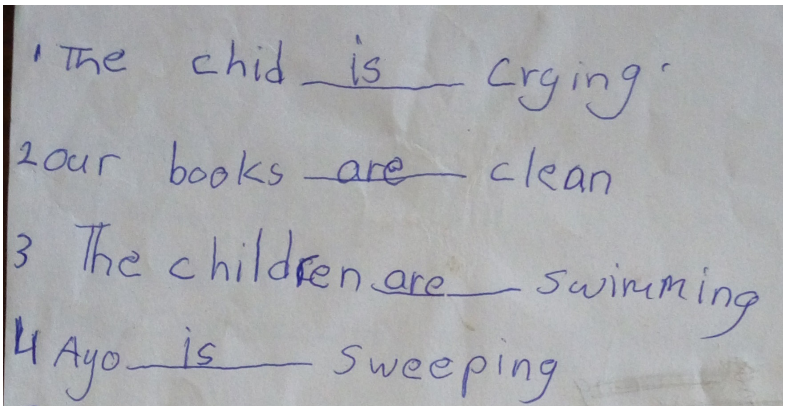


Figure 3: Output from a Ugandan learner's portfolio

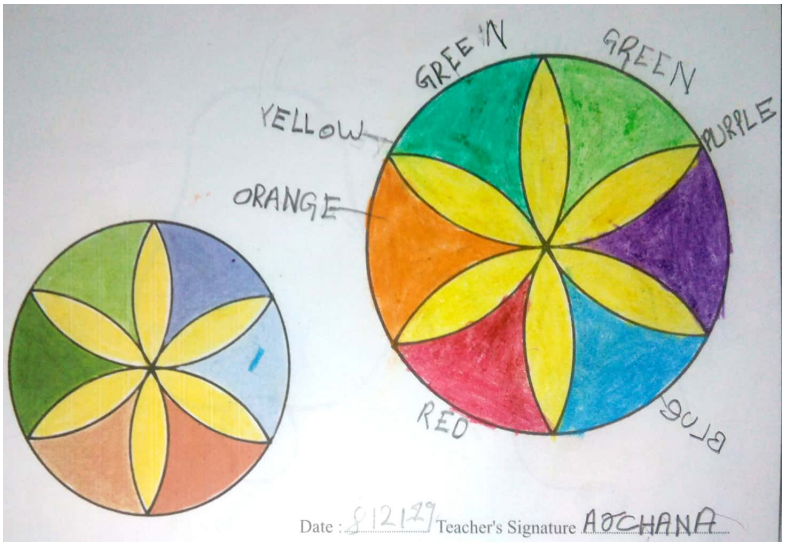


Figure 4: Output from an Indian learner's portfolio

2.2 Organisation of data

The data were organised to facilitate the analysis based on the interaction between the modalities and languages of the eight skills around which the classroom activities were designed. These skills are fingerspelling, reading, drawing, writing, acting, digital literacy, numeracy in writing, and numeracy in signing.[1]

1 Ultimately, the analysis did not include examples of digital literacy, so this skill is absent from the data tables in this chapter.

Coding data helps the researcher classify the different skills under investigation in order to organise and interpret them during the analysis. The data from the files on Box discussed in sub-section 2.1 were entered into an Excel spreadsheet and organised into a set of meaningful, cohesive categories with codes (see Figure 5). The codes were designed to make it easier to filter the specific data on the different skills. The main categories for data coding were WHAT, WHO, and HOW.

The WHAT category means the activity that took place in class, e.g. learners drawing and colouring a house and naming parts of it by writing corresponding words such as *roof*. Data entries are in the form of short text descriptions of the learning activity. The WHO category represents the people involved in the particular activity, e.g. the learners, the tutor, or both. There is an associated data column WHO(CD) with a code for each option in this category, e.g. TLCH for 'tutor and learners/children'. The HOW column provides some further explanation of the activity by emphasising the sequence of events, i.e. what took place first, next and last, as well as mentioning specific skills that were taught or practised during the lesson.

Figure 5: Extract from the Excel spreadsheet showing some of the coded data (with columns from A to W)

In addition to the basic HOW column, there are several sub-codes for categorising the learning event. The code HOW(A) represents the steps taken to teach or practise the given skills, that is, whether one skill was taught before another (sequential, SEQ) or several skills were active simultaneously (SIM). The next two coding columns represent the number of languages used: HOW(B) is for when sign language was used alongside written English (i.e. a bilingual approach), and HOW(C) is for when only one language was used (i.e. a monolingual approach). Similarly, HOW(D) is for bimodality and HOW(E) is for monomodality (see section 4 for a detailed discussion on the bi-/monolingual and bi-/monomodal distinctions).

Furthermore, the 'Topic' column indicates the actual topic that was the centre of the learners' focus and discussion. For example, during the topic 'My house', learners would engage in different activities such as drawing a house, colouring it, signing different parts of the house and then writing the English words for them, e.g. *door* and *window*.

The central part of the Excel spreadsheet is dedicated to entering the skills that were in evidence in each learning session, with columns from Skill A to Skill H, each recording a different skill. The entries in these columns also show the order in which skills appeared in each session. For instance, Fingerspelling1 and Drawing2 means that the activity started with fingerspelling first and then moved on to drawing. For example, children may be asked to fingerspell any colour words they know, and then be given a colouring-in activity. By contrast, Fingerspelling1A and Drawing1B would mean that both activities were combined together at the same time, for instance by showing a coloured object and practising fingerspelling it at the same time, then moving on to the next colour.

At the time of data coding, sign language was not recorded as a skill in its own right on the spreadsheet because as the medium of instruction, signing is always present by default in the classroom, and developing sign language skills is a continuous process. However, it was recognised in the course of the analysis that particular sign language skills can also be an explicit learning target, for example when learning to sign numbers. This dual status of sign language is discussed further in sections 3 and 4.

The spreadsheet also has two other important columns, one to cater for quotes and another to cater for comments. The former is for recording quotes from the PT reports and MCS about the learners' progress and outputs; the latter is for independent observations by the research assistants on the activities. The data were categorised according to country, with the dates of the activities and the type of the data source clearly noted for easy reference while carrying out the analysis.

After the skills were identified from within the data sources, and distributed and coded in the Excel spreadsheet, the skill patterns were analysed to determine their co-occurrence and sequencing, which is described in the next section.

3 Skills and their interactions

As mentioned in sub-section 2.2, 'skills' are the particular set of competencies that learners were required to master throughout the classroom activities. These are fingerspelling, reading, drawing, writing, acting, numeracy in writing, and numeracy in signing. Fingerspelling is a manual system in which 26 signs represent the letters of the English alphabet and are articulated sequentially to spell out English words. This system is one-handed in Uganda and two-handed in India. The fingerspelled letters are comprehended visually and learners used them while reading or when indicating a particular word for a concept they did not know how to sign. Writing means transcribing individual letters and then full English words on paper or on the blackboard, while reading refers to comprehending a given written word, sentence or story.

Drawing involves learners sketching and sometimes colouring in images such as a house, animal, or plant, either on their own or with the guidance of teachers. Acting is mostly about portraying characters in a story; for example, in a story featuring animals, the learners mimic the actions of animals using exaggerated gestures and body movements. Numeracy in writing means transcribing numbers on paper or the blackboard, while numeracy in signing means articulating the numbers using either Ugandan Sign Language or Indian Sign Language. These skills are the basis of investigating the sequencing of multiliteracies skills by deaf teachers.

Two kinds of interactions between the skills are discussed in this section. Sub-section 3.1 looks at where a particular skill occurred in a sequence of activities and with what frequency, noting for example whether some skills are more likely to appear as lead-in activities at the beginning of learning sessions while other skills appear later on. Then sub-section 3.2 explains how skills were combined with each other, that is, skills co-occurring within one and the same learning activity.

3.1 Patterns of skill sequencing in the data

This section describes skill sequencing patterns. 'Sequencing' refers to the process by which the learning session moves from one skill to the next. Table 3 shows the skill sequencing patterns found in the data, indicating

the numbers of occurrences of the different skills at various places in the teaching sequence.

As described in section 1, this research targets the sequencing of multiliteracies skills through teaching conducted with sign language as the medium of instruction. Because sign language was always actively used both as a skill being learned and as a medium of instruction, sign language is envisaged as the beginning of the process and considered to be 'skill zero'; therefore, it is not included as a sequenced skill in this section. However, sign language is discussed as an explicit learning target in section 4.

Table 3: Skill sequencing found in the data

Skill	Appearing as first skill (with another skill)	Appearing as second skill (with another skill)	Appearing as third or fourth skill	Total number of occurrences
Fingerspelling	22 (5)	19 (7)	2	43
Reading	16 (4)	6 (3)	4	26
Drawing	13 (1)	5 (1)	1	19
Writing	15 (4)	24 (7)	6	45
Acting	13 (7)	2 (2)	1	16
Numeracy in writing	2 (2)	5 (4)	0	7
Numeracy in signing	0	3 (3)	3	6

Table 3 reveals the frequencies with which skills appeared as first or second or further skill in a learning sequence, and it is assumed that all skills are introduced by explanation in sign language, which also precedes the listed first skills. The table shows the total occurrences of each skill in each position, with a second figure in brackets that indicates how many times the skill occurred simultaneously with another skill rather than on its own. For example, fingerspelling occurred 22 times as the first skill, and for five of these instances, another skill was involved at the same time. This means that there were 17 times when fingerspelling appeared as the first skill alone with no other simultaneously accompanying skill.

Out of the seven skills in the table, writing is the most frequent with 45 occurrences, followed by fingerspelling with 43. This could be attributed to the tendency for teachers to think of writing as a vital target skill that is integral to sign bilingualism, which aims for a balance between written English and signing fluency. In most of the occurrences of writing in the data, the children were engaged in expressing in written English what was signed, fingerspelled, drawn, related in a storybook or acted out in a role-play, because the teachers used other activities to lead into writing. Hence, writing was used more often as a second skill (24 times), and less often as a first skill (15 times).

In contrast with writing, drawing and acting were more likely to be exploited as lead-in activities. This is evident from the data, as both drawing and acting appear as first skills 13 times, while their use as second or further activity is much less frequent (6 times for drawing and 3 times for acting). For example, before asking the children to read the English text in a storybook or write short sentences from it, teachers often started by telling children the story through the use of pictures in the book and thereafter guiding the children to act and perform a role-play depicting different characters in the story.

It is also observed in the MCS and PT reports that drawing is an effective way for children to prepare to construct written or signed stories. For example, when the children constructed sentences using verbs based on a clock activity wherein they described their daily routine (e.g. 'I wake up in the morning and have a wash'), they first drew pictures of themselves doing these things (see also Manavalamamuni, this volume, about learning activities involving clock time). The pictures illustrated the steps of events or activities which the children then used as a basis for writing short stories or signing what happened.

On the other hand, fingerspelling was frequently used as the first skill, possibly because of its role as a bridge between sign language and other skills. Unlike writing, which is consciously employed as a target skill for learning, fingerspelling can be said to be a supporting skill. Fingerspelling is frequent as a first skill, both on its own and along with other skills, but it also appears often as a second skill. It is typically the first basic literacy-related skill that deaf children learn, and the data suggest that this group of learners was no exception. As well as happening on its own, fingerspelling is used in conjunction with writing and reading, sometimes as a deliberate technique that deaf children use for reading. Fingerspelling often precedes writing in the data; in some cases, this is because children are working in pairs and one fingerspells a word while another watches and writes it down, or the teacher fingerspells a word

which all of the children are then expected to write. Fingerspelling is more closely connected to 'skill zero', i.e. sign language, than the other skills are. This is seen for instance in the children's tendencies to use fingerspelling as a bridge between sign language and reading. In other cases, children fingerspell words and concepts that they cannot sign. Because of its multiple uses, fingerspelling has a high number of total occurrences.

In contrast, numeracy in writing and numeracy in signing are the least frequent skills, with seven and six occurrences respectively. These two skills were seldom taught first in the sequence because the teachers did not tend to use numerals as an independent topic. Rather, as revealed by the MCS and PT reports, they usually discussed numerals as an extension of another topic, such as food items that are counted and/or given numerical weights at the market.

However, the sequencing pattern for reading is a bit harder to understand. Reading would perhaps be expected to appear most often as a second skill, but in the data this is not the case. A possible reason for this is that reading may have been happening along with the signing (as a first skill). This is difficult to verify, because signing was taken for granted as 'skill zero' and not coded in the main Excel data. Nonetheless, what is seen is that reading often occurs adjacent to writing and to some extent fingerspelling. This could be attributed to the inter-linked nature of reading and writing, e.g. requiring children to write sentences based on the stories they have read, or to read what they have written and fingerspell or sign it.

Figure 6 illustrates a generalised teaching and learning sequence that is evident in much of the data. The teaching process begins with the teachers using sign language as the medium of instruction to explain and introduce activities. They then choose a lead-in activity like drawing or acting in order to progress toward more difficult target activities such as writing. Teachers also use fingerspelling as a bridge across the whole pathway of learning.

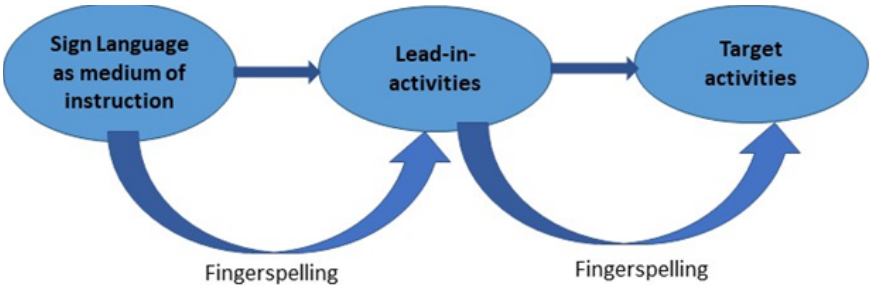


Figure 6: The learning process

The lead-in activities such as acting and drawing are considered as easier skills. This could have been due to the fact that these skills carry transparent visual components that are easier for deaf learners to recognise compared to writing and reading which are more abstract and complex skills. According to Sturm and Koppenhaver (2000, cited in Malik & ud Din 2019), written composition requires a complex thinking process that must integrate multiple components including the topic, theme, structure, word choice, and grammar. Similarly, it was observed in the P2PDM project through teachers' observations and learners' output that writing was the most difficult of the skills, so it is perhaps unsurprising that it is often preceded by other skills. In instances where writing appears with another skill, this is most likely to be fingerspelling or reading. Reading and writing do often occur together (see the co-occurrence data in sub-section 3.2), probably because both involve the same modality and because writing automatically involves reading, i.e. children generally read what they are writing as they are writing.

3.2 Co-occurrence of skills

Table 4 presents the co-occurrence patterns found in the data. This includes all co-occurrences of skills within the same learning session, irrespective of whether they co-occurred simultaneously or sequentially. This is different from the data in Table 3 (that is, the figures in brackets), which only include skills co-occurring simultaneously. In terms of the Excel data as shown in Figure 5 above, co-occurring skills in this section are defined as those occupying the same data row.

It is evident from the distribution that certain skills tend to co-occur frequently whereas others do not co-occur at all. For example, numeracy in writing and numeracy in signing tended to occur together because in the classroom context, numbers that are signed often need to be written down, and vice versa. It will be observed in section 4 that some of this patterning can be explained if we group skills in terms of modalities.

Table 4: Co-occurrence of skills in the data

Skill	Finger-spelling	Reading	Drawing	Writing	Acting	Numeracy in writing	Numeracy in signing	Total
Finger-spelling		15	6	27	11	2	2	63
Reading	15		3	17	6	0	1	42
Drawing	6	3		4	2	3	2	20
Writing	27	17	4		5	3	2	58
Acting	11	6	2	5		0	1	25
Numeracy in writing	2	0	3	3	0		5	13
Numeracy in signing	2	1	2	2	1	5		13

An interesting observation in Table 4 is that drawing occurred relatively rarely with other skills. Table 3 in sub-section 3.1 shows that drawing usually came first rather than second or third in a learning sequence, and that apart from one instance, it always occurred on its own. This could be because drawing was being used as a way to engage children visually with a concept and prepare them for reading or writing. Although the teacher's ultimate goal is typically building the children's literacy and numeracy, rather than increasing their drawing skills per se, in the data drawing did not often co-occur with other skills. This may be attributable to the tendency for drawing to require a child's full visual attention and dexterity, making it quite difficult to engage with other skills at the same time. When children have trouble comprehending new concepts, drawing can be deployed as a start-up activity to help them visualise the concepts and become actively engaged in the learning.

Reading also occurred frequently as a first skill according to Table 3, mostly on its own rather than being accompanied simultaneously by another skill. However, Table 4 reveals that a very common skill co-occurring in the same learning session with reading was fingerspelling. This may be because children often express what they are reading through fingerspelling, especially when they do not know the actual signs of the words being read. In other cases, while reading and asking questions in pairs, the children were often required to fingerspell a vocabulary word that they had read, so that their partners could write it down or sign it. This created instances where reading and fingerspelling happened

together sequentially. In fact, fingerspelling, reading and writing all have strong co-occurrence patterns with each other.

When reading co-occurred with acting, this was mostly related to storytelling; the children typically read from storybooks and engaged in role-plays wherein they acted out the events in the story. The role-playing happened often after the first attempt at reading a particular story, and then the children made a second attempt to check whether the text was in conformity with what they enacted. For example, the Ugandan learners read the storybook *Anna goes to school* (Lutalo-Kiingi & De Clerck 2018), which is about a young deaf girl attending school for the first time. After their first attempt at reading it, some of the children formed a group and took turns acting out the roles of the characters, most of whom are depicted in the book as using Ugandan Sign Language. These children then performed the play in front of their classmates, who consequently gained a better understanding of the events, chronology, and meaning of the story (see Figure 7).

Figure 7: Ugandan learners performing a role-play based on *Anna goes to school* (Lutalo-Kiingi & De Clerck 2018)

In this case, acting through sign language appears to reinforce reading comprehension and strengthen memory. By role-playing the events in the story, the children were able to demonstrate what they understood from the reading, and also show what they did not understand so that the teacher could guide them appropriately to correct the mistakes or fill the gaps. Children cannot usually engage in acting simultaneously with reading or writing, however, because these skills require working with paper-based materials. But sign language combines very well with acting and can combine with fingerspelling too, because all three of these skills

are in the same modality that is referred to below in section 4 as visual-gestural. This suggests that acting through sign language and using the body's movements to elicit visual attention and visualisation of concepts can make a significant contribution to children's comprehension of a story or topic.

4 Modalities and languages in multiliteracies skills

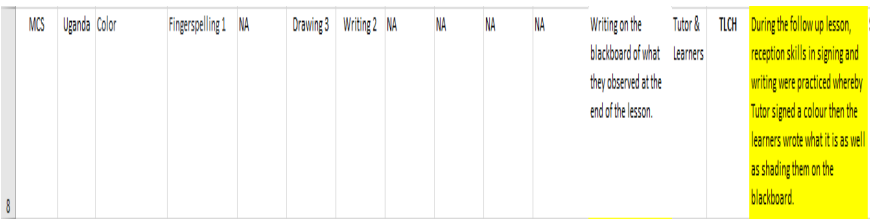
In order to better understand the multiliteracies skills practised by the learners, the data procured has been categorised in term of modalities and languages. This section begins by explicating these key concepts used for the analysis (4.1). Next, the skills are characterised in terms of various combinations of languages and modalities, namely literacy, visual-gestural communication, and visual representation, which equips us to understand the patterns emerging from the actual learning situations (4.2). With this background, we then move on to analysing the actual learning situations in the data and revealing that the majority of the learning activities used more than one modality (4.3). Finally, sub-section 4.4 provides examples for the combinations of languages and modalities from the data.

4.1 The concepts of modality, bilingualism and monolingualism

This sub-section briefly clarifies how the notions of modality, bilingualism and monolingualism were understood for the purposes of this research. In order to characterise the use of language in the activities under investigation, I use the terms *monolingualism* and *bilingualism*. *Monolingual* refers to competency in one language, e.g. someone who speaks or signs only one language. Crystal (1987: 425) defines *monolingual* as a person or community with only one language. In the context of this research, monolingual refers to the situation in class where only one language, e.g. Indian Sign Language, was active. For example, a monolingual situation is one where the class is doing drawing, acting, or numeracy along with sign language but without using any reading or writing of English. When both sign language and English are present, the situation is *bilingual*.

Modality, on the other hand, is taken to mean the physical channels that are used to create meaning (Wilbur 2011). The term *monomodal* refers to the use of only one physical channel or modality to create meaning or express and perceive messages. Examples of this included children drawing or acting as a single channel to express themselves during class activities. *Bimodal* means that two channels or modalities are used, and *multimodal* refers to the use of more than two. A situation in class where

children together with their tutors used more than two modalities is shown in Figure 8.



8	MCS	Uganda	Color	Fingerspelling 1	NA	Drawing 3	Writing 2	NA	NA	NA	NA	Writing on the blackboard of what they observed at the end of the lesson.	Tutor & Learners	TLCH	During the follow up lesson, reception skills in signing and writing were practiced whereby Tutor signed a colour then the learners wrote what it is as well as shading them on the blackboard.

Figure 8: Data instantiating multimodality

As seen in the figure, the Ugandan learners did an activity where they used fingerspelling, writing, and then drawing. Signing was also included because it says that the tutor signed a colour first. Because both sign language and written English were involved, this data is coded as bilingual, and because there are three modalities involved (visual-gestural communication, literacy, and visual representation, which are explained in the next sub-section), it is also coded as multimodal.

4.2 Mapping of skills to modalities and languages

Taking all of the channels into account enables the researcher to investigate how modalities corresponded with particular skills and languages. Each skill, e.g. drawing, reading, and acting, has a specific combination of language and modality, as shown in Table 5. The table shows the different skills that learners engaged in throughout the learning sessions in the left-hand column. The middle column shows the languages involved in the use of each skill, while the right-hand column shows the modalities through which the skills and languages were expressed.

Table 5: Correspondence between skills, languages and modalities

Skill	Language	Modality
Reading	English	Literacy
Writing	English	Literacy
Fingerspelling	English	Visual-gestural
Signing	Indian/Ugandan Sign Language	Visual-gestural
Numeracy (signed)	Indian/Ugandan Sign Language	Visual-gestural
Acting	Indian/Ugandan Sign Language or none	Visual-gestural
Drawing or 3D artwork	None	Visual representation

For signing, the languages involved are Indian Sign Language and Ugandan Sign Language, with the modality being visual-gestural which is through the eyes, hands, and body. Fingerspelling also uses the visual-gestural modality, but English is the language that is being represented.

Writing and reading are identified as two different skills but they belong to the same modality. We call this modality 'literacy' which is through written symbols of the alphabet, with the language being English. This often happens through the use of paper, pen and/or blackboard.[2]

During drawing, children often concentrated on using paper and pencil to sketch objects or using various materials such as clay or cutouts to build 3D artwork, with no other activities or language involved. We call the modality in drawing and other artwork 'visual representation'. Although in the case of 3D artwork children use materials other than pen and paper for visual representation, the logic is the same as for drawing in terms of the channel used to represent meaning. While the other two modalities involve specific languages, visual representation simply conveys a message. This modality is frequently observed during classroom activities but rarely mentioned in the literature. It is separate from literacy and visual-gestural communication, courtesy of the fact that even though children use pencils and papers as they do during literacy (writing), the way that the meaning is conveyed through drawing and other artwork is quite different from writing. This is because while literacy (writing) involves knowledge of certain letters, correct spelling, spacing and arrangement of words, which makes the process complex for learners, drawing involves the use of visual images and representation of the shapes of objects, which is often easier for them.

Acting, on the other hand, is a skill that involves children using body gestures to create meaning, e.g. when portraying characters from their storybooks or demonstrating how they wake up in the morning, brush their teeth, etc. to represent sentences with verbs like 'I woke up', I brushed my teeth', etc. This skill belongs to the modality that we call 'visual-gestural communication', which uses hands and body to produce visual gestures and symbols to express meaning. This is different to 'visual representation', because when signing and acting, children use their own bodies, whereas when they are drawing they typically use a medium of pen and paper.

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2 Written forms of sign languages have also been invented, for example the system known as 'sign-writing', but this is not in use in India and Uganda. Hence sign languages are listed only under the visual-gestural modality and not under 'literacy' as the modality.

Depending on how it is performed, acting may or may not involve a language, in this case Indian or Ugandan Sign Language. If children sign while they act, there is linguistic content but when children act and there is no signing involved, as in a mime performance, there is still a meaning being expressed and understood. Hence acting either involves a sign language, or no particular language, in which case all meaning is expressed through miming.

Unlike the literacy modality, the visual-gestural modality is used to express two different languages, English and sign language. For the latter, signed structures with linguistic content are articulated to convey a message, while for the former, fingerspelling is used to produce manual versions of letters from the English alphabet.

4.3 Combinations of modalities with languages

Since actual activities used in the lesson plans, in most cases, combined multiple skills, we see a very interesting spectrum of combinations between modalities and languages emerge. On the one end of the spectrum, we have lesson plans that exploited just one modality and used no linguistic content, for instance when the only activity is drawing or performing mime, while on the other end, there are activities that incorporated two languages and multiple modalities. In between these two extremes we see learning situations that are monomodal and monolingual, bimodal and monolingual, or bimodal and bilingual. Table 6 presents the frequency with which these various combinations were instantiated in the data.

The aim of documenting the different types of situations as they happen during learning is to understand which type of modality combinations are more frequent and how they are manifest in the classroom. In the first four columns of Table 6, we are looking at the frequency of languages and modalities separately, and the last column shows the combinations, that is, which combinations of languages with modalities are more frequent. Sub-section 4.4 offers examples from the data that show how deaf children engaged with the integration of different languages and modalities within the same task.

Sometimes only one language was in active use during a particular lesson but was expressed through two modalities. Notably, when learners were engaged in reading or writing along with fingerspelling, they were using a single language, written English. However, the activities are expressed through two different modalities, literacy for reading and writing and the visual-gestural modality for fingerspelling. Alternatively, a single language might be used in one modality. This happened for example when the children were reading and writing English, using the

literacy modality, with no other languages involved. In other situations the learners used multiple languages in multiple modalities, meaning that both sign language and English were in active use and being expressed through different modalities.

Table 6: Frequencies with which combinations of single and multiple languages and modalities appeared in the data

Modalities	Frequency	Languages	Frequency	Situations
One modality	9	One language	17	A single language used in one modality (9)
More than one modality	24	More than one language	15	A single language is used in different modalities (9)
More than one modality and more than one language	15	More than one modality and more than one language	15	Different languages are used in different modalities (15)
No modality	n/a	No language	3	No language used but modalit(ies) present (3)

Finally, it was also observed that sometimes there is no active language in use, but we can identify a modality/modalities, as there is always a physical channel through which meaning is created. Such scenarios are seen in both India and Uganda, for example in activities where drawing is exclusively taking place amongst learners. In these activities, learners fully concentrated on drawing, which expresses meaning through the creation of visual representation without using any language. Another example occurred where children acted out a story from a book, exactly mimicking the characters and correcting one another. There was no complete grammatical sign language involved but meaning was expressed through the mimed actions.

It is important to note that sign language appears at two different logical levels in the learning situations. One is where it acts as the medium

of classroom communication among tutors and learners, and another is where sign language is itself part of learning activities. As a medium of communication, sign language is used as a channel through which tutors communicate with learners. Of course, communication is always signed, so sign language is there throughout the learning, for example, when tutors explain to learners what to do in a given activity or when tutors answer questions in between or give directions. On the other hand, at other times sign language is part of the learning activity itself. Learners are seen learning sign language as the target language, e.g. learning how to sign vocabulary items or stories. For the analysis in this section, the focus is only on sign language when it is targeted as part of the learning activity itself.

The data in Table 6 was obtained from the main raw data in the Excel spreadsheet shown in Figure 5. Overall, the table shows that most learning activities were very multimodal, and there are not many that used only one modality. The teachers were never instructed to use a multimodal style of teaching, so this may mean they intuitively felt that different modalities would be helpful for their deaf learners. The few examples where one only modality is used include times when learners were engaged in drawing or acting.

4.4 Multiliteracies, languages and modalities in actual learning situations

Having understood the different languages and modalities involved, we now look at how these play out in actual learning situations, by examining situations with different combinations of skills from our data as case studies. We begin with less complex examples where a single language is involved along with different combinations of modalities, and then move to more complex examples.

Example 1. Topic: Words for food items – Situation: monomodal monolingual

Skills	**Languages**	**Modalities**	**Situation**
Writing	English	Literacy	A single language is used in one modality

In this session, which took place in India, learners were given a piece of paper and told to write the names of food items they had seen and studied. This activity was based on earlier learning, where the children had matched pictures of food items with the corresponding English

words. Although the activity was explained through signing, only English was the target for learning. Writing was the only activity being performed, with literacy being the only modality through which English was expressed. Although less complex, the interaction between just one language and one single modality (a monolingual and monomodal situation) is relatively infrequent in the data, with nine out of 36 instances.

Example 2. Topic: Parts of a house – Situation: bimodal monolingual[3]

Skills	**Languages**	**Modalities**	**Situation**
Drawing Writing	English	Visual representation Literacy	A single language is used alongside different modalities

In Example 2 from Uganda, the task set out by the tutor was to first give the learners a sample of a drawing, in this case the drawing of a house. The children then drew their own versions, coloured them in and added labels in English indicating the different parts of the house. Drawing and writing took place in a sequence where first the learners carried out the tasks of drawing and colouring, followed by writing the names of house parts.

At each step, the language of communication in the classroom was Ugandan Sign Language, as the teacher explained how to go about each step of the task. However, UgSL was not itself the target of learning because the children's proficiency in UgSL was already more than sufficient to discuss the parts of a house. This is an example where sign language functions as the basic skill on which other skills can be built, and therefore UgSL is not listed as a targeted skill in the data for this activity.

In this activity, the teacher prepares the children for learning literacy in a gradual way. The initial drawing is intended to support interest and motivation and provide a clear context for the English words that are added at the next step. The two modalities, literacy (writing) and visual representation (drawing), interact with each other and with the signed classroom communication to support the children's learning.

3 The listed skills, languages, modalities and situation are taken from the data sheet reproduced in the appendix.

Example 3. Topic: Colours – Situation: bimodal monolingual

Skills	Languages	Modalities	Situation
Fingerspelling Drawing	English	Visual-gestural communication Visual representation	A single language is used alongside different modalities

Example 3, also from Uganda, is also monolingual but uses a different combination of modalities. In this activity, learners were prompted to sign colours they knew. The teacher then asked them to fingerspell the colour words, before the children proceeded to draw in the particular colours they had fingerspelled, getting feedback/corrections from the tutors. In this case, the focus of learning was on English, via the visual-gestural modality of fingerspelling, where the alphabets are represented or expressed visually through the use of hands. The drawing activity introduced an additional modality and supported this learning.

The data reveal that later on, there was a follow-up lesson on the same topic, where the activity extended to receptive skills in signing, as well as writing. The tutor's report notes that 'During the follow-up lesson, reception skills in signing and writing were practiced whereby the tutor signed a color then the learners wrote what it is as well as shading them on the blackboard.' It seems that this activity targeted an extended colour vocabulary in sign language, whereas initially, the children only worked with colour words they already knew. As the same topic is continued to introduce literacy and create a link between the signed and the written words, the combination between sign language and English along with drawing is seen to be reinforcing writing English. There are several examples in the data where topics carry on across several sessions, with varying languages and modalities being activated.

