P-ISSN: 2790-6795	Annals of Human and Social Sciences	Jan-Mar 2023,Vol. 4, No. 1
O-ISSN:2790-6809	http://doi.org/10.35484/ahss.2023(4-I)02	[12-24]

Annals of Human and Social Sciences
www.ahss.org.pk

RESEARCH PAPER

Factors Affecting the Uniformity of Sign Language: Perceptions of Teachers of Students with Hearing Impairment

[1]Zainab Rehmat Ali [2]Asma Kanwal* [3]Ghazala Ishrat

1. B.Ed. (Hons) in Special Education, Department of Special Education, University of Education, Lahore, Punjab, Pakistan
2. Lecturer, Department of Special Education, University of Education, Lahore, Punjab, Pakistan
3. Lecturer, Department of Education, University of Management and Technology, Lahore, Punjab, Pakistan

***Corresponding Author** asma.kanwal@ue.edu.pk

ABSTRACT

The main purpose of this study was to examine the perception of teachers of students with hearing impairment (SWHI) about the factors affecting the uniformity of the sign language. The nature of study was quantitative. The population of the study was teachers of SWHI. Sample of the study teachers was 100 (M=52, F=48) of students with hearing impairment selected through convenient sampling techniques from different special education institutions. Survey method was used to collect data through self-developed questionnaire with reliability coefficient (α= 0.72). statistical measures were used to analyse the data. The result of the study highlight. This study used to find the variation in sign language which effect on teachers and students. There is no professional development for teachers per-service and in service. The study showed that teachers of students with hearing impairment faced many issues due to the variation of the sign language when students use different signs in the classroom and teachers also learned different signs. And the school did not pay attention on the professional development of the teachers that teachers can use same standard sign language. School and government should pay attention on the development of per-service and in-service teachers in accordance with Pakistan sign language.

Keywords: Factors, Hearing Impairment, Sign Language, Teachers of SWHI, Uniformity, Variation

Introduction

Targeting Deafness is defined as the condition of an individual has hearing loss that interferes with language acquisition or sound reproduction. Deaf persons suffer severe hearing loss and have very little or no auditory sense for speaking (Moore, 2010). People who are dealing with SWHI (parents and teachers) should have to aware with the basic characteristics of SWHI, their limitations, challenges face by them and reading and writing characteristics of SWHI. They have to know about the challenges which have to face by SWHI due to hearing impairment (HI). And have to know about the assistive and audiological devices which can be helpful for persons with HI. Clearly, there is a need for further empirical research in the domain of deaf and hard of hearing kids' literacy development. Researching the effectiveness of interventions that promote reading among deaf and hard of hearing kids involves distinct obstacles (Luckner et al., 2005).

According to Hardin, when a child is born deaf or becomes deaf (e.g., due to illness or accident), family members face several important decisions, particularly regarding the medium of communication their child will use, a decision that shapes every aspect of a child's life. This is a very personal decision that is influenced not only by the child's parents, but also by professionals working with the family, friends, and extended family members (Hashim, 2021).

Sign language have different regional variations according to the usage of its users. Every country has its own sign language (SL) and it also vary from area to area due to its users. There are many sign languages in the word as American SL, French SL, Italian SL, Indian SL, German SL, SL of British and Swedish a well. SL has its own rules and grammatical structure. It does not represent any language as it is.

Sign language varies greatly in the Pakistani environment, even from region to area and person to person. Pakistan's sign language is still in its early stages. There is an urgent need to discover the elements influencing sign language consistency.

Literature Review

Deaf communities across the globe sign languages are used to convey message and purpose (Sandler & Lillo-Martin, (2006). A naturally existing language, sign language emerged from the necessity for communication within the Deaf community. Since sign language is indeed a visual-gestural language, it primarily uses the face, hands, and upper body to convey meaning. The fact that nobody is certain about the genesis of Sign still stands. It's possible that signs pre - date humanity. When hominids stood upright, according to Schein (1947), their hands were unrestricted to use tools and communicate. As a result, anthropologists think that the appearance of Homo erectus around 100,000 years ago may have marked the start of sign language. The earliest surviving sign language systems, which was established in France in the middle of the eighteenth century, is said to be the origin of sign language (Nendauni, 2021).

