

Introduction of Indian Sign Language in Inclusive Education

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ABSTRACT

Purpose: *The predominant mode of human communication is speech, and whenever it is hindered, humans resort to the tactile-kinaesthetic mode. Use of sign language by persons with speech-hearing impairments is a classic example of such adaptation. The Demonstration School at the Regional Institute of Education in Mysuru, South India, undertook training of typically-developing students in Indian Sign Language (ISL), so as to facilitate communication and instruction of students with hearing impairment who are in mainstream learning environments.*

Method: *Training in ISL was imparted to 140 typically-developing students in higher primary classes. Twenty-four 40-minute sessions were conducted over a month. After theoretical orientation in logical bases of manual communication, practical training commenced with elementary manual alphabets, progressed through essential daily-life vocabulary necessary to construct simple sentences and carry out general conversations, and culminated in signing the Indian National Anthem.*

Results: *Typically-developing students gained primary benefits such as improved awareness about non-verbal communication modes, mastery of basic skills in ISL, and positive attitudes towards sign languages.*

Conclusion: *The UNCRPD 2006 authorises sign language as the linguistic identity of the Deaf, and encourages the use of sign language in learning environments. Future research should add to the findings on secondary benefits in the form of scholastic and sociometric advantages derived by students with hearing impairments who receive instructions in sign language in mainstream learning environments.*

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“The one true deafness, the incurable deafness, is that of mind” – Victor Hugo.

INTRODUCTION

Language is a versatile faculty consisting of an arbitrary system of codes that represent notions. It evolved as a means of facilitating intrapersonal transactions, and has developed into an indispensable tool of the thought system for organised representation of its notions. Interaction among primates, the species closest to humans, and communication between pre-historic paleontological beings are said to have involved touch and movement predominantly. Language, as an arbitrary system of communication, progressively adopted sounds as the major element of transaction due to the ease of production, rate of transaction and advantage over space and time, thus contriving to make human speech, involving aural-oral transactions, the primary form of language and major mode of communication.

However, in lay perception, speech and language are considered to be one and the same, and this lack of differentiation between both has led to oral supremacy. The predominant oral language bias has in turn led to lack of understanding of manual languages, pushing it to a disadvantageous position in the perception of human society (O'Rourke et al, 1975; Armstrong et al, 1995; Armstrong & Wilcox, 2007).

Authenticity of Manual Forms of Communication

In the early phases of human development, tactile and kinaesthetic elements predominate in the communication of infants and toddlers before they acquire elements of proper language. Even though the visual-manual forms of communication have reportedly diminished through the years of human evolution and wane beyond the infant and toddler years of development, humankind is known to revert to them whenever aural-oral modes of communication are impeded. A common example is to make gestures at a distance to a communication partner located out of earshot or in a noisy environment. When the impediments to aural-oral communication are more permanent and lifelong, such as for individuals with hearing impairment, efforts have been made to evolve visual-manual means of communication into full-fledged sign languages. These sign languages are often misunderstood as manual representations of spoken language which are universal across the world or as incomplete systems that

are not supported by proper grammatical norms or well-defined structures. On the contrary, sign languages are authentic languages that have evolved among the culturally Deaf over the years. The word deaf, written with a capital 'D', refers to a group of people who do not consider themselves as handicapped with loss of hearing, but rather as people with a different cultural-linguistic origin, with a specific spoken language having a common cultural root. This group of Deaf includes not only persons with hearing impairment, but also the hearing children or siblings of adult deaf, referred to with acronyms CODA and SODA, respectively (Woodward, 1978; Kyle & Woll, 1985; Zeshan, 2002).

The manual forms of communication evolved indigenously by the Deaf are said to have sound phonologic (or rather chereologic), semantic, syntactic or morphologic bases like any authentic spoken language. In spoken languages, meaningful units are made up of groups of sounds; similarly, in sign languages they are constituted by specific hand shapes or configurations with particular movements in a definite location and orientation in relation to the physical bodies of the communicating participants. The phonological production of speech involves mobile articulators like tongue, lips, etc., moving in relation to immobile articulators like hard palate, teeth, etc., generally within the oral cavity. Similarly, in the production of sign language the primary mobile articulator is the hand, along with facial features moving in relation to other body parts of the sender as well as the receiver of the communication, largely within the signing frame that extends between the head and the chest. While the spoken language follows a definite syntactical order, which is determined by the different parts of speech involved in an expression, sign language expressions are more morphologically oriented with the order being determined by the semantically-based material classification, as well as the size and shape of the signs. Like speech signals, signs are also temporally organised in time, but there is an added feature of arrangement of signs in visual space as heaps - one over the other - or in pleats - one beside the other. Thus, sign languages qualify to be authentic languages with specially evolved phonology, semantics and syntax of their own (Kyle & Woll, 1985; Wilbur, 1987; Armstrong et al, 1995; Martin & Pitcher, 2006; Armstrong & Wilcox, 2007).

