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Research Article

Documentation of Sign Languages of North East India

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Abstract

Today, technological advancements offer much more solutions in ensuring accessibility for the D/deaf community in school education. Computer tools and programs have made the task of documenting Sign languages easier and more efficient. This paper describes the documentation of sign language varieties in the North East Region (NER) of the Indian Sign Language for wider and web-based dissemination of resources for the teachers and the students in classroom transaction.

The nature of sign languages requires a visual database to be stored systematically and designed in a user-friendly manner for ease of access. Documentation of sign language is a still a major necessity in India and particularly in the NER. This paper is not debating on what Sign language is or how it differs from spoken language; rather, it focuses on how such documentation has resulted in a web-based app known as 'NESL Sign Bank'.

Keywords: Sign Language; Deaf; deaf; Documentation; Sign Bank; North East Region

Introduction

Technology has played a major role in every aspect of our lives and it is now, indispensable in the sphere of human connection and communication. It has proved to be more of a boon for the D/deaf* community who rely on visual media for communication, i.e. sign language (a language based on visual-spatial mode). With emerging technologies in a range of media services such as computer programs and applications, resource materials for education in sign language can be developed and designed with the aim of providing effective classroom transaction between teachers and students in an interesting manner.

Prior to the 1960's, Sign Language did not receive any linguistic attention even though its existence had been documented in various literatures. Sign language has similar grammatical features as any spoken language, the only difference is that, it is produced by the hands and

perceived by the eyes. The emergence of the concept of language in visual modality as propounded by Stokoe (Stokoe, 1960) triggered further linguistic research on the differences between spoken and sign language, and on empowering the linguistic status of sign language. His pioneering work, Sign language Structure: An outline of the Visual Communication System of the American Deaf reveals that sign language operates in ways similar to spoken language. In the last 40 years, the field of sign linguistics has shown that sign language is a natural language that fulfils the same functions and has the same standards as any spoken language.

Attempts to study sign language and the deaf community in India started in the 1970's by Vasishta, Woodward & Wilson (Vasishta et.al., 1978, 1980, 1985 and 1987). Their findings indicated lexical variations in basic signs and they provided evidences of the existence of similar syntactic patterns of sign structure across India. They concluded that Indian sign varieties in these four major cities (Mumbai, New Delhi, Bangalore and Kolkata) are one language, which is Indian Sign Language (ISL). Their studies have been compiled and outlined in 4 dictionaries in book form. Sociological studies were further carried out by Jepson (1991a, 1991b and 1991c), and Miles (2001). More attempts include the comparative study of ISL with the Pakistani Sign language by Zeshan (2000, 2001, 2002, 2003a, and 2003b) which is known as the Indo-Pakistani Sign language Grammar. Zeshan (2000) suggested that IPSL may be operating all over India and Pakistan with varying degrees of dialectical variation which require more research. Linguistic analysis of ISL has been initiated in India which provides an elaborate description of how the language works (Sinha, 2003 and 2017).

Researches related to the lexicography of Sign Language have been published over the years. The first known dictionary of signs was produced by John Bulwer in 1648. However, sign language lexicography did not actually begin until 1965 when the first sign language dictionary based on linguistic principles was published by Stokoe, Casterline and Croneberg (Stokoe et.al., 1976). It is widely known as the Dictionary of American Sign Language on Linguistic Principles (DASL) which set off further development of sign language dictionaries all over the world. Most of these sign language dictionaries developed around this era was in

book form. These dictionaries were developed on the basis of spoken language which was translated into signs for the hearing community. Most sign language dictionaries that have been published in the 1970's and 1980's are uni-directional bilingual dictionaries (Schermer, 2004). The most widely known bilingual dictionaries of sign language in book form are the Gallaudet Dictionary of American Sign Language (Valli, 2006); the Australian Sign language Dictionary (AUSLAN) by Johnston (Johnston, 1989); and the Dictionary of British Sign Language (BSL) by David Brien (Brien, 1992). There are various forms of sign language dictionary; some are developed for a specialized field, for example, Legal terms, Computer terms, Medical, etc. There has also been development of a machine system for translation from speech to sign or vice- versa for example spoken text to sign language.

In India, several attempts have been made to document sign language in book form and many have begun to document ISL for an online course as well as in web and mobile based applications such as the "Talking Hands" (Deaf Enabled Foundation, Bengaluru initiated in 2013). Since 2000, the Ramakrishna Mission in Coimbatore (2001) has also documented sign language according to different semantic categories derived from a project in collaboration with CBM international. Wallang (2007, 2014 and 2015) has also attempted to analyse the situation of deaf education in Shillong and document the language used by the Deaf community in the form of a Multi-media dictionary of Shillong sign language (ShSL). At present, the Indian Sign Language Research Training Centre, (under the Ministry of Social Justice and Empowerment, Govt. of India) has recently launched an ISL dictionary encompassing the varieties of sign languages operating in the country, with an entry of 3000 words. In this context, documentation of the Sign Language varieties in NER can contribute to their endeavor.