Example 4. Topic: People's names and the alphabet – Situation: multimodal bilingual

Skills	Language	Modalities	Situation
Reading Fingerspelling Acting	English Indian Sign Language	Literacy Visual-gestural communication Visual representation	Different languages are used alongside different modalities

In this activity, which happened in India, learners played a game in which one of the children acted as a father character. The 'father' picked up a folded paper with a name written on it. Another child read and signed the name, and then other children responded by fingerspelling the name.

This is a bilingual situation where three different modalities are embedded in the context of the game. When reading and fingerspelling names, English is represented in both the written and the signed modality. In addition, it is important for deaf children to understand the use of sign names, which is an essential part of deaf culture in an Indian Sign Language environment. Moreover, there is an opportunity for practising attention-getting and turn-taking in sign language during the game. Acting out the game adds interest and motivation.

This session was the first in a series of five lessons around the English alphabet, which increasingly focused on reading and writing, supported by fingerspelling as a bridge activity. Further sessions included the difference between small and capital letters, and another game with a fingerspelling competition.

Example 5. Topic: Weight – Situation: multimodal bilingual

Skills	**Language**	**Modalities**	**Situation**
Fingerspelling Writing Numeracy in writing Numeracy in signing	Indian Sign Language English	Visual-gestural Literacy	Different languages are used alongside different modalities

The final example is from a lesson implemented in India, where we see the use of four different skills in the same session, namely fingerspelling, writing, numeracy in writing and numeracy in signing.

This particular activity, a lesson on weight, involved a bilingual situation with English and Indian Sign Language. The aim was to teach the concept of weight alongside ISL skills, i.e. how to sign 1kg, 500mg etc., as well as the writing of words and numbers. The learning material was related to things sold in the market by weight, e.g. kilograms of sugar or rice. The students had to first sign and then write words and numbers. As seen in sub-section 3.2, the signing and writing of numbers frequently occur together, and this was the case in this activity too. In addition to numeracy, this complex activity also used signing, fingerspelling and writing of text.

5 Implications of the research

This chapter has looked into the sequencing of multiliteracies skills during learning amongst deaf children in Uganda and India, based on the analysis of a set of micro-case studies and peer tutors' reports.

Writing was observed to be the most frequent skill that tutors reported on, perhaps signalling its perceived importance as a target of learning. Reading often occurred adjacent to writing and to some extent fingerspelling, which is consistent with the fact that children are often required to sign and/or write down what they have read. Fingerspelling was also often used as a bridge between signing skills and literacy skills. These patterns are consistent with the principles of sign bilingualism (Wilbur 2000; Swanwick 2016), an approach to the literacy learning of deaf children in which both the sign language of the local deaf community and the written language of the surrounding hearing community are used. Sign bilingualism aims for a balance between written English skills and signing fluency. This approach is premised on the idea that knowledge of the first language (L1) can be transferred to and facilitate the development of the second language (L2), as characterised by Cummins's (1991) linguistic interdependence model. In the data, Indian Sign Language and Ugandan Sign Language are the learners' first languages and main medium of communication in the classroom, with English addressed primarily through reading and writing and to some extent through fingerspelling.

The analysis also showed that sign language was actively used both as a skill being learned and as a medium of instruction, contrary to current practice in many schools for deaf children. This implies that while sign language is a medium of instruction, children are not always fluent signers when they begin classes, and new vocabulary items tend to emerge every day. Thus, there is a need to emphasise sign language itself as a skill that should be learned, in order for children to progress.

The findings of this study indicate that it may be worthwhile for sign-bilingual education to be expanded to include not just signing as L1 and written English as L2, but the whole range of multiliteracies discussed in this chapter. Drawing and acting can be exploited as lead-in activities, and fingerspelling can be involved as a bridge across the whole pathway of learning. Moreover, the use of sign language as both a skill being learned and a medium of instruction means that there is a need to employ teachers who are fluent signers. Such practitioners, especially if they are deaf, are likely to have the skill set for not only teaching sign language but also for facilitating cultural mediation and explaining the differences between sign language grammar and English grammar (see

Nankinga 2021). Harnessing the benefits of the learning process described here, which involves making use of lead-in activities like drawing and acting to progress toward more difficult target activities like writing, is likely to require policy adjustments. This process consumes more class time and preparation time than what is allocated by the systems of formal education in India and Uganda at present. Therefore, it is recommended that policy-makers attend to this need to make extra time and flexibility available for sign language users.

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Appendix

Excerpts from the data sheet on languages and modalities

No	Row	Skills involved	Languages	Modalities	Situation	Comment
1	03	Fingerspelling, signing and reading	English and Ugandan Sign Language	Literacy and visual-gestural modality	Different languages are used in different modalities	Signing parts of a house. SL is thus involved in the learning activity.
2	04	Drawing and writing	English	Literacy and Visual representation	A single language is used in different modalities	
3	05	Reading	English	Literacy	A single language used in one modality	
4	07	Fingerspelling and drawing	English and Ugandan sign language	Visual-gestural and visual representation	Different languages are used in different modalities	Learners signed colors they knew, finger spelled them. When there is error tutor corrected them. SL was thus part of learning
5	08	Fingerspelling, drawing and writing	English and Ugandan Sign Language	Literacy, visual-gestural and Visual representation	Different languages are used in different modalities	Learners practiced reception skills on colors signs (SL part of learning)
6	09	Drawing	None	Visual representation	No language used in different modalit(ies)	

No	Row	Skills involved	Languages	Modalities	Situation	Comment
7	10	Reading and writing	English	Literacy	A single language used in one modality	
8	12	Fingerspelling and writing	English and Ugandan Sign Language	Literacy and visual-gestural	Different languages are used in different modalities	Besides writing names of the buildings, learners signed them, e.g. 'church'. Writing and signing were practised.
9	13	Fingerspelling, reading, drawing, writing and acting	English and Ugandan Sign Language	Literacy, visual-gestural and visual representation	Different languages are used in different modalities	In pairs, learners would read and fingerspell what was shown in the picture. e.g. skipping a rope
10	16	Fingerspelling and writing	English and Ugandan Sign Language	Literacy and visual-gestural	Different languages are used in different modalities	Learners matched with letters what was signed by tutors. Signing and matching were done simultaneously.

No	Row	Skills involved	Languages	Modalities	Situation	Comment
11	19	Fingerspelling and drawing	English	Visual-gestural and visual representation	A single language is used in different modalities	Drawing was performed as a second activity. The drawings were the basis of writing texts
12	23	Fingerspelling and acting	English	Visual-gestural	A single language used in one modality	SL as a mode of communication
13	27	Reading and drawing	English	Literacy and visual representation	A single language is used in different modalities	Learners read text with support of illustrated pictures. (Anna goes to school)
14	29	Signing, fingerspelling, reading and writing	English and Ugandan Sign Language	Literacy and Visual-gestural	Different languages are used in different modalities	Learners read words from the blackboard, signed and wrote them
15	30	Writing	English	Literacy	A single language used in one modality	Filling in the missing words
16	31	Acting	None	Visual representation	No language used but have modalit(ies)	
17	36	Writing and acting	English	Literacy and visual representation	A single language is used in different modalities	

No	Row	Skills involved	Languages	Modalities	Situation	Comment
18	41	Fingerspelling, signing and acting	English and Ugandan Sign Language	Literacy and Visual-gestural	Different languages are used in different modalities	PT signed the story page by page first then learners also imitated and did the same (learners learning to sign story)
19	42	Drawing	None	Visual representation	No language used but have modalit(ies)	
20	45	Fingerspelling	English	Visual-gestural	A single language used in one modality	
21	46	Fingerspelling and writing	English	Literacy and visual gestural	A single language is used in different modalities	Learners wrote about themselves e.g. 'my name is Angel and I am nine years old, I wake up every morning' and signed.
22	51	Reading	English	Literacy	A single language used in one modality	
23	53	Fingerspelling and acting	English and Indian Sign Language	Literacy and Visual-gestural	Different languages are used in different modalities	Learned how to sign and fingerspell easy words e.g. A-Apple, B-Ball, C-Cat etc. through game

No	Row	Skills involved	Languages	Modalities	Situation	Comment
24	64	Fingerspelling, writing, numeracy in writing and numeracy in signing	English and ISL	Literacy and visual-gestural	Different languages are used in different modalities	
25	66	Writing and numeracy in writing	English	Literacy	A single language used in one modality	
26	68	Writing, numeracy in writing and numeracy in signing	English and ISL	Literacy and visual-gestural	Different languages are used in different modalities	
27	69	Drawing, numeracy in writing and numeracy in signing	ISL	Visual-gestural	A single language used in one modality	
28	73	Fingerspelling, writing	English and Indian sign language	Literacy	Different languages are used in different modalities	After signing contents in the calendar they wrote short texts e.g. one month, two months etc. and put writing skills on display
29	80	Fingerspelling, writing and reading	English	Literacy and visual-gestural	A single language is used in different modalities	
30	84	Fingerspelling, writing and acting	English	Literacy and visual-gestural	A single language is used in different modalities	

No	Row	Skills involved	Languages	Modalities	Situation	Comment
31	87	Fingerspelling, reading and acting	English	Literacy, visual-gestural and visual representation	A single language is used in different modalities	
32	90	Reading and writing	English	Literacy	A single language used in one modality	
33	101	Reading and drawing	English	Literacy and visual representation	A single language is used in different modalities	
34	104	Numeracy in writing and numeracy in signing	English and ISL	Literacy and visual representation	Different languages are used in different modalities	
35	105	Fingerspelling, drawing, numeracy in writing and numeracy in signing	English and ISL	Literacy and visual representation	Different languages are used in different modalities	
36	107	Reading, acting and numeracy in signing	English and ISL	Literacy and visual-representation	Different languages are used in different modalities	Practised signing complex numbers

Disadvantage and marginalisation in special education systems for deaf students in India, Ghana, and Uganda: A comparative analysis

George Akanlig-Pare, Anthony Mugeere, Rajani Ranjan Singh and Ulrike Zeshan

1 Introduction

The aim of this chapter is to analyse the educational systems in Ghana, Uganda, and India with respect to the education of deaf learners, in particular those who rely on the use of a sign language. We compare the characteristics of the systems in the three countries in order to identify where deaf learners and sign language users are disadvantaged or face barriers specific to them. Drawing out similarities and differences between countries has the potential to throw fresh light on the system dynamics in each case on the basis of a comparative perspective.

Central to these discussions is a concept of deaf sign language users as linguistic and cultural minorities. Hence the framing of the issues in this chapter is in terms of rights for linguistic minorities, and indeed linguistic human rights, just as much as in terms of disability-related provisions. As we shall see, this perspective is often at odds with the way that educational systems are set up in order to support deaf learners.

Furthermore, our aim is to draw conclusions from this analysis and make recommendations for improvement of the current situation. In particular, we explore where practitioners and policymakers in education may be able to learn from another country's experiences.

The chapter therefore proceeds in three logical steps: firstly, to describe the educational systems in the three countries and how deaf learners are embedded into these systems (section 2); secondly, to identify problematic areas where systemic disadvantages are visible, in particular with respect to linguistic issues (section 3); and finally, to discuss what improvements could be made in each case at the level of the educational systems (section 4). Section 5 provides a conclusion.

2 Educational systems

In this section, we briefly describe the educational systems in all three countries. This is important so that the discussions in later sections can be understood in their proper context. Ghana, India and Uganda have some similarities in their educational systems, which are summarised at the end of this section.

In the following sub-sections, we set out the basic characteristics of the educational systems of Ghana (section 2.1), India (section 2.2) and Uganda (section 2.3). While we cover both mainstream and special education as well as, to some extent, their relationships with each other, the field of inclusive education is not specifically covered in depth in this chapter. In relation to deaf sign language users, who are the focus of this chapter, the concept and practice of inclusive education is complicated and contested. This is because unlike for any other group located in the disability sector, the use of a different language sets deafness apart from other situations, and a proper appraisal of the implications is beyond the scope of this chapter. For relevant overviews with respect to Ghana, India and Uganda, see Ametepee & Anastasiou (2015), Bhattacharya (2010), and Omona (2018) respectively.

2.1 The educational system of Ghana

2.1.1 Levels of education

There are two sub-systems in the educational system of Ghana, namely the tertiary and pre-tertiary systems, the latter including primary, secondary and technical/vocational schools. Both sub-systems have publicly funded and private schools.

According to Article 38, Section 2 of the 1992 Constitution of Ghana, Basic Education is compulsory and free for all children of school-going age. This section of the constitution informs the policy document known as the Free, Compulsory, Universal, Basic Education (FCUBE), which aims to ensure that every child has a good quality education. However, the implementation of this policy has neglected children with disabilities, especially the deaf as we show later in this chapter.

Basic education in Ghana begins with the nursery or creche, where children begin to socialise. Teaching and learning begins in kindergarten, where the children are given a 2-year foundational education to prepare them for a 6-year primary education. Primary education is divided into two levels: lower primary (beginning from Primary 1 to 3) and upper primary (beginning from Primary 4 to 6). At the primary level, attention

is given to the development of literacy, numeracy, and the development of communication skills.

Pupils are automatically promoted to the Junior High School (JHS) after primary 6. The JHS curriculum is designed to take 3 years to complete. It prepares the pupils for various subject paths at the Senior High School. Subjects taught here include English Language, Mathematics, Integrated Science, Social Studies, French, a selected Ghanaian language, Physical Education and Information and Communication Technology. After the 3 years, pupils then sit the Basic Education Certificate Examination (BECE), and are required to make a minimum aggregate of 36 in 6 subjects to make the cut to the Senior High School (SHS).

There are approximately 12,000 primary schools and 9,000 JHS for hearing children all over the country. As far as deaf pupils are concerned, there are now 17 deaf schools spread across only 10 out of the 16 political regions of the country. Out of these, 14 are public and 3 private. All 14 public schools have kindergarten to JHS classes and run the same curriculum as the hearing schools.

The Senior High School also lasts for 3 years after which students sit the West African Senior School Certificate Examination (WASSCE) in subject groupings such as Science, General Arts, Business, Visual Arts and Home Economics. Again, students need a minimum aggregate score of 36 in 3 core and 3 elective subjects to qualify for admission into a tertiary institution of their choice. While there are about 700 secondary/technical schools to absorb hearing students who make it from the JHS, there is only one secondary/technical school for the deaf students in Ghana.

The tertiary institutions in Ghana include 21 public universities/technical universities and approximately 57 private universities. There are 44 public Colleges of Education that award diplomas in education. Out of these, only five tertiary institutions provide any training in limited programmes for deaf students.

2.1.2 Governance of education

The governance hierarchy of education in Ghana is headed by the Minister for Education who is appointed by the government of the day to supervise the Ministry of Education. The Ministry makes policy decisions to govern the educational system, usually in tandem with the ideology of the ruling government.

The Ghana Education Service (GES) is responsible for the implementation of the pre-tertiary educational policies. To facilitate the implementation processes, the GES has specialised units for this

purpose. The Basic Education Division supervises the implementation of policies with regard to Early Childhood normally in the creche, the kindergarten, primary and the JHS, and with additional responsibilities for private schools and Girl-Child education. The Secondary Education Unit supervises the implementation of policies in the Senior High Schools as well as the Technical and Vocational Training Institutes (TVET). The third unit under the GES that carries out policy decisions is the Special Education Unit, which works to create a congenial environment for the education of children with special needs, including those with disabilities. A flagship programme under the Special Education Unit is the Inclusive Education system.

Units within the Ministry of Education that facilitate the work of the GES include the National Teaching Council (NTC) responsible for among others, Teacher Training for the pre-tertiary institutions; and the National Council for Curriculum Research (NCCR) which is responsible for the development, implementation and assessment of the national curriculum at the pre-tertiary level.

2.2 Educational systems in India

2.2.1 Mainstream education and special education for deaf learners

The educational sector in India is highly complex, with many different actors and institutions. At the governmental level, the main two levels are the central government and the state governments. In some parts of the system, the same type of institution or regulator is replicated at both of these levels, with central policies flowing down and being specified by state policies. In other cases, there are single national regulators. Within the two-tiered system, the National Council of Educational Research and Training (NCERT) and the State Councils of Educational Research and Training (SCERTs) are responsible for developing the National Curriculum Framework (NCF) and the State Curriculum Frameworks (SCFs) respectively. With respect to standard national examinations, the secondary level has the greatest impact on students' educational pathways via the board exams in class X and class XII. Access to tertiary education, especially for public institutions and for prestigious courses, is intensely competitive and largely dependent on exam scores.

Under the Right of Children to Free and Compulsory Education Act (2009),[1] universal and free school education has been mandated for

1 This Act is known in short as the Right to Education Act (2009).

children between the ages of six and 14. Children with disabilities in India attend both mainstream and special schools, and in principle, schools cannot deny admission to children on the basis of disabilities. The special school sector is comparatively large, and there are approximately 800 schools for the deaf in the country at present. This is an estimate, as many schools are private and/or small local provisions and may not be accessed by statistics.

The National Institute of Open Schooling (NIOS) is a parallel system with its own structures of governance and examinations. The main remit of the NIOS is to provide an alternative pathway of primary and secondary schooling for those who do not participate or have dropped out of the mainstream system. The NIOS operates through its regional centres, each of which in turn oversees a large number of study centres, mostly operating out of existing educational institutions. The education provided through NIOS is very flexible and largely implemented in the form of distance education. Most students join NIOS in order to gain class X and class XII qualifications, but there is also a primary-school-level curriculum.

In addition to schools, there are several institutes whose mandate is specifically to serve people who are hard of hearing, deaf, or have speech difficulties. These include the Ali Yavar Jung National Institute of Speech and Hearing Disabilities (headquartered in Mumbai), the All India Institute of Speech and Hearing in Mysore, and the National Institute of Speech and Hearing in Trivandrum. Among other functions, these institutes train special education and rehabilitation professionals, and some also offer educational programmes for deaf learners. The use of sign language varies across these institutions.

2.2.2 Governance and teacher training for deaf education

One interesting particularity of the Indian educational system is that special education and its associated teacher training programmes are regulated separately from mainstream education. The mainstream educational systems in India are ultimately the responsibility of the Ministry of Education (MoE). However, this does not apply to special education, which falls under the responsibility of the Department of Empowerment of Persons with Disabilities within the Ministry of Social Justice and Empowerment (MSJE). The oversight over special education is carried out by the Rehabilitation Council of India, which is a national body created under the RCI Act (1992).

At state level, the MSJEs have responsibility for special education schools. On the one hand, they provide funding for such schools. On the other hand, they organise registration for special schools and certify schools following the provisions of the RPwD Act (2016).

For mainstream education, teacher training is the responsibility of a professional council, the National Council for Teacher Education (NCTE). In the special education sector, the RCI is centrally responsible for teacher training in the whole country. RCI-accredited teacher training programmes are offered through tertiary educational providers, including diploma and bachelor's level courses as well as various certificate and in-service training programmes.

India's National Education Policy (2020) emphasises Inclusive Education, and there is a chapter on 'Equitable and Inclusive Education: Learning for All'. The NEP references the Rights of Persons with Disabilities (RPwD) Act (2016) and endorses all its recommendations. These include the use of sign language in deaf education and in the media, in order to provide accessible information to deaf sign language users. India is a signatory to the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD).

In the new National Education Policy (NEP 2020), Indian Sign Language is explicitly mentioned, with following provisions:

> 4.22. Indian Sign Language (ISL) will be standardised across the country, and National and State curriculum materials developed, for use by students with hearing impairment. Local sign languages will be respected and taught as well, where possible and relevant.
>
> 6.11 […] NIOS will develop high-quality modules to teach Indian Sign Language, and to teach other basic subjects using Indian Sign Language. […]

For details on the role of the National Institute of Open Schooling (NIOS) with respect to work on Indian Sign Language, see Singh & Mahapatra (this volume).

2.3 Educational systems in Uganda

2.3.1 Mainstream education and special education

The education of deaf or hard-of-hearing children has become as complex as the varying needs of each individual child (Christensen 2010). The World Federation of the Deaf (WFD) estimates that 80% of the world's 72 million deaf sign language users live in developing countries, but only 3% of all deaf people have access to education through sign language as

advocated in the UN Convention on the Rights of Persons with Disabilities (UNCRPD 2006).

In Uganda, the Ministry of Education and Sports is the body responsible for education policy, development and provision of all forms of education (MOES 2018). The idea of deaf education was however, conceived in 1959 by the Uganda Society for the Deaf (USD) under the auspices of one individual - Mrs. Julia Lule - whose two deaf children were denied admission to Mengo primary school. Gradually, other schools were established in various parts of the country as the number of deaf children increased largely due to the efforts of the Uganda National Association of the Deaf (UNAD), whose advocacy and sensitisation campaign for the realisation of the potential of deaf and hard of hearing persons through education is one of its goals (UNAD 2018). As a member of the World Federation of the Deaf (WFD), the National Union of Disabled Persons of Uganda (NUDIPU) and the Uganda National NGO Forum, UNAD has promoted the use of sign language and improved the availability of information for education and training, culture and social services.

Over the years, the Ugandan government has designed a number of policies to ensure that children with disabilities can access education. These include: the Uganda National Institute of Special Education Act (1995) which instituted Special Needs Education (SNE), the Constitution of Uganda (1995) and the Persons With Disability Act (2006). SNE was designed as an affirmative action instrument to facilitate educational approaches and programmes specially designed for persons with special learning needs (CSBAG & DGF 2013). The implementation of some of these elaborate institutional and legal frameworks has, however, remained a challenging issue.

Despite the fact that deaf education has quite a long history in Uganda, there is limited empirical research about its performance. Policy implementation is often given lip service while the various government agencies entrusted with the governance of the sub-sector are short of the required personnel to execute their mandate.

2.3.2 Governance of deaf education

An extensive desk review of Uganda's policies, legal framework, development plans and programmes on disability-specific and inclusive education revealed that the governance of deaf education is anchored in an international, regional and national regulatory framework. Like many other countries, Uganda ratified the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), in September 2008.

This was in addition to earlier ratification of the Universal Declaration on Human Rights (1948), the Convention on the Rights of the Child, the World Declaration on Education for All and the Framework of Actions to meet basic and learning needs (Jometien, 1990). Other frameworks include the Salamanca Statement and Framework for Action on Special Needs Education (1994), the Dakar Framework for Action (2000), the Sustainable Development Goals (2016–2030) and the Marrakesh Treaty (2013).

Uganda's constitution includes explicit recognition of the need for a sign language. Interestingly, this is part of a section on 'cultural objectives' along with other language provisions. The section on rights of persons with disabilities does not mention deaf people specifically. The relevant provisions in the Constitution are:

> **Rights of persons with disabilities.**
> 35. (1) Persons with disabilities have a right to respect and human dignity and the State and society shall take appropriate measures to ensure that they realise their full mental and physical potential. (2) Parliament shall enact laws appropriate for the protection of persons with disabilities.
>
> **Cultural Objectives.**
> XXIV. Cultural Objectives.
> Cultural and customary values which are consistent with fundamental rights and freedoms, human dignity, democracy, and with the Constitution may be developed and incorporated in aspects of Ugandan life. The State shall-
> (i) promote and preserve those cultural values and practices which enhance the dignity and well-being of Ugandans;
> (ii) encourage the development, preservation and enrichment of all Ugandan languages;
> (iii) promote the development of a sign language for the deaf; and
> (iv) encourage the development of a national language or languages

At the regional level, Uganda is party to the East African Community (EAC) and the New Partnership for Africa's Development (NEPAD) protocols on inclusive education. On the domestic front, the draft Special Needs and Inclusive Education policy (2011) makes it mandatory for all schools to have special needs teachers trained and placed in different classrooms and also requires schools to have the right infrastructure, such as ramps to ease the movement of learners with physical disabilities.

On the other hand, the National Policy on Disability (2006) provides for sign language as the medium of communication used by people with hearing difficulties and also defines social inclusion as a range of multiple and integrated initiatives resulting in previously excluded people being included in normal exchanges and interventions in the development process.

2.4 Comparing the educational systems

The three countries share a number of characteristics with respect to their educational systems. In each case, the system is divided into primary, secondary and tertiary levels, although the specific labels are different in each case. There are also provisions for special education, including deaf education, although the place of special education within the overall system differs a lot between the countries. This issue is explored further in section 3.

Another similarity is that all countries have a substantial number of legal/administrative frameworks, institutions and organisations that are involved in the governance of education at the various levels. Although the involvement of multiple agencies may increase available resources, it may also lead to inconsistencies and confusion as to who is responsible for the governance, implementation and monitoring of deaf education.

There are also similarities with respect to the linguistic situation. All three countries are highly multilingual, recognising and promoting the use of various languages in education in different ways and at different educational levels (see further details in section 3). Here Uganda stands out as the only country among the three with official recognition of sign language in a legal context that is related to language and culture, and this is set at the highest level, namely in the country's constitution. This is different from India and Ghana, where the main drivers of sign languages being mentioned in legislation or policies have to do with disability, and there are no provisions in the constitution. In all three countries, English plays an important role as an official language and as a language used in education, particularly at the higher levels.

With respect to the relationship between special education and mainstream education, India stands out as different from the other two countries because its special education system is separate from mainstream education, managed by the Rehabilitation Council of India, and comes under the purview of a different ministry, namely the Ministry of Social Justice and Empowerment. In the other two countries, special education remains under the Ministry of Education. Moreover, substantial parts of educational policies and agencies are devolved to the states in

India, unlike in Ghana and Uganda which are centralised systems. The African countries also maintain the same curriculum across special and mainstream education, whereas in India, this is not always the case, in particular with respect to language requirements in deaf education.

3 Systemic disadvantages for deaf learners in educational systems

This section aims to analyse the educational systems in the three countries to identify where deaf learners face systemic disadvantages. In India and Ghana, many of these disadvantages are related to the status of Indian Sign Language and Ghanaian Sign Language and their use in educational contexts. It is therefore useful to clarify the view of sign languages as linguistic minority languages in general, before we move on to discussing individual countries.

The definition of deaf communities as linguistic and cultural minority groups is now commonplace in many countries and strongly supported by research over the past decades (e.g. Ladd 2003; Padden & Humphries 2006). The relevant arguments include the following points:

Deaf communities are linguistic and cultural minority groups because:

- The group has its own language, the regional, national or local sign language.
- There is regular in-group interaction between the members of the group, for example during deaf sports competitions, religious services in sign language, and the like.
- The group has its own institutions, such as deaf associations.
- There are shared collective experiences and values within the group, such as experiences of linguistic oppression and positive attitudes towards sign language.
- The group has its own norms of communication, its own history and cultural heritage, and/or its own art forms.

All of these factors are true of the national sign languages of the countries discussed here (see Akanlig-Pare 2014, Edward & Akanlig-Pare 2021, Bhattacharya, Grover & Randhawa 2014, Lutalo-Kiingi 2014). We explicitly recognise that other sign languages also exist these countries, for example Adamorobe Sign Language in Ghana (see Nyst 2007, Edward & Akanlig-Pare 2020) and Alipur Sign Language in India (see Panda 2012). However, as this chapter is concerned with education policy and governance, the discussion in this chapter focuses on the national sign languages.

Moreover, the arguments in this chapter are based on the recognition that sign languages are the rightful mother tongues of deaf people who are unable to acquire a spoken language naturally. This is obvious in the case of deaf children of deaf parents, who acquire their parents' sign language as a native language from infancy. This language acquisition process is entirely comparable to the acquisition of a spoken language by hearing children (Meier 1991), and the sign language used at home naturally becomes the deaf child's native language. However, most deaf children have hearing parents, and the languages used at home are spoken languages that these deaf children cannot acquire naturally. Without hearing the spoken language, it is not accessible to deaf children, and they will typically go on to acquire a sign language from the time of their first contact with signing, which often happens at school age in a school for deaf children. For these people, the sign language typically becomes the primary and preferred language that is used for the greatest part of their day-to-day communication, just as in the case of deaf children of deaf parents. Therefore, the sign language can be identified as the mother tongue equivalent in both of these cases.

In addition to linguistic rights, deaf education in all three countries is also affected by issues of governance and resource allocation. These are discussed in the respective sub-sections, and a comparison table at the end of this section summarises the main issues.

The discussion in this section is limited to children and young people where the degree of deafness is of a severity that significantly disrupts communication in a spoken language and the natural acquisition of a spoken language. People who are hard of hearing rather than deaf (in terms of this functional linguistic definition), whether naturally or due to medical intervention, are not included in the considerations below. This also implies that the overwhelming majority of these children and young people are either sign language users or semi-lingual people without any successful first language acquisition.

A natural, age-appropriate and complete acquisition of a spoken language as first language (L1) is virtually impossible in the case of deafness as defined here. The early language deprivation that most young deaf children experience (unless sign language is present in their home environment) leads to disadvantage even before school or preschool age (Humphries et al. 2012), and this makes the role of school education particularly crucial. The remaining sub-sections provide details on how these disadvantages play out in the context of Ghana, India and Uganda.

3.1 Challenges to deaf education in Ghana: Language and linguistic issues

From the nature of the educational system of Ghana, there are bound to be endemic challenges for deaf education. There are no clear-cut policies specifically designed to govern the delivery of deaf education. The policies that are made generally to govern education delivery in Ghana are applied grosso modo to deaf education. There is no language in education policy for deaf education, there are no policies to regulate the design of curricula suitable for the deaf, and to deal with recruitment and training of teachers for the deaf schools, the provision of suitable classroom teaching tools, and other issues.

Linguistic issues remain the most damning factors that hinder deaf education in Ghana. Deaf children do not grow up mastering sign language until late when they go to school. Even in schools, most of the teachers who teach them do not have adequate signing skills to be able to communicate effectively with deaf students in class. Paradoxically, there are many teachers who still do not understand that sign language is a fully fledged language that should be developed and used as a medium of instruction and as a subject of study.

3.1.1 Pre-school level

Right from the pre-school level, deaf children suffer linguistic deprivation since virtually no sign language input is available to them. The majority of these children are born to parents who are hearing, and who do not have sign language skills to communicate effectively with the children. There are also no hearing people in the communities who are skilled signers. The net effect is that these deaf children enter pre-schools with a partial or failed first language (L1) acquisition. To aggravate the situation, the deaf children usually start pre-school at an advanced age already, with ages averaging 8 years and above.

Pre-schooling plays an important role in the learning life of children. The acquisition of the basic skills they require to journey through the educational system begins here. How successful they will be depends on the level of skills attainment they achieve here. These skills can only be imparted to them through language. But unfortunately, the children do not have enough linguistic skills to benefit from the instructions given at the pre-school, since their sign language immersion is actually just starting. It is also significant that the teaching and learning materials that are used in the pre-schools are the same as those used by hearing

children. These are mostly unsuitable and further compound the tasks of the teachers, who already have sign language challenges.

3.1.2 The Junior High School and Senior High School levels

By the time the deaf pupils get to the JHS, most of them would have acquired just about adequate linguistic skills to be minimally functional. They face challenges coping with the academic programmes taught in school. While their inadequate linguistic skills make the learning effort challenging, it is further compounded by the unsuitable teaching material and aids. At this level, a deaf education classroom should be equipped with digital aids and equipment which include projectors and screens, electronic whiteboards, computers, and educational software to assist in the teaching and learning process. But these are inadequate, if they are available at all in the schools.