Currently, statute on language identity and/or language freedoms has authorized the sign language(s) in roughly thirty-one nations, the bulk of which are EU member states. This is the outcome of the Deaf communities' demands for the unambiguous legal validation of their languages, frequently in connection to the previously existing implicit recognition (De Meulder, 2015).

The majority of efforts on sign language recognition divide the manual from the non-manual components. In contrast to non-manual features, which include facial expressions, gaze direction, lip patterns, head and body posture, manual features are characteristics of the hands (such as hand configuration and motion trajectory). For instance, signers transmit linguistic information via articulators such facial expressions, head posture, and body movement (Pfau & Quer, 2010).

It has been shown that non-manual indicators in sign languages work at various levels. Manually identical indications may be recognized on the lexical level by facial expression or, more particularly, by mouthing (silent articulation of a word from a spoken language). On the morphological level, facial expressions and mouth patterns communicate adjectival and adverbial information (e.g., size of objects or aspectual aspects of occurrences) (Crasborn et al., 2008).

Since each sign comprises different manual and non-manual components and differs from signer to signer, automatic Sign language identification presents several difficulties. Many datasets are unbalanced and have a small vocabulary because deep learning techniques need a lot of data, and it might be difficult to get that data from native signers (Mukushev et al., 2020).

French Sign Language (FSL) originated in France. British Sign Language (BSL) originated in Britain. When a wedding ceremony was done in sign language in Leicester in 1576, it became one of the first historical accounts of British Sign Language. American Sign Language originated in America (ASL). Gallaudet was a major proponent of Sign language who met and persuaded Clerc, a recent deaf graduate, to travel back to America with him and assist in founding the country's first school for the deaf. Auslan, sometimes referred to as Australian Sign Language, originated in Australia. In the Signs of Australia or lexicon of

Auslan, there are now sixty-two hand forms included. South African Sign Language, or SASL for short, originated in South Africa. It is essential to remember that American Sign Language has had a significant effect on South African Sign Language (Nendauni, 2021).

These gesture-based sign languages have different grammatical structures than spoken or written languages. Because spoken and written languages use words and grammar rules, whereas gesture-based languages use forms and ideas, both kinds of languages have quite distinct grammatical structures (Marschark et al., 2004; Debevc et al., 2015). The sign language is made of two groups of signals: manual signals and non-manual signals. Manual signals consist of signs and fingerspelling, but non-manual signals include, among others, body language and facial expressions (Liwicki & Everingham, 2009). The term "sign language" has been used to a broad range of semiotic systems, from the emotional expression of men and women to the transmission and reception of truly linguistic structures (Darwin & Prodger, 1998).

First to arise was educational research: in 1880, a conference of educators in Milan determined that deaf students should not observe or utilize sign language in their educational experience. To those unfamiliar with the emergence of "oralism," this may appear impossible (Hodgson, 1954; Gallaudet, 1881).

A rough timeline of research efforts fits pretty well with a division of sign language structure into phonology, morphology, and semiology. Here, these terms mean (1) the organization of the physical phenomena through which sign languages are expressed; (2) the structure of sign morphemes and their selection, distribution, and co-occurrence, as well as their rules for arrangement (syntax); and (3) the relationship of meanings to sign words and sign sentences (Trager, 1963).The more we learn about how sign languages are put together, the more we can learn and understand about the problems of translation, not just between signed and spoken languages but also between different cultures (Stokoe, 1980).

The capacity to communicate and utilize language is realized in both the vocal and visual modalities for humans. This is most evident in sign languages and (co-speech) gestures. Sign languages, which are the native languages of Deaf cultures, include the use of standardized hand, facial, and body motions to communicate words. Co-speech gestures, although being non-linguistic, are generated in close semantic and temporal integration with speech and are an intrinsic aspect of language alongside speech (Emmorey, 2001; Brentari, 2010).