To clarify further, sign languages are not similar the world over and neither are they just pantomime nor gestural representations of languages spoken in their region. Like spoken languages, sign languages are also rooted to geographic and cultural contexts. American Sign Language (ASL) or Ameslan, Australian Sign Language or Auslan, British Sign Language (BSL), and Indian Sign Language

(ISL) are some of the authentic sign languages that have been evolved and are practised by a considerable number of people. Like any of the spoken languages in India, Indian Sign Language also has its own regional dialects across the sub-continent such as the Delhi-Karachi dialect, Kolkata-Dhaka, and Bengaluru-Chennai variations, while retaining 60% to 75% similarities across the regions (Bellugi & Fischer, 1973; Siple, 1978; Vashista, 1980; Zeshan 1998; Zeshan, 1996 qtd. in Zeshan, 2002). Every spoken language has been found to instil certain cultural-specific and practical implications, like the Indian custom of folding hands together or the Japanese custom of bowing while uttering a verbal greeting. Similarly, sign languages too have Deaf-culture behaviours like mandatory eye contact between communication participants, leniency in using touch or throwing weightless objects to draw attention, and exaggerated facial expressions amalgamated as part of their visual-manual mode of communication (Kyle & Woll, 1985).

Another prevailing misconception about sign languages is that they are recent synthetic creations developed by hearing people for use by people with hearing impairment who cannot use speech for communication. This assumption is also baseless, with recorded evidence of the use of sign languages as far back as 400 years ago, while it is assumed that some sign languages are more than a thousand years old. There are some contrived manual systems of communication that are developed on the basis of spoken languages, adopting their syntactical and morphological inflections. These are not acknowledged as sign languages but are termed signed systems, and are promoted to aid the development of written language skills with manual communication skills as a base (Fischer, 1974; Kyle & Woll, 1985; Zeshan, 2002).

The relative disadvantage of sign language might be the number and nature of users. There are estimates that several lakh people use sign language in the Indian sub-continent, while there are two lakh fifty thousand users in the United States of America and 20,000 to 50,000 in smaller European countries (Kyle & Woll, 1985; Zeshan, 2002). In India there are many spoken languages, some of which are given the status of national languages, with fewer users. However, the practitioners of sign language do not culturally inherit the language as in the case of spoken languages which are acquired through families and the neighbourhood culture. These individuals are spread across wide geographical locations. Only miniscule numbers of Deaf have the opportunity to learn sign language from practising adults like Deaf parents or other adults in the family and residential

locality. In most situations, it is acquired in segregated educational institutions where there are considerable numbers of individuals with hearing impairment, and more often this happens after these individuals fail to learn aural-oral forms of communication. This adversely affects mastery of the language, which in turn retards the functional use of the language during early cognitive development and later academic learning. As in the case of spoken languages, the fact that sign language is not supported by secondary written forms that correspond to its phonological structure, further undermines its vitality in the learning environment. Some sign languages like ASL and BSL have tried evolving corresponding graphic notations to represent signs, but these efforts have helped in maintaining permanent records of communication using sign languages rather than aiding academic learning (Kyle et al, 1979; Esam, 1981).