The academic progression of the deaf pupils is dependent on their achievements at the Basic Education Certificate Examination (BECE). The examination tests the achievement in 10 subjects but 6 are weighted for the purposes of admission into the next level of the education hierarchy, which is the SHS. Deaf children are tested in the same subjects as their hearing counterparts. With inadequate preparation, the failure rate at the BECE among deaf students is very high, so that they can hardly compete for admission into mainstream schools. Consequently, all the pupils from the 17 JHSs for deaf children compete for placement at the only SHS in Ghana, the Senior High Technical School for the Deaf in Mampong Akwapem. Due to this, there is overcrowding in the Senior High Technical School, which makes effective teaching challenging.

The majority of deaf children exit the education system at the JHS level, at which point they would not have acquired any meaningful employable skills. Most of them therefore end up doing menial jobs, and taking up farming if they hail from the rural areas. Quite a number of them are also given the opportunity to acquire skills such as dress making, leather works, carpentry, and masonry in vocational schools.

3.1.3 The tertiary level

The cumulative effect of the ill-preparation at the pre-tertiary levels means that a minute number of deaf students are able to break through into the tertiary institutions, which is based on the scores attained at the SHS final examination, the WASSCE. These exams are sat by both hearing and deaf students. Since the former are better prepared, they perform well and compete among themselves for the vacancies at the tertiary

institutions. The few deaf students who make it to the universities attend lectures with their hearing counterparts. They are integrated into the university without optimal support. The classrooms where they attend lectures with the hearing students are not deaf friendly. Just like the SHS, they are ill equipped with digital and visual teaching aids. Coupled with these deficits is the lack of qualified Learning Support Assistants such as interpreters and note takers to help them have equal access to teaching and learning in such predominantly hearing classrooms.

Another challenge is that peer tutoring is virtually unavailable for the deaf students. When hearing students are able to form discussion and study groups, where they create and share knowledge, the deaf students are unable to join them due to the language barrier.

3.2 Ghanaian Sign Language (GSL) as a subject of study

GSL is accepted by the Government of Ghana, and non-governmental actors in education in Ghana, as the national sign language. In all 17 JHS, and the SHTS in Ghana, GSL is used as the language of instruction, alongside the English language. GSL is also taught to teacher trainees at the Akropong Presbyterian College of Education; at the University of Education, Winneba, a Special Education Department offers GSL as a subject. The Department of Linguistics of the University of Ghana also offers an elective programme in GSL over two semesters, after which students attain intermediate proficiency in GSL.

Despite its use in schools and its acceptance by government and actors in education, GSL is yet to be given official status (Akanlig-Pare 2018, 2019). Spearheaded by the Ghana National Association of the Deaf (GNAD), many advocacy initiatives have been undertaken to give GSL its official recognition. These are founded on statutory provisions of the 1992 Constitution of Ghana such as the one on the linguistic rights of Ghanaians in Article 39(3), which states as follows: 'The State shall foster the development of Ghanaian languages and pride of Ghanaian culture'. While successive governments since the pre-colonial era have responded to this provision and have adopted a language in education policy that allowed a Ghanaian language or languages to be used as mediums of instruction alongside English, GSL has never been one of them, as Table 1 shows.

Table 1: The language in education policies of Ghana from pre-independence to date

Pre-Independence Period	1827–1860	Castle School Era; Dutch, English and Danish
	1860–1925	Missionary Era; L1 and English as subject
	1925–1951	L1 from P1-P3; P4-P6 English
	1951–1956	L1 at P1 only; English thereafter
Post-Independence Period	1957–1966	English only; no L1
	1967–1969	L1 at P1; English thereafter
	1970–1973	L1 from P1-P3; extended to P6 where possible
	1972	French was added
	1974–2002	L1 from P1-P3 and English thereafter
	1987–1994	Study of Ghanaian language became compulsory at the SHS
	1994–2002	L1 from P1-P3
	2002–2007	English from P1; L1 as subject of study from P1-JHS
	2008-Present	L1 from KG1-P3; English thereafter.

*L1 (i.e. the first language / mother tongue) promoted in the policies: Fante, Asante Twi, Akuapem Twi, Nzema, Ga, Dangme, Ewe, Gonja, Kasem, Dagbani, Dagaare

The consistent advocacy efforts spearheaded by GNAD culminated in the inclusion of GSL in the Disability Act, Act 715 of 2006. Section 21 of the Act reads as follows:

> **Special education in technical, vocational and teacher training institutions**
> 21. The Minister of Education shall by Legislative Instrument designate in each region public technical, vocational and teacher training institutions which shall include in their curricula special education, such as
> 1. Sign language, and
> 2. Braille writing and reading

It took 13 years for a Legislative Instrument (LI), which was meant to spell out the implementation of this Act, to be drafted. Yet, what the LI says is as vague as the act itself. All it says is as follows:

> **ACCESS TO EDUCATION 11.**
> (2) The learning of Sign Language, Braille, alternative script, augmentative and alternative modes, means and formats of communication and orientation and mobility skills shall be promoted and facilitated.

Clearly, the status of Ghanaian Sign Language has not been helped with this law, 14 years on. It must, however, be noted that even for the spoken Ghanaian languages selected for use in schools, the implementation process has not been without teething challenges. Different political agendas, inadequate human resources and lack of textbooks and other teaching and learning material in the Ghanaian languages, have been cited as some of the challenges.

The expectation of a language policy, especially at the basic education level, is that children would have acquired some basic numeracy and literacy skills upon completing lower primary schooling, and would be ready for a more rigorous upper primary education where students are introduced to different subjects, including Religious Studies, Mathematics, Science and Physical Education. The sole official language of instruction throughout the Ghanaian educational system is English. Students may study in any of eleven selected Ghanaian languages for much of the first three years, after which English becomes the medium. Students can continue to study a Ghanaian language and/or French as classroom subjects through to at least the JHS. No provision has been made in the educational system of Ghana to take care of deaf students in this regard. So whereas the hearing children are given a bilingual education, the deaf students are subjected to a monolingual system, with English as the only language of study.

While Ghanaian languages are studied, Ghanaian Sign Language is not a subject of study even in the deaf schools. By not teaching GSL as a subject, deaf students' linguistic skills are compromised. Deaf students are denied the opportunity to master the structure and use of their L1 as hearing students do with their L1. Not teaching the grammar of sign language also does not challenge the language to develop in accordance with the linguistic and communicative needs of the deaf students. Studying the sign language as a subject will lead to the formation of new signs to refer to new experiences. The sign stock of the language could also be extended through linguistic processes such as compounding, derivations

and blending. In the end, the sign language will be equipped linguistically to deal with subject areas in mathematics, science and technology as well as every endeavour that requires the use of language.

The reason for not teaching GSL as a subject is that there is no pedagogical expertise in sign language in the schools. Not surprisingly, the teaching and learning materials used by deaf students in the deaf schools are the same materials used by the hearing students. So are the teaching methodologies. The teacher draws up a lesson plan, comes to class and delivers to the students. This has not worked well over the years, resulting in poor achievements of deaf students at both the BECE and the WASSCE.

The educational system has no clear policy with regard to the training and recruitment of teachers and personnel to the deaf schools. There is only one institution in Ghana, the Akropong Presbyterian College of Education (APCE), that trains qualified teachers for the schools for the deaf. Even though it is a plus that the APCE trains both deaf and hearing teachers for the schools for the deaf, the numbers trained are insufficient to fill the vacancies in all 17 JHS and the one SHTS for the deaf in Ghana.

As is expected, the majority of teachers who are posted to teach in the deaf schools lack sign language skills to be able to teach well. As a result no meaningful teaching and learning takes place. This contributes to the abysmal performance of the deaf students at the BECE and the WASSCE. Due to this, the progression of deaf students to higher institutes of learning is low, thereby resulting in their inability to acquire employable skills to help them earn meaningful livelihoods. Consequently, as far as the Human Development Index (HDI) is concerned, the deaf are among the most vulnerable, poor people in Ghana.

3.3 Politicisation of education in Ghana

The education system of Ghana may be one of the best in sub-Saharan Africa, but there are a lot of challenges facing deaf education that need urgent attention to make it optimally useful to the country. Governmental interference in policy implementation in the education system does not augur well for its growth. Successive governments have changed educational policies to suit their political ideologies. Such changes have affected the growth of education in Ghana, particularly deaf education. While successive governments have focussed their attention on improving mainstream education, deaf education has been largely neglected in contravention of statutory provisions such as are provided for in the 1992 Constitution of Ghana.

Since Independence, the ideological positions of the two main rival political parties in Ghana have shaped the system of education. This is problematic to educational development in Ghana in many ways. For instance, the number of years spent in the JHS and SHS have changed as these two parties have assumed governance in succession. From 1991 onwards, the amount of time spent in the SHS was 3 years. This was changed to 4 years in 2001. The 4-year school cycle was changed again to 3 years in 2009. These changes affected the JHS system as well as tertiary education, which also had to adjust in response to the number of years spent at the SHS. In this regard, Deaf education was also adversely affected.

Another dimension to the politicisation is the fact that educational policies of one administration were either truncated or pursued in a manner that was conducive to the current administration. This was the main reason why it took 13 years for the Legislative Instrument for the Disability Act, Act 715 to be completed in 2019. Indeed, during the fallow period between administrations, many of the provisions of the Act were not rolled out since they did not interest the party in power.

The politicisation also finds expression in the fact that each party comes to power on the back of some electoral promises. Given that deaf education is not high on the agenda of a political party, education policies will be silent on it. For instance, one of the successive governments promised to deliver SHS buildings to each community in Ghana, and even though there is only one SHTS for deaf students in the country, that government did not consider building one for them. Since deaf education is not considered for infrastructural development, there continues to be over-crowding in the deaf schools, with its concomitant challenges with regard to staff-student ratios that inhibits effective teaching and learning.

Once the political will to foster the growth of deaf education is lacking, it is expected that funding for it will not be forthcoming either. Indeed, over the years funding for deaf education has trickled down from the meagre budgetary allocation to the Special Education Department (SPED) of the Ministry of Education, which is tasked with catering for the physically challenged, the deaf as well as the blind. The largest budgetary allocation to date given to the SPED was approximately 1% of the budget of the Ministry of Education. Subsequent years have seen a decrease in the allocation. For instance, the allocation to SPED in 2015 was approximately 0.4% of the Ministry of Education's budget.

3.4 Systemic disadvantages for deaf learners in India

The observations in this sub-section cover all levels of general education as well as vocational and professional training and teacher training. The discussion here focuses on the systems as such, and not on the implementation of the various regulatory structures and provisions, though comments will be made from time to time about implementation. Although it should be explicitly acknowledged that difficulties with implementation of existing provisions is a major factor in the disadvantage of deaf students at all levels, it is also true that implementation of educational provisions for deaf learners varies widely across the country. Therefore, a general analysis is best based on existing structural issues. The potential for the structures to negatively impact on the education of deaf people equally applies across the country.

3.4.1 Preschools and primary schools

The learning journeys of deaf children in India are in many ways similar to their Ghanaian peers, and there are very few opportunities to remedy the situation of disadvantage from the outset. Special deaf preschool programmes are very rare, and where they exist, they often occur in the context of medical interventions intended to restore hearing (for instance, preschool programmes for children receiving cochlear implants). Systematic use of sign language in special deaf preschools is marginal, if it exists at all. Instead, where programmes do exist they are likely to focus on auditory rehabilitation of some kind.

When children enter mainstream primary schools, these schools are not equipped to deal with receiving semi-lingual or a-lingual children, who are in need of linguistically enriched and linguistically accessible environments. Many deaf children go through several failed primary school placements. Under the circumstances, one would expect that the primary departments of special schools for deaf children would offer linguistic enrichment, in particular through abundant use of sign language. However, linguistic deprivation often continues instead.

There are several factors contributing to the failure to remedy early language deprivation of deaf children in primary schools, including the fact that sign language-using teachers and sign language-based learning materials are largely unavailable. Despite recent pertinent legislation, there is still a widespread focus on spoken/written language and a disregard for sign language in schools.

In the cases where deaf children, sometimes after attempting mainstream education, attend a special primary school for deaf children,

they gain exposure to sign language from their sign language-using peers in the school, that is, from older children, or from children of any age who have sign language-using family members and have acquired sign language before starting school. Typically, whatever sign language is encountered in such a school then becomes the first language, though with a delayed L1 acquisition pathway, and often without substantial exposure to adult language models.

In summary, the inbuilt structural disadvantage for deaf children at primary school level centres around the failure of educational settings to provide an environment that is conducive to successful first language acquisition. In fact, none of the educational policies that are intended to guarantee a basic level of education for all, such as the Right to Education Act (2009), in any way take account of the need to guarantee a complete first language acquisition for all children. Although India is a signatory to the UN Convention on Rights for Persons with Disabilities and subsequently enacted new legislation in the form of the Rights of Persons with Disabilities Act (2016), access to education through sign language and training of teachers who are fluent in sign language has not been put in place, though there are several promising recent developments (see section 4). In practical terms, only in a small minority of schools is the acquisition of sign language as L1 supported in any systematic way, or explicitly enabled by the presence of adult sign language users as mature language models.

3.4.2 Secondary and vocational education

Secondary education for deaf students is even more limited than primary education. In mainstream schools, it is increasingly difficult for deaf students to follow lessons in the absence of specialist support. Special schools for deaf children often do not cover the entire range of the secondary years. Deaf schools may only take students until class VIII or class X, with no option for further studies. For example, in the state of Uttar Pradesh no programme for deaf students at the level of class XI and XII was available in the entire state until a specialist rehabilitation university established such a programme on its campus.[2] Where no schooling is available, the National Institute of Open Schooling may be the only option to access class X and class XII exams.

2 This programme is hosted at the Dr Shakuntala Misra National Rehabilitation University, Lucknow.

In terms of career options and employment readiness, the most important barrier to deaf students' success is probably the 10th standard board exam. As the skill base is so low and so many deaf learners are still functionally illiterate after class X, passing these exams is exceedingly difficult, if the students arrive at this stage at all and have not already dropped out earlier. In either case, acquiring skills leading to employability and access to non-menial jobs is a challenge.

As this situation has continued over the years and the gaps are clearly visible, there have been many recent and current attempts to 'rehabilitate' deaf youth via vocational education, in order to make them 'job-ready'. Sizeable training ventures have often been funded by private donations (e.g. CSR funding to NGOs), including the programmes of Youth for Jobs, CentumGRO and V-shesh. The central Indian government's 'Skill India' initiative has a separate PwD (Persons with Disabilities) stream, but this is largely inaccessible to deaf youth due to the language barrier. An alternative possible approach has been to sensitise potential employers to deafness and sign language, and some companies have sizeable groups of deaf employees (e.g. some hotel chains).

Whether by design, due to resource shortage, or under pressure from funders, many of these vocational rehabilitation programmes have in common that they can only attempt short-term solutions to try and repair years of damage, with the training duration typically between a few weeks and six months. As the long-term systemically accumulated disadvantage cannot really be addressed in that time frame, the long-term success is yet to be evidenced. To the extent that sign language interpreting is not sufficiently available, and literacy levels remain marginal so that written communication is also not an option, sustained employment would seem to be challenging and career progression impossible.

The only professional training programme that is specifically aimed at deaf sign language users is a two-year diploma in Indian Sign Language teaching (DTISL). This provision originally began as a series of shorter certificate courses at the Ali Yavar Jung National Institute of the Hearing Handicapped (at the headquarters in Mumbai and in four regional centres), and now runs at several institutions, including the Indian Sign Language Research and Training Centre (ISLRTC), which also runs a two-year diploma course in ISL interpreting (DISLI). Students who graduate from the programme can work as accredited sign language teachers and are registered as professionals by the Rehabilitation Council of India.

Except in the above-mentioned programme for class XI and class XII at the National Rehabilitation University in Lucknow, Indian Sign Language has not been available as a school subject in India. However,

the National Institute of Open Schooling has developed ISL as a subject at 10th standard, and this may contribute to increasing pass rates of deaf NIOS students at this level in due course (see Singh & Mahapatra, this volume)

In the same way as in primary education, issues of language acquisition are the most pertinent point of disadvantage for deaf students at secondary and vocational levels of education. In mainstream schools, the three-language formula provides for multilingual instruction. As deaf students struggle with acquiring functional literacy even in a single written language, some state governments have tried to address the issue by removing additional language requirements from deaf education. While this may superficially increase pass rates, it is nevertheless a structural disadvantage that excludes deaf students from the expectation of acquiring proficiency in several languages. In particular, literacy in English is in high demand among deaf youth.

3.4.3 Tertiary/ Higher Education

The penetration of deaf people in Higher Education is absolutely marginal in India because of barriers to successful primary and secondary education as noted above. Very few students have realistic HE opportunities, in particular those who have acquired sufficient literacy due to some individual fortunate circumstances, or those in special programmes for deaf college-age learners. Efforts have recently been made by central and state governments to establish colleges for deaf students, some of which are intended to focus on vocational courses.

There are very few special programmes in India targeting deaf learners at the tertiary level. These include private institutes (which may be government funded) such as the National Institute of Speech and Hearing in Kerala, and government-initiated provisions such as the National Rehabilitation University in Uttar Pradesh (Lucknow). From 2009 to 2016, India's first (and so far only) university-level course on sign language was operational at the Indira Gandhi National Open University. The BA in Applied Sign Language Studies was developed and operated in collaboration with the University of Central Lancashire. It was exclusively targeted at deaf learners, and ca. 70 deaf students graduated from the programme, including non-Indian students from other countries in the Global South.

3.4.4 Teacher training

As mentioned in section 2, teacher training for the special education sector is separate from mainstream teacher training and comes under the responsibility of the Ministry of Social Justice and Empowerment. Employing certified special educators is not a requirement placed on schools for the deaf; mainstream qualifications such as D.Ed and B.Ed are also acceptable and sufficient for schools who want to receive grant-in-aid from government. Nevertheless, the fact that special teacher training exists for the 'Hearing Impairment' sector is highly relevant.

Structural disadvantage for deaf students in India follows from the way in which this special education teacher training is set up, overseen, and implemented. First of all, unlike all other teacher training, the entire special education oversight is centralised under the Rehabilitation Council of India (RCI), which unlike its mainstream counterpart has no state-level infrastructure. The consequent remote management has many disadvantages, as the limited number of staff in New Delhi are unable to oversee relevant provisions in person. Instead, the RCI works through various constituted committees and inspection teams, who undertake travel to visit teacher training programmes.

At present, no programme exists to train deaf people for teaching roles using Indian Sign Language. Moreover, the existing programmes such as D.Ed (HI) and B.Ed (HI) are not deaf-friendly, either in terms of the curriculum or in terms of the delivery. For example, deaf students choosing such a course do not have the right to sign language interpreting being provided to them. More serious is the fact that none of the existing programmes in special deaf education produce teachers with sufficient ability to communicate with deaf children. Fluency in Indian Sign Language is neither a requirement for entering these programmes, nor a requirement for graduating from them. Although the ISL content in the B.Ed (HI) is expected to increase, this is nowhere near enough to look after essential components in deaf education such as first language acquisition, let alone being able to teach secondary-school-level content in ISL. Even the limited sign language provision in the curriculum is not guaranteed to be implemented because there are not enough qualified sign language teachers, or the institution running the programmes does not place value on this element of the course. Moreover, there are no training programmes aimed at sign language users to become professionals in educational settings.

It is easy to see how the inability to communicate with deaf students in the classroom leads to all the systemic and structural problems described above. In addition to inertia within the system, which has meant that

teacher training for deaf education has still not caught up with the results from several decades of sign language research, the main underlying reason for the high levels of disadvantage experienced by deaf children and youth in education is the marginalisation of sign language. This is explored in more detail in the next sub-section.

3.5 Sign language in deaf education in India

This sub-section details the ways in which Indian Sign Language and its user community have been excluded from playing a sufficiently recognised and supported role in the education of deaf children and youth. Sign language is not only excluded because of practicalities and resource issues, although especially the latter factor of course plays a very important role. Exclusion is also due to remaining prejudice and continuation of a medical model of deafness, where the disabled deaf person needs to be 'fixed' in order to fit into mainstream society. This view has been slow to change, although a rights-based, social model of deafness, where the disablement of the person arises from the way in which society fails to accommodate disabilities, has been gaining ground in India.

However, championing a view of deaf communities as linguistic minorities has not automatically resulted in an understanding of the various language acquisition issues that are at the root of so much of the educational disadvantage of deaf learners in India. Viewing deafness in the context of education as something that primarily needs to be addressed by linguists (rather than by ENT doctors, audiologists, rehabilitation personnel, social workers, rights activists, or special educators) is very much a minority view in India, as well as in many other countries.

On the positive side, Indian Sign Language is by now a well-documented language whose linguistic status as equivalent to other Indian (spoken) minority languages is no longer in question (cf. the contributions in Bhattacharya, Grover & Randhawa 2014). In fact, ISL has a unique status among the languages of India because it is the only indigenous pan-Indian language. Regional dialects of ISL in different parts of India largely share the same grammatical structures, but differ to some extent in their vocabulary. Multidialectism and familiarity with several regional vocabulary variants is widespread in the Indian deaf community.

Among the developments that Indian Sign Language has benefited from in recent years, the following are particularly relevant:

– Development and implementation of an Indian Sign Language interpreter training programme and an Indian Sign Language teacher

training programme. Both of these are now accredited diploma-level qualifications under the Rehabilitation Council of India.
- Increasing availability of sign language interpreters, although still very patchy and subject to a huge manpower shortage.
- India's first graduate-level programme in sign language, the Bachelor of Applied Sign Language Studies (2009–2015) at the Indira Gandhi National Open University in New Delhi.
- Indian Sign Language as a school subject for 11th/12th standard at the National Rehabilitation University in Lucknow.
- Inclusion of sign language in several parts of the Rights for Persons with Disabilities Act (2016).
- Establishment of the Indian Sign Language Research and Training Centre under the Government of India in 2015, with the remit to develop sign language resources, train sign language professionals, raise awareness on sign language and promote the use of sign language in deaf education.
- Development of ISL as a school subject by the National Institute of Open Schooling due to NEP 2020.

While these developments are welcome and significant in their impact, it is very noticeable that none of them has significantly affected the education of deaf children and youth or interacts systematically with the existing educational systems. Let us therefore look at whether the Indian Constitution may be useful for championing the use of ISL in deaf education, as the Constitution makes a number of provisions in relation to languages and education.

It is clear that the Constitution regards India as a multilingual country where diversity is valued and respected, and where the languages and cultures of minorities should be protected. Part III, §29.1 states:

> 'Any section of the citizens residing in the territory of India or any part thereof having a distinct language, script or culture of its own shall have the right to conserve the same.'

In addition, §30 states that '[a]ll minorities, whether based on religion or language, shall have the right to establish and administer educational institutions of their choice.'

The Indian Constitution makes provisions for assigning a particular official status to individual languages, in the form of so-called 'scheduled languages' (see Ministry of Home Affairs 2019) at national level, as well as provisions for individual states to choose their own official languages which may or may not coincide with the scheduled languages.

Finally, all linguistic minorities in the Republic of India have certain rights relating to the educational domain. Specifically, linguistic minorities have the right to instruction in their mother tongue in primary education (Part XVII Chapter IV, §350A), which says:

> 'It shall be the endeavour of every State and of every local authority within the State to provide adequate facilities for instruction in the mother-tongue at the primary stage of education to children belonging to linguistic minority groups'

This is particularly pertinent in view of the fact that sign languages are now widely recognised as the mother tongues of deaf children who cannot naturally acquire a spoken language as their first language (Murray et al. 2016). However, currently all of these provisions, rights, and categorisations apply to spoken languages only. There has been no explicit attempt at applying any of these sections of the Indian Constitution to the Indian deaf community and their sign language, Indian Sign Language.

The situation with sign language-based teaching and learning resources has been improving in recent years. There have been several initiatives to create learning resources that are either bilingual in Indian Sign Language and writing, or exist purely in the form of ISL videos (see section 4 for details). However, most of these initiatives are private, and the resulting products are unrecognised. There is no systematic distribution of such materials to contexts where deaf children and youth are being educated. A notable exception is the distribution of ISL materials by the National Institute of Open Schooling (Singh & Mahapatra, this volume).

Likewise, there are very few explicit approaches to using Indian Sign Language as first language (L1) in order to teach a second language (L2), primarily in the form of literacy (reading and writing). This approach is known as Sign Bilingualism. However, there are no specific teacher training programmes and no systematic dedicated resources to implement Sign Bilingualism in classrooms with deaf learners. The various private initiatives remain patchy because they do not have support at a policy or systemic level; therefore, their reach necessarily remains limited.

3.6 Deaf education in Uganda: Governance and resource issues

We now turn to a discussion of systemic issues in deaf education in Uganda. A detailed desk review of relevant literature on the international, regional and national laws, policies and frameworks on deaf education was conducted with a view to examining the underlying governance issues. In addition, co-author Mugeere also conducted face-to-face and online interviews with 15 deaf educators, officials working for

organisations with deaf-related programmes, and parents and caregivers of deaf children.[3] The study participants were purposefully recruited through Disabled Peoples' Organisations (DPOs), government agencies and Non-Government Organisations (NGOs) using the snowball method. All the quotes cited here were re-read by the contributors for accuracy.

An analysis of these policies, legal framework, development plan and programmes shows that they promote deaf education for children with varying forms of hearing impairment in all parts of Uganda. Widely referred to as special needs education, the framework not only makes it a compulsory component of primary teacher training, but also outlines appropriate classroom methodologies and life skills to be used for this type of training. Data gathered from interviews with policy makers at various levels of education implementation also strongly points to widespread knowledge of the existing framework for the programme—as explained thus:

> Uganda's governance structures and policies for deaf education are well set in place but the problem is that the country seems not to be in position to implement inclusive education which is a key component of deaf education. First, we are yet to establish more special needs schools; some of which are for the education of the deaf while the promotion of sign language which is critical for deaf education has only received lip service (Key informant, working with a civil society organisation).

The study's findings also show that deaf education governance is further undermined by the failure to institute clear monitoring and evaluation mechanisms in the country. Despite the promotion of affirmative action awareness campaigns by government and Disabled Peoples' Organisations (DPOs) for—among other things—deaf education especially at primary school level, there is limited effort to provide adequate resources to monitor the design and implementation of this education component. There are also governance issues related to inadequate numbers of specially trained teaching staff, learning materials and inspection of special needs schools.

> The governance of deaf education needs to be urgently streamlined. Despite all the government commitments over the years, there is a

3 For all interviews held, full written consent was always sought. Besides, all study participants were granted anonymity and confidentiality during the entire research process.

> lack of an appropriate deaf learning environment that is free from physical and psychological barriers. There is also no governance structure regarding the inspection of such schools (Ministry of Education and Sports official—key informant).

Other governance issues that emerged from the findings of this study include the inappropriate national Primary Leaving Examinations (PLE) curriculum which is unconducive to children in the schools for the deaf. Whereas the standing PLE governance rules in Uganda stipulate that all deaf and hard of hearing children must be fluent in the English language before they are graded in a given subject, this disregards the widespread assertion that learning any second language (in this case English) is influenced by one's mother tongue.

> To me, this is a critical governance issue for deaf education in Uganda. Many of these children are at a disadvantage because of the disability condition which means that they end up failing exams and are unable to continue schooling. It needs to be addressed urgently (parent of a deaf child attending an inclusive school).

The findings show that even if Uganda has one of the most elaborate governance frameworks for deaf education among developing countries, there is a lot that needs to be done to achieve the level of implementation necessary for attaining quality education for these individuals. Overall, deaf learners are performing poorly, dropping out of school, and the few who complete primary education cannot continue with formal education due to a host of inhibiting factors resulting from poor planning and weak enforcement of legislation (Mbulamwana, 2013).

A pervasive inhibiting factor that holds back improvements in deaf education in Uganda is the issue of resource allocation. Implementation of existing legal provisions has been bedevilled by the fact that only an average of 0.33% of the education sector budget is allocated to financing Special Needs Education. By contrast, the Persons With Disability Act (2006) stipulates that not less than 10% of all educational expenditure should be allocated to the needs of Persons with Disability (PWDs). In addition, most special needs schools are hampered by a lack of technical, human, financial and physical public resources (CSBAG & DGF 2013).

Key factors among the outcomes of the failure to streamline governance protocols include: absence of an inclusive education policy, non-enforcement of primary education policy, absence of sign language interpreters in most schools for the deaf and the failure to implement early childhood development policies for the deaf. Besides undermining

efforts to attain the Sustainable Development Goals (SDGs), the failure to streamline governance of deaf education has also curtailed sensitisation efforts to promote deaf education in the country.

3.7 Comparing disadvantage in education systems

In all three countries, we have seen that language-related issues are at the forefront of disadvantage for deaf learners, beginning with early language deprivation and continuing in later years with lack of access to sign language and literacy. Naturally, early language deprivation is likely to interfere with age-appropriate cognitive development, as the linguistic tools to underpin cognitive development are underdeveloped or absent until the point where an accessible linguistic environment is encountered. As a rule, deaf children either acquire a sign language as their first language, if they are in a special deaf school or have sign language in their home environment, or they are at risk of becoming semi-lingual with no strong first language base. In both cases, deaf school leavers are likely to be functionally illiterate, which restricts their opportunities in later life. Moreover, deaf children's journey through their school career is often delayed by several years. The penetration of deaf students in tertiary education is very low in all three countries.

The policies around language and the status of sign language differ across countries. However, the education of deaf learners suffers from being under-resourced to various degrees, particularly in Uganda and in Ghana. Lack of institutional, financial and human resources prevents the implementation of favourable policies.

The dynamics of deaf education policies and the status of sign language are subject to different civic and political drivers in each country. In Uganda, we see more stability and continuation of efforts, with the national deaf organisation (UNAD) as a consistent advocate and the status of sign language legally secured from the beginning. In both Ghana and India, language policies for spoken languages are a contested political issue, and it has been difficult for sign language to find its place. However, there has been a recent substantial boost to the status of Indian Sign Language with high-level policy changes.

Table 2 summarises some of the issues discussed so far.

Table 2: Comparing the status quo of deaf education

Comparative element	Ghana	Uganda	India
Relationship between mainstream education and special education for the deaf	– Focus on improving mainstream education by successive governments, but deaf education largely neglected.	– Elaborate governance frameworks for deaf education, but problems with access to learning due to weak enforcement of existing policies.	– Special education and associated teacher training regulated separately from mainstream education under the Rehabilitation Council of India. – Pathway of alternative primary and secondary schooling outside the mainstream system through the National Institute of Open Schooling.
Resources for deaf education (institutional, financial, human)	– Insufficient number of teachers to meet the demands in deaf schools, which are predominantly staffed by hearing teachers without adequate signing skills. – One teacher training college offering GSL classes, but it mostly trains hearing people.	– Little to no provision of sign language interpreting in most deaf schools. – Bespoke digital sign language resources, but minimal investment in teacher training to use these resources, which are also expensive for deaf education institutions.	– Current teacher training unable to produce teachers with appropriate level of skills in ISL. – Increasing amount and variety of sign language content online. – National-level institution for ISL, i.e. Indian Sign Language Research and Training Centre

Table 2: continued

Comparative element	Ghana	Uganda	India
Status of sign language / language policies and sign language	– The Disability Act, Act 715 (2006) recognises GSL, but little has been done to date to implement it. – GSL not included in official language policies, but accepted as the national sign language and used as a language of instruction alongside English in many deaf schools. - GSL is also taught at some HE institutions.	– Legal status of USL under Uganda's constitution. – Several policy instruments, but little work on implementing the provisions enshrined within the policy framework, such as access to health services and public life through USL.	– Recognition of ISL in the Rights of Persons with Disabilities Act. – Provisions relating to ISL in education under the recent National Education Policy (2020).