The parallels and distinctions between gestures and signs provide a glimpse into how humans might use various levels of representation (such as category, gradient, iconic, and abstract) to use or develop conventionalized communicating systems. This study proves clearly that human language is multimodal in nature and transmits information at several semiotic and representational levels, regardless of whether channel of transmission is dominant or favored in various communication systems. Both gesture and sign share comparable visual representations of information, potentially as a result of similar spatial conceptualizations and common mental and motor representations of events. However, sign and gesture vary in whether they employ the visual modality as the only mode of expression (sign) or as part of a composite system with speech (gesture) (Perniss et al., 2015).

Sign language interpreters help people who are deaf or dumb talk. But they can't rely on interpreters in their everyday lives, mostly because it's hard to find qualified interpreters and it costs a lot. Automatically recognizing sign language is an interesting idea. The technology to make it possible already exists, and the possible uses are exciting and worth it (Alvi et al., 2004).

Sign languages employ movements to represent certain units, such as letters, words, and phrases. These gestures are further broken down into manual and non-manual motions. Manual gestures include hand form, movement, position, and orientation, while non-manual

gestures include facial expression, head movement, body posture and orientation, shoulder elevation, and mouthing. Manual indicators are mostly supplemented by non-manual indicators (Maarif et al., 2012; Hall et al., 2015).

Every region of the world has its own sign language, despite the fact that there is no universal sign language. Every country has its own SL which is being used in that specific country as Pakistani SL called Pakistan Sign Language (PSL), where signs are utilized to portray Urdu letters and words, similar to American Sign Language (ASL) and British Sign Language (BSL). (Raees, Ullah, Rahman, & Rabbi, 2016) Spoken languages have an impact on sign language. A number of blends or combinations of two languages arise when they interact. Sign English is a combination of English and British Sign Language (BSL). American Sign Language (ASL) and English were combined to create Sign Exact English (SEE). Likewise, how PSL and Urdu interacted, Sign Urdu developed as a consequence.

PSL also creates mixes with other local dialects including Sindhi, Pushto, Punjabi, and Baluchi. The majority of hearing people who are learning manual communication have a tendency to use this mix of PSL and Urdu word order for descriptive purposes. This would aid in learning the structure of the Urdu language in a classroom environment.

Diversity in spoken languages are common and result from cultural and environmental influences. In various parts of Pakistan, Urdu is spoken in a variety of ways. Vocabulary and grammar usage are different. Similar to PSL, there are geographical differences in the number of elements. In one place, a sign is appropriate, but not desired in another. It may not always follow that it is inappropriate there (Sulman & Zuberi, 2000).

Additionally, each state has its own symbol variant. Some of this variance is due to the fact that the first British deaf immigrants came from various regions of the country and carried with them diverse dialects of BSL. It also occurs as a result of the fact that deaf pupils attend schools within their state and have little interaction SL users from any other states. Sign language has not been officially taught or even acknowledged in the educational system for many years, and there is no national television show in sign language that can disseminate the same signs throughout the country (Aussie Deaf Kids, 2022).

For years, educators focused on teaching deaf children to talk and banned sign language, denying them communication. Oral versus manual debates have lasted decades. No compromise existed for decades. Some educators may now utilize complete communication, which combines both approaches, even if they still argue their advantages. Hearing-impaired children learn language differently. Teaching style classifies them as oral aural method, manual method and total communication method. The history of Pakistan Sign Language (PSL) may be grouped into four significant milestones done by distinct groups. These ground-breaking works are presented in chronological order: (a) Sir Syed Deaf Association (SDA), Rawalpindi, (b) Anjuman Behbood-e-Samat-e-Atfal (ABSA), Karachi, (c) National Institute of Special Education (NISE), Islamabad, and (d) Pakistan Association of Deaf (PAD), Karachi. The majority of work was done on individual or organizational level initiatives rather than the whole at governmental level that failed to gain attention, mostly of the work done for SL did not represent any specific method and generally it was too costly to make it accessible for general public (Sulman & Zuberi, 2000).

Firstly, the research discovered that the language parents choose to use with their hearing-impaired children might be a barrier to the adoption of sign language, particularly if sign language is not utilized at home. The data found that hearing parents utilize spoken language rather than sign language more often. The significance of socialization and contact between individuals in order to practice sign language for improvement, vocabulary growth, and the learning of sign language. The research discovered that many hearing impaired learners are born into homes where there is no exposure to a standardized sign language and, in the majority of instances, spoken language is utilized. In an effort to communicate, hearing impaired learners create their own signs. In addition, the study discovered that age

can hinder the acquisition of sign language by hearing-impaired students. The home environment poses an even greater threat to the hearing impaired learners' early acquisition of sign language (Razalli et al., 2019).