Essentiality of Manual Modes of Communication

For a long time, hearing people, in their role as caregivers or educators, have been deciding the mode of communication or the medium of instruction for young children with hearing impairment. Environmental viabilities rather than innate abilities or inclinations of the child have rarely been considered in the process. Other than a few rare exceptions, like Pedro Ponce de Leon, Juan Pablo Bonnet, and Abbe de l'Eppe from the European continent, seldom was sign language considered as the natural or native language of children with hearing impairment, and rarely were efforts made to promote it as a medium of instruction. Such biased approaches, lacking empathy, have led to depreciative influence on the learning capability of the child, as well as employment prospects and quality of life as a whole (Lane, 1984; Lane & Philip, 1984). However, the more recent espousal of the rights-based approach in the field of disability rehabilitation in the 21st century, has led to universal advocacy for consideration of manual languages as an authentic medium for functional communication as well as education. The United Nations Convention on the Rights of Persons with Disabilities (2006) in the global vista and the Rights of Persons with Disabilities Act (2016) in the Indian scenario insist on promoting the use of sign language in public domains, and especially in learning environments as a medium of instruction. With the contemporary thrust on inclusion of Deaf individuals in the predominantly hearing educational and social mainstreams, provisions for sign language interpretation is suggested as a solution to bridge the communication barriers between verbal and manual languages (United Nations Organisation, 2006; India, 2016).

However, time-tested experiments and exposure point to several social and subjective barriers in the practical provision of interpretation services. The most crucial among them are the non-availability of skilled interpreters, complexities in real-time interpretation especially in a classroom-like situation where many interactions may happen simultaneously and other activities of learning may overlap, personal compatibility between the sign language user and interpreter, and depersonalised interaction between the actual participants in the communication process (Herbert, 1978; Llewellyn-Jones, 1981; Kyle & Allsop, 1982). Added to these intricacies is the impossibility of providing for every child with hearing impairment in mainstream schools in India where there are still millions of single-teacher institutions. A more viable alternative to this is that hearing people in the learning environment should make an effort to acquire rudimentary elements of visual-manual communication, while the students with hearing impairment should also pitch in with essential verbal communication so as to maintain an atmosphere of total communication. Even though this suggestion may seem to be far-fetched, there is practical evidence for the viability of such a democratic, egalitarian process. In the oldest democracy of the world, the United States of America, ASL is provided as a second language option in schools, and the consequential development is that it is the fourth most widely used language (after English, Spanish and Italian) familiar to over five lakh people including non-deaf users (Wilbur, 1987). The largest democracy in the world, India, which takes pride in including special provisions for the linguistic minority in its constitutional law, could try it as well.

Exposure to sign language by all learners, including those with good or impaired hearing, has been found to effect myriad benefits such as optimal social integration, mutual appreciation, concrete means of instruction leading to effective learning, enhanced memory, and all-round development stemming from simultaneous whole-brain stimulation of the left-brain by verbal communication and the right-brain by visual-manual communication (Wells, 1981). It will further encourage two-partite endeavours in the process of communication as well as learning, involving students with and without hearing loss in the inclusive environments, where four out of every thousand children are estimated to be suffering from profound hearing loss which prevents using speech as the primary mode of communication (Ministry of Social Justice & Empowerment, 2001). It is also reported that teaching sign language stimulates development of early communication in children with myriad disabilities like aphasia, autism,

cerebral palsy and Down's syndrome among others, and even in children without disabilities (Berke, 2018).

With hearing loss being a widespread fallout of ageing among Indian adults, it is not far-fetched to state that teaching sign language to hearing children may also serve to prepare them for hearing impairment later in life, with 1.7% of the people reported to experience some sort of hearing loss and 50% of senior citizens suffering from deafness due to ageing (National Institute for Deafness and other Communication Disorders - NIDCD, n.d.). Being familiar with sign language is also considered to extend scope for carrying out business or serving as volunteers among hearing handicapped (Everyday Health, 2018).

Objective

Although there are proposals to open inclusive schools to manual modes of communication, very little has been done to investigate the prospects and profits, especially in India. In this context, the second author of this article had undertaken a venture in the form of a PAC programme, funded by the National Council of Educational Research and Training, at the Demonstration School of the Regional Institute of Education, in Mysuru.

The present research was undertaken to study the feasibility of extending instruction in sign language, as well as the resultant outcomes, in the mainstream learning environment.

METHOD

Study Design

The research design was decided by the main investigators - a professor of speech-language pathology involved in planning the research, a postgraduate school teacher responsible for coordinating the process, and a sign-language interpreter-cum-trainer for carrying out the instruction and evaluation in ISL - along with other collaborators who were administrators and educators working in the field of investigation. Experimental research design was adopted as being suitable for any research endeavouring to investigate the impact of a manipulated variable, sign language instruction in this case. However, a pre-experimental design without a control group was chosen because in a large educational set-up with a substantial number of participants and limited resources, it would be difficult to

control spill-over effect between groups and also arrange for follow-up training for the control group participants on an ethical basis.