4 The way forward in deaf education

Having analysed systematic barriers and disadvantages that deaf learners at all levels face within the framework of the current systems of education in India, Ghana and Uganda, we now turn to the question of how the situation of deaf learners could be improved. In the light of the analysis in the previous sections, it seems unlikely that the current situation of structural disadvantage could be resolved merely by an increase in resources. It would not be sufficient, for instance, to develop a few additional instructional packages targeted at deaf students, or to provide for a mere increase in the number of special education teaching professionals under the existing professional training regimes. Nevertheless, some useful interventions can be envisaged based on increasing resources that target teaching and learning materials or awareness raising tools, and these are discussed in section 4.1.

More importantly, resource increases alone do not address underlying causes of educational disadvantage. Therefore, there is a need to analyse other leverage points that could have a larger impact. Some of these are based on deaf sign language users' linguistic minority status and their

unique pathways towards the acquisition of language and literacy skills. We consider several such possible leverage points. Firstly, the official status of sign languages is relevant, particularly in India and in Ghana (section 4.2). In all three countries, it is also important to consider issues related to the systems of educational governance (section 4.3). Finally, changes can be made to the training of teachers and other professionals, both with respect to introducing sign language training for hearing staff and with respect to facilitating opportunities for deaf sign language users to work in deaf education (section 4.4). A comparison table in section 5 summarises potential leverage points across all three countries.

4.1 Teaching and learning resources

The discussions in this chapter point to interventions that could be implemented to promote awareness of language issues or improved teaching and learning materials. In Uganda, a good example is the recent emergence of digital resources on Ugandan Sign Language (USL). There are two useful interventions:

- Scaling up the USL digital learning platforms: Since 2017, the Ministry of Education and Sports has been implementing a project aiming to make access to digital USL open source learning content available while at the same time maintaining its originality and quality. The key output of this project includes a strategic guidance document to inform the design and development of USL digital learning contents, which will result in a mobile application, an eLearn Webportal, and DVD modules. Other project objectives include mainstreaming USL so that deaf students and persons can access education and other services.
- USL Mobile App: There is a need to promote the use of the Ugandan Sign Language mobile app to ease communication among the deaf pupils and community in general. Launched by the Uganda National Association of the Deaf in 2019, the app – dubbed UGsign Mobile – was developed in partnership with SPIDER, a Swedish programme for ICT in developing regions, to make learning of sign language accessible via digital platforms. It is expected by policy makers that the promotion of the app, which contains sign language interpretations for all English words, will break many barriers affecting deaf education in Uganda.

While a number of individual deaf teachers and IT specialists are developing digital apps to make GSL learning easily accessible in Ghana, governmental involvement in this is missing. A notable example of this effort is the mobile app called HandsLab developed by a GSL tutor at

the University of Ghana in collaboration with researchers from Leiden University in the Netherlands. The app contains a modest 1,300 sign entries with English translations and is suitable for teaching and learning in the school system for both deaf and hearing children. It is also suitable for GSL interpreters, as well as healthcare workers such as nurses, pharmacists and doctors who need GSL to be able to communicate with deaf persons attending their facilities. Another app developed and in use is the Ghana Sign Language Dictionary produced by a Ghanaian NGO, Ayele Foundation, in collaboration with Mill Neck International. If government gives institutional backing to these efforts, it will go a long way in popularising GSL and consequently increase its acceptability and use by Ghanaians.

In India, teaching and learning materials using Indian Sign Language have been gaining popularity and uptake is accelerating, with a large number of educational video collections. Deaf children and youth in India need multilingual education, where the sign language is explicitly used and recognised as the most essential part of their linguistic repertoire. This in itself is not a new idea in India. Multilingualism and Multilingual Education (MLE) have long been at the forefront of sociolinguistic and educational discussions in India (e.g. Pattanayak 1990, Annamalai 2003, Agnihotri 1995, 2006). Research institutes and centres such as the Central Institute of Indian Languages and the consortium for MLE established at Jawaharlal Nehru University New Delhi have been promoting multilingual research, development, and resource creation, and there is substantial useful experience in practice too. For instance, in the state of Odisha, which has a particularly high percentage of tribal populations including 62 different groups, the government ran an MLE programme until 2013 (Mohanty et al 2018). The country should therefore be well placed to extend this approach to deaf education, although MLE has not been applied to deaf sign language users so far. However, there is much scope in developing teaching and learning materials that are grounded in the MLE approach already piloted with other minority language users in India. Notably, the following initiatives are already ongoing:

- the Digital Sign Library project at Haryana Welfare Society for Persons with Speech and Hearing Impairment, where deaf sign language users create content in Indian Sign Language based on school curricula;
- translations of 10th standard textbook material into Indian Sign Language at the National Institute of Open Schooling (see Singh & Mahapatra, 2019 and this volume);

– dictionary/glossary entries of technical, professional, and academic terminology in Indian Sign Language created by the Indian Sign Language Research and Training Centre.

Obviously, this kind of teaching and learning material is based on video recordings, and consequently all the above resources are in the form of multimedia content. Using video editing software allows the sign language videos to be combined with inserts of pictures, text slides, and similar content. The content is either distributed via the Internet or, in the case of the NIOS material, additionally via satellite television. The distribution of such content is still a challenge in areas of India where Internet access has not reached the required bandwidth, but India has made great strides in providing increasing Internet bandwidth at ever diminishing cost.

Therefore, extending this line of development is highly feasible. At the same time, teaching and learning materials on their own cannot provide a satisfactory solution, whatever their technical and linguistic quality. The most impactful innovations in this area can be expected where the creation of such material is combined with the development of sign language-using professionals in deaf education, especially deaf professionals (see section 4.4). Secondly, consideration must be given to the curricula that would be supported by new groups of professionals and new teaching and learning materials, and the delivery of such curricula. From the arguments in the above sections, it follows that for younger deaf children, language and literacy content in their curricula must be of prime importance. Once students are literate in a written language and fluent in sign language, they have a much better chance of becoming independent learners.

4.2 The official status of sign languages

As we have seen in section 3, many of the issues around barriers to education for deaf students, as well as many of the opportunities for improvements, rely on access to a sign language. Therefore, the official status of sign languages in each of the three countries is a matter of concern, although official recognition on its own does not guarantee access to resources such as educational materials or sign language-using teachers.

With respect to the official status of sign language, Uganda is different from the two other countries. In Uganda, sign language was recognised in the constitution in 1995. In fact, Uganda was one of the first countries worldwide to recognise its sign language in this way. Therefore, efforts

in Uganda do not focus on official recognition but on implementation and resources. In India and Ghana, there are frameworks for recognising languages for various official purposes, including for education, but relevant legislation has so far not been applied to sign languages.

The frequently changing language policies in Ghana have been described in sections 3.2 and 3.3. As summed up by UNESCO (1953), the use of children's mother tongue or L1 to start their education has emotional, psychological, linguistic and academic benefits for them. Being aware of this crucial role a learner's first language plays in effective pedagogy, GSL should be approved as one of the Ghanaian languages used and taught in Ghanaian schools at all levels. To start with, it should be included as one of the Ghanaian languages in the language policy of Ghana. This will give it the official status it has lacked over the years.

The official status should make it compulsory to integrate GSL into the curricula of the Ghana Education Service. Depending on the language policy in vogue, GSL would be a subject of study for hearing children from the upper primary level to the JHS, SHS and the tertiary level of the education system of Ghana. The practical benefit of this to the deaf students is that, at the tertiary level for example, the communication barrier will be bridged as hearing students would be adequately proficient in GSL and be able to interact with deaf students who are course mates about their course work and extracurricular activities.

Furthermore, a deliberate policy to design curricula that are deaf centred should also be pursued. Such curricula would be bilingual in nature, where GSL will be both a language of study and a medium of instruction in deaf schools. When GSL is a language of study, it will provide both internal and external motivation for the language to grow. Linguistic gaps in terms of vocabulary and grammar, for example, shall be addressed. A robust GSL should facilitate the teaching and learning of every subject including maths, science and technology.

In India, the provisions, rights and categorisations of the Indian Constitution with regard to language and culture as summarised in section 3.5 do not need to apply to spoken languages alone to the exclusion of sign languages. It is clearly possible to extend the scope of these sections to include the visual-gestural modality of a sign language. If a group meets commonly used criteria for identification as a linguistic and cultural minority, as argued at the beginning of section 3, it clearly should be included in these provisions. It is also pertinent to point out that Indian Sign Language has more users than several of the existing languages currently recognised as scheduled languages.

The fact that dialects of ISL are used in all regions of India makes the language different from regional spoken languages that have gained official recognition in the past, and in fact different from any indigenous Indian spoken language. While the Constitution provides for regional languages to gain official status in individual states if there is a substantial number of users of this language, this provision is difficult to apply to Indian Sign Language despite the large number of users because Indian Sign Language is not geographically restricted to individual states. Since Indian Sign Language is a pan-Indian language used by a pan-Indian deaf community, official recognition makes most sense at the national level, for example in the form of inclusion of ISL as a scheduled language.

So far, Indian Sign Language has been given recognition in important legislation and policy documents. Firstly, it appears in the Rights of Persons with Disabilities Act (2016), although the Act merely mentions 'sign language', and not Indian Sign Language, which can lead to certain ambiguities.[4] The National Education Policy (2020), on the other hand, does mention 'local sign languages' in addition to ISL. Moreover, the establishment of a national-level centre working on sign language, the Indian Sign Language Research and Training Centre, is further explicit recognition of Indian Sign Language and its user communities.

However, these measures do not yet put ISL on a par with spoken languages used by similar sizeable linguistic minorities in the Indian context. In a context where the Indian central government and state governments have explicit legislative instruments to recognise languages, an equivalent official recognition for Indian Sign Language at the same level must become a priority. In other countries, where governments do not make use of the notion of official languages, such recognition would have a less prominent status. However, in the Indian context official recognition on a par with spoken languages is especially pertinent.

The main argument arising from a call for official recognition of Indian Sign Language is the fact that this would enable the Indian community of sign language users to have the linguistic rights of minority spoken languages applied to their sign language. Gaining official recognition

4 This Act makes no mention of the fact that various different sign languages are used within the territory of India. The issue of minority sign languages in India, such as rural sign languages in small-scale communities with hereditary deafness (cf. Panda 2012), adds another level of complexity. At present only ISL has a substantial number of linguistic and educational resources. Other minority sign languages, as well as the considerable dialectal variation within Indian Sign Language, need to be respected and valued, even if bespoke resources cannot be made available.

and hence access to linguistic rights would also provide access to certain protections for sign language users, such as the constitutional right of linguistic and cultural minorities to preserve their languages and cultures and to establish and administer educational institutions of their choice, as mentioned in section 3.5.

4.3 Issues of governance in educational systems

In Ghana, deaf education is supervised directly by the Special Education Division (SPED), one of four units of the Ghana Education Service (GES). The core mandate of the SPED is to ensure that equal opportunities are created for people with disabilities at the pre-tertiary level of education. However, the policies to ensure that this mandate is fulfilled are not usually made with recourse to the SPED, and therefore they are usually problematic. For instance, the posting of teachers to deaf schools is not done by the SPED which knows the teaching manpower needs of deaf schools. Instead, this is done by the manpower and supervisory unit at the headquarters of GES, usually without the consultation of the SPED. As a result, teachers without signing skills and the relevant training in special education are posted to deaf schools.

Funding for specific deaf-centred projects is usually not forthcoming because the GES has its own priorities. Infrastructural development in deaf schools is infrequently funded. Developments such as the creation of deaf-friendly classrooms, equipped with projectors, electronic whiteboards and other digital assistive devices that will enhance the teaching and learning experience, are not funded as a result of this.

Another governance bottleneck concerns curriculum development and designing and production of teaching and learning material suitable for deaf students. The curriculum is produced by the Curriculum Research and Development Division at the Headquarters of the GES. SPED may only make inputs, but invariably, the curriculum used in deaf schools is the one designed with the hearing students in mainstream education in mind, and therefore, all of it does not suit the deaf students. The same applies to teaching and learning materials. This state of affairs is largely due to funding issues since SPED does not operate a budget separately, which is meant for these activities.

To avert these challenges, government should commit to creating a separate unit specifically to administer deaf education. This will ensure that relevant expertise is introduced into handling deaf education. Staff in this unit shall be persons who have the requisite training in Deaf Culture and deaf education. This unit should be given the mandate to recruit as well as post staff to deaf schools. As a separate unit, it should

have a designated budget, to improve the infrastructure needs of the deaf schools. With the right calibre of staff at the deaf education unit, the design of suitable curricula for deaf education should be feasible. These curricula must be deaf-centred. In the same vein, teaching and learning material suitable for deaf education would also be funded.

In India, the central issues are not due to a lack of resources, although there is much room for improvement as well, but due to the way that deaf education is organised. An important weakness in the current system of deaf education in India, along with special education in general, is that its governance has been separated out from mainstream education. That is, the Ministry of Education (previously Ministry of Human Resource Development) does not hold the ultimate responsibility for special education. Instead, teacher training for special education is under the remit of the Rehabilitation Council of India, which in turn functions under the Ministry of Social Justice and Empowerment. The same Ministry is also responsible for the accreditation of special schools.

In and of itself, this division of labour may not be a design fault, and it was certainly established in order to support, not disadvantage learners with disabilities. However, at the level of implementation this system is not resilient and is prone to risk from human resource shortages. Whereas mainstream education is channelled through state-level governance for the accreditation of teacher training, the training of teachers, and the design and implementation of curricula, important parts of special education are centralised nationally under the Rehabilitation Council of India.

The centralised functions notably include the design and accreditation of all professional development and professional training courses in the area of disabilities, as well as accreditation and monitoring of all institutions in the country delivering these courses. However, in relation to its remit the RCI has a very small core team of staff working in the head office in New Delhi. Administering these provisions for the entire country via a single central institution with few permanent staff obviously creates a severe resource bottleneck. Hence the RCI works substantially with panels of experts, who visit institutions applying for RCI accreditation, and oversee the development of new training programmes. Expert committees are convened for specific purposes and do not work continuously. Working for these committees on an ad hoc basis is dependent on people having sufficient flexibility of time and logistics in order to accept such assignments. Likewise, the development of new curricula is often dependent on freelance writers rather than permanent staff.

It is obvious that under such a system, introducing innovation and keeping up with up-to-date research findings upon which to base the development of curricula and training programmes is very difficult. The system therefore tends to inertia, particularly with respect to curriculum development and teacher training. For example, the time taken from the development of the first Indian Sign Language teacher training course until its accreditation by the RCI was over 10 years.

Another disadvantage of the system is that special education becomes uncoupled from mainstream education. That is, as mainstream education moves on and modernises, special education does not automatically move alongside because it operates within its own separate system. Thus intrinsically, special education is at risk of being left behind other parts of educational governance. The new National Education Policy (2020) has potential for steering against these tendencies, but its implementation is itself not a quick turnaround.

This situation could only be addressed by a new legal framework, which is a very difficult target. However, there is one part of the educational system that could serve as a bridge context. This is the National Institute of Open Schooling (NIOS). The NIOS follows its own system of study centres, examinations, and curricula. Because its mission has been, among other things, to function as a backup system and offer additional options to learners who have not been able to succeed through mainstream education, its curricula and systems of examination are very flexible, and NIOS courses tend to be designed as more learner-centric than in other parts of the educational system. Therefore, in future it may be worth examining whether such a system might suit deaf learners especially with respect to the following characteristics:

- There are fewer compulsory subjects than in mainstream education, and a much wider range of optional subjects including vocational subjects;
- at primary and secondary school level, curricula only provide a scaffolding framework (rather than a fixed weekly teaching schedule as used in mainstream education), and the details can vary between learners according to their needs and abilities;
- examinations can be taken on an ad hoc basis whenever the student is ready for examination in a specific subject; learners choose their own pace and decide which examinations they take, how many, and when.

The one feature that does not suit deaf learners is the fact that the NIOS is primarily designed as a system of online and distance learning. Deaf learners, on the other hand, need face-to-face instruction through Indian

Sign Language. However, there is nothing within the NIOS system that prohibits full-time face-to-face instruction. Therefore, turning programmes for deaf learners into NIOS study centres that follow the flexible and adaptable NIOS curricula might lead to an improvement of the situation for deaf learners.

Turning to the situation in Uganda, we find that while governance structures are appropriate, their implementation is weak. The success or failure of any education system largely depends on its governance and respect for its underlying principles. The discussion in section 3.6 points to a well-structured but ill-implemented governance structure of deaf education in Uganda. There is a need for all actors to take cognisance of the wider cultural and political context in streamlining deaf education in Uganda and other developing countries.

Given that the legal status of sign language is secured under Uganda's constitution, measures to improve the implementation of educational and language access through governance in deaf education may need less policy change, compared to the situation in India and in Ghana, but still needs to focus on implementation of existing frameworks and, in particular, on public awareness. There should be greater awareness, understanding and deaf-friendly information from teaching staff, health workers and the judiciary to meet the communication needs of deaf children. For instance, one of the unique cultural resources that the Ugandan deaf community has developed is silent drama. There is a need to promote silent drama groups formed by deaf people to share information and communicate important messages in an expressive way while also entertaining the deaf community.

Another priority in Uganda is that the country simply needs more schools for the deaf. Government and other stakeholders should promote the establishment of schools for the deaf particularly in the countryside, as most of them are currently found in urban areas, denying those in rural areas education.

4.4 Training of teachers in deaf education and other sign language professionals

In this section, we consider training needs for different professional profiles in education and wider society. As the specifics of training needs are different in each case, each country is discussed separately in this section. Section 4.4.1 looks into situation of teacher training and sign language interpreting in Ghana, before moving on to sign language training needs in Uganda (section 4.4.2). For the situation in India, a case is made for the role of deaf educators (section 4.4.3).

4.4.1 Teacher training in Ghana and professionalism in Ghanaian Sign Language Interpreting

One of the nagging problems in deaf education in Ghana, is the issue of lack of adequate qualified teachers in the Deaf schools. The current dispensation is that teachers in deaf schools are predominantly hearing teachers, who do not have adequate signing skills. To get around this problem, sign language instruction should be made part of the curriculum in those Colleges of Education that train language teachers. At the moment, only the Akropong Presbyterian College of Education (APCE) is doing this. But as has been noted in section 3.2, the number of teachers trained at the moment is insufficient to meet the demands in the deaf schools.

While the APCE is involved in training GSL teachers for the schools, these teachers are predominantly hearing people. It would be more prudent to prioritise the training for more deaf teachers since being familiar with Deaf Culture, they are likely to understand the needs of the students and to engage them in a more meaningful manner than the hearing teachers who may not have such cultural intuition in dealing with the deaf students. As expected, such deaf teachers would also serve as role models for the young deaf students. This should instil in the deaf students a sense of self confidence to raise their aspirations or go beyond the achievements of their role models. Furthermore, it is anticipated that the turnaround period for training deaf teachers should be shorter, since it will focus more on imparting pedagogical skills to them rather than on sign language instruction. This is a better alternative than training hearing teachers who would have to spend several years learning to sign, without guarantee that they would attain adequate proficiency at all to be able to make any impact in their teaching.

When the teachers who are posted to teach in deaf schools are deficient in signing, no meaningful teaching and learning takes place. Another way to address this problem is to have competent sign language interpreters in the classroom to interpret to the students. These interpreters must be persons that have undergone rigorous training and are certified by recognised institutions. They must also be members in good standing of a professional interpreting society.

Unfortunately, Ghana does not have a recognised institution that trains professional interpreters. The University of Education in Winneba (UEW) runs a programme in sign language interpreting, but that is not adequate to certify the graduates of this programme as professionals. In their publication, Oppong et al (2016) sampled 23 deaf students of the UEW, to find out whether they were satisfied with the level of interpreting done

by their sign language interpreters during lectures. Only 4 (17%) agreed the quality of interpreting was satisfactory, and 19 (83%) thought the low level of satisfaction was as a result of the inadequate training they had. In other words, they were not qualified. All 23 (100%) preferred to have a deaf tutor with expertise in the subject matter, because they will not have the signing deficiency that the hearing sign language interpreters have. Oppong et al therefore recommended that their sign language interpreting curriculum be revised to make it more rigorous; they also recommend a training period of 2–3 years.

While the University of Education is considering restructuring their interpreting programme, it is also questioned whether these graduates are really professional or quasi-certified interpreters. This concern is important in the light of the absence of a professionally recognised body to regulate the proficiency of the interpreters. A survey that co-author Akanlig-Pare conducted in 2017 on whether there was any sign language interpreting qualification in Ghana elicited the responses summarised in Table 3.

Table 3: Survey responses about sign language interpreting

Question: Is there any sign language interpreting qualification in Ghana?	
YES: 11 NO: 6	
Those who responded Yes named the following as the awarding Institutions:	
Ghana National Association of the Deaf (GNAD):	3
The Church of Christ:	6
UEW	2
Total	**11**

Considering the outcome of Oppong et al's research, and that of this survey, it is clear that there are no professional sign language interpreters in Ghana. Therefore, if the urgent need to fill the 17 JHSs and the SHTS with qualified sign language interpreters to assist teachers in delivering quality teaching to the deaf students is to be met, then there is the need to improve on the training of sign language interpreters.

4.4.2 Sign language training needs in public services and in deaf education in Uganda

In Uganda, training in sign language falls under two headings, achieving inclusion for deaf people through sign language in society in general, and sign language used by teachers in schools with deaf children.

There have been calls by disability rights civil society organisations for efforts to ensure that service providers like teachers, nurses, and

doctors, as well as parents, caretakers and family members of deaf people, and the whole community learn USL to achieve inclusion of deaf people and enable communication between them to reduce stigma and discrimination. Such efforts will also build the capacity as well as equip sign language instructors and organisations working with deaf persons with skills and knowledge on the development and usage of the digital Ugandan Sign Language content mentioned in section 4.1. Moreover, Uganda is increasingly considering inclusive education, which implies integrating deaf children alongside hearing children in the same school, rather than having specialised deaf schools. The latter will still exist, but inclusion of deaf children in mainstream schools clearly implies a different challenge in terms of the school community (not only the teachers) becoming comfortable with sign language communication.

With respect to sign language in education, there is a need to streamline sign language training and use in Uganda, so that sign language training for teachers working with deaf children becomes mandatory. Specifically, there should be mandatory sign language training for teachers to enable them to interact with deaf students in school and improve their learning environment. At the moment, many deaf children feel isolated in schools that lack special needs experts and this makes them drop out of school. This could be complemented by the introduction of special needs programmes to teacher-training institutions like Primary Teachers' Colleges, National Teachers' College, and at universities.

4.4.3 Professional roles for deaf sign language users in deaf education in India

The most important conclusion from discussions in section 3 is that deaf learners need people who are fluent in sign language in order to make progress in their education. The absence of meaningful communication between teachers and students of all ages is the single most damaging factor in the education of deaf learners, whether in the special education or in the mainstream system. In addition, we have seen that in India, current teacher training is unable to produce teachers who are able to communicate in sign language at the necessary level of fluency.

In theory, three avenues present themselves for resolving the situation. These are similar to the options discussed above for Ghana (section 4.4.1) but the feasibility of options is different in India because of the very large numbers of deaf learners in education.

One approach is to ensure that non-signing teachers who are preparing themselves to work in contexts with deaf students become fluent in sign

language during their professional training. However, as noted above for Ghana, the problem with this approach is that it would take several years of full-time study by future teachers in deaf education to attain sufficient fluency in sign language in order to teach, for example, lessons about political science, geography, or chemistry through sign language in secondary school. Such a scenario is unrealistic.

The second approach is to involve trained sign language interpreters in the classroom in order to mediate the communication between teachers and deaf learners. This is an approach that also fits in with current efforts towards inclusion of deaf children in mainstream settings. Again, it seems that we will be presented with insurmountable problems in the Indian context. Firstly, there is no way that a sufficient number of sign language interpreters can become available throughout the country any time soon. In particular, in the case of mainstream settings, providing a sign language interpreter to every deaf child in a hearing classroom is highly resource-intensive, and therefore unrealistic in India. Even the several hundred current schools for the deaf cannot realistically be resourced with enough sign language interpreters to be deployed in every classroom. Moreover, the current two-year full-time course in Indian Sign Language interpreter training does not include any pedagogical content or subject knowledge for interpreting in education.

Secondly, providing sign language interpreting to mediate between a teacher using spoken and written language and deaf learners using sign language can only apply in contexts with older deaf children, who have already acquired a sufficient level of sign language themselves. Interpreting cannot resolve the barriers towards first language acquisition by young deaf children, which is at the root of educational disadvantage throughout older deaf populations.

Compared to some other countries, for example in western Europe and East Asia, there has been much less language contact between Indian Sign Language and spoken/written languages, and the structures of ISL are very different from spoken languages in India. In particular, this also concerns the level of discourse organisation, and this is one of the reasons why interpreting from a spoken language is often not successful even for adult learners with good ISL skills. Interpreting sentence by sentence does not convey truly equivalent content in Indian Sign Language, as the entire discourse would have to be restructured.

This then leaves us with the third approach, which is to train fluent sign language users, in particular deaf sign language users, for professional roles in deaf education. This is the flipside of the first option. That is, instead of training non-signers with pedagogical qualifications to use

Indian Sign Language, the solution is to train fluent sign language users in pedagogy. This has the advantage that it can be done more quickly, so that scaling up is a realistic option. The success of this option has been indicated in recent research in India where such an approach has been piloted (see Gillen et al. 2015, Zeshan et al. 2016, Fan 2018, as well as the chapters in this volume and the associated Volume 1).

As stated above with respect to Ghana, another advantage of deaf sign language users acting in professional roles in deaf education is that they become role models for deaf children and young deaf learners. In other words, who better to teach deaf children how to be deaf than a deaf adult? For the youngest deaf children, the most relevant factor would be a grounded identity and successful first language acquisition. Fluent deaf signers with relevant training would likely be capable of the style repertoires that are needed to communicate with young deaf children who are just beginning to learn sign language as the L1. With respect to older deaf children, such as in secondary school, being in constant contact with well-educated deaf professionals can make a big difference to their aspirations, as they will try to emulate their deaf teachers.

Overall, the potential of deploying deaf professionals in deaf education is realistic, and perhaps the only practical option that can function at scale. What is obviously lacking currently is a suitable training programme to produce such professionals (see Zeshan 2021 for a design proposal of such a programme). The current teacher training programmes in the so-called Hearing Impaired category are not deaf-friendly and not grounded in sign bilingualism. Therefore, a new professional qualification is needed, specifically catering to deaf trainees, and specifically targeting the crucial areas of language and literacy development.

5 Conclusions and comparative summary of leverage points to improve deaf education

Approaches to improving deaf education as set out in section 4 are summarised in Table 4 under three broad headings: the status and use of sign languages, the use of digital resources, and the training of teachers and other professionals in education and/or sign language. When comparing solution elements, an important point to keep in mind is the enormous size of the deaf community in India compared to the much smaller number of deaf people in Ghana and Uganda. This affords opportunities, such as a thriving online environment with Indian Sign Language, as well as barriers, such as the feasibility of training sufficient manpower.

Table 4: Comparison of solution elements to improve deaf education

Comparative element	Ghana	Uganda	India
Improving the status and use of sign language	– Approve GSL as one of the Ghanaian languages used and taught in Ghanaian schools at all levels, with an official status in the language policy of Ghana. – Compulsory integration of GSL into the curricula of the Ghana Education Service. – Design of bilingual, deaf-centred curricula for GSL as both a language of study and a medium of instruction.	– Strong implementation and monitoring of existing frameworks for status and use of sign language. – Raise public awareness on USL (including via silent drama) to increase deaf people's access to information from teaching staff, health workers and the judiciary.	– Official recognition for ISL on a par with spoken languages recognised at national or state level (e.g. scheduled languages). – Linguistic rights for ISL users as a minority language community, as provided for in the Indian constitution.
Increasing the use of digital resources	– Popularisation of GSL through new media.	– Building on existing initiatives for digital resources in USL (platform and mobile app).	– Tech-savvy deaf professionals creating innovative digital initiatives in education and training
Training of teachers and other education / sign language professionals	– GSL instruction as part of the curriculum in Colleges of Education - Prioritise the training of deaf teachers who are well versed in deaf culture and able to act as deaf role models. – Professionalise the training of GSL interpreters.	– Opportunities for providers of public services and the wider community to learn USL. – USL training to be streamlined and made mandatory for teachers working with deaf children. – Introduction of special needs programmes at teacher-training institutions.	– Training for deaf ISL users in pedagogy so that they can undertake professional roles in deaf education. – Create a new professional qualification for deaf trainees in the areas of language and literacy development.

The above solution elements constitute promising avenues towards overcoming structural disadvantage of deaf learners in India, Ghana and Uganda. Although the different aspects in the above sections have been presented individually, it is important to understand that learning for this group is best seen as an integrated ecosystem. Therefore, the most impactful solutions will come from combining several solution elements into viable new ecosystems of learning (cf. Fan 2018). This is particularly the case in India, where the size and complexity of the educational system makes systemic change quite challenging.

In addition to systems and resources, socio-cultural issues have also been mentioned in this chapter, though without detailed discussion. The negligence of deaf education has its roots partially in the negative perception of the deaf by the society, both at family and community levels. To take the example of Ghana, ignorance, superstition and negative cultural practices have led to this stigmatisation and consequently, the discrimination against the deaf. In many communities in Ghana, the deaf are often looked down upon as misfits in society and unintelligent. The stigma about deafness finds expression in linguistic and social behaviour towards them. As a result of this stigma, families are unwilling to expose their deaf children to the public for fear of ridicule. Sending them to school is a far-fetched thought. When eventually they are convinced to send the deaf children to school, they are often at an advanced age. But most families do not send their children to school because they believe it will be a wasted investment since the deaf are believed in traditional culture to be unintelligent. It is usually by the benevolence of non-governmental organisations and well-meaning individuals that most deaf children are in school. It requires aggressive but persuasive advocacy to de-stigmatise deafness so as to be able to promote deaf education in Ghana. To a greater or lesser extent, a similar situation is found in many countries.

The socio-cultural environment with respect to views of deafness and sign language is also greatly affected by the recent exponential growth of online media, whether educational platforms, social media, or other online content. In this regard, it will be interesting to see the results of popularisation of sign languages through new media. The digital sign language resources in Uganda and the impressive multiplication of sign language content in social media and other internet platforms in India are examples of how the visibility of sign languages can be improved substantially. Ghana is lagging behind in this respect because there is no scaled-up institutional involvement. But the efforts of individual deaf teachers and IT specialists in collaboration with institutions of learning points to a a positive direction, making it possible that Ghana would soon

see an up-scaling of the development of digital media to enhance the teaching and learning of GSL.

Another potential trend to watch in future concerns alternative education, that is, alternatives to both mainstream and special education as currently implemented. The example of the National Institute of Open Schooling in India has been mentioned in this chapter, where schooling is much more flexible and ISL resources have much potential for benefiting deaf learners (Singh & Mahapatra 2019 and this volume). Innovative resources could also go hand in hand with deaf sign language users working in professional roles in education. To take an example from India, the Haryana Welfare Society for Persons with Speech and Hearing Impairment runs an accredited special education programme (diploma in special education with specialisation in hearing impairment) where the majority of students as well as some core teaching staff are deaf. Across many countries, the pool of deaf university graduates and young deaf professionals is growing steadily, and they are increasingly able to contribute to innovative educational initiatives. By taking a comparative perspective as we have done in this chapter, we hope that learning about innovations and alternatives can be shared across countries and systems.