The study analysis reveals the numerous aspects on which individuals have worked to overcome Pakistan sign language challenges. Unfortunately, there are no notable works on Pakistani sign language. In the lack of any organized information on the language's contents, grammar, and tools and services for communication, Pakistan Sign Language is linguistically understudied. To aid the Pakistani deaf population, this gap and related obstacles must be addressed (Khan et al., 2020).

Purpose of the Study

The purpose of the study was to investigate the factors affecting the uniformity of sign language trough the perception of teachers of students with hearing impairment.

Methodology

This study used a descriptive research design within a quantitative research paradigm. Lahore-based teachers instructing pupils with hearing impairment at special education institutions were the focus of the research. A sample of 100 teachers was chosen using a technique called purposive sampling. Utilizing a self-developed questionnaire (α=.72) that was pilot tested, verified by field specialists, and finished, a survey was employed to gather data. About 150 surveys were individually delivered, 114 were returned, and after a comprehensive assessment, 100 were chosen by the researchers.

Results and Discussion

Table 1
Gender

Sr.no	Gender	f	%
1	Female	48	48
2	Male	52	52
	Total	**100**	**100**

Table 1 demonstrates that majority (52.0%) respondents were male and (48.0%) respondents were female.

Table 2
Age

Sr.no	Age in years	f	%
1	21-30	76	76
2	31-40	18	18
3	41-50	4	4
4	51-60	2	2
	Total	100	100

Table 2 demonstrates that majority (76%) respondents belong to age range 21-30 year. (18%) respondents belong to age range 31-40 year. 4% respondents belong to age range 41-50 year. (2%) respondents belong to age range 51- 60.

Table 3
Job Experience

Sr.no	Job Experience in years	f	%
1	0-10	92	92
2	11-20	5	5
3	21-30	2	2
4	Above 30	1	1

Total	100	100

Table 3 demonstrates that majority (92.0 %) respondents had 0-10-year job experience. (5.0%) respondents had 11-20-year job experienced. (2.0%) respondents 21-30-year job experienced. (1%) respondents above 30-year job experienced.

Table 4
Sign language is natural language

Sr.no	Responses	f	%
1	S. D	5	5
2	D	4	4
3	N	8	8
4	A	67	67
5	S. A	16	16
	Total	**100**	**100**

Table 4 demonstrates that majority (83.0%) respondents were agreed to the statement whereas (9.0%) respondents were disagreed and (8.0%) respondents were neutral that sign language is natural language.

Table 5
Children who learn sign language at home mostly use it in school

Sr.no	Responses	f	%
1	S. D	2	2
2	D	5	5
3	N	8	8
4	A	61	61
5	S. A	24	24
	Total	**100**	**100**

Table 5 demonstrates that majority (85.0%) respondents agreed whereas (7.0%) respondents were disagreed and (8.0%) respondents were neutral that children who learn sign language at home mostly use it in school.

Table 6
The children have difficulty learning standard sign language

Sr.no	Responses	f	%
1	S. D	1	1
2	D	4	4
3	N	11	11
4	A	63	63
5	S. A	21	21
	Total	**100**	**100**

Table 6 demonstrates that majority (84.0%) respondents were agreed whereas (5.0%) respondents were disagreed and (11.0 %) respondents were neutral that the children have difficulty learning standard sign language.

Table 7
In school students use different signs from each other

Sr.no	Responses	f	%
1	D	6	6
2	N	8	8
3	A	33	33
4	S. A	53	53
	Total	**100**	**100**

Table 7 demonstrates that majority (86%) respondents were agreed whereas (6%) respondents were disagreed and (8.0%) respondents were neutral that the in-school students use different signs from each other.