Study Sample

A total of 140 students were purposively chosen from the higher primary classes 7 and 8. Students from these classes were considered for inclusion in the study because they would be sufficiently mature for responsible participation, while having more time and less study load than secondary and senior secondary students of classes 9 - 12. As all these students were minors, written consent was sought from their caregivers after a detailed orientation by the coordinator of the research.

Of the 140 students who were selected, 128 participated in the process. However, the actual number of students who were involved in the pre- and post-test exercises of data collection ranged between 119 and 122. The number of participants varied at different stages owing to absenteeism on the days of data collection. The details of the participants are provided in Table 1.

Table 1: Participants in the Investigation

Stage of Investigation	No. of Female Participants	No. of Male Participants	Total No. of Participants
Theoretical Pre-test	71	48	119
Theoretical Post-test	67	52	119
Practical Skill test	71	51	122

Training Procedure

In consultation with the sign language interpreter-cum-trainer it was decided that after a theoretical orientation to sign languages, the practical training in Indian Sign Language would incorporate basic aspects of manual languages, namely, double and single-handed manual alphabets, manual numerals, signs for days of the week, months of the year, social greetings, vocabulary related to family and relationships, constructing simple sentences with vocabulary for common everyday objects and activities, carrying out general conversation with up to six transactions, and signing the Indian National Anthem.

Practical instruction was imparted to groups of 30-35 children, as per the norm of student-teacher ratio prescribed in the Right To Education Act (2009) of Government of India. It was decided that the grouping was to be the same for different classes and sections in the school. Face-to-face demonstration by the instructor was followed by imitative reciprocation and practise by the students, monitored by the instructor. The training was scheduled over the span of a month, with 3 sessions per week, accounting for a total of not less than 20 sessions.

Data Collection

The material for collecting data had three components. The first one consisted of 10 objective items testing the general awareness about sign language among the participating students. The items were statements that elicited 'yes/no' responses from students. This test was conducted prior to and following the orientation and practical training in sign language. The second component was an illustrated worksheet to test practical knowledge about sign language, where children had to interpret and transcribe the information conveyed through images representing signs. The second component on practical knowledge was administered only post-instruction as it was not logical to expect students to perform a specialised practical skill without prior exposure. Both the components were quantitative in nature, carrying a maximum total score of 10. The third component involved inviting qualitative remarks from the student participant about the experience and its effects. All data collection procedures were carried out in groups.

Data Analysis

The collected data was subjected to empirical analysis of descriptive and interpretive measures to arrive at the results. Independent sample t-test was used as the sample was of sufficient size to expect normal distribution and thus justify employment of parametric measures. However, due to irregularity of participant attendance in the pre- and post-tests and initial data having been compiled in the form of collective scores for each item instead of total scores of individual students, paired sample t-test was not employed.

RESULTS and DISCUSSION

Impact of any process aiming to create a common social good is always gauged on the basis of three criteria: the creation of awareness about the issue, the

consequent effect on attitudes, and culmination in the betterment of practices. The results of this research are discussed along these lines.

Creation of Awareness

The theoretical orientation of students was found to have cleared their misconceptions and improved their perceptions about sign languages and their users. This is evident from the results of pre-instruction to post-instruction advancements presented in Table 2. For convenience of comparison and interpretation, the raw scores have been converted in percentage scores for presentation.

Table 2: Comparison of pre- and post-test Awareness about Sign Languages

Group of Participants		Pre-test Scores	Post-test Scores	Gain Scores	T-Score	Significance
All students (N = 119)	Mean	60.84%	79.41%	18.57%	0.1680	Statistically Insignificant at 0.05 level
	SD	41.55	24.36			
Female students (Pre-test N = 71 Post-test N = 67)	Mean	61.12%	78.96%	17.83%	0.3112	
	SD	23.92	15.86			
Male students (Pre-test N = 48 Post-test N = 52)	Mean	60.42%	80.00%	19.58%	0.0763	
	SD	18.03	10.52			

An aggregate advantage of nearly 19% highlights the positive effect of exposure to sign language, which had improved the understanding of the participating students in the training programme. This effect has been recognised earlier by others like O'Rourke et al (1975) and Wilbur (1987). Though girl students started with the marginal advantage of 0.7%, boys seemed to have been keen learners with almost 20% improvement from the pre-test scores and have outdone girls with an advantage of 1.04%. The decrease in standard deviation scores in the post-test scores also indicates the stabilisation of participants' knowledge following the exposure.

