



## **Comparative Study Of Sign Language Insert and Close Captioning Strategies on Comprehension Ability of Students With Hearing Impairment in Tertiary Institutions in South West Nigeria**

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### **Abstract**

*Persons with hearing impairment are those whose hearing mechanism is 'faulty to the extent of losing all or some of the hearing abilities. Hence, students with hearing impairment require a modification in the teaching-learning process for them to reach their full potential. Television is an electronic media which appeals to most students, including those with hearing impairment, because of its audio-visual potential. However, to increase the visual, potential of the television for persons with hearing impairment, sign language insert and close captioning strategies have been differently used. This research compared the relative strengths and weaknesses of sign language insert and close captioning strategies on the comprehension ability of students with hearing impairment in tertiary institutions in South-West Nigeria. The study adopted, a comparative quasi experimental design using a 2x2x2 factorial matrix, A multi-stage sampling approach as used for the study. First, purposive sampling technique was used to select Federal College of Education (Special) Oyo, being the only tertiary institution in the target zone that has more than twenty (20) students with hearing impairment in the identified states. Secondly, simple random sampling techniques was used to select twenty (20) male students (10 deaf and 10 hard of hearing) and twenty (20) female students (10 deaf and 10 hard hearing) to make up forty (40) respondents. Data collected were analyzed with t-test and it was discovered, among others, that the hard of hearing benefit more from captioning because of the post lingual nature of their loss. It was then recommended that television packages for the deaf, especially in education, should contain both sign language insert and close captioning. Stakeholders in the education of students with hearing impairment should ensure the provision of regular power and television or computer set in the school. As agents of socialization, television stations should, incorporate sign language insert together with close captioning, as much as possible, in their programmes to consciously carry students with hearing impairment along in the scheme of things. Parents and guardians should make the television at home accessible to their children and wards with hearing impairment.*



**Keywords:** Hearing impairment, Television, Sign language insert, Close captioning

## Introduction

The level of understanding of students with hearing impairment within and outside the classroom, during communication, goes a long way to determine their academic success or otherwise. Hearing impairment is a sensory deficit that exerts a considerable amount of limitation on the communication and comprehension ability of persons with it. To a disturbing extent, students with this condition manifest comprehension deficit that thwart their academic progress, especially, when there is no reasonable accommodation. In education, students with hearing impairment are considered not to be high flyers, even when some of them are gifted, as a result of hitches in communication channels. Their comprehension ability both in and outside the classroom depends so much on the type and level of accommodation employed to ensure a hitch free communication.

Hearing impairment, which is also known as hearing loss or deafness, can be described as a categorization in special education that encompasses both the deaf and the hard of hearing. Okuoyibo (2009) and Aiyaleso (2009) agree that hearing impairment is a generic term which describes all levels of disorders. It covers both little or mild disorders and the very severe and profound conditions. Hearing impairment results when the hearing mechanism is damaged or obstructed in such a way that sound cannot be perceived or understood. Smith (2007) opines that it means impairment in hearing whether permanent or fluctuating, that adversely affect educational performance. One way of helping the deaf and the hearing impaired to get out of their isolation is to give them access to visual media which is of paramount importance when information of general importance is disseminated (Kurz and Mikulasek, 2004).

Generally, persons with hearing impairment are classified into two broad areas of deaf and hard of hearing. Although, deaf and deafness are sometimes used as generic terms to refer to hearing impairment and/or persons with hearing impairment, they are specifically meant for complete or total loss of hearing ability. According to Schow and Nerbonne (2002) the term deaf is synonymous with severe to profound bilateral hearing loss, meaning that the child obtains very little benefit from amplification in understanding speech. Onwubolu (2019) corroborates that deafness is defined as a degree of hearing loss such that a person is unable to understand speech even in the presence of amplification. From the above, it can be deduced that the deaf make use of manual communication in their day-to-day existence. However, the hard of hearing is a classification for those with hearing impairment who still possess residual hearing meaningful enough to allow for aural-oral communication with or without hearing aids. Most of the hard of hearing speech-read and/or use hearing aids whereas the deaf do not use hearing aids but depend on sign language.