Table 8
Mostly theory is taught to prospective teachers instead of sign language

Sr.no	Responses	f	%
1	S. D	2	2
2	D	6	6
3	N	13	13
4	A	32	32
5	S. A	47	47
	Total	**100**	**100**

Table 8 demonstrates that majority (79%) respondents were agreed whereas (8.0%) respondents were disagreed and (13%) respondents were neutral that the mostly theory is taught to prospective teachers instead of sign language.

Table 9
Teacher had no relevant training or experience in sign language

Sr.no	Responses	f	%
1	S. D	2	2
2	D	17	17
3	N	12	12
4	A	27	27
5	S. A	42	42
	Total	**100**	**100**

Table 9 demonstrates that majority (69%) respondents were agreed whereas (19.0%) respondents were disagreed and (12.0%) respondents were neutral that the teacher had no relevant training or experience in sign language.

Table 10
When teachers join they do not know much about the standard signs

Sr.no	Responses	f	%
1	S. D	2	2
2	D	26	26
3	N	14	14
4	A	40	40
5	S. A	18	18
	Total	**100**	**100**

Table 10 demonstrates that majority (58.0%) respondents were agreed whereas (28.0%) respondents were disagreed and (14.0%) respondents were neutral that the when teachers join, they do not know much about the standard signs.

Table 11
Deaf children learn enough sign language form the teachers while they are taught various content subjects.

Sr.no	Responses	f	%
1	S. D	2	2
2	D	18	18
3	N	12	12
4	A	39	39

5	S. A	29	29
	Total	**100**	**100**

Table 11 demonstrates that majority (68.0%) respondents were agreed whereas (20.0%) respondents were disagreed and (12.0%) respondents were neutral responded that the deaf children learn enough sign language form the teachers while they are taught various content subjects.

Table 12
No workshops are conducted to teach teachers standard sign language

Sr.no	Responses	f	%
1	S. D	3	3
2	D	17	17
3	N	12	12
4	A	26	26
5	S. A	42	42
	Total	**100**	**100**

Table 12 demonstrates that majority (68%) respondents were agreed whereas (20%) respondents were disagreed and (12.0%) respondents were neutral that the no workshops are conducted to teach teachers standard sign language.

Table 13
The school does not pay attention to the same standard signs used by all teachers

Sr.no	Responses	f	%
1	S. D	2	2
2	D	27	27
3	N	8	8
4	A	27	27
5	S. A	36	36
	Total	**100**	**100**

Table 13 demonstrates that majority (63%) respondents were agreed whereas (29.0%) respondents were disagreed and (8.0%) respondents were neutral that not the school does not pay attention to the same standard signs used by all teachers.

Table14
Parents communicate child in a mixture of signing, gesture and speaking

Sr.no	Responses	f	%
1	S. D	4	4
2	D	6	6
3	N	11	11
4	A	29	29
5	S. A	50	50
	Total	**100**	**100**

Table 14 demonstrate that majority (79.0%) respondents were agreed whereas (10.0%) respondents were disagreed and (11.0 %) respondents were neutral that the parents communicate child in a mixture of signing, gesture and speaking.

Table 15
Parents prefer general signs over standard sign language

Sr.no	Responses	f	%
1	S. D	3	3
2	D	9	9

3	N	8	8
4	A	31	31
5	S. A	49	49
	Total	**100**	**100**

Table 15 demonstrates that (80.0%) respondents were agreed whereas (12.0%) respondents were disagreed and (8.0%) respondents were neutral that the parents prefer general signs over standard sign language.

Table 16
Parents do not co-operate with teachers to teach children standard sign language

Sr.no	Responses	f	%
1	S. D	3	3
2	D	26	26
3	N	10	10
4	A	27	27
5	S. A	34	34
	Total	**100**	**100**

Table 16 demonstrates that majority (61.0%) respondents were accepted whereas (29.0%) respondents were disagreed and (10.0%) respondents were neutral that the parents do not co-operate with teachers to teach children standard sign language.

Table 17
Parents do not attend workshops to learn sign language

Sr.no	Responses	f	%
1	S. D	4	4
2	D	23	23
3	N	9	9
4	A	24	24
5	S. A	40	40
	Total	**100**	**100**

Table 17 demonstrates that majority (64.0%) respondents were agreed whereas (27.0%) respondents were disagreed and (9.0%) respondents were neutral responded that the parents do not attend workshops to learn sign language.