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PART - II

English grammar games

Uta Papen and Ulrike Zeshan

In the field of second language teaching the question of whether grammar should be taught explicitly or via immersion has been much researched and debated. How to teach grammar is part of a wider debate about the kind of learning environment and input to offer in lessons, whether teaching of grammatical patterns is to be explicit or implicit (Dewaele 2013). An explicit approach has also been described as a 'focus on forms' (Long 1996, Loewen 2018). This means that grammatical structures (forms) are explicitly taught through lessons that are devoted to grammar, with the teacher explaining to the students the characteristics and rules of a specific pattern, for example how the past tense is created. In this approach, grammatical structures are often taught in a predetermined sequence (Loewen, 2018), using a grammar textbook to guide the curriculum. This way of teaching a second language is different from approaches that use a 'focus on meaning' (Long 1996). With a focus on meaning, the emphasis is on students engaging in communicative activities, that 'should be meaningful and relevant, ideally mimicking real life' (Dewaele 2013: 81). Such an approach is also known as 'communicative language teaching' (Richards and Rodgers 2014).

The debate about a focus on forms, i.e. grammar teaching, versus an emphasis on meaning-based communicative activities is also reflected in the work on Deaf Literacy/Multiliteracies that is the subject of the contributions in the *READ WRITE EASY* volumes. In the earlier stages of this research, the intention was in fact to work on functional English with learners, where the focus is squarely on what learners can do with the language they are acquiring, rather than on what they know about its grammar.[1] Our approach was focussed on 'real literacies' (Street, Baker, and Rogers 2006; Street 2012) and authentic uses of English, closely linked to students' prior experiences and everyday life. Grammar rules were to be introduced in the context of work on authentic texts taken from students' everyday lives. Isolated grammar lessons, without link to authentic communicative situations, were to be avoided.

1 Hence the logic was in terms of 'can-do'-statements adopted from the Common European Framework of Reference (CEFR) for second language learning (see the contribution by Waller, Jones and Webster in the first volume).

This way of teaching 'embedded grammar', as we had called it, was part of the wider approach that informed the pedagogy which we had developed and which we tried out in two subsequent projects, a one-year pilot and a three-year follow-on project (see the introduction by Webster & Zeshan in this volume for a summary of the trajectory of this work). However, in both projects it became clear that deaf learners not only had a genuine need for some form of explicit instruction on English grammar, but they actively requested that our classes should include such grammar teaching. In the groups of young deaf adults in all three participating countries (Ghana, Uganda and India) there was increasingly vocal feedback from deaf learners about their need for explanations of the basics of English grammar. This was particularly noticeable with respect to writing, while reading comprehension was more feasible without explaining grammar overtly. With respect to writing, it was not satisfactory for learners to be shown that 'this is how you write it'; learners wanted to know why something they had written was correct or incorrect. At the same time, this was also driven by their need to perform well in standard exams in some of the learner groups.

This chapter describes the prototyping of a solution that addresses these issues by embedding explicit learning of grammar in a gamified environment with authentic texts. This experiment was carried out with young deaf adults in India. Section 1 introduces the overall approach to teaching English that we developed, how we had planned to teach grammar as part of this, and what happened in the lessons. Section 2 gives an account of the rationale behind the subsequent design of the English grammar games. The game process is described in section 3, and section 4 provides examples and experiences from developing and experimenting with the games. A conclusion is attempted in section 5, where we evaluate our activities and discuss the implications of our observations so far. We also elaborate on the potential for future deployment of English grammar games. The appendix at the end of this chapter provides examples of English grammar games that have been played by groups of deaf learners.

1 Background: The real literacies approach and our plans for grammar teaching

The approach to teaching English that underpins our work with young deaf adults is based on the curriculum centring on students' 'real life' uses of English. The cornerstone of the lessons were 'real' or 'authentic' texts (Hewagodage and O'Neill 2010), such as a shopping receipt, a street sign or a rail ticket. As explained elsewhere (Papen and Tusting 2020),

our pedagogy drew on what is known as the 'real literacies' approach (Street, Baker, and Rogers 2006; Street 2012). Real literacies are authentic, everyday uses of English, taken from the students' environment and allowing lessons to build on students' prior experiences and knowledge of English. The curriculum was made meaningful by this close link of the lessons to everyday uses of English. The students were to collect texts from their environment and bring them to the lessons. In a real literacies approach, explicit grammar teaching is de-emphasized, the focus being on what in second language research is called 'communicative practice' (Ellis 2006).

In our project, this meant creating lesson activities around authentic texts, with a focus on the kind of communicative situation such a text would be part of. In the training for our pilot project, an example was a customer feedback form the trainees had collected while visiting a shopping mall. We created a lesson plan including vocabulary work (to support understanding of the form), a role play, and an exercise that included completing the form. The real literacies approach was originally developed for work with adult literacy learners (see Nirantar 2007). It had not previously been used with deaf students. In its original version, the approach had privileged what may best be called 'useful' non-fiction texts from students' everyday lives, for example an application form to open a bank account or, as mentioned above, a rail ticket. Based on the experience of our pilot project and feedback from students and tutors, we broadened the concept of real literacies to include everyday uses of English that relate to leisure, fun and creativity (Papen and Tusting 2020). Accordingly, in the follow-on project, while we still used non-fiction texts such as signs or forms, other genres were included.

A real literacies approach is similar to communicative language teaching. Our approach also shares much with what is known as 'task-based language teaching' (TLBT, which is itself a form of communicative language teaching). Both these approaches focus teaching on the aim of developing communicative competence, not on students knowing and mastering structures (i.e. grammar) (Richards and Rodgers 2014). This is not to say that grammar teaching has no place in TLBT or in our approach. In our work with deaf students, grammar teaching was not to happen through separate grammar lessons, guided by grammar textbooks. Instead, grammar teaching was to be 'embedded' in the lessons on real literacies. In the training, we introduced the deaf tutors and research assistants to the concept of real literacies. We showed them how to use authentic texts in their lessons and how to connect these with grammar teaching. We developed with them lesson plans that started from an authentic text.

The trainees identified grammatical patterns in that text. Work on these patterns was then to be added to the lesson plan, using explanations for the identified patterns and exercises to practice them. The use of such embedded grammar work, closely linked to authentic texts, has much in common with TBLT. In TBLT, students are given tasks that require them to use language for communication and real-world purposes. Similar to our work on real literacies with embedded grammar, in TBLT 'grammar is not taught as an isolated feature of language but as it arises from its role in meaningful communication' (Richards and Rodgers 2014: 180). Another way to describe our approach is to refer to it as 'a planned focus on form' (Ellis 2001). This means that while overall lessons focus on meaning and communication, grammar teaching is planned ahead of these lessons and does not just happen if and when learners ask about grammar or when they do not understand a specific structure.

It turned out though that teaching grammar in this planned and embedded way was more difficult than we had anticipated. While the identification of grammatical structures in the real texts worked well in the training, looking at grammar teaching that took place in the pilot project, we saw that it was quite rare to see explicit connections between the grammar being taught in class and the authentic texts that learner groups were drawing on (Papen and Tusting 2020). This is not to say though that no grammar teaching took place. Grammar lessons happened, frequently requested by students, but unlike what we had planned, they were rarely linked to a real text. In the longer follow-on project, we intensified training on how to identify grammar in texts and develop related learning activities.[2] In that way we tried to prepare tutors better for the planned focus on form.

Looking at the follow-on project, we can see that grammar was a regular part of the lessons. In some cases, the grammatical feature that the tutor introduced had been identified in the real text that the lesson focussed on. In other lessons though, what grammar was taught was the result of students asking to understand a specific form, such as possessive pronouns or past tense. In one of the classes in India, the students had been vocal about their need to learn the 'basics' of English grammar. Several students had left the class after the first few weeks of teaching, and the tutor suspected that this was the result of his focus on authentic

2 In the second project classes were also taught in Ghana and in Uganda but we focus on India only in this chapter because this is the context where the English grammar game development took place.

texts, with much discussion of their content (thus a focus on meaning) and little grammar work.

In their monthly reports and in informal conversations, tutors regularly commented on grammar teaching being difficult for them. Looking at the real texts used by some of the tutors, we can see some of the issues they faced. In some of these texts, such as notices (e.g. on streets or in a library) the grammar was simple. This could be a preposition or a negative construction such as 'don't eat in the library'. But other texts included complex structures, in addition to specific terminology. Explaining these structures required a high level of grammatical expertise. A deposit slip from a bank in India included this sentence: 'Transfer instruments will be credited after realisation'. How would a tutor explain and practice with students a structure such as 'will be credited'? This kind of passive, future tense structure is hardly 'basic' English grammar that the learners would need regularly, raising the question of whether such grammar should or should not be taught.

The various difficulties that tutors experienced with teaching English grammar are discussed in more detail in Nankinga (this volume). She identifies several sub-themes as problematic, including the tutors experiencing 'difficulty in explaining English', and challenges related to the 'tutors' own English competency'. In addition, she notes the absence of 'resources for using sign language to explain English'. The observations in her chapter add to the scenario of the multiple barriers to accessing English grammar, both for tutors and for learners.

Another issue with some of the authentic texts that our tutors used is that they dealt with interesting and relevant topics, but that their content was difficult from a language point of view. This became apparent for example in a series of lessons in a young adult class in Indore. Much lesson time was spent on discussing, in Indian Sign Language (ISL), a poster on how to reduce one's carbon footprint. Over a week in September 2019, Papen had observed these lessons. She noticed that there was little communicative activity in English around this text. Instead, the content of the poster and the meaning of specific words was discussed in ISL. This is not to suggest that there was no merit in the students engaging with the propositions made on the poster in their first language. But this is the class that several students had left, commenting on the discussions of authentic texts being too long and asking for more grammar teaching. There was no writing activity relating to the content of the poster. It is possible that the students felt that their level of English grammar was too limited to allow them to be productive users of the language, thus making meaning based communicative activities difficult.

Several insights emerge from the experience of grammar teaching in our projects. These match the concerns Nankinga raises in her chapter. A first point is that the focus on meaning and communicative ability that we had planned was sometimes difficult to realise because our students' prior knowledge of English limited their ability to engage in and benefit from such meaning focussed activities. The second insight, mentioned already, is that the real texts our tutors worked with could be grammatically complex and thus be a challenge for the tutors. The third insight is that a focus on communication and meaning was new to the students and that it may not have met their expectations and beliefs in how they should be taught. The approach we had chosen may not have matched their prior experiences of language teaching. This has been found to be an issue for others trying to use a communicative language teaching approach (Richards and Rodgers 2014).

In our context, it became apparent that those students who also had language lessons as part of their school education were familiar with a different approach, presumably with a greater focus on grammar. The idea that a more grammar focussed approach is needed for beginner learners is shared by many teachers. This stems from the belief that a more 'form-focussed' approach is required to help students generate sufficient knowledge of basic forms and structures to allow them to engage in communicative activities (Ellis 2006). This is matched by concerns about lessons that focus too much on learning by doing (learning to use the language by using it). Such lessons may help to develop fluency, but learners are likely to make many mistakes, not being aware of these and not learning much grammar (Higgs and Clifford 1982, in Richards and Rodgers 2014).

The final but no less important insight to take from our experience of the two projects is that when grammar was taught in the classes, it appeared to follow a specific practice or way of teaching. The tutors' monthly reports and the students' portfolios (samples of their work) give us a good idea of how grammar was taught. The use of grammatical terms was rare and limited to basic concepts such as word classes. In other words, grammar was not taught by introducing students to the meta-language common in grammar books. Instead, grammar was introduced via practice, using exemplar sentences. Tutors commonly searched for sample sentences on the internet, used them to introduce the structure in question and then requested students to create their own sentences based on the given model. Such exercises were done in class or given as homework. The emphasis was on students becoming familiar with the pattern. At times, the tutors tried to explain the grammar rule in

question. At other times, the group together tried to discover the rule. In their reports, the tutors often talked about how difficult it was for them to explain the grammatical structures that are used in the authentic texts. Using sample sentence was a way to 'explain' grammar and to introduce students to structures. It is important to note here that for sign language users learning English grammar is particularly difficult because of the mismatch between how grammatical structures are used in the English language compared to how this is done in sign languages (see section 2.1).

The strategy of working based on analogy, used by the tutors instead of introducing the meta-language of grammatical terms, is also a design feature of the English grammar games. Likewise, the real literacies approach is maintained in the game design. The games target both reading comprehension and writing skills while learners practice grammatical structures. We now explain the linguistic rationale behind the grammar game design.

2 Linguistic rationale for English grammar games

The context where English grammar games were first developed was a capacity building programme held over six months in India with a group of aspiring deaf professionals from India, Nepal, and Uganda (see Zeshan, this volume). As the training revolved around language and literacy, it was only too natural that the long-standing issue of teaching grammar (in this case, English grammar) came up. The idea for English grammar games arose after training sessions where we discussed difficulties that deaf sign language users have with learning English grammar. The game process was invented by co-author Zeshan in response to these discussions, which covered some of the linguistic rationale set out in this section.

A common approach for teaching grammar with a sign language as the medium of instruction is to explain the 'rules' of English in sign language. In India, deaf people usually do not get any intelligible instruction in English grammar until very late in their education, often as young adults. Most schools are ill equipped for teaching English because in the absence of staff, methods and resources for using sign language in the classroom they struggle with intelligible communication between teachers and learners (Randhawa 2006). There are various interventions for deaf youths, typically carried out by NGOs, where English is taught through sign language.

However, it is not sufficient to merely use an intelligible medium of instruction. Ideally, interventions would also be based on a linguistic

rationale. This is the case with the English grammar games. To summarise briefly, each game starts with an authentic text. After reading the text for comprehension, the task in the game is to locate parts of the text that match abstract grammatical structures given as a set of prompts. Learners then write their own examples by analogy, using the same grammatical structures, and finally compare their solutions in a group. Figure 1 shows an example of the steps in this process.

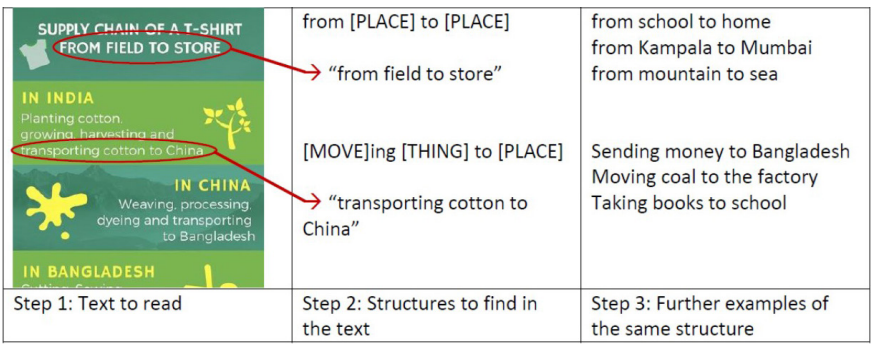

Figure 1. Steps in an English grammar game

In addition to the use of authentic texts, there are two other aspects of the linguistic rationale underlying the games: the specific linguistic difficulties around word classes, their complexity in English, and their mismatch with sign languages (2.1), and the use of chunks and structural frames around which the games are constructed (2.2).

2.1 English grammar instruction and word classes

The most common way of structuring grammar resources such as in a reference grammar is largely dependent on and follows categorisation into word classes, also known as parts of speech. In English, this includes open word classes that are the main carriers of meaning in a sentence (nouns, verbs, adjectives and adverbs) and closed word classes that mainly have grammatical functions (prepositions, particles, articles, conjunctions, etc). This makes sense because open word classes are distinguished by their morphology (word-building mechanisms), so that the grammar can be organised straightforwardly into sections such as the noun's morphology (e.g. plural), the verb's morphology (e.g. tenses), etc.[3] When instructing

3 This is a simplified account of grammar, to convey the main idea of word class complexity and mismatches to readers without involving an overly technical background in linguistics, e.g. the differences between derivational and inflectional morphology.

deaf learners, often the same logic is used, and anecdotally, deaf learners report their struggles with learning 'the tenses' of English, for example. In English grammar games, the targets of learning are different and lie at an intermediate level between a fully specific utterance as it occurs in a text and a maximally generic pattern (e.g. 'the passive voice') as found in a typical reference grammar.

The problem with basing English grammar instructions on word classes in the traditional way when working with deaf learners is twofold. Firstly, the typical characteristics of word classes in sign languages make them rather different from word classes in English (see Meir 2012). There is of course linguistic diversity across sign languages but overall, the divergence from English is substantial, especially in the area of word formation processes (morphology) associated with different word classes.[4] For instance, sign languages typically have different classes of verbs depending on the verb sign's behaviour in three-dimensional space. In addition, there are other complex visual-spatial constructions that have no direct counterparts in spoken languages and do not map onto the familiar word classes of spoken languages. For example, adverb-like modifications of an action, event or property are often expressed non-manually (e.g. through facial expressions) or by way of modifying some aspects of hand movement, e.g. faster, larger or repeated movements; that is, these modification are simultaneously superimposed on the basic sign rather than being separate words as occurs in spoken languages (cf. English *drive* vs. *drive slowly, tired vs. very tired*, etc.). In addition, some of the closed word classes that English has, such as conjunctions and prepositions, are poorly represented across sign languages. The rather different characteristics of word classes in many sign languages may explain some of the great difficulty that deaf learners express when trying to learn English grammar.

Another issue with English word classes, from the point of view of our target group of deaf learners, is the considerable fluidity of open word classes in English, as well as their mismatch with the word classes of signs with corresponding meanings. Unlike most other languages, in English many nouns can be used as verbs, and vice versa, without any indicative change to the form of the word itself (i.e. without morphological change).[5]

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4 Meir (2012) points out that although there are approaches to identifying word classes in sign languages, in particular verbs, nouns and adjectives, systematic studies of word classes are few and far between in the literature.

5 In addition, there is of course also morphologically marked word class conversion, such as *develop* (verb) → *development* (noun) or *strength* (noun) → *strengthen* (verb).

This is called 'zero derivation', for example *This is a difficult text.* vs. *I will text you later.* or *Ask me some questions.* vs. *She questions everything.* To a lesser degree, this also applies to adjectives, for example *We like a green campus.* vs. *Let's green our campus.*

In addition, signs with an equivalent meaning often do not match onto English word classes. For instance, the Indian Sign Language sign DANGER corresponds to English *danger* (noun), *dangerous* (adjective) and *endanger* (verb). The sign AGAIN corresponds to English *again* (adverb) as well as *repeat* (verb).[6]

This level of fluidity and mismatch arguably makes it difficult for sign language users to identify given English words against their word classes, which interferes with using word classes as the basis for teaching grammar. In addition, of course, sign language users in India (as indeed in most other countries) have not been exposed to any meta-linguistic explanations in their first language because sign languages are not legitimised as school subjects. This makes it difficult to talk about grammar in the abstract, especially in the absence of established vocabulary for talking about the grammar of English.

In the English grammar games, these difficulties are addressed by drawing learners' attention to grammatical constructions that are immediately available as examples in the authentic texts that learners choose to read. Grammatical patterns are not presented in the abstract and illustrated with out-of-context example sentences but are embedded in a real communicative context. The targeted structures are also more specific than what is found in traditional grammar books. The next section elaborates on these points.

2.2 Learning English grammar through chunks and frames

The mismatch of word classes and other areas of grammar between English and sign languages in the countries of our research is not the only difficulty facing sign language users. Another area is the issue of collocations, that is, the way in which certain words fit together in phrases. For example, we say that *people in need are housed in a shelter* or *accommodated* therein but not **homed*.[7] On the other hand, abandoned pets are *re-homed* but not **re-housed*, and we can *accommodate a choice* but not **home a choice*. The use of larger chunks of language as occurring in the game materials means that learners are directed to focus on collocations

6 It is the convention in sign language linguistics to use glosses in capital letters to represent signs.

7 An asterisk * indicates a grammatical error or collocation error.

as a whole. Another difficulty is that in English, many structures that learners need to master have unpredictable elements. This includes many instances of word formation rules, which often use word endings to create new words with related but different meanings. For instance, *forgetful* is correct but **rememberful* is not a possible word (though *mindful* is). From *rich* we can derive *enrich* and *enrichment* but the same is not possible with its opposite *poor* (instead, there is *impoverish* and *impoverishment*). When word formation rules are targeted in grammar games, learners are naturally exposed to a range of words that the rule can apply to because each game generates several examples of the same structure.

These difficulties with English are of course not unique to deaf learners. However, the deaf sign language users involved with our research have been disadvantaged by insufficient exposure to English. Learning songs, watching movies (except with subtitles) and overhearing all kinds of conversations is not accessible to them, and the above-mentioned lack of quality education severely undermines early access to reading for pleasure, which would be essential in order to be exposed to English with sufficient frequency.

With the English grammar games we aimed to design a low-threshold learning activity with easy access to enjoyable interactions with texts and constructions. In order to make explanations of grammatical structures accessible and easier to understand, the English grammar games operate on the basis of larger chunks with a focus on the entire construction rather than its component parts.[8] The approach also avoids grammatical terms, which often do not have established counterparts in our target sign languages. Instead, the constructions are expressed on the basis of more or less abstract and generic categories of meaning (see examples of games in sections 3 and 4, and in the appendix).

There are two differences between this approach and a traditional reference grammar. Firstly, the focus is on meaning and not on grammatical categories; hence terms like [DO], [QUALITY], [MOVE] and [OWNER] appear rather than verb, adjective, or possessive. Secondly, learners are invited to focus on the entire construction (here called 'frames') when playing the game. For instance, the frame '[MOVE] to [PLACE]' is used to generate a number of similar phrases such as *fly to China*, *walk to the market*, and the like. The aim is to practice the entire chunk by replacing the meaningful words (content words) in a given example with other

8 This is in line with a view of grammar known as 'construction grammar' (e.g. Fillmore, Kay & O'Connor 1988, Goldberg 2006). Construction grammar argues that grammatical constructions are the building blocks of language, rather than words and rules for putting words together.

content words that make sense. Using abstract meta-language is not excluded and can be introduced as and when learners feel comfortable or develop an interest in such explanations, but this is not necessary for playing the game and learning from the process.

As learners play more and more games, they will come across these categories of meaning (that is, the expressions in square brackets) in many different frames, and they will practice expressing meaning and context repeatedly. This is not unlike children's natural language acquisition, where children are exposed to complete constructions and may only derive abstract grammatical rules subsequently, on the basis of broadening the database of examples they have encountered (cf. Tomasello 2009). Learners operate by way of analogy when they create new examples using the same grammatical frame.

The implication from this method is that the explanations that a teacher would provide when leading the games are specific to the frame and its meaning and context. This avoids having to explain whole areas of grammar that may have no direct counterpart in the language of deaf sign language users, for example the tense system, the passive voice, the use of auxiliaries *have* and *be*, or the separate sets of subject pronouns, object pronouns, and reflexive pronouns. Instead, the target of learning is a local pattern mapped onto a specific example in an authentic text, and not generic rules without context. Students are expected to learn about grammar in bite-sized chunks. This is particularly helpful because grammar in English is often subject to sub-patterns that apply to specific sub-groups of expressions, for instance with short and long adjectives (*smaller/smallest* vs. *more/most interesting)*, or *bag-s* vs. *box-es* vs. *cit-ies* for plural endings, or regular vs. irregular verb forms. Instead of being exposed to the entire paradigms, it is easier to learn and practice sub-patterns separately. Learners can be supported to draw larger generalisations later on, when they have become more familiar with the various forms.

In the next sections, we describe how the game is played (section 3), and then elaborate on the successive phases of experimentation with English grammar games (section 4). In addition to the linguistic rationale presented above, the game method is also motivated by general considerations about the effect that gamification of learning has on motivation, peer support, confidence, and memory (cf. Zeshan 2020). Moreover, the method has implications for the level of training and knowledge of English grammar that game facilitators need. These factors have been visible throughout the development process and the various

trial runs that we undertook with several groups of deaf learners in India to validate the game methodology.

3 Playing the game

When the English grammar game method was first invented, the games were played face-to-face around the table, with the target text shown on a laptop and grammatical structures written on slips of paper. Each game session is linked to a single text and consists of several game rounds, each of which relates to a single grammatical pattern to be identified within the text. At the beginning of a session, the game facilitator explained the aim and process of the game, and the text was presented to the learner group to read on the laptop screen. Game rounds were then played as follows:

- The grammatical patterns, which were prepared in advance on slips of paper, were placed in a circle in the middle of the table, with the abstract structure (e.g. 'from [PLACE] to [PLACE]') on one side and face-up and the 'solution' from the text (e.g. *from field to store*) face-down on the other side.
- Players took turns to pick up a paper slip and to find the part of the text matching the grammatical pattern on the paper, checking on the back of the paper that they got it right.
- After discussing the structure in the group, all players wrote additional examples of their own with the same structure, and then compared what they had written. They also compared their own examples with additional examples that were part of the prepared game materials (written on the inside of the folded paper slip), to make sure that they had not misunderstood the target structure.
- Having completed a game round, the next player was selected to continue with the new grammatical pattern, until all had been covered.

These game sessions had 4–5 rounds and took between half an hour and an hour to complete. Some of the initial game sessions were video recorded. It is beyond the scope of this chapter to analyse these recordings in detail. However, an excerpt from one of these early sessions is represented in Figure 2, to give an impression of what the interaction in the game is like. The Figure consists of screenshots from the video, with superimposed translations of what the players are saying.

Figure 2. A grammar game session

The game round starts by picking out the next player. Pictures 2.1 and 2.2 show how one of the group members spins a pen that is lying in the middle of the table, so that the pen ends up pointing to the next player (in this case, himself). Usually, games include elements of chance, so this simple procedure introduces the framing of the session as a game. Elements of chance work well to maintain everyone's attention. In this case, each

player needs to be ready to take the next turn if the pen happens to point at them the next time.

Pictures 2.3 to 2.6 show how the target structure is identified in the text shown on the laptop screen, and how the answer is found to be correct. Although one player is responsible for this round, everyone around the table checks the match between the paper slip and the laptop screen, and they agree that the solution is correct. When the correct answer is found on the back of the paper slip, this functions like a reward, as it feels good to have been right. A reward is another game element, and seeking rewards is good for keeping up the players' motivation.

The game is designed to be a collaborative game, that is, there is no competition between the players and there are no winners and losers. The aim of the game is for the group as a whole to identify all the structures in the given text and to write down additional examples. In picture 2.7, the question 'All of us?' is addressed to the game facilitator (not visible in the picture). When all players have written their own examples, they take turns explaining what they have done (picture 2.8).

During later experimentation, several additional suggestions came up to increase the use of game features and introduce competitive elements into the game. In addition, we converted the game from its original face-to-face setting to an online setting. The development and experimentation process is described in the next section.

4 Developing and experimenting with the English grammar games

The first game sessions were played by the trainees participating in the capacity building programme and led by research assistants from India and Uganda. Subsequently, training participants took turns leading game sessions, including some players from outside the research group. In total, eight games were played in small groups of 4–5 participants. The texts were mostly factual and/or educational, for example a labelled diagram on drinking water, a poster on human health, a noticeboard with safety rules, but there was also an example of a personal letter and a paragraph from a narrative about the Indian Diwali festival.

The aim of this first development phase was to validate the game methodology in order to check whether players understood the game, how much time would be needed for each game, and whether participants could see what they needed to see without having their visual attention distracted or their line of vision blocked. As this validation was positive, we then moved to a second-phase experiment in 2021.

The next phase of experimentation was implemented with one of our Indian partner organisations. By this time, all our activities had changed to online mode due to restrictions in the wake of the COVID-19 pandemic. The partner organisation was running two training programmes, one Indian Sign Language teacher training course with 30 deaf students, and one Diploma in Education programme with 25 deaf students out of a total of 30 students. In the teacher training course, English was timetabled for one hour per day, so there was a ready time slot to use for the grammar games. The teacher was able to map some of the structures from the games on to the English language curriculum of his course (see Zeshan 2021 on the 'reverse curriculum' concept). The Diploma in Education programme did not have an English language component in the curriculum, so for these learners, English grammar games were an additional activity, and it was more difficult to engage students consistently.

Two research assistants worked with the teachers in these two programmes, who were also deaf, to test English grammar games. It was important to test the games with groups of learners who had not been exposed to all the theory on multiliteracies and the co-creative learning opportunities from our own training programme. The game approach could only be successfully applied more widely if it was doable for 'naïve' learners without specialised background knowledge. Indeed, using English grammar games with these two groups was quite challenging at the beginning, and we learned to adjust the methodology in several ways based on the feedback from the second-phase experiment.

A particular challenge was the fact that the game had originally been designed for face-to-face interaction. The layout and choreography had to be adapted for online communication. This involved the following modifications (see Figures 3 and 4):

- The grammatical target structures and associated examples were placed on one PowerPoint slide together with a picture of the text, and the slide shared with the learner group in a zoom call. The teachers first discussed the text with the students to make sure they understand what it says (reading comprehension).
- To play the game, the abstract patterns and examples were first displayed hidden under square shapes and uncovered one by one by the teacher as the game progressed (Figure 4).
- Individual students took turns to match the abstract patterns (i.e. the expressions involving square brackets) to sentences or phrases in the text, in the same way as in the face-to-face game. After the solution was found, all students wrote their own examples into the zoom chat.

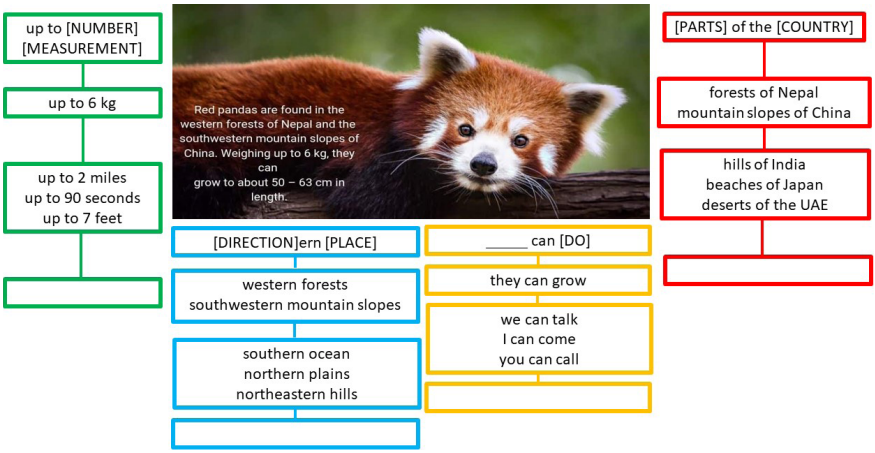

Figure 3. Design of a slide for the online version of an English grammar game (all fields are to be covered up before the game starts)

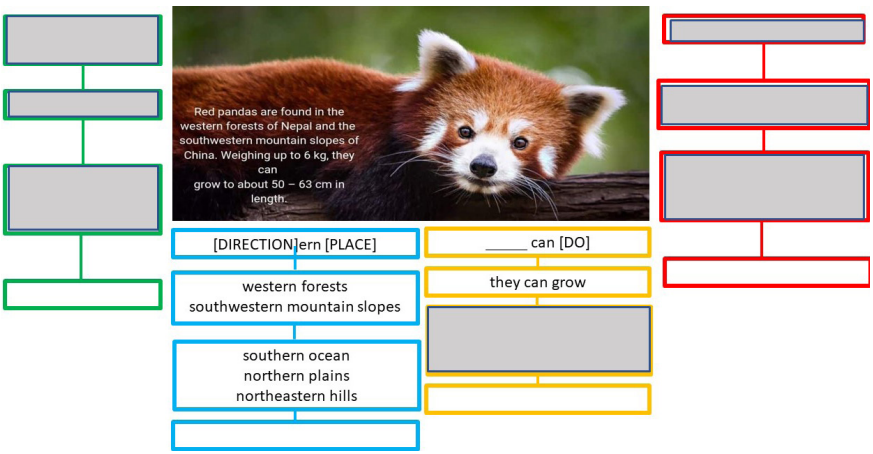

Figure 4. Online grammar game halfway through the game session, with fields uncovered successively.