At this point of development, a multi-media dictionary is not the main objective of the documentation since it almost feels impossible to produce work of the same level of quality and precision as seen in the sign language dictionary developed for the BSL by Brien (1992). Thus, the term 'Sign Bank' is adopted for this web based documentation to signify a collection of signs (at the lexical level) recorded from the native signers across the NER.

Considering the rich diversity of the region in terms of culture and languages, it is expected that the type of sign languages used in the states will also differ extensively from one state to another. At this point, lexical variants are being considered and incorporated into the Sign Bank. Each sign-meaning collected has simply been translated into English as the majority of the schools use English as the medium of instruction. It does not describe the grammatical properties of each sign. There have been no linguistic studies that take into account the sign languages operating in North Eastern India. The most striking feature of the NER is its linguistic situation where 70% of India's spoken languages are found. As per the Census, 2011 the NER is home to 122 languages, with Arunachal Pradesh having the highest number of 90 languages. Amongst the 122 languages, 4 fall in the category of scheduled languages (GOI, 2010). English is the official language in Nagaland, Mizoram, Meghalaya and Sikkim except in the states of Assam and Tripura. Although all the tribal languages have the same equal status as a language, only 27 tribal languages have found a place in the school curriculum in their respective states. The D/deaf people co-exist with these varied linguistic communities who are themselves struggling to empower their own ISL (collaborating with the National Association of the Deaf) and fighting for linguistic survival in the globalised world.

As compared to the past, with today's social media and instant communication access, the deaf communities existing in each state are more closely linked with each other. The native signers are constantly exposed to other sign language native signers. With the rapid development of ISL, the contact of the deaf communities of the NER and ISL native signers have become more frequent through various platforms such as Deaf conventions, conferences, gatherings, and other interactive activities. Such activities are conducted by NGOs working for the welfare of the disabled. Hence, there is a likelihood of finding cognates of ISL in the sign languages used by the deaf community in this region.

For example, the Regional Deaf Conference organized by the Ferrando Speech Hearing Centre, Shillong (with the National Association of the Deaf in October, 2017) indicates the existence of a larger deaf community and considering the varied numbers of spoken languages and culture found in this region, it is no surprise that different varieties of signs particularly at the lexical level was found, with the exception of Nagaland. In Meghalaya,

British Sign Language (BSL) was initially introduced, and then the American Sign Language (ASL). At present, one school is using the ISL Mumbai variety while in another the sign language developed by the Coimbatore team is being used. The types of fingerspelling used are the double-handed fingerspelling (ISL) and the single-handed ASL fingerspelling (Wallang, 2014). ISL is found in almost all the states in the North East, with the exception of Nagaland where ASL is used. This school (details available in the app) makes use of a different variety of signs and the sign system used in this school resembles the ASL lexical items and as well as the word order. Although, most signs denote the cultural aspects specific to their community in terms of food habits, dress, customs, etc. In Mizoram a dictionary (2004) of Mizo sign language (2004) has been published and it comprises of signs commonly used in the state, with the integration of the ASL varieties.

The term NESL adopted here refers to the collection of sign language varieties commonly used by the deaf community across the NER. NESL: A Sign Bank is a proto-type version consisting of a sign language database which is commonly used in the field of education. Signs included in this Web-App cover several areas which have been classified into different semantic categories i.e. basic words, question words, kinship terms, colour terms, food items, locations, professions, educational terms (of various subject areas), etc. Besides these words, alphabets in English or fingerspellings, both single-handed and double-handed, along with numerals, have also been included. The NESL Sign Bank offers technological resources to teachers for enhancing communication access to the D/deaf children in an inclusive classroom.

Significance of the Documentation

Over the past few decades, the accumulated research findings have brought forth significant breakthroughs that highlight the value sign languages have for D/deaf children in the context of the present education system. In India, however, despite the academic research that has already been initiated, a wide gap still exists between the academicians and school practitioners, and furthermore, the academic contributions are hardly visible in school education. Misconceptions about the language and the Deaf community still abound across

school educational programmes and policies due to the lack of substantial and useful academic resources.