Table 18
Parents do not allow their children to attend extra workshops due to financial issues

Sr.no	Responses	f	%
1	S. D	2	2
2	D	12	12
3	N	8	8
4	A	36	36
5	S. A	42	42
	Total	**100**	**100**

Table 18 demonstrates that majority (78.0%) respondents were agreed whereas (14.0%) respondents were disagreed and (8.0%) respondents were neutral that the parents do not allow their children to attend extra workshops due to financial issues.

Table 19
The government not paying attention to the professional development of H.I teachers

Sr.no	Responses	f	%

1	S. D	1	1
2	D	5	5
3	N	7	7
4	A	31	31
5	S. A	56	56
	Total	**100**	**100**

Table 19 demonstrate that majority (87.0%) respondents were agreed whereas 6.0% respondents were disagreed and (7.0%) respondents were neutral that the government not paying attention to the professional development of H.I teachers.

Table 20
The government is not doing much for the uniformity of sign language

Sr.no	Responses	f	%
1	S. D	1	1
2	D	4	4
3	N	6	6
4	A	35	35
5	S. A	54	54
	Total	**100**	**100**

Table 20 demonstrates that majority (89.0%) respondents were agreed whereas (5.0%) respondents were disagreed and (6.0%) respondents were neutral that the government is not doing much for the uniformity of sign language.

Table 21
The sign on Social Media is not Uniformed Sign Language

Sr.no	Responses	f	%
1	S. D	2	2
2	D	5	5
3	N	10	10
4	A	37	37
5	S. A	46	46
	Total	**100**	**100**

Table 21 demonstrates that majority (83.0%) respondents were agreed whereas (7.0%) respondents were disagreed and (10.0%) respondents were neutral that the sign on Social Media is not Uniformed Sign Language.

Table 22
Frequency and percentage of respondents
Variation is due to signers having different society networks

Sr.no	Responses	f	%
1	S. D	1	1
2	D	5	5
3	N	11	11
4	A	31	31
5	S. A	52	52
	Total	**100**	**100**

Table 22 demonstrates that majority (83.0) respondents were agreed whereas (5.0%) respondents were disagreed and (11.0%) respondents were neutral that the variation is due to signers having different society networks.

Conclusion

In conclusion, the performance of both learners and teachers in Sign language is critical and is measure along international and national standards. First of all, the child is not given an environment at home where they can learn the same standard sign language. Parents taught their children the sign language according to their convenience. When children go to a school, they have trouble learning standard sign language. Students in the classroom use different sign language. The sign language of the teachers in the school is also different from each other's. When teachers join class, they do not know the proper standard sign language. While studying in universities, prospective teachers are not taught a proper Standard sign language which causes them to go to school and face problems. The school and the government are also not taking any steps for the professional development of the teachers.

Recommendations

1. A campaign will be commenced to create the awareness about the use of standard sign language for all disabilities along with hearing impairment.

2. The government, non-governmental organizations and school authorities shall come forward and make arrangements for the Uniformity of the sign language for the non-affording children with hearing impairments.

3. Educational institutions should provide proper training to prospective teachers for standard sign language.

4. Social media should also come up with different content to help the hearing-impaired children make easy and understand so that children will learn standard sign language.

5. Schools should have workshops for parents so that parents will also learn standard sign language and will make it easier for children to learn sign language.

References

Alvi, A. K., Azhar, M. Y. B., Usman, M., Mumtaz, S., Rafiq, S., Rehman, R. U., & Ahmed, I. (2004). Pakistan sign language recognition using statistical template matching. *International Journal of Information Technology*, *1*(1), 1-12.

Aussie Deaf Kids. (2022). *Sign Language Variation.* https://www.aussiedeafkids.org.au/sign-language-variation.html

Brentari, D. (Ed.). (2010). *Sign languages*. Cambridge University Press.

Crasborn, O. A., Van Der Kooij, E., Waters, D., Woll, B., & Mesch, J. (2008). Frequency distribution and spreading behavior of different types of mouth actions in three sign languages. *Sign Language & Linguistics*, *11*(1), 45-67.

Darwin, C., & Prodger, P. (1998). *The expression of the emotions in man and animals*. Oxford University Press, USA.