Enriched Attitudes

The experience of undergoing training in sign language was found to have made a positive impact on the young minds of the student participants. As understood

from the compilation of their qualitative remarks, the exposure had helped them to understand the difficulties faced by their peers with hearing impairment in day-to-day communication and consequently they had developed empathy and consideration for their differing abilities. They reported that they were able to communicate more frequently and fluently with their peers with hearing impairment in the learning environment. The participants also expressed their eagerness to help children with special needs, and some of them were keen to take up professions that would benefit the speech and hearing impaired in future. These qualitative remarks underline the positive impact of the experiment on inclusion of children with hearing impairment in the current learning and, later, social environment.

Besides the social benefits, the participating students also mentioned that they had accrued personal rewards from the endeavour. They found the exercise easy and enjoyable, and expressed eagerness to share the practical knowledge they had gained with their family and friends. They found acquisition of the new language an appreciable addition to their constructive abilities, leading to other returns like better retention capacity for scholastic learning as well as advantageous skills for co-scholastic activities like dumb charades.

Enhanced Performance

Factual knowledge and favourable attitudes in turn were found to have culminated in fruitful practices among the student participants. As mentioned earlier, the process of data collection did not involve pre-testing of practical knowledge or skills of the participants. However, the post-interventional performance revealed improved learning, with an aggregate attainment of 85% in all learners. The lower degree of standard deviation at around 10 or less also affirmed coherent learning among the participants.

Further analyses of data were carried out to gauge the impact of demographic factors like age (in terms of grade/class level) and gender on the learning ability for sign language. Out of the 122 participants who underwent the test for practical knowledge, 62 were from class 7 and 60 were from class 8, and 71 were females while 51 were males. Results displayed in Table 3 expound their combined as well as comparative performances.

Table 3: Post-interventional Attainment of Practical Knowledge

Attainment of Practical Knowledge	Overall Performance	Class-wise Performance		Gender-wise Performance	
		VII (N = 62)	VIII (N = 60)	Female (N = 71)	Male (N = 51)
Mean	85.32%	88.87%	81.67%	86.62%	83.53%
SD	9.55	9.93	7.63	8.61	10.55
Mean Difference		7.20%		3.09%	
T-Score		1.6384		0.0886	
Significance		Statistically insignificant at 0.05 level			

Results shown in Table 3 demonstrate that students of lower grades have performed comparatively better. This leads to the realisation that carrying out such activities at early stages of schooling among younger children will lead to more positive and prolonged impact on inclusion. However, the finding that girl students displayed better performances contradicts reports of earlier research (Gardner, 1983; James, 2007) that boys are strong in visual-spatial and bodily-kinaesthetic learning while girls are found to be strong in auditory and verbal-linguistic learning. Nevertheless, there are contrary claims substantiating reasons for girls' better performance. James (2007) and Mulvey (2010) assert that even though the male brain is slightly large in size, it has not shown any effect on learning. However, the female brain is found to have approximately 25% more connectors between the two hemispheres of the brain than in males, allowing them to grasp details better, specifically in language acquisition and vocabulary. They are also found to be more inclined to cooperative learning, while boys are more disposed towards competitive learning. Girls are also reported to be more balanced, with greater commitment and self-control in the process of learning. These revelations could be taken as pointers for involving girls as lead students in such social-learning endeavours.

CONCLUSION

The research had limitations in the form of difficulties in controlling the influence of extraneous variables like regular attendance of participants, in adopting a true experimental design with a control group in a public school environment, and in implementing an intensive practical training course amidst the hectic

school schedule, and carrying out multi-faceted pre- and post-interventional data collection among a substantial number of students. However, all things considered, the research has provided positive indications about the workability of an instructional programme in sign language in inclusive learning environments, and the worth of the exercise in developing awareness, moulding favourable attitudes and generating resourceful skills among typically developing students.

Further experiments involving a pure experimental design; validated tools for quantitatively measuring awareness, actual practice, as well as attitudes; and in-depth investigation beyond the primary learning into the secondary impact on academic and sociometric implications for students with and without hearing impairment, may serve to be more beneficial. With such constructive measures on the anvil, it may not be long before Indian Sign Language and Deaf culture are acknowledged and appreciated in the multi-linguistic and multicultural fabric of Indian schools and society.

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