In the context of education, sign language in India still fails to make its way into the school curriculum and the classrooms that Deaf children attend. As one of the priority areas in promoting inclusive education, the National Curriculum Framework (2005) states that "Children with language-related impairments should be introduced to standard sign languages, which can support their continued growth and development to the fullest. A recognition of the linguistic abilities of learners would encourage them to believe in themselves and their cultural moorings" (NCERT, 2005, p. 36). Johnson et.al., (1989) highlighted the importance of natural sign language right from an early stage which is critical in second language learning development and discussed the incongruities that abounds deaf education around the world. Further, they pointed out that the adoption of total communication method, which is an inclusive approach to deaf education, is actually 'Crypto-oralism' where the use of sign language to learn English is simply a process of literal translation of words for signs, rather than using a natural sign language. They also stressed that it is only the d/Deaf children's natural sign language that is justifiable in being used in the school so as to make the curricular content more linguistically accessible.

It is within such similar notions that the NESL Sign Bank was developed so as to ensure easy accessibility to resources in sign language (derived from the community members) for classroom interaction. At this point, however, the level of documentation has been initiated only at the lexical level, and the task of incorporating such lexical items structurally in a sentence remains a future endeavour.

There is a dearth of sign language materials that can be used as educational reference materials in India, particularly in the context of NER. On this basis, there is a pressing need to document the sign language in the region and produce sign language resources that can support future developments.

Several studies have discussed the challenges faced by deaf communities around the world and they are no different from the deaf communities in the NER. This NESL Sign Bank is only a small step towards eliminating the language barriers in the educational context of

North East India. Thus, in one of the most linguistically diverse regions of India, only a multi-lingual education model which can accommodate sign language as having an equal status with other spoken languages can truly minimize the barriers of education for the Deaf.

Methods of Documentation

The process of documentation begins with the recording of selected data and the methods used are similar to the process of data collection used for linguistic documentation of any spoken language. However, because of the differences in modality in the transmission channel i.e. in the perception and production of sign languages, video recording was employed for the research to capture the accuracy of data. Moreover, sign languages make use of space, movements, handshapes, etc. which significantly and uniquely define the linguistic structural system which only a video recording can capture. Data was collected from native signers (D/deaf who are members of deaf communities in the states and the region) out of a random sampling of population from inclusive schools and special schools (both Private and Government schools) in the NER. Further, Deaf Associations, Deaf clubs and other NGOs were consulted for data collection. Data was collected through a series of video recordings, using a digital video camcorder. Video recordings can capture the accurate descriptions of lexical signs in terms of all its specified features. The lexical items that were collected consist of a word-list and words capturing various semantic, grammatical categories and educational terms comprising of approximately 5000 words.

Compilation of NESL Sign Bank

Online access to sign languages is available around the world and a few exist in India which are mostly dedicated to fulfilling daily communicative needs. This NESL: Sign Bank provides online access to sign languages in the context of school education. It is an online educational resource that contains information regarding the types of sign languages used by the deaf community. This Web App has been developed using free online software programs (open source) which aim at supporting the education of d/Deaf people across the region. The application will be hosted in NERIE-NCERT website to cater to educational institutions in the NER.

The Web App contains information about how a particular English word is used in Sign language. For instance, if a teacher teaching a d/Deaf child in the classroom does not know how to sign the word 'EXPERIMENT', he/she can use the App to access information about how it is signed. Signs have been arranged in alphabetical order so that a user can simply click on the window containing the NESL: Sign Bank and either scroll down to the alphabet 'e' to look for the sign 'Experiment' or simply type the word in the search window which is placed adjacent to the NESL: Sign Bank icon on the main window page. When a user clicks on the selected English word, the corresponding or equivalent sign is automatically displayed in video format. Besides the lexical items, users can also access information about the research background and other materials which relate to how sign language works and functions.

Characteristic Features of NESL Web App

1. Format: Web based Application that can be accessed offline as well as online.

2. Technical information: This Web App has been developed using free online software programs (open source) which aim at supporting the education of d/Deaf people across the region.

- **Software used**: Visual Studio, Xampp server, MySQL, Adobe Premiere Pro (for video editing).
- **Web development** using HTM5, CSS,PHP

a) HTML (Hypertext Markup Language) for designing the Web App.

- **A database** is created using MySQL. (Standard Query Language)

A particular word is linked to the particular video.

The words are stored in alphabetical order in the database.

Each word is linked to a particular video by storing the path location of the video (for that particular word).

3. Layout: NESL Sign Bank consists of five navigation tabs/windows in the vertical menu bar. The main sections of the app are presented in this section as follows:

(I) Homepage: The homepage of "NESL Sign Bank" contains the background of the Web-App. It gives an introduction to the Web App stating that it is a collection of signs that have been collected from different parts of the NER in order to facilitate teachers to use sign language for the benefit of the Deaf children studying in the different states of the region. Teachers in different government schools and NGO's have expressed their difficulty in finding resources to help them communicate with the Deaf students in their classrooms and thus, NERIE-NCERT has taken upon itself the task of providing context-based vocabulary specifically tailored for the academic needs of their classrooms. Teachers can now simply, log on to the internet, type the word that they are looking for and a video of the sign will be displayed. This app not only provides the word list and signs, but also the grammar of the sign language along with background knowledge of the Deaf community of the NER The process .of developing this Sign Bank is a continuous process that is regularly being improved upon by the developers through more research and the feedback given by the users.