This procedure works in principle, but there were a lot of practical problems, some technical and some related to the interaction. Some students did not have laptops but had to follow the session on smartphones, which is obviously difficult on a small screen. Insufficient bandwidth was also a problem for some. In addition, reading the text itself took too much time, as each session was timetabled for 45 minutes only. Moreover, when the group got to the stage of writing examples into the chat, teachers were unable to handle the sudden deluge of text appearing from so many participants at the same time.

The experiment continued for just over a month, with several sessions per week in each group, and several project meetings with both the research assistants and the teachers from the partner organisation. Research assistants joined the online sessions to support the teachers. A number of modifications emerged from these trial runs. Firstly, teachers decided to send pictures of the texts in advance of the sessions, so that less time would be needed in the session itself for text comprehension. Initially, translating the text into sign language and explaining it to students took too much time. To deal with the large number of examples coming up in the zoom chat, teachers only chose a few to discuss in the session, and then saved the chat with the rest of the examples and provided feedback to students separately outside the session. Adding both preparation time ahead of the session and review time after the session created a much better learning experience. In one of the groups, the teacher picked up some examples from the chat during the live zoom session and copied them onto the displayed slide to comment on them. He tended to pick examples with mistakes in order to explain how they should be improved.

The feedback provided by the teachers of the two online learner groups has been very useful in getting a first impression of the learning experience. The teacher of the sign language teacher training course commented that students were highly motivated in the game sessions. Their participation was much more intensive, with everyone raising their hands frequently, in comparison with the previous sessions on English grammar.

Indeed, the enthusiasm for the games extended beyond the online sessions. Some way through the games, several students, of their own initiative, decided to create their own games following the model they had experienced in class. This involved not only the top performers in English but also other students with lower literacy levels. The students created their own games complete with sample texts and patterns with square brackets. According to the teacher, there are quite a few 'mistakes' in these games but the initiative as such is remarkable.

In addition to difficulties with managing the visual environment in terms of what everyone was supposed to look at, the large diversity in the students' language and literacy background was a major challenge in both groups. Among the 30 students on the teacher training course, seven were more comfortable with English and made good progress, some having taught English themselves before. However, 11 of the learners found English very challenging. For them, the game method was still not resolving their barriers to learning. Similarly, the teachers of the second group commented that some of the students struggled greatly

with English, no matter what method was used. Managing diversity of learners is also noted as a major issue in the contribution by Nankinga in this volume.

Another interesting observation was that it seemed easier for students to learn about an abstract expression in square brackets when it had a direct counterpart in Indian Sign Language. There are individual signs that correspond to some of the concepts, such as [MOVE], [PERSON], [NUMBER], [DO], [QUALITY] and [PLACE]. However, some students were still unclear about the matching signs, or perhaps did not know some of the signs, for example the sign glossed DO.

The observation about Indian Sign Language (ISL) counterparts of abstract expressions was later included in the design of a virtual learning environment (VLE) in terms of defining the level of difficulty for each game. The VLE was implemented using Moodle as the platform software and was set up in order to allow further groups of learners to access English grammar game materials. When constructing the abstract grammatical frames, we prioritised expressions with such equivalent single-sign translations into ISL for the easiest, entry-level games on the VLE. Later on, further expressions were added that do not have single-sign equivalents in ISL but need to be explained.

In a further validation stage, our research team also worked with additional deaf collaborators across India. We organised two online workshops in mid-2021 where the grammar games approach was discussed. The first workshop had 20 and the second workshop 13 participants, who were a subgroup from the first workshop except for one new participant joining only for the second workshop. Each workshop generated recommendations. For instance, participants recommended that in the virtual learning environment the grammar games should be organised into themes according to the content of the sample text (e.g. history, social media, stories). The workshops also recommended a short-term training programme for deaf facilitators who could lead learner groups in English grammar games, so that the method could be taken up by other deaf learners.

Six of the deaf workshop participants were recruited to produce additional materials for grammar games. As they did not have specific expertise in English grammar, their task was to find further reading materials and to produce a sign language video for each text. The videos are translations of the texts into Indian Sign Language, and sometimes also explain the context. All texts are short, so that they can fit easily onto one laptop screen. The collected texts are in the form of pictures because they include other visual elements in addition to print, as in the examples

in Figure 1 and Figure 3. These collaborators were free to identify any reading that they thought would be interesting and fun for deaf readers. It seems therefore that a combination of print with other visual elements is the preferred format.

To generate the abstract grammatical patterns and supplementary example phrases, a non-deaf project member based in India was recruited for adding this material to the texts and preparing PowerPoint files for online sessions. This work was checked by project lead Zeshan to ensure it was suitable for deaf learners.

The Moodle virtual learning environment includes introductory materials (i.e. an explanation of the game method in ISL and a video recording of a game session), grammar game materials (i.e. the texts in English and PPT files for both offline and online use), with the theme of the text in the section heading, and a searchable 'grammar dictionary' where the labels for abstract grammatical structures are listed and explained (see Figures 5 and 6). The VLE was discussed at the second workshop to gain feedback about the best way of structuring the material to make it easily accessible for deaf learners.

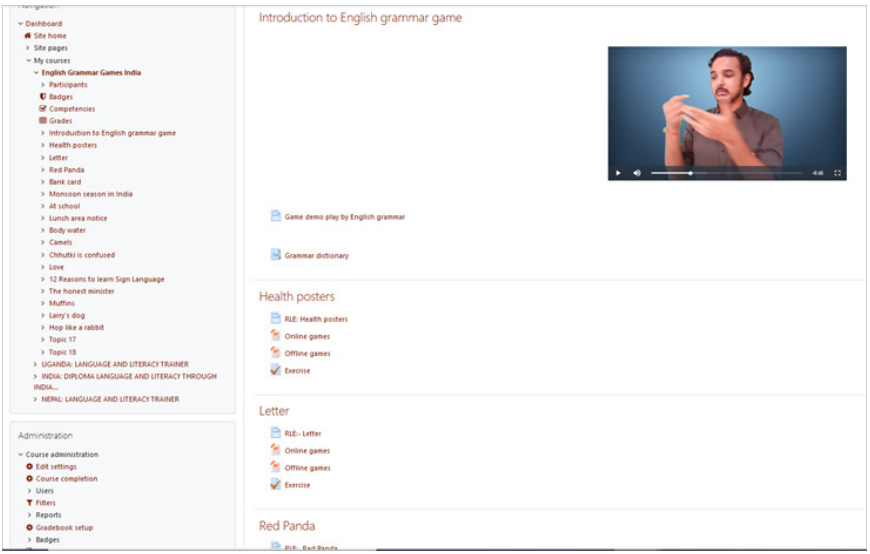

Figure 5. Main page of the English grammar games VLE

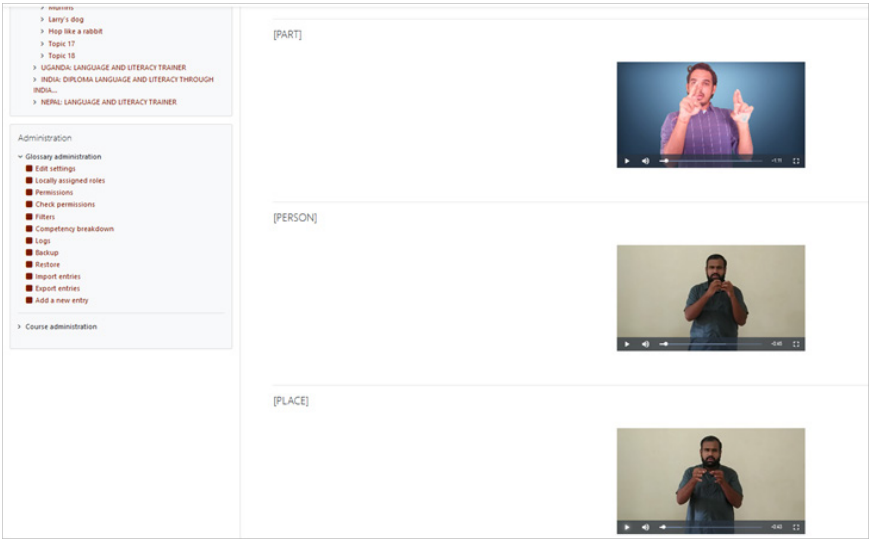

Figure 6. A page from the grammar dictionary

In the next re-design of the virtual learning environment, the games will be categorised by level of difficulty, and ISL translations of the texts will be added. On the basis of feedback and discussions, we have decided to group grammar games into three levels, which are defined as follows:

Level 1:
Short texts (ca. 2 sentences)
Mostly 2 abstract patterns per game, exceptionally up to 3
Mostly 1 [ ] expression per pattern, exceptionally up to 2
Prioritise [ ] expressions that correspond to single signs

Level 2:
Medium-length texts
4–5 abstract patterns per game
Mostly 2 [ ] expression per pattern, sometimes up to 3
[ ] expressions may or may not correspond to single signs

Level 3:
Long texts (a whole page of text)
4–5 abstract patterns per game
No limit on complexity of structures
Possibility of using formal grammatical terms (e.g. possessive pronoun, adjective, etc)

This design is supported by experiences from the two groups of learners. When we began experimenting with games, the very first games corresponded to Level 2. This was not ideal because students had to cope with the unfamiliar format along with more difficult texts and patterns. In fact, in one of the groups it took a whole week to work through a single game of Level 2. In future, learners would start with games at Level 1. Starting slowly with shorter texts and fewer abstract patterns to deal with will help learners getting to know the method first, before moving on to more difficult games.

5 Conclusion and outlook

Experimenting with the English grammar games has pointed to a viable alternative for deaf sign language users to overcome the considerable barriers to learning about English grammar. At the same time, using the game methodology has enabled us to preserve our original intention, namely that grammar should be embedded in authentic texts. The games maintain a focus on communication and uses of English relevant to students' everyday lives and interests, including both factual and fictional texts. So far the research team has assembled a wide variety of texts, from notices, advertisements, cooking recipes, online forms, dictionary entries and information posters to cartoons, movie subtitles, poems, and social media posts. For future work, we envisage that groups of deaf learners will identify sample texts themselves to use in games, ensuring that there is a genuine interest in the content of these materials and motivation to understand them.

The approach of learning grammatical structures by analogy rather than explanations in meta-language is another feature that has carried over from our experiences in the earlier projects. As explained in section 1 of this chapter, creating new sentences and phrases based on given examples is an activity that tutors used in their classes.

In further work with deaf learners, there are several development lines that would be suitable next steps. In addition to the next round of VLE development mentioned in section 4, training will be needed for deaf facilitators to work with the English grammar games. Such training would include not only how to use the English grammar game resources that are already available but also how to create additional games and use them with learners. For instance, as learners progress to more advanced levels of the game, they can be supported to draw generalisations across grammatical structures, when they have become familiar with a variety of forms. Tutors who would like to use English grammar games need

training in how to do this. It is not intuitively obvious at what point and to what extent explicit explanations and meta-language about grammar should be introduced.

The learner groups we worked with also suggested that it would be good to increase the game-like design features. In particular, some students and tutors suggested that there should be more competitive elements in the English grammar games. In how far the game design should be moved from collaborative to competitive needs further consideration. However, it is clear that there could be many options to introduce competitive elements. For instance, players could split into two teams and compare which team has produced more correct examples of their own. Alternatively, there could be a time limit within which an abstract pattern needs to be identified in the sample text. If the time has expired, there may be a penalty to the team, or the turn would pass to the next person or team.

So far, we have not used English grammar games with deaf primary school children. The situation of younger children acquiring literacy for the first time is obviously quite different from the young deaf adults in India, who are all constantly exposed to written English in their daily lives. A different approach may be needed for children, especially with respect to learners creating their own examples based on analogy with the given text. Younger children may not yet have sufficient exposure to English, including enough vocabulary to draw on for creating examples. Whether the game process as such would work with primary school children needs further research.

Another particularly interesting consideration is to think about the applicability of English grammar games to non-deaf learners. For instance, using such games with children who have English as their first language would allow them to think about grammatical structures while avoiding linguistic terminology that can be difficult to master in primary school. Meta-linguistic and meta-cognitive skills can be fostered in an engaging way through grammar games.

For second language learners, the use of grammar games has more parallels with the deaf learners. In particular, this method could be useful in contexts where professionally qualified teachers are not available. One of the advantages of English grammar games is that game sessions can be led by facilitators who are themselves not highly fluent in English, certainly not at the level of a university degree in English language or language teaching. The experiments in all groups of deaf learners have clearly established that the tutors do not need to have any advanced understanding of English grammar either. Therefore, a short-term

training programme would probably be sufficient to enable facilitators to guide learners using English grammar games, especially if there are sufficient game materials already available. There are many contexts where this could be very useful, for example in refugee camps where regular schooling may not be available, or in adult education classes for recent immigrants. Such learners may have difficult educational experiences, or indeed no experience of formal education at all, as well as psychological barriers to effective learning. A game format combined with the possibility of learners deciding themselves what to read could play a role in overcoming barriers to language and literacy learning in such groups.

Finally, in the context of extending English grammar games to non-deaf learners, it is interesting to observe how in this case, an innovation first arises in a special education context and may then be made applicable to contexts of mainstream education. The fact that deaf learners may have something valuable to share with non-deaf education is in itself an empowering notion.

Acknowledgements

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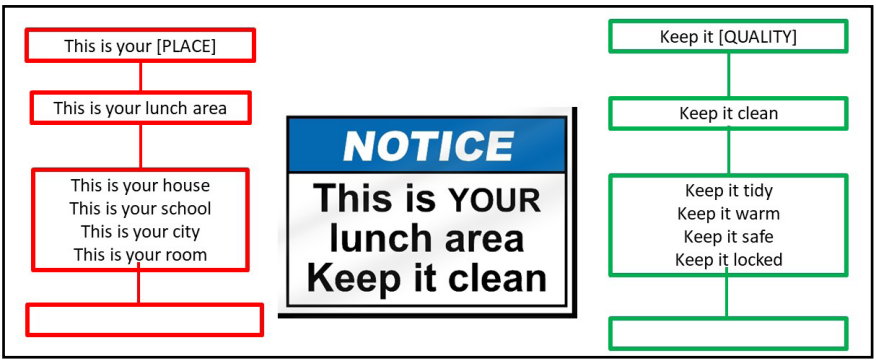
Appendix: Examples of games

All games are shown in the online format but exist in the offline format too. Examples include games at Level 1 and Level 2 of difficulty. Level 3 is not included as the learner groups we worked with were not yet operating at this level of skills in English.

Games at Level 1:

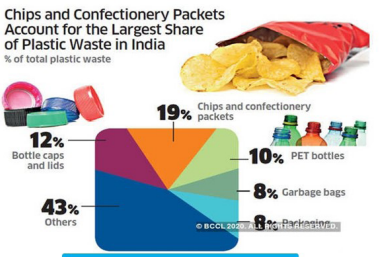


Games at Level 2:

[THING]s and [THING]s

Chips and confectionary packets
Bottle caps and lids

shirts and pants
books and pens
doors and windows



the [SIZE]est

the largest

the biggest
the smallest
the longest
the tallest

[NON-COUNT THING] in [COUNTRY]

waste in India

electricity in Japan
rice in Mexico
petrol in Sri Lanka
water in Bangladesh

Stop [DO]ing

Stop yelling

Stop watching TV.
Stop smoking.
Stop pretending.

turn [ON/OFF] the [DEVICE]

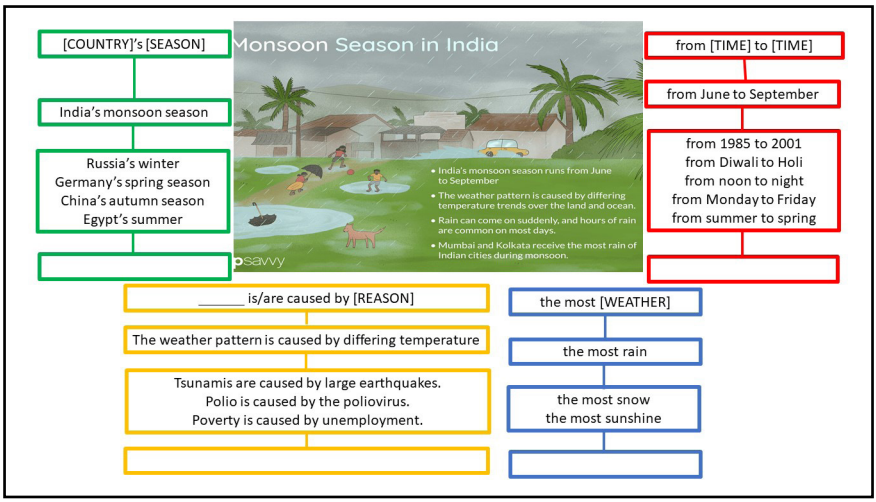
Turn off the light

Turn off the washing machine.
Turn on your phone.
Turn on the radio.

[DO]ing at me

yelling at me

looking at me
throwing things at me
frowning at me


[COUNTRY]'s [SEASON]
India's monsoon season
Russia's winter
Germany's spring season
China's autumn season
Egypt's summer
Monsoon Season in India
• India's monsoon season runs from June to September
• The weather pattern is caused by differing temperature trends over the land and ocean.
• Rain can come on suddenly, and hours of rain are common on most days.
• Mumbai and Kolkata receive the most rain of Indian cities during monsoon.
psavvy
from [TIME] to [TIME]
from June to September
from 1985 to 2001
from Diwali to Holi
from noon to night
from Monday to Friday
from summer to spring
_____ is/are caused by [REASON]
The weather pattern is caused by differing temperature
Tsunamis are caused by large earthquakes.
Polio is caused by the poliovirus.
Poverty is caused by unemployment.
the most [WEATHER]
the most rain
the most snow
the most sunshine

Learning by publishing: An innovative language support procedure for deaf researchers producing academic English

Jenny Webster

This short sketch is about an innovative procedure that was developed during the latter stages of the Peer-to-Peer Deaf Multiliteracies (P2PDM) project to enable four of the deaf project members to transform their expertise into written contributions for this book. As sign language users, none of them used English as a first language and they had little to no experience in producing academic writing for publication. Therefore, their fellow team members designed a language support procedure to support and guide them through their writing process. This sketch briefly introduces the concept and practice of language support in general, and then looks into the three main phases of the team's innovative procedure: the selection of chapter topics and the identification of relevant literature; the creation of signed videos and notes that the writers used to formulate their drafts; and the revision of successive drafts by email. In each phase, the authors were deliberately given opportunities to build up their meta-knowledge of academic writing, including planning, citing literature, structuring a text, checking grammar, and making appropriate lexical and stylistic choices. At the end of the writing process, when the book was in publication, each of the four authors (Pal, Nankinga, Ahereza and Manavalamamuni) was sent a brief set of questions via email to elicit their views and comments on this procedure, and some of their remarks are provided here to illustrate the discussion.

The term 'language support', when applied to working with deaf students, especially in the UK, can be defined as assistance provided by a language tutor in one-to-one sessions with the deaf learner that aim 'to bridge the language and information gaps within academic discourse, and to create a learning environment whereby deaf students are provided with access to their course materials and assignments and supported in their production of written English' (Barnes & Doe 2007: 143). The literature on language support with deaf individuals at the university level and/or in academia is rather scant, and the role of 'language tutor' in the UK still has no established professional profile (Barnes, Dodds, Haddon, Mowe & Pollitt 2005) or qualification pathway (Barnes 2006). In contexts where the deaf student is a signer but the language tutor is not,

an interpreter may be used to facilitate communication (see Babcock 2011 on this practice in the USA). Language support sessions may take place in person or remotely, and involve tasks like preparing for and planning assignments; discussing the structure and organisation of written work; facilitating access to academic texts, sometimes by modifying the English; and translating texts into sign language (Barnes 2006: 108; see also Babcock 2013).

Prior to commencing the work on their chapters, the four deaf authors each had different amounts of experience with using language support. Author Manavalamamuni's only experience with it was from the P2PDM project itself, as occasional support had been provided by team member Webster with the peer tutor reports and micro-case studies when needed. Manavalamamuni commented that he was concerned that producing his chapter would be much more challenging than working on these other shorter files:

> Before starting the chapter, I was not sure that I could write it. I expected it would be very difficult and would possibly take many long months, and that I would get very confused. But in fact it progressed well, and having already had language support for the peer tutor reports and micro case studies helped me to know how to engage with the process of language support for my chapter.

In contrast, author Nankinga said that she had language support previously at university, which was provided by a non-signing tutor who did not specialise in working with deaf students, and tended to be more directive. This informed her expectations of what it would be like to work on her chapter for this book:

> When this second opportunity for writing my research came up, I expected that it would be the same kind of experience as the first. So before I started writing my chapter, I expected that I would be given direct answers whenever I got stuck. The process took a lot of time to understand at first, but then I realised I could make my own changes correctly because of the guidance given to me by Professor Zeshan, which was done face to face [in sign language] at first so that I got first-hand information.

The work on the chapters began in April 2020, when the authors each chose a topic and a research question to address. Then, they searched for literature about their topic online, including on the peer tutors' section of

the project's online SLEND[1] platform, where the team had been amassing a number of academic resources. When they could not find a particular publication, they messaged UK-based project member Webster who searched further and sent them the requested files or URLs by email. Author Nankinga remarked that 'the assistance given by [Webster] to access online articles for my citations and references was very helpful for my chapter, as I did not have good internet access'. They read through their articles, made notes on them, and discussed them in Indian Sign Language (ISL) with project director Zeshan at one-to-one weekly tutorials over a period of seven months from April to October 2020. From April to June, all four authors and Zeshan were based in India, so they were able to meet face to face. In June, Nankinga and Ahereza returned to Uganda, so their tutorials took place online.

Zeshan explored with them how to use the results from the P2PDM project and their notes on the literature to structure their argumentation for their chapter. One piece of advice that she offered was to organise the data and findings in a table (see Figure 1) and then use the table to start structuring the argumentation. Author Nankinga said: 'This advice on producing a good research text through arranging data in a table first so it becomes easier to write the text for the research chapter guided me a lot and remains an experience to use in future'.

1 SLEND stands for Sign Language to English by the Deaf (see Waller, Jones & Webster 2021).

Issues reported	Implications	Quotes	Solution
a. Teaching Grammar: Difficulty in explaining English	Using pictures in teaching enhance understanding especially for the weak children. They are able to identify the activity using the picture and can easily talked about what they see in the picture.	This activity enables both the weak and strong learners to easily remember the words taught matching the pictures and without the pictures, they could write the words. The weak learners especially the youngest ones were able to read the words correctly with the aid of the pictures. **(MCS.Ghana.Nov 2018.Demodeaf)** We need to focus a lot on reading. E.g. while reading and signing a sentence e.g. 'OLIVIA IS EATING' children only signs two words (OLIVIA and EAT) dropping IS. We need to get strategies on how to explain why 'IS' has not been signed and what is the purpose of having IS that is never signed in a sentence. Whether it is a grammar, need to clarify how it is used. **(MCS Ug.Children.Feb 2019)**	Because, teachers have difficulty in explaining English: Explaining English through games method can be adopted. English games ideas can be created by language experts along with tutors who had used the game methods in Deaf schools as best practices.
No resources of using Sign Language to explain English	Most Deaf teachers are fluent sign language users however most of these sign language users also have less English knowledge thus this poses a question on how can teachers teach English to the Deaf learners. Sign language resources used to teach English are not readily available as of yet. There is	I felt that it has difficult deeply explain in English grammar linked to this topic. Hence, I searched internet for NO & DO NOT so I felt little confuse but did not properly to find for this topic NO & DO NOT so I tried better explain this. **(PT Report.May 2018)**	Identifying and developing expert teachers as mentors and coaches to support learning in their area(s) of expertise for other educators such that measures and innovations on developing sign

Figure 1: An extract from one of the tables used by author Nankinga to organise her data and findings

For some of the authors, this planning and outlining phase involved making signed videos to explain in their own first language what they wanted to say. Author Pal developed an effectual and innovative approach wherein he created comprehensive MP4 files by superimposing his signed video stream onto the spreadsheets containing his data, and made references to particular pieces of information by pointing to them with the cursor as he explained them in ISL (see Figure 2). He said:

> Initially I intended to film myself on my phone explaining to Prof Zeshan how the children's results changed between the pre-test, first post-test and second post-test. However, I felt that it was maybe difficult to understand what I explained without the data graphs mentioned; hence I found it useful to record my explanation with the data graphs by using the laptop.

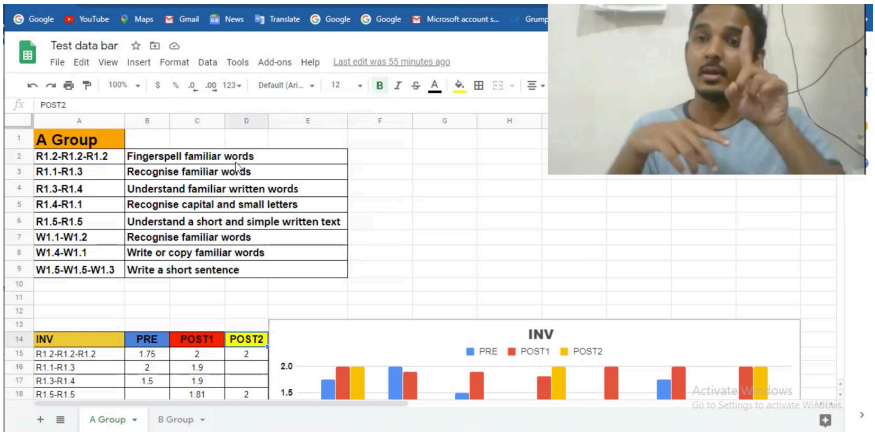


Figure 2: A screenshot from author Pal's innovative MP4 file

Through their tutorials with Zeshan, they gradually formulated full first drafts of their chapters. Author Pal commented that Zeshan 'guided me with her suggestions and advice to get my chapter planned out through a WhatsApp chat. She understood what I intended to include in each part of the chapter'. However, he also pointed out that the use of text-based remote communication was sometimes challenging because 'there were often academic words that were new to me, and I was hesitant to reply to those questions, and had to learn them from her'. He said that while this enabled him to expand his academic English vocabulary, on the other hand it meant that they could not have as deep a discussion as they did when they were communicating face to face. Likewise, author Nankinga reported that: 'After face-to-face feedback was interrupted by Covid-19, it took me a while to understand the text-based feedback communicated via WhatsApp, and sometimes I would misunderstand what I was required to do'.

For the Indian authors, it was sometimes possible to have one-to-one video calls, but during the lockdown it was very difficult for the Ugandan authors to do this because of resource issues. They were isolated at home and unable to go to the places where internet services are robust enough to facilitate video calls in sign language. Therefore, the use of WhatsApp texting for the Ugandan authors in particular was a necessity. But this method of feedback had the advantage that the authors could go back and re-read what they needed to do, whereas this is impossible with ephemeral video calls. Moreover, the text-based chats on WhatsApp can and often did involve several people, whereas video calls are normally restricted to just two.

In the last phase of the procedure, the authors communicated remotely with Webster about their written drafts, with several rounds of back-and-forth emails and the occasional chat on WhatsApp. Typically, they would send her each successive draft by email attachment, with queries and requests regarding what they wanted her to check or advise about. Her guidance about specific items in the text was usually typed in using the comments feature in Microsoft Word. Then within the email reply Webster sometimes made general observations about the draft, including its strengths and areas that required further attention. As the work progressed and the files became larger, it was more and more challenging for the authors to go through their texts and resolve all of the comments. Author Ahereza said: 'Because the support was done at once on the whole chapter, it was a little difficult to track everything. I think it would be better if the support started earlier and was done section by section. This would allow us concentrate on less volume and give us ideas on how to write the next section'.

As capacity building was a main concern of the project as a whole, Webster included in her comments not only suggestions and corrections, but also explicit guidance on English grammar designed to encourage reflection and practice, particularly where she identified a pattern that was repeated often in the text. For example, comments included 'use past tense'; 'use the verb form here, not the noun form'; and 'make these two sentences into one sentence with a linking word (e.g. *because*)'. Comments about academic style and word choice were also provided, e.g. 'Use a softer "hedging" word here, like *few* instead of *no*. In academic writing, be careful of using strong words like *no*, *never*, *all*, *always*, etc. It is better to say *few*, *little*, *most*, *many*, *often*, *may*, *possible,* etc'. Webster also made comments to support the authors' work on citing and referencing their sources in their texts, for instance 'All of your in-text citations need the surname and year, and you need a page number for this one as well, because this is a direct quote'.

Author Pal said he found it useful to learn from this part of the process because it enabled him to acquire new English words, improve his ability to structure sentences and paragraphs in an academic text, and gain confidence in dealing with references and citations. Similarly, author Ahereza said: 'What I liked most was learning at the level of organising and sequencing the message, as well as improving my choice of words to fit into the context for better cohesion and coordination. Punctuation is also my main challenge and it was useful looking at how punctuating was done'. Author Manavalamamuni said that this phase of the process helped him to learn more about the rules of English grammar, and reflect

on his editorial decisions: 'I made my own changes to the sentences after [Webster] had added her comments in Word. It was good for me to think more deeply about how to edit my sentences'.

However, because of time constraints, it was not possible for Webster to request or explain all of the necessary amendments within the comments feature, so she used the tracked changes facility to make some changes directly within the text for the authors to then check. A key benefit of using the tracked changes facility is that the author maintains ownership of their work at all times, as they must review and accept or reject each amendment. Author Manavalamamuni remarked that he was able to practise his English by learning from these modifications in his text. Toward the end of this phase, the pressure of the publication schedule necessitated a decrease in this meta-discussion of academic English within the comments, so that tracked changes was the main feature used, with comments only made to ask questions about content (e.g. 'why does this number differ from the total given in the table above?'). This part of the writing process for the four deaf authors was on a par with the rest of the contributors to the volume, who were all asked to resolve similar queries in their texts. The only difference was that some of the authors needed supplementary chats with Zeshan and Webster on WhatsApp because they had to deal with more global structural issues, e.g. the merging of one section with another. These chats allowed them to clarify their understanding of the issue.

Having described the steps that were involved in the language support, it is possible to depict the innovative procedure diagrammatically (see Figure 3).