Debevc, M., Milošević, D., & Kožuh, I. (2015). A comparison of comprehension processes in sign language interpreter videos with or without captions. *PloS one*, *10*(5), e0127577.

De Meulder, M. (2015). Sign language recognition: tensions between specificity and universalism in international deaf discourses. In *It's a Small World: International Deaf Spaces and Encounters; 2015; pp. 160 - 172*.

Emmorey, K. (2001). *Language, cognition, and the brain: Insights from sign language research*. Psychology Press.

Gallaudet, E. M. (1881). The Milan Convention. *American Annals of the Deaf and Dumb*, *26*(1), 1-16.

Hall, M. L., Ferreira, V. S., & Mayberry, R. I. (2015). Syntactic priming in american sign language. *PloS one*, *10*(3), e0119611.

Hashim, A. T. (2021). Factors affecting sign language acquisition in hearing impaired learners during primary education. Fakulti Pembangunan Manusia.

Hodgson, K. (1954). The deaf and their problems. *Journal of Consulting Psychology*, *18*(6), 473.

Khan, N. S., Abid, A., Abid, K., Farooq, U., Farooq, M. S., & Jameel, H. (2020). Speak Pakistan: Challenges in developing Pakistan sign language using information technology. *South Asian Studies*, *30*(2), 367-379.

Liwicki, S., & Everingham, M. (2009, June). Automatic recognition of fingerspelled words in british sign language. In *2009 IEEE computer society conference on computer vision and pattern recognition workshops* (pp. 50-57). IEEE.

Luckner, J. L., Sebald, A. M., Cooney, J., Young III, J., & Muir, S. G. (2005). An examination of the evidence-based literacy research in deaf education. *American Annals of the Deaf*, *150*(5), 443-456.

Maarif, H. A. Q., Akmeliawati, R., & Bilal, S. (2012, July). Malaysian Sign Language database for research. In *2012 International Conference on Computer and Communication Engineering (ICCCE)* (pp. 798-801). IEEE.

Marschark, M., Sapere, P., Convertino, C., Seewagen, R., & Maltzen, H. (2004). Comprehension of sign language interpreting: Deciphering a complex task situation. *Sign Language Studies*, *4*(4), 345-368.

Mukushev, M., Sabyrov, A., Imashev, A., Koishibay, K., Kimmelman, V., & Sandygulova, A. (2020). Evaluation of manual and non-manual components for sign language recognition. In *Proceedings of the 12th Language Resources and Evaluation Conference*. European Language Resources Association (ELRA).

Nendauni, L. R. (2021). *The Development Of Sign Language: A Synopsis Overview*. (Unpublished Manuscript).

Perniss, P., Özyürek, A., & Morgan, G. (2015). The influence of the visual modality on language structure and conventionalization: Insights from sign language and gesture. *Topics in cognitive science*, *7*(1), 2-11.

Pfau, R., & Quer, J. (2010). *Nonmanuals: their grammatical and prosodic roles* (pp. 381-402). na. Cambridge University Press.

Raees, M., Ullah, S., Rahman, S. U., & Rabbi, I. (2016). Image based recognition of Pakistan sign language. *Journal of Engineering Research*, *4*(1), 1-21.

Razalli, A. R., Rakoro, J. U., Ariffin, A., Hashim, A. T., & Mamat, N. (2019). Factors Affecting Sign Language Acquisition In Hearing Impaired Learners During Primary Education. *Religación: Revista de Ciencias Sociales y Humanidades*, *4*(15), 202-209.

Rietveld-van Wingerden, M., & Tijsseling, C. (2010). Ontplooiing door communicatie. Geschiedenis van het onderwijs aan doven en slechthorenden in Nederland. Publisher??

Sandler, W., & Lillo-Martin, D. (2006). *Sign language and linguistic universals*. Cambridge University Press.

Stokoe, W. C. (1980). Sign language structure. *Annual review of anthropology*, *9*:365-390.

Sulman, D. N., & Zuberi, S. (2000). *Pakistan sign language–a synopsis.* Pakistan

Trager, G. L. (1963). *Linguistics is linguistics*. Buffalo.