(II) NESL Sign Bank: This tab contains the explanation of the question, "What is NESL?" It has a "dictionary" having words listed in alphabetical order which the user can access easily with a click of a button. Examples of two variants of a single sign meaning have been found in two states. If a sign is found to be commonly used across the region, only one sign video citation is used. Besides the dictionary, it also has a "Fingerspellings" tab which consists of both the single-handed and double-handed alphabets in English. The single-handed finger spellings are based on the American Sign Language which is adapted within the Indian deaf community. A tab representing the "Numerals" in sign language is also available.

(III) Educational Resources: Most often teachers teaching D/deaf children are unaware of how sign language works and how in the absence of sound, a language can be used in similar ways like any other language. Therefore, the window/tab on 'Educational Resources' provides a glimpse into the nature of sign language and provides basic insights that will equip teachers with the grammatical properties of the language. The tab '**Contact us'** provides users a chance to send their comments and feedback and to contact the developers

for any further information that they may require for classroom transaction The tab/window '**The Team'** consists of information about the team members responsible for the documentation and compilation of the database for NESL Sign Bank.

Instructions for Installation

(I) Software Requirements: Web browser, MySQL and Xampp or Wampp (provided in pendrive)

(II) Instructions for Installation:

Step 1: Installation of MySQL

1. Install MySQL (either 32 bit for 64 bit depending on the computer configuration).
2. Open the folder named "Software", click on either "mysql-5.7.19-win32" or "mysql-5.7.19-winx64".
3. After clicking on it, a window will pop out; click on "Next".
4. Click on a checkbox "I accept the terms in the license Agreement"
5. Then click on "Next"
6. Click on "Typical"
7. Click on "Install"
8. Click on "Yes", and then click on "Finish".

Step 2: Install Xampp

1. Click on "xampp-portable-win32-5.6.31-0-VC11-installer"
2. A window will pop up, click on "Yes"
3. Click on "Next", go "Next"
4. Click on "Next", again "Next"

5. Click on “Next”
6. Wait as it will take some time
7. When it is done, click on “Finish”
8. Choose the Language, then click on “Save”.
9. A window will pop up, go to step 3.

Step 3: Go to Xampp Control Panel

1. Go to Start Menu, Type Xampp Control Panel
2. When the Panel is open, click on Start button near what it is written “apache” and also Click on the start button near what it is written “MySQL”.
3. Now, Click on Admin which is on same row with MySQL.
4. A screen will be displayed, do not close it, go to step 4 for importing database.

Step 4: Importing Database

1. Click on “New” which is on the left hand side of the screen.
2. You will see “Create Database”, so create the database with the name “signbank” (Note: all the letters of the word “signbank” are in small letters).
3. Click on “Create”.
4. Click on “Import”
5. Click on Browse; go to the location where the sql file is. (if it is in the pendrive, go to the pendrive and select the folder named “Database” , click on “signbank”.
6. Click on “Go” which is below.

Step 5: The Web App

1. Go to the folder named “NESL”
2. Copy the folder “NESL”
3. Go to C drive, open “xampp” folder, go to “htdocs”, paste it here.
4. Now, open your browse example, Google Chrome or Microsoft Edge or any browser.
5. Type “localhost/NESL/index.html”
6. Now the “NESL” Web App is ready.

Future Projections and Conclusion

At present this study has managed to incorporate data at the lexical level only. Due to time constraints, most varieties could not be covered. Therefore, there is a need to document more linguistic aspects of the sign languages in NER. The outcome of this research, as mentioned earlier, has been compiled in a web-based application and hence, the NESL SignBank is proposed to be hosted in the official website of of North East Regional Institute of Education. At present, the application has been sent to the National Informatics Centre, Meghalaya State Centre, for auditing and hopes that it will find a place in the official website of the institute.

Acknowledgement: *The development of this database would not have been possible without the support of the deaf community in the region and particularly the schools and institutions working for deaf education. With the support of NCERT (PAC), this NESL Sign Bank will surely further the cause of promoting inclusive schools in the country and empower the Deaf community here in the NER.*

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*(Note: The term 'Deaf' is used with a capital 'D' referring to a group of deaf people whose first language is sign language having their own specific and unique culture and a community of their own, which is the contemporary trend in linguistic research. In this paper, the same convention is also followed.)