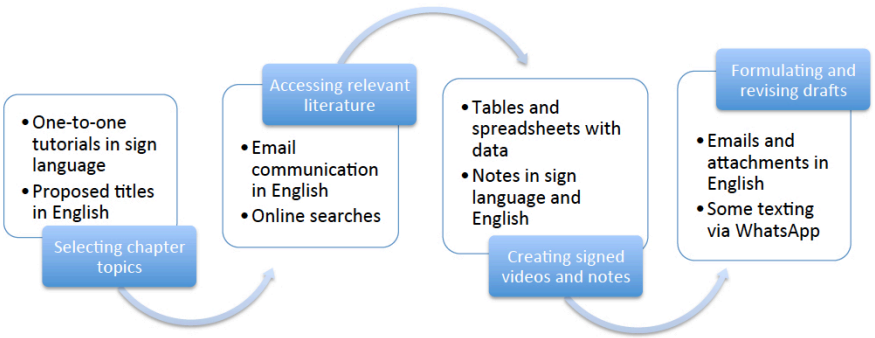


Figure 3: Flow chart illustrating the language support procedure used by the four deaf authors

With regard to the process as a whole, all four authors agreed that it can play a vital role in facilitating deaf-led research and opening the doors for

deaf people to enter academia and establish a publication profile. Author Manavalamamuni said that language support is especially beneficial for deaf people who have experienced systemic barriers in education that caused delays in their development of writing skills:

> Many deaf people do not have fluency in English, often because of a lack of access which results in poor quality deaf education. But in years to come, with this kind of support, some of them could become researchers in the field of deaf studies. The language support process was very important in my own development. I felt more confident when I was working with language support and cannot imagine that I would have progressed so far as a researcher and writer without it.

Finally, author Ahereza expressed the view that the language support generated not only skill development but also motivation to continue writing in the future: 'It is a joy reading exactly what you wanted to emphasise but struggled to. Reading feedback with all your points well laid down motivates you to keep writing. I believe with such support sustained, we can be good academic writers'.

This approach to academic writing support for new deaf authors in developing countries was also used to produce a teaching handbook for language and literacy trainers as part of the impact project that followed P2PDM (see Zeshan & Webster, this volume). It may be worth analysing and deploying this approach further, to build supportive collaborations between newer and more experienced academics in the Global South. Deaf scholars are still poorly represented in academia because of systemic obstacles to the publication process (Woodcock, Rohan & Campbell 2007; De Clerck 2010). The language support procedure described here may help to facilitate greater access to research careers for deaf individuals as well as increasing the number of scholarly papers by deaf authors.

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Capacity building for professionalising the roles of deaf sign language users in deaf education

Ulrike Zeshan

1 Introduction: Setting and participants

From December 2019 to June 2020, a capacity-building programme was organised for young deaf participants with previous experience or the aspiration of working as professionals in the context of deaf education. This chapter summarises some of the experiences from this programme, with particular emphasis on interactions between learning, peer teaching, and materials development.

The programme was part of the impact project on 'South-South collaboration' that was itself based on research undertaken during the 'Peer-to-peer deaf literacy/multiliteracies' projects (P2PDL/P2PDM).[1] The capacity-building programme was held in India, in a rural area of Odisha and close to a residential primary school for deaf children. In addition to Indians, participants joined from Uganda and Nepal.

The main aim of the programme was to experiment with ways of professionalising the role of deaf sign language users in deaf education contexts, with a particular focus on primary school children and young deaf adults, as these were the groups of learners that the research had also focused on.

UK- and India-based members of the P2PDM research group facilitated the programme, with myself as the main trainer, project consultant Sibaji Panda as the second trainer, two project staff working at the nearby deaf primary school (Jagdish Choudhari and Nirav Pal) as field visit facilitators, and a project manager coordinating the complex logistics of the programme.

The programme had 12 participants (10 men and two women), six of whom were also research project staff at the same time (i.e. research assistants and peer tutors, including those acting as field visit facilitators).

1 For a summary of P2PDL research, see Zeshan et al. (2016). For research results of P2PDM, see the introductory chapters to this volume and its associated first volume, also edited by Webster & Zeshan.

Their backgrounds and levels of experience varied considerably and included the following sub-groups:

Research assistants (two Indians and two Ugandans) – project staff

Peer tutors (two Indians) – project staff

Trainees with previous experience in teaching roles (two Nepalis and two Indians)

Trainees without previous relevant experience (two Indians)

Rather than being a hindrance, this diversity in the learner group afforded many learning opportunities, for example to translate between different sign languages, and pass on skills to less experienced participants.

The programme took place across three locations: a lab space in a small town (Binika) for working independently and in sub-groups, which was also equipped for video filming and editing; an eco-village campus for whole-group activities about 2km away (Shikha eco-village); and the deaf primary school located in the nearby village of Sindurpur about 15 minutes' drive away. The participants lived in the town and shared flats, and the trainers lived either in the town or in the eco-village.

The main language of the training programme was Indian Sign Language (ISL). This presented some obvious difficulty, given the participation of non-Indians. They faced additional challenges in acquiring competence in ISL alongside other content. It was helpful in this respect that trainees shared accommodation, so that non-Indians could practice ISL outside of formal learning time.[2] The written language was English, which presented another difficulty for those with lower levels of literacy. However, written texts were used as additional material rather than for core learning, which was conducted face-to-face through signing.

For logistical reasons, not all participants arrived at the same time. Arrivals took place between late December and mid-January, and in retrospect, this proved to be fortuitous because it allowed us to build up the structure of the training programme over the first few weeks, starting with the in-situ project staff and adding less experienced participants as and when they arrived.

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2 One of the Ugandan participants was bilingual in Ugandan Sign Language and ISL due to living in India earlier for several years, and one of the Nepali participants had some previous exposure to International Sign. They were able to give some support with signed communication to their colleagues from their respective home countries.

2 Overview of capacity-building activities

The design of capacity-building activities followed several principles: participants should be actively involved in constructing and implementing the programme, opportunities for participants to learn from each other as peers should be maximised, and teaching and learning materials for future use should be created as part of the programme itself. This was partly motivated by the fact that ready-made teaching and learning materials for this context are not available in the sign languages of the participating countries. In addition, we believed that actively creating something new would lead to a more thorough and sustainable learning experience for our participants than being taught according to a predefined set of learning objectives.

From discussions of our programme's objectives and components, an initial timetable emerged over the first two weeks, which was subsequently modified several times. Figure 1 shows one of these timetables, with all of the main features included (sections in yellow have parallel sessions labelled A and B, and sessions in blue are for the whole group).

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9:00 to 11:30am	Individual & sub-group Lab work	Individual & sub-group Lab work (A)	Individual & sub-group Lab work (A)	Individual & sub-group Lab work (A)	Individual & sub-group Lab work (A)	Individual & sub-group Lab work (A)
		School visit (B)	Research (B)	MT lectures (B)	School visit (B)	
12pm to 1.30pm	Plans and Outcomes		"Lectures" Concepts and Theory	"Lectures" Concepts and Theory		
2:30 -4:15 pm	"Lectures" Concepts and Theory	Open Space: T and L Materials	Open Space: Teachers' Handbook / storyboard	MT-led Open Space	Curriculum (A) including planning meeting MT lectures (B)	Special events or Free time
4:15 to 5.30pm	Sports					

Figure 1: Training timetable

Three times a week, I led sessions introducing new concepts and theories. For the most part, these were not lectures in the usual sense but sessions with a variety of visual and interactive activities in addition to explanations for the learners. For instance, in the session on the relationships between learning and memory I asked the participants to recall an event they

remembered well from their childhood, and then engaged them in a competition to remember as many names of countries written on post-it notes as possible under time pressure. From the observation and discussion of what they could remember and why, we then arrived at the concept of 'emotional memory enhancement', i.e. the fact that triggering an emotional response can improve aspects of memory (Kensinger 2009, Tyng et al. 2017).

Although the conceptual space revolved around multiliteracies with deaf learners, there was no fixed set of lecture topics to begin with. The programme of lectures partly relied on topics and materials used previously for training the P2PDM research group, especially at the beginning. However, there was much room for new topics to emerge during discussions.

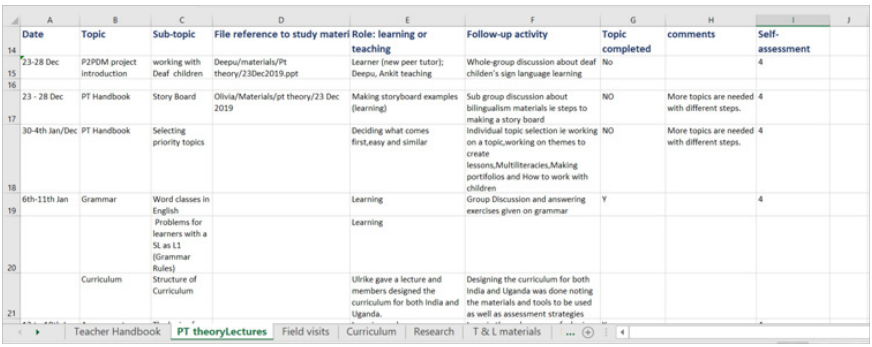
Another main activity was scheduled time for lab work, where the participants worked in smaller groups on producing video lectures following on from topics discussed earlier with the whole group. This process is described in more detail in section 3.

Two other types of sessions were intended to deepen learning and provide opportunities for peer interaction: 'MT lectures' were repeat sessions of the same topics already covered by myself but taught again by one or two (rarely three) participants functioning as 'Master Trainers' for these sessions. The sessions called 'Open Space', also led by participants, helped to clarify any questions whether related to theoretical content, the methodologies of lab work, or questions of technical support. For those participants with less experience, or those who were not familiar with Indian Sign Language, these clarification sessions offered an additional learning environment. For those at a more advanced level, the sessions provided important practice in teaching roles. Over time, all participants got at least some experience of leading peer learning sessions, though some were naturally much more involved in peer teaching than others (see Table 1 in section 3).

Twice a week, the programme included field visits to the primary school for deaf children. At the beginning, these visits were led by the project staff who were already teaching children in this school, so that the children and trainees could be properly introduced to each other. Later on, participants became more independent when visiting the school. Participants took turns doing this because we limited the number of visitors to a maximum of four, given the small size of the school with 32 children. The aim of the field visits was for the trainees to experience the environment of a functioning school and to put into practice some of the concepts and methods that had been discussed in the training sessions.

Halfway through the programme, the more advanced participants who were working as research assistants started attending research sessions with myself, mostly for 1:1 advice on conducting their own research based on data collected in our project. Support for this research continued after the end of the six-month capacity-building programme (see Webster, this volume), and the outcomes of these individual projects form part of this book and the associated Volume 1 of *READ WRITE EASY*.[3] Ugandan and Indian project staff also attended separate sessions with me for work on curriculum development (see Zeshan 2021 on collaborative curriculum development).

An important part of the programme was the use of learning logs. All participants had to complete an overview of learning in the form of an Excel sheet, listing activities, reflections, and a score between 1 and 5 to indicate confidence with the topic or activity (see Figure 2). For several participants, expressing themselves in written English was a challenge, and the learning logs differ considerably as to what is conveyed in writing. Video diaries would have been more helpful for these learners but very time consuming to review and provide feedback on. Instead, a classroom-based session was used every Monday for participants to talk about their learning in the previous week in sign language, using their Excel entries as memory aides.



	A	B	C	D	E	F	G	H	I	J
14	**Date**	**Topic**	**Sub-topic**	**File reference to study materi**	**Role: learning or teaching**	**Follow-up activity**	**Topic completed**	**comments**	**Self-assessment**	
15	23-28 Dec	P2PDM project introduction	working with Deaf children	Deepu/materials/Pt theory/23Dec2019.ppt	Learner (new peer tutor); Deepu, Ankit teaching	Whole-group discussion about deaf childen's sign language learning	No		4	
16										
17	23 - 28 Dec	PT Handbook	Story Board	Olivia/Materials/pt theory/23 Dec 2019	Making storyboard examples (learning)	Sub group discussion about bilingualism materials ie steps to making a story board	NO	More topics are needed with different steps.	4	
18	30-4th Jan/Dec	PT Handbook	Selecting priority topics		Deciding what comes first,easy and similar	Individual topic selection ie working on a topic,working on themes to create lessons,Multiliteracies,Making portifolios and How to work with children	NO	More topics are needed with different steps.	4	
19	6th-11th Jan	Grammar	Word classes in English		Learning	Group Discussion and answering exercises given on grammar	Y		4	
20			Problems for learners with a SL as L1 (Grammar Rules)		Learning					
21		Curriculum	Structure of Curriculum		Ulrike gave a lecture and members designed the curriculum for both India and Uganda.	Designing the curriculum for both India and Uganda was done noting the materials and tools to be used as well as assessment strategies				

Teacher Handbook | PT theoryLectures | Field visits | Curriculum | Research | T & L materials | ...

Figure 2: Example from a learning log

Aside from using written English, the format and use of learning logs was also a struggle for some participants because they were unfamiliar with self-assessment and reflection on learning. Therefore, the teaching team provided three rounds of individual feedback to each learner in order to

3 For these four research assistants, work on their personal research project including its publication was part of their training, with the whole programme taking 12 months.

improve the use of logs. If learning logs had been assessed and graded, a video-based option would definitely have been necessary. However, the capacity-building programme did not include any assessment. Instead, each participant received a transcript listing all learning activities undertaken during the programme (see section 4).

Finally, it must be noted that the capacity-building programme was disrupted by the lockdown imposed in India due to the COVID-19 pandemic in late March 2020. From then until the end of the programme in mid-June 2020, all activities were moved online. Trainees stayed in their separate shared flats and continued working remotely as directed by the trainers. The programme of visits to the school was also compromised, as all schools had to close. Despite the highly disruptive effect of this, the remote activities proceeded better than expected, and we were able to address the limited objectives of this part of the training programme relatively smoothly, though the learning environment was of course severely limited.

3 Interaction between learning, peer teaching, and materials development

This section provides details of one part of the capacity-building programme, namely the process leading to the production of video-based bilingual learning materials. These materials were generated by the trainees themselves and were compiled into a multimedia teacher's handbook. The handbook was intended to be the basis for further training with additional groups of aspiring deaf education professionals. It overlaps to a large extent with the curricula that were also created during the training (see Zeshan 2021), though the two are not identical. The process of producing these learning materials starts with the allocation of topics to sub-groups (section 3.1), and proceeds via a visual content planning method to the production of signed lectures (section 3.2). The interaction between the process and the development of skills is summarised in section 3.3.

3.1 Training topics and sub-groups

Over the training period, the programme included ca. 25 topics. The way in which these topics were selected is not discussed in detail here, except to say that they were not decided by the trainers ahead of the programme but brought up in various ways by either trainers or participants.

All topics were covered initially in whole-group sessions. Usually, the topic was first introduced in a 'lecture'-type slot and then taken up again

in a peer learning session. In most cases, the topic was then selected to be the topic of a video lecture. For both the peer learning sessions and the video production, we identified leads from among the trainees who would be in charge of the peer learning sessions and coordinate a small sub-group producing a video lecture.

Table 1 shows the allocation of topics to video unit production and peer learning session leads. Usually, video production leads and peer learning session leads were not the same people for any particular topic. In this way, trainees had more chances to work on a variety of topics rather than being responsible for just a few topics.

Table 1: Lead roles of trainees (research assistants in yellow, peer tutors in blue; names have been anonymised)

Topic	**Peer-to-peer learning leads**	**Video production leads**
Multiliteracies	PN	MD
Academic reading and writing	PJ, NO	--
Repetition and learning	LP, AN	AN, MD
Real-Life English	VA, MD	MD
First language acquisition	LP, VA, AN	--
Second language acquisition	LP, VA	--
Learning and memory	PJ, LP	AN, MD
Working bilingually with children	NO	MD, PN
Using picture books with children (focus on comprehension skills)	--	PN, AN
Using picture books with children (focus on expressive skills)	--	NP, AN
Creating stories with children	--	NO, PN
Creative language use with children	--	CJ, PN
Classroom management (general introduction)	LP, VA, AN	MD, AN
Classroom management (managing people)	BS	MD, AN
Classroom management (managing resources)	MD	MD, AN
Classroom management (managing the environment)	BS	MD, AN
Theme-based learning	PJ, PN	VA, PN, NO

Table 1: continued

Topic	Peer-to-peer learning leads	Video production leads
Education system in India	PJ, MD	--
English through games	PJ, NO	MD, AN, CJ
Self-reflexivity for teachers	NO	LP, NO
Lesson planning	SU	NO
Assessment	VA, PJ	MD, AN
Reverse curriculum	PN	--
Curriculum structure	MD, AN	--
Video editing	CJ	--

Some topics related to organisational aspects of the programme, such as planning for field visits to the school, are excluded from Table 1. Moreover, participants from Nepal are not included in the table because their programme was somewhat different, with more focus on translating existing video lectures into Nepali Sign Language. The table shows that many of the trainees took part in leading peer learning sessions, but video production leads were almost exclusively from among the project staff, mainly the research assistants (highlighted in yellow) with a few peer tutors (highlighted in blue) also involved. The majority of peer learning sessions involved at least one non-staff trainee in a lead role, and we particularly encouraged these trainees to step forward when they felt confident about leading on one of the topics.

For the production of video lectures, the lead person for each unit coordinated work with a small sub-group, usually consisting of 3–4 people. The choice of topic was up to the participants, but it was mandatory for all trainees to be actively involved in sub-group work.

3.2 Storyboard method and video production

As the video production sub-groups were, for the most part, not working from written sources, we decided to use a visual content planning method. The participants' English literacy levels varied greatly, especially with respect to reading academic English. However, they did use materials from several weeks of training that took place at the beginning of the P2PDM project. These materials consisted of selected short texts, PowerPoint presentations, and some texts in simplified English prepared at the

time by one of the UK team members. With the exception of the second research assistant from Uganda, the participants who were project staff attended the earlier training. Their familiarity with some of the training topics and earlier materials proved very helpful, and in the first phase of capacity building, the sub-groups worked on these familiar topics before moving on to new topics.

As a visual content-planning method, I selected so-called 'storyboards', which are used in film production. These are sketches drawn as a succession of rectangles, each showing the camera perspective and the expected action (Figure 3). To plan the video lectures, the sub-groups created storyboards on large posters using a similar logic. The storyboards show the successive parts of the planned video lecture, including the presenter, additional elements such as pictures and subtitles for the presenter to refer to, and slides or example video clips to be inserted. Storyboards are annotated with notes detailing the content to be signed. Figure 4 shows some examples of storyboards; as can be seen from the various additions and corrections on the poster, these were in-progress working documents. Figure 5 shows a storyboard with corresponding screenshots from the video that was eventually produced.

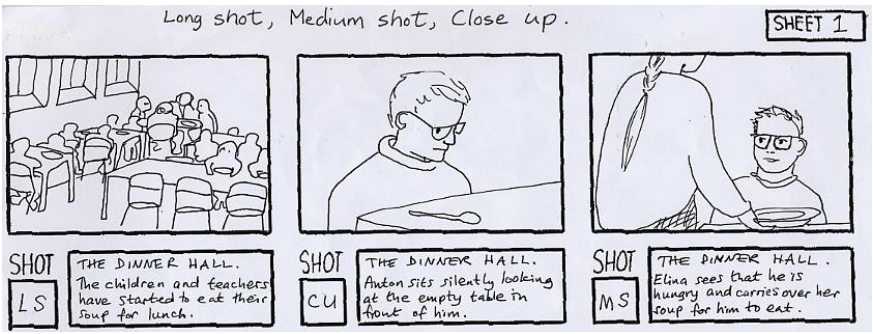


Figure 3: Example of a storyboard as used in film-making (from https://www.pinterest.com/pin/458522805797629913)

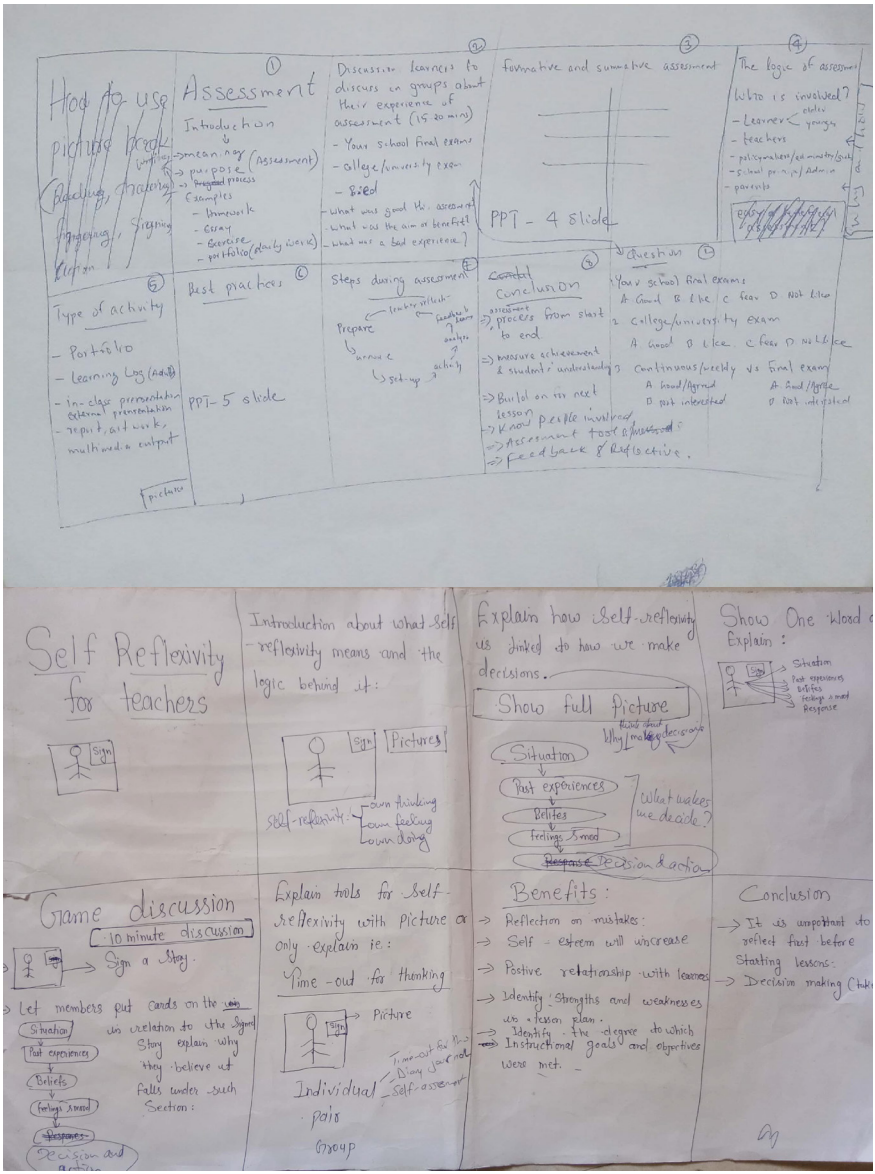


Figure 4: Examples of storyboard posters

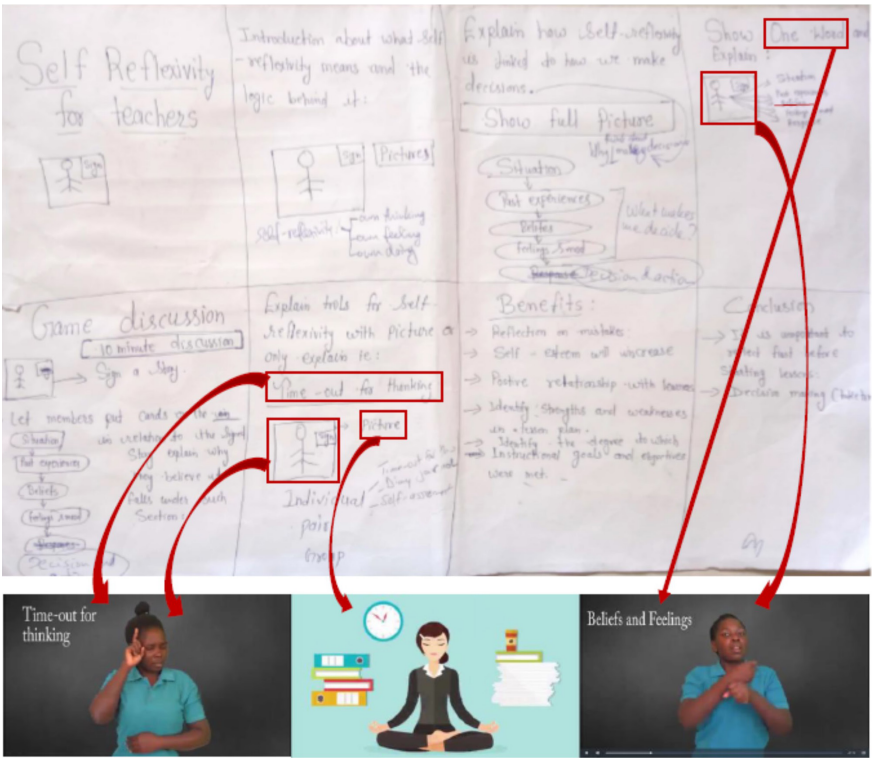


Figure 5: A storyboard and its corresponding implementation on video

Based on the visual storyboards, the presenters (usually the lead person(s), sometimes together with other group members) then signed each lecture. It is important for the quality and intelligibility of the videos that the lectures are not based on translating from the written text. Translations based closely on written texts are often difficult to understand for sign language users, particularly in those sign languages that have had less contact with written languages and where the discourse structure is very different from written texts. Signed explanations that are based on visual notes such as storyboards create a much better information flow.

Working in the sub-groups was a multi-faceted process that deserves in-depth analysis in future, with many layers of peer feedback, in-group and cross-group discussions, and skill sharing. For the purpose of this chapter, I merely present some quotes from the learning logs that are indicative of various aspects of sub-group work. The appreciation for working collaboratively is summarised aptly by NO (entry 9–14 March 2020): "I have confidence and can take led. [...] I am glad my team

cooperated in creating the story board by giving ideas on what we can include and also invent a game."

When collaborating on individual lecture topics, the sub-groups actively considered what different members of the group would contribute based on their background, and who would be best placed to undertake the work at hand:

> AN and me discussed to make two storyboards done. We added two example stories relation activity-based learning. […] But I will not make a film because I did not experience teaching with children. I think PN will film better. (MD, entry 3–8 Feb 2020)

> We made innovation this storyboard. I have some B[achelor of] Ed[ucation] of my experienced L[esson] P[lanning] (LP, entry 18 May 2020)

> I created the process on a storyboard after thinking, searching on Google for what relvent methods are for Deaf children who lack of Sign Language for a long time and also talking with CJ and CR [tutors at the school] to collect videos from class, but I am proud of experiencing by creating the process myself which makes me satisfied knowledge how to work with children. I updated the storyboard into box [the project's file sharing platform] for feedback from Ulrike. CJ, CR and me will film finally after modifing the storyboard following the feedback. (PN, entry 19 May 2020)

The latter quote also exemplifies how sub-group leads were managing the materials development process, taking account of the different steps and people involved. In addition, they were keen to support less experienced group members in taking an active role:

> Me and RS and BS shared the film on managing environment (classroom management) We already film done. We will work editing on it later. I felt that it is better to share with it. They began to practice more and repeat signing before the filming. Me and AN helped them made felt satisfy with the film. I am glad that they had film done. (MD, entry 24–29 Feb 2020)

> The new trainees need time and efforts to explain to the them how to do about signing and filming. We made sure that they understood contents to be signed and filmed. They did a good job and the videos are awaiting editing. (AN, entry 2–7 March 2020)

In addition to the peer-led process, each sub-group also received multiple rounds of more formal feedback. When the group had agreed on a new version, I gave feedback both on the storyboards and on the signed lectures, resulting in multiple drafts. Work on improving the drafts was an important learning process for participants, as they discussed my feedback in the group and made changes for each next version. Over time, the drafts improved and fewer rounds of feedback were needed.

Finally, each lecture went through video editing to assemble all the components. Two of the Indian participants were heavily involved in video editing because of their familiarity with video editing software. This is a skill that takes time to learn, so it was efficient to use the existing skill base for video editing, although some other participants were very keen on learning about video editing as well. In addition to a peer-to-peer learning session for the whole group, several participants comment in their learning logs that they worked on video editing in pairs with one of their technically skilled peers, and this learning-by-doing was a popular activity among trainees.

The signed lectures were produced in multiple languages, sometimes in parallel, and sometimes by translating from ISL (as the dominant language with the most users among the participants) into another sign language. By the end of the 'South-South collaboration' impact project, we had produced 17 lectures in ISL, and slightly fewer in Ugandan Sign Language and Nepali Sign Language. All of the lectures are being assembled into a Virtual Learning Environment using Moodle as the platform, so that they can be made available to future groups of trainees. For India and Uganda, the lectures appear alongside written materials selected by the trainees from among a larger set of materials that had been provided by the UK team (Figure 6). The materials are categorised into easy reading and advanced reading. These multimedia materials constitute the teacher's handbook.[4]

4 Materials intended for Nepal do not include written text because the relevant language is Nepali rather than English, and we did not have capacity in the group to source texts in Nepali or translate from English into Nepali.

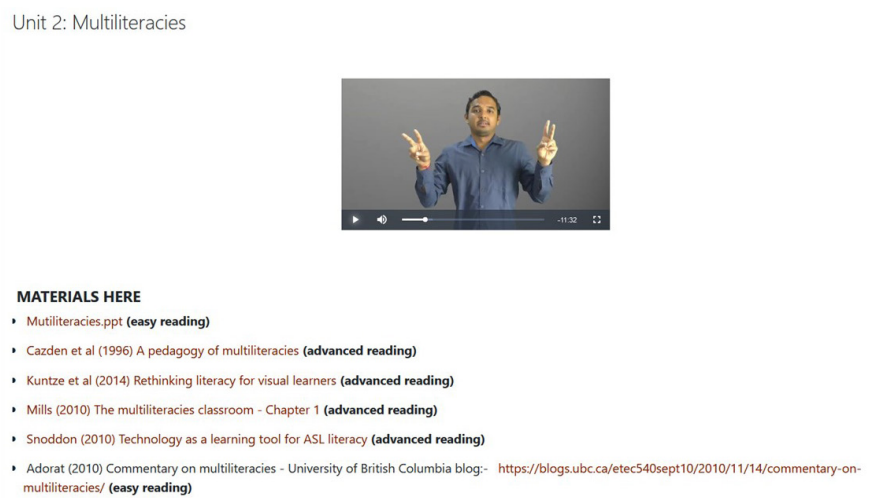


Figure 6: Screenshot of a unit from the teacher's handbook materials

3.3 Skills development along topic-based learning journeys

Although this was not planned from the beginning, I observed how topic-based learning journeys connected to the production of educational materials afforded the participants many opportunities for skills development. I briefly comment here on conceptual skills, editing skills, and leadership skills.

Conceptual skills are involved in designing the lectures, in particular with respect to the logical flow of information. Trainees not only learn about the topic in classroom sessions, but then need to apply their learning to the production of their own lectures. It is said with good reason that the surest way to really understand a subject matter is to explain it to others. A large part of the conceptual work happened when the sub-groups created storyboards because this is the point where the sequencing of content is planned.

The skills involved in editing successive versions of outputs come into play when both the storyboards and the signed lectures move from preliminary drafts to the final versions. Drafting and re-drafting the same output is an important process because it forces the trainees to enter more deeply into a topic, compared to merely seeing a lecture. Engagement with the re-drafting process was an important tool for building skills in being able to understand and assimilate feedback. For some of the trainees, acting on feedback to make improvements was not a familiar experience. Moreover, revising one's own output is also a good self-reflective practice which allows trainees to experience continuous improvement.

The editing process also included quality control. As mentioned above, the group made use of the specialised video editing skills of two Indian trainees to finalise the video lectures. The video editing process took place in two different ways. One was for the lecture authors to sit together with the video editor to give instructions about the addition of pictures, subtitles, etc. This was an opportunity for the content producers to get insight into the technical aspects of video editing and learn some of the skills. Alternatively, the video editor would work on the basis of the storyboard and other instructions. In this case, members of the sub-group had to review the edited video for quality control to make sure all of the elements came together in the right way.

The embedding of peer learning sessions has allowed all participants to act in lead roles at least some of the time, although the more experienced trainees took on a larger share of this responsibility.[5] Leading a group session is very useful for building confidence, practising presentation skills, and getting experience with coordination. In this respect, the research assistants worked at a much higher skill level as they were in charge of coordinating the entire group process for generating a signed lecture.

The learning journeys also included spaced repetition of topics (i.e. repetition after some time has elapsed in between, see Dempster 1989) quite naturally because the same topic appears multiple times in different contexts. A topic might initially be introduced in a lecture session, and then taken forward to produce a video lecture some time later, which means that it is revisited several times in the form of successive drafts. In another programme strand, the same topic may also appear in a peer learning session. Spaced repetition is known to increase retention of the subject matter being learned (Kang 2016), and it is particularly fruitful if learners encounter the same topic in different contexts.

Importantly, the work in sub-groups led by the more experienced trainees made it possible for everyone to participate in both a conceptual and a practical way at his or her own level. For example, even with low literacy skills trainees could be active in sub-groups because the work was mainly based on visual activities. Furthermore, understanding a topic fully was not necessary to participate in a sub-group; there were opportunities for supporting group work in other ways, for example by being a sounding-board for a new idea or helping with video editing.

5 Leading peer learning sessions was not limited to the production process for video lectures but included several other elements of training, e.g. the Open Space sessions or 'English grammar game' sessions. More junior participants were active in leading such sessions.

Finally, there are opportunities in such intensive small-group settings for vicarious learning, especially for less experienced trainees: for instance, participants can see in others what it is like to act as a professional in an educational context, as more experienced group members model this behaviour; or if they find a topic difficult, they can temporarily retreat to a position as observer until they become more confident. Direct experience of confident young professionals using sign language is bound to be a powerful signal to those who aspire to such work, even if their own contribution has its limits.

4 Outcomes and outlook

From the above sections, it is clear that through this capacity-building programme, not everyone has learned the same content and skills, and different participants have engaged with content and skills at quite different levels in terms of both depth and frequency. This is also evident in the learning logs and in the transcripts that summarise the outcomes of the programme for each participant.

The transcripts of the programme consist of the following sections:

A. Theoretical content
- **A.1. Lectures attended:** These are lectures taught by the trainers.
- **A.2. Lectures taught / class sessions led:** This includes lectures presented by the participant to the learner group and interactive sessions led by the participant.

B. Practical work
- **B.1. Content development for teaching and learning material:** This includes background research, design of content, and preparation for production of materials, either individually or in a group.
- **B.2. Teaching and learning materials produced:** These are signed lectures on video; the work includes filming and editing, either individually or in a group.

C. Other learning activities: This includes any other activities not covered in the above, for example English grammar games, interactive sessions on programme planning and skills, or support sessions for less experienced participants.

D. Field visits: Field visits are undertaken to gain practical experience in a real-life educational context.

E. Individual research (for research assistants only): Research on an individual topic includes design of the research project, data compilation, data analysis, and academic writing.

The transcript itself was not a pre-defined format from the beginning. Instead, its various sections emerged from the learning logs, and the transcript itself went through several drafts. At the beginning of the programme, we were noncommittal as to what evidence of learning we would issue to participants.

Looking at the transcript profiles of some of the participants illustrates the differences between learners. For instance, one of the research assistants has a profile with a heavy involvement in lead roles within the practical work that was done in sub-groups, both in B1 (leading on six units) and in B2 (leading on 10 units). By contrast, there are only two field visits to the school (section D). One of the peer tutors, on the other hand, played a central role in field visits, joining 10 visits to the school. The same participant also took the lead role in video editing, with a total of 15 units edited. The third participant, who was not a project staff member, has a very balanced transcript with some activity in all areas, joining seven topics under B1 and six under B2 but not in a lead role, and instead leading various individual sessions or activities under A2 and under C. This participant was particularly interested in English grammar games[6] (joining five times) and field visits to the school (joining eight times). The area where there is most overlap among participants is A1 because attending the theoretical lectures was mandatory, and the main difference is that some participants joined slightly later.

This programme design has several implications. Firstly, the outcomes are uneven because the 'How' has been more important than the 'What'. That is, the main aim was to involve everyone actively in co-creation of both the programme and its outcomes, and for the participants to contribute their individual skills and background according to their capacity, so that they could experience self-efficacy and confidence (see Schwarzer 2014 on the notion of self-efficacy, the belief that one can take effective actions). When learners are very diverse, it is difficult or impossible to provide the 'same experience' to everyone. Instead, the aim of this programme was to constitute a rich and varied environment with many learning opportunities and an emphasis on learning within peer

6 For details on the English grammar games, see the contribution by Papen & Zeshan in this volume.

groups. By design, participants would engage with different experiences, but it was important that everyone's skills should be valued. For instance, when producing high quality video lectures, presentation skills for explaining theoretical notions in sign language and technical skills when editing videos are both indispensable.

Such a design is quite different from a normed programme with learning outcomes that are specified for everyone in the same way. In fact, the philosophy of our capacity building is immediately at odds with standard notions of quality assurance, where it is necessary to have a standard curriculum with standardised assessment and certification. Quality assurance in this sense carries with it the assumption that all learners by and large go through the same material at the same pace, though some of course do better than others. In our case, there was no requirement to formally accredit our training programme. However, it is quite clear that there would be many obstacles to accreditation for such a programme. Its emergent nature can be considered both an advantage and a disadvantage. Participation provides a unique experience for the learners, but the nature of this experience cannot be easily accommodated under standard quality assurance regimes, which makes formal accreditation unlikely. [7]

Another disadvantage of this kind of programme which arises directly from its design is that occasionally, there is a risk of information being passed on in peer groups which is not factually correct. The programme included a large number of peer-led sessions, facilitated by both experienced researchers from among the P2PDM staff and trainees who were new to the topics being discussed. The content of these sessions was sometimes well-understood by the lead person but at other times, the lead persons were themselves new to the topic, or the activity itself was experimental (for example, the English grammar games). It was not feasible to supervise all these sessions, and in any case, constant supervision would have been detrimental to the character-building intention. The content that was converted into signed lectures was less at risk of inaccuracy because the successive drafts were checked by the teaching team.

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7 In fact, it could be argued that with respect to soft factors such as a respectful environment, peer support, growing confidence and motivation, the experience was similar across learners. For instance, growing confidence can be tracked in the learning logs, where learners were asked to self-assess their level of confidence with each activity. However, such factors are of course more difficult to measure in a non-subjective way, so this does not solve the barriers to formal accreditation.

There is no real solution to this issue, except to recognise explicitly that there is a trade-off between being correct at all times and supporting the capacity for acting independently. This would be the case with any group of learners. In addition, there is a trade-off that is specific to this kind of context, namely that between factually correct study materials and accessible study materials. A lot of material is of course available to read in English on all the topics covered in our programme, but this is not accessible to most of the learners because of low literacy levels. Equivalent materials in their sign languages are not available, and in fact, creating such material has been a major part of the programme. Moreover, repeating a topic among peers is also more accessible than lectures signed by academics, whether hearing or deaf, who are not native users of the participants' sign languages. With time, we can hopefully get to a situation where large libraries of materials are available in sign languages and where native sign language users have become professional academics who can organise learning and capacity building with their deaf peers.

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Technology-enabled education for deaf learners in India: The case of a sign language initiative at the National Institute of Open Schooling (NIOS)

Rajiv Kumar Singh[1] *and Sukanta K. Mahapatra*[2]

1 Introduction and background

In recent decades, there has been a strong emphasis on creating inclusive systems for ensuring education for all, including deaf learners in India. However, deaf learners face challenges due to inappropriate learning environments both at home and school, as they are not able to acquire sign language easily and readily, and cannot access education in sign language. Thus, they drop out of school. Further, the lack of sufficient learning resources in sign language along with long-standing stigmas limit deaf children's access to sign language. Therefore, leveraging technology to make sign language learning resources accessible to all through open and distance learning is highly desirable.

In this regard, the National Institute of Open Schooling (NIOS) has devised a number of strategies to facilitate the education of deaf learners through the use of technology. Its innovative strategies have included the development of a video dictionary and educational videos in Indian Sign Language (ISL) to provide access to various subjects at secondary level, and the introduction of ISL as a school subject in 2021, which was supported by collaboration with members of the Peer-to-Peer Deaf Multiliteracies project (see Zeshan & Webster, this volume). The aim of this chapter is to reflect on the effectiveness of these initiatives, highlighting how they meet the needs of deaf and hard-of-hearing (DHH) learners. First, some background details are provided on deaf education in India (1.1) and the work of the NIOS in this area (1.2).

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1.1 Status of deaf education in India

The World Health Organisation estimated in 2018 that globally, there are 466 million deaf and hard-of-hearing (DHH) people, who constitute 6% of the world's population. Of this number, 34 million (7%) are children. Estimates show that if the current trend continues, the number could rise to 630 million by 2030 and may be over 900 million by 2050 (WHO 2018). Studies reveal that worldwide, including in India, deaf children and young people rarely receive any schooling. There is also disproportionately higher unemployment and underemployment among DHH adults (WHO 2019).

In India, there are about 2.68 crore (26.8 million) individuals under the category of 'persons with disabilities' and they comprise 2.21% of the total population. Of this group, 18.9% are DHH and another 7.5% of them have speech-related disabilities. This means that about 26% of people with disabilities may require sign language support for communication within their respective community. According to the 2011 census of India, 20.42 lakhs (2.04 million) children aged six and under are disabled, out of which 23% are DHH (Singh & Mohapatra 2019; Census 2011).

With regard to literacy, about 62.2% of DHH people in India have lower levels of reading and writing skills. Even among those who are literate, a high percentage (66.2%) only have qualifications below the secondary level of education (Singh & Mahapatra 2019; Census 2011). Open schooling offers substantial benefits to this group, giving them the flexibility to learn anywhere and anytime and upgrade their qualifications to further their careers (Singh & Mahapatra 2019, NIOS 2018).[3]

1.2 NIOS and the education of deaf learners

The education of children with disabilities is in a challenging state in India, as the mainstream schools do not have adequate facilities, and there is a lack of special schools in many parts of country. In this regard, open schooling with a flexible curriculum and assessments can be one of the most effective alternatives for the education of these children (NCERT 2013; Singh & Mahapatra 2019). Indian Sign Language (ISL), which is also fundamental to the communication and education of DHH learners, is not often encouraged or recognised by mainstream society or the education system in India. This has adversely influenced the deaf community. There is also a dearth of sign language teachers in India,

3 See the chapter by Akanlig-Pare, Mugeere, Singh & Zeshan in this volume for further details about the National Institute of Open Schooling and its functions.

and most of those who deliver ISL classes are not properly trained to do so (Randhawa 2005; Bhattacharya, Grover & Randhawa 2014; Zeshan et al. 2016, 2017). The NIOS provides access to a plethora of resources and institutional networks that are in tune with the educational needs of DHH learners. This networking of open schooling institutions across the country and effective use of information and communication technology (ICT) has huge potential to offer a wide range of learning opportunities including access to sign language content and signed interaction among learners (Singh & Mahapatra 2019).

On the recommendation of the National Policy on Education 1986 by the then Ministry of Human Resource Development (MHRD), now renamed the Ministry of Education, Government of India, the NIOS (formerly known as National Open School, or NOS) came into existence in November 1989. It has aimed at providing inclusive and barrier-free education in order to fulfill the vision of sustainable inclusive learning and skill development. To do this, the NIOS offers secondary and senior-secondary courses in academic and vocational programmes through the open and distance learning (ODL) mode. Students are supported mainly through the Personal Contact Program (PCP) at approximately 7,400 study centres all over the country. Additionally, NIOS has about 100 Special Accredited Institutions for Education of the Disadvantaged (SAIED) centres to cater to disabled learners and those from underprivileged sections of society. These centres are well equipped with accessible facilities and infrastructures which can meet the learning needs of this group.

The flexible system provided by the NIOS, the largest open schooling system in the world, gives both children and adults the chance to overcome the constraints of time, distance and gender or disability stereotypes. DHH learners are able to access an environment with trained teachers and an enriched curriculum. But deaf schools, particularly those located in rural parts of India, are not familiar with the use of standardised ISL to educate deaf learners. To address this, the NIOS has undertaken several major initiatives resulting in the production of ISL-based resources and the launch of ISL as a school subject in India. These are described in sections 2 and 3 respectively, followed by a conclusion in section 4.

2 NIOS initiatives to improve the education of deaf learners

The ISL-based resources generated by NIOS initiatives to improve deaf individuals' access to learning are discussed in this section, and include an ISL dictionary (2.1), ISL videos (2.2), and other platforms and media for

dissemination (2.3). A study that evaluated the ISL videos is described in the final sub-section (2.4).

2.1 Indian Sign Language dictionary

To promote high-quality deaf education and enhance learners' sign language skills, the NIOS has developed an ISL dictionary. It is not only beneficial to the deaf students, but also very useful for the teachers (both hearing and deaf) and parents. At the time of writing, the dictionary features 38 videos containing about 2,000 ISL signs in total, as well as basic sentences. The signs that have been selected for the dictionary are related to everyday life, such as family terms, place names, and signs describing the weather and natural environment, in addition to concepts associated with education. Further, the words are accompanied by pictures and illustrations (Singh & Mahapatra 2019). Various sign language experts and deaf education professionals were involved in preparing the dictionary, and feedback has been sought and collected continuously from both learners and teachers to improve the quality of the dictionary (ibid.).

2.2 Sign language videos at secondary and senior secondary level

The NIOS has developed about 700 videos in seven different secondary-level subjects, namely social science, home science, Indian cultural heritage, painting, data entry operations, English, and Hindi; and five senior-secondary-level subjects, which also include home science, data entry operations, painting, and English, along with business studies. These videos are each only about 15–20 minutes in duration, so that students can follow them easily and if needed, watch them again for better comprehension. The videos are prepared in ISL with visual materials integrated into them. These videos can be viewed on the NIOS channel on YouTube, which has been accessed by more than 3.5 million viewers. Many DHH learners have benefited from using these ISL videos to learn their school subjects in their own native language. NIOS is one of the first national boards in the country that has developed and introduced learning through sign language at the secondary and senior secondary levels (Singh & Mahapatra 2019).

2.3 Use of media and ICT for sign-language-based education

In order to reach more DHH learners, the NIOS utilises various media and ICT-enabled platforms to disseminate sign-language-based content. Apart from its sign language content on YouTube, the NIOS offered broadcasting of ISL videos around the clock from October 2018 to August 2020 on its DTH (Direct to Home) channel 30 called *Gyanamrit*, which

is part of the *Swayam Prabha* initiative for satellite-supported content broadcasting. This is the first educational channel in India to broadcast content in sign language at the secondary level (Singh & Mahapatra 2019). The NIOS has also been engaged in providing live learning though its dedicated TV channel. One-hour live telecasts of ISL videos have been offered twice a week on PM eVidya channel 10 since September 2020 to increase awareness of deaf culture and sign language across the country. This also provides the learners with an opportunity to directly interact and to clarify any questions they have.

2.4 Evaluation of sign language videos

In order to evaluate the acceptability and usefulness of the subject-specific ISL videos mentioned in sub-section 2.2, the NIOS conducted a small-scale study with 32 DHH learners who were enrolled in the NIOS secondary-level education programme (10th standard). A mixed-method approach was followed with both qualitative and quantitative elements.

The learners were shown three videos each from six subjects, namely English, Hindi, social science, painting, home science and data entry operation. Then questionnaires were administered to gather their feedback on the usefulness of the videos, providing the researchers with quantitative data. The questionnaires were in English, but translated into ISL by interpreters, and the participants' responses were recorded in ISL. In addition, focus group discussions were held to generate qualitative data on the extent to which the learners benefited from the videos. For these focus group discussions, the 32 students were divided into four groups to explore various questions with the researchers, and sign language interpreters were present to facilitate the interaction.

The results of this small-scale study are summarised in the appendix. The data from both the questionnaires and the focus group discussions are very encouraging. The majority of the learners found the content explained by the presenters in the videos to be 'very good' (43.75%) or 'good' (37.5%). Similarly, the clarity and comprehension of the content was mostly rated as 'excellent' (21.9%) or 'very good' (37.5%), while the relevance of the images used in the videos received a rating of 'excellent' in 40.65% of the responses. The technical quality of the videos was also found by most learners to be 'excellent' (50%) or 'very good' (43.75%). In addition, the usefulness of the videos was evaluated in terms of the learning support they provided (43.75% rated them as 'extremely useful' and 34.38% as 'very useful'), as well as in comparison to formal classroom interaction (31.25% rated this as 'extremely important' and 50% as 'very important').

The focus group discussions also pointed to the alienation that the deaf learners faced in their life course and in formal educational institutions. For instance, learners commented that they 'rarely understood in the classroom' when teachers used spoken language, and that they did not have much interaction with either their teachers or their hearing peers at school.

After these largely positive experiences with providing sign language materials to support the delivery of existing course content to deaf learners, the NIOS took a further step by developing an entirely new course in order to teach ISL as a language subject at secondary level. This initiative is described in detail in the next section.

3 Indian Sign Language as a language subject at secondary level

Indian Sign Language (ISL) is the natural language of the deaf communities of India. It is a full-fledged language on a par with spoken languages and has its own vocabulary and grammatical structures which are different from those of all the spoken languages used in India (Bhattacharya, Grover & Randhawa 2014). Learning about sign language and acquiring signing skills is useful for both deaf and hearing people. For deaf learners, it is essential to understand the status and nature of their first and preferred language, and to become confident in expressing themselves fully in sign language. Likewise, they need to be able to understand complex information presented in ISL and appreciate linguistic creativity in sign language. For hearing people, knowing ISL gives an insight into the workings of a visual language and allows them to communicate with deaf people they come into contact with. India's Rights of Persons with Disabilities (RPwD) Act has mandated the use of sign language in deaf education and in the media, in order to provide accessible information to deaf signers. Similarly, the new 2020 National Education Policy of India has recommended that 'the NIOS will develop high quality modules to teach ISL, and to teach other basic subjects using ISL' (NEP 2020).

The Indian Sign Language course that was developed as a subject at secondary level has several different components such as the history of sign language, understanding deaf culture, ISL grammar and usage, and interpersonal communication in ISL. This enables learners to develop their ability to interact with the world around them and make significant contributions to society. DHH learners can choose ISL as a language subject just as other learners can choose the other language subjects such as Hindi, English, or regional languages in India. This means that unlike

existing ISL courses, this course is not aimed at teaching ISL to non-signers as a second language ab initio, for example in order to train sign language interpreters. Instead, the course primarily serves secondary school students who are already sign language users, and is especially but not exclusively for deaf signers (e.g. also hearing teachers and hearing people with deaf family members), and allows them to study ISL as a language subject.

In the remainder of this section, we describe the development of this initiative, including the design of the course curriculum (section 3.1), the creation of instructional videos in ISL to cover the theoretical course content (3.2), the production of practice materials and the practical part of the course (3.3), and issues associated with the planned delivery of the course to learners (3.4). The latter includes considerations about piloting the course, determining assessment strategies and implementation, and delivering the course through the NIOS network of study centres. Excerpts from the course curriculum, including modules and units, are reproduced in the appendix.

3.1 Designing the course curriculum

The NIOS follows a standardised operating procedure when designing and developing curricula, which involves preparing an initial draft curriculum based on a comparative analysis of stakeholders' requirements and what other boards and institutions are offering; and forming an expert committee who undertake in-depth review and research and use it to make decisions on the formulation and finalisation of the curriculum. This procedure was also followed for the ISL secondary-level curriculum. Since this was to be the first-ever ISL course offered in schools and there was no comparable curriculum in India at school level, a comparison was made with the three levels of an Indian Sign Language course administered by the Ali Yavar Jung National Institute of Speech and Hearing Disabilities (AYJNISHD), which is run by Government of India. The structure of the NIOS's curricula for other language subjects was also taken into consideration when shaping the preliminary draft of the ISL curriculum.

The NIOS formed a high-level curriculum committee with both Indian and international experts, including several members associated with the 'Peer-to-Peer Deaf Multiliteracies' (P2PDM) project led by University of Central Lancashire (see the list of committee members in the appendix). Several members had experience of using ISL for research, teaching and capacity-building in various parts of India. The committee also involved deaf education experts from various universities and

institutions around the country, five of whom were deaf themselves and provided an invaluable deaf perspective on curriculum development. The NIOS conducted a number of workshops with the committee members to carry out an in-depth analysis of the curriculum and finalise it (see excerpts from the curriculum in the appendix). Initially, there was a plan of having an 80:20 ratio of theoretical to practical components, but after deliberations, this was modified to a 40:60 ratio.

3.2 Development of instructional videos for theoretical course content

The development of instructional videos for theoretical course content was a complex process with multiple rounds of revision. The design of each lesson followed a visual method based on storyboards as used in film production. A storyboard consists of a series of rectangles showing the succession of different camera perspectives along with a sketch of the scene content and written comments. This method was adapted for generating visual content notes for each of the lessons (see Zeshan, this volume, for details on this process). In the case of the ISL lessons for the new NIOS course, research assistants and interns worked on background research to collate relevant information, identify suitable ISL samples to include, and source pictures to add to the visual content.

On the basis of these visual notes and materials, the preliminary video for each part of the content was developed in sign language by deaf members of the P2PDM research group, followed by several review cycles and rounds of discussion. It was important for the quality of the instructional videos that the process did not involve translation from a written script, so that the flow of information in each lesson agreed with the conventions of Indian Sign Language. P2PDM team members followed the visual storyboards when rendering the content in sign language. Written summary translations of all lessons in English were produced at the end of the process and compiled into a textbook, which functions as supplementary material. The 17 signed lectures in ISL, 20–30 minutes long on average, constitute the primary study material. Materials were finalised at a workshop attended by curriculum committee members.

3.3 Practice materials and practical parts of the course content

The practical components, which comprise 60% of the total course content, were also decided by the curriculum committee. The production again involved deaf experts, in particular for producing videos with learner instructions for all practical activities. The materials were produced by

a team at NIOS, supported by researchers from the P2PDM project, who provided feedback on successive draft videos.

The materials related to the practical part of the course content are different from the signed theory lessons, and therefore the process was different too. The team produced 26 videos, one video for each practical activity (see the appendix for a list of these activities). The practical part of the course content as agreed by the curriculum committee only listed the activities but did not include any details on how to go about implementing each activity.

For the learners, it is important to have clear step-by-step instructions to follow. Therefore, most of these videos have a similar structure, first introducing the activity and its aims, then explaining how to go about each assignment, and finally stating clearly what output is expected from the learner for each activity. This information, while quite detailed, is not itself very technical or difficult to understand. Therefore, the videos were made on the basis of written notes sent to the NIOS team. Videos were then prepared in ISL by a deaf staff member, and the output was vetted by P2PDM researchers and other members of the committee, who gave feedback and suggestions that enabled the deaf team to improve and finalise their ISL videos.

3.4 Delivery of the course to learners

The course was launched by the Honourable Prime Minister of India on 29 July 2021 on the eve of the one-year anniversary of the 2020 National Education Policy. It will be offered by those institutions/study centres of the NIOS that have adequate infrastructure, human resources, and expertise, such as training in ISL. The content has to be delivered by a deaf teacher/instructor to have optimal validity as well as acceptability among the deaf community, and these teachers will receive training from experts in language pedagogy. The courses are also being offered though the government's PM eVidya 10 channel on DTH TV. The course content in the form of videos is available on the NIOS channel on YouTube, links to which are provided on the NIOS website.[4]

As this course is new in its entirety, the curriculum committee decided that it should first be piloted by a few study centres before it is rolled out more widely. This has the advantage of identifying any issues with implementation and support needs for the learners that should be in place,

4 See https://nios.ac.in/online-course-material/course-material-for-divyang-students/isl_230.aspx

as well as filling any gaps in the learning materials and/or information provided to study centres about the course. A particular challenge will be to organise assessment for this course because a substantial part of the assessment will need to be conducted in Indian Sign Language. An assessment strategy for the course has been created but needs to be field tested in the pilot.

4 Conclusion

The education of people with disabilities has been a major concern for many decades. However, innovations in the use of technology have made education more accessible for these groups of learners. Video use in education represents one of these innovations. What emerges from the initiatives described in this chapter is that ISL videos have been found to be useful for DHH learners. While there is a scarcity of teachers who are adequately trained in sign language, making it impossible at present to offer effective face-to-face instruction to the millions of DHH learners in India, the introduction of ISL videos in education has enriched the scope of learning opportunities for this group of learners. These videos produced through the open schooling system have not only constituted quality teaching and learning support but also emerged as effective resources to increase communication in sign language. It is possible for ISL videos to be used as supplementary tools for teachers, learners and parents where there is a lack of resources for educating DHH learners, allowing them to bridge this daunting gap. This is a global concern. Like India, many developing countries in South Asia and Africa are struggling to meet the needs of their DHH learners and can also benefit from programmes that harness sign language videos devised by deaf experts.

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Appendix

Results from the evaluation of ISL video materials for NIOS course content

Questionnaire responses:

Table 1: How was the content explained in the video by the presenter?

Response	No	Percent
Excellent	5	15.65
Very Good	14	43.75
Good	12	37.5
Fair	1	3.1
Poor	0	0
Total	32	100

Table 2: To what extent was the content presented in sign language clear and understandable?

Response	No	Percent
Excellent	7	21.9
Very Good	12	37.5
Good	11	34.35
Fair	2	6.25
Poor	0	0
Total	32	100

Table 3: To what extent are the images used in the video relevant to the content?

Response	No	Percent
Excellent	13	40.65
Very Good	8	25
Good	11	34.35
Fair	0	0
Poor	0	0
Total	32	100

Table 4: How would you rate the overall quality of the Indian Sign Language videos?

Response	No	Percent
Excellent	16	50
Very Good	12	43.75
Good	2	6.25
Fair	0	0
Poor	0	0
Total	32	100

Table 5: How do you find the usefulness of Indian Sign Language Videos for learning support?

Response	No	Percent
Extremely Useful	14	43.75
Very Useful	11	34.38
Moderately Useful	5	15.65
Slightly useful	2	6.25
Not useful	0	0
Total	32	100

Table 6: How did you find the usefulness of the Indian Sign Language videos compared to formal classroom interaction?

Response	No	Percent
Extremely Important	10	31.25
Very Important	16	50
Moderately Important	5	15.62
Slightly Important	1	3.13
Not at all important	0	0
Total	32	100

Responses from focus group discussions:

Question 1: How do you find the usefulness of the Indian Sign Language videos for learning support?
Group 1: We feel easy and very good about it.
Group 2: It enriched our learning and these videos are very much resourceful.
Group 3: The images used in the video help us to learn and understand the concept.
Group 4: The texts used in the videos are short and crisp and thus, helped a lot to understand the concepts.

Question 2: How do you find the Indian Sign Language videos compared to formal classroom interaction?
Group 1: Teacher was using English/Hindi language in the class which they rarely understand in the classroom. Teachers rarely look at us and interacting with us. Sign language videos are good and help us to learn
Group 2: Most of the students in the class are hearing. We get less scope to interact with peer group. I used to feel alone and demotivated.
Group 3: I have very bad experience in formal classroom. I feel good now.
Group 4: Our parents are not able to understand us because they do not know sign language. They are not able to help us in study.

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Excerpts from the curriculum of the secondary-level ISL course

Module 1. Understanding Indian Sign Language

Lesson
1.1 Indian Sign Language as a complete language: concept, characteristics, and common misunderstandings about sign language
1.2 The history of ISL: its origin, development, and relationship with other signed and spoken languages
1.3 Deaf communities and sign languages in other countries, in comparison to ISL

Module 2. Sign Language in Society

Lesson
2.1 The community of Indian Sign Language users, their commonalities and diversity
2.2 Aspects of deaf culture and linguistic identity
2.3 Legislative provisions for ISL in India
2.4 Status of use of ISL in deaf education

Module 3. Structure and Grammar of ISL

Lesson
3.1 Manual and non-manual components of ISL
3.2 Word-level structures
3.3 Sentence types
3.4 The meaning of signs

Module 4. Creative Expressions in ISL

Lesson
4.1 Stories
4.2 Poems and songs
4.3 Jokes and humour
4.4 Mime and drama
4.5 Newsreading
4.6 Sign language in social media

Practicals

Practicals are for a total of 144 hours, distributed over 15 activities. Section 4 has one substantial activity (32 hours), and the other sections have a set of shorter activities. The average time allocated for shorter practical activities is 8 hours.

1. Language Description **Time: 24 hours**

Learners are to select and complete three activities out of the list of activities below:

1.1 Compare linguistic features of signed languages and spoken languages

1.2 React to a set of given statements about sign languages and distinguish facts from myths in these statements

1.3 Identify features of Indian Sign Language in comparison with other sign languages.

1.4 Identify features of Indian deaf communities in comparison with other deaf communities.

1.5 Assign a given set of ISL signs to different time periods to distinguish older signs from more recently evolved signs.

2. Language context **Time: 24 hours**

Learners are to select and complete three activities out of the list of activities below:

1.1 Identify and discuss different sub-groups in the ISL community

1.2 Comparison of ISL across different areas of the country: Find examples of regional/dialect signs in your local area and demonstrate their use in common phrases.

1.3 Study the RPwD Act and discuss points related to the Deaf community and the linguistic rights of ISL users in India.

1.4 Meet a sign language interpreter and learn about the situations where s/he is invited to interpret.

1.5 Have a discussion about cultural aspects of using deaf teachers and Indian Sign Language in education, with examples.

3. ISL grammar and usage **Time: 32 hours**

Learners are to select and complete four activities out of the list of activities below:

1.1 Distinguish between correct and incorrect samples of given signs

1.2 Use language resources to search for ISL materials, e.g. online ISL dictionary

1.3 Describe linguistic patterns in the following structures:
- 3.3.1 Non-manual components of ISL
- 3.3.2 Sentence types: Simple statements, questions, negatives
- 3.3.3 Describing people and objects (adjectives, opposites)
- 3.3.4 Pronouns and kinship terms
- 3.3.5 Expression of time, numbers and measures
- 3.3.6 Verbs and uses of the sign space
- 3.3.7 Possession (having and not having)

4. Creative language production **Time: 32 hours**

View different types of sign language videos, including the following types:
- narrative texts and stories
- jokes and anecdotes
- poems and drama/skits
- expository and factual texts
- descriptive and procedural texts
- formal presentations
- news reading in sign language

Select two texts from the given material and paraphrase the signed text in your own signs. Then produce two sign language videos with your own new content, using the same two selected types. The length of each video should be 2 minutes.

5. Language Production/Interpersonal Communicative Skills **Time: 32 hours**

Learners are to select and complete four activities out of the list of activities below:

1.1 Create a personal diary in ISL about observed examples of sign language use in society in areas such as public transport, railway stations, bus stations, markets/shopping areas, hospitals, police, etc.

1.2 Meet a CODA (Child of Deaf Adult) or SODA (Sibling of Deaf Adult) and interview them about the role of sign language in their lives.

1.3 Give a presentation in ISL to a live audience

1.4 Use ISL in a mock interview situation

1.5 Use an online chat application to have a conversation with another ISL user via sign language video (live or pre-recorded).

1.6 Sign the same story to a child and to an adult. Adjust your signing style to suit the child/adult.