In every incident of disability, there is need for adjustment to enhance residual abilities, if there is an indication that a student has a disability that is impacting on his education, there may be the need to undertake reasonable adjustment. According to Australian Disability Clearinghouse on Education and Training (ADCET, 2018) reasonable adjustment refers to a measure or action taken to assist a student with disability to participate in education and training on the same basis as other students. An adjustment is considered reasonable if it achieves this purpose while taking into account student's learning needs and balancing the interest of all parties



affected including those of the students with disabilities, the education provider, staff and other students.

## **Television in the education of students with hearing impairment**

In an effort to get access to persons with hearing impairment, various communication strategies have been employed. Worthy of note is the use of television in their teaching, learning and entertainment. McNickle (1951) agrees that educators and the television industry are in general agreement that television can serve as a highly effective medium for teaching children and informing adult. Television is the latest extension of methods for teaching by sight and sound as well as by the use of words- "Audio-visual education" is the collective term for this method of teaching. According to Mass Communication Talk (2011) Television has been given considerable importance in many countries as a source and a tool of teaching. The success stories of using television for education in many countries has negated the concept that television is basically on entertainment oriented medium.

Being an audio-visual medium, television has the potential to appeal to both the sense of sight and that of hearing at the same time. While the audio potential of a television may not be accessible to persons with hearing impairment, the visual potentials are feasibly engaged in getting across to them. According to Sharma and Rao (2018) in deaf people, the perceptual impairment, permanently limits their access to the audio component of the televised speech, thus depriving them of information, education, entertainment and pleasure of watching television. They are unable to capture, the equal quantity of information from their environment as compared to people without hearing loss. In maximizing this visual-potential, many strategies have been employed to enrich the visual display of a television program for persons with hearing impairment. Prominent among these strategies are sign language insert and close captioning. Jisc Digital Media (2015) corroborated that if the television is to be very useful to the deaf communities, there are a number of options which include close captioning or an overlaid sign language interpreter who interprets spoken information in visual forms.

Media access services for the deaf can be describe as those services that ensure that people with deafness are able to get the most out of the TV content. BTI Studios (2017) grouped the media into (a) Subtitling or close captioning and Sign language insert. Kurz and Mikulasek (2004) agree that there are two ways of giving the deaf and hearing-impaired access to television: captions or sign language insert..

## **Sign Language Insert**

Sign language insert is one of the accommodation strategies used to enrich the television programs for persons with hearing impairment. It can be described as an inserted interpreter in a television programme to interpret in sign language the auditory components of television program for persons with hearing impairment. Ugbo (2013) asserts that a television program could be overlaid with a visual interpreted version of the same program or have a superimposed sign language interpreter who signs the auditory component of the television programme without obstructing the main program being displayed.

According to Great Mountain West (2015) the objective of this technique is to allow users who cannot hear or read text rapidly to be able to access synchronized media materials. Since this strategy is the sign language presentation of the audio information in a television/video programme, it is meant for those persons with hearing impairment who may not be able to



comprehend text in captions but depend primarily on sign language. With this strategy, persons with hearing impairment have little or nothing to lose as all dialogue and important sounds will be presented to them in a sign language interpretation in the same program at the same time.

## **Close Captioning**

Close captioning which can also be called subtitle, can be described as a text representation of the audio component of a television/video programme. Sudden Link (2015) observe that close captioning is a process of displaying text on the television screen, typically to show a transcript of what is being said on the programme shown. Eric (2005) agreed that close captioning are text version of the spoken part of a television, movies or computer presentation. It was developed among other things to aid persons with hearing impairment comprehend the audio components of educational and entertainment programmes presented through audio-visual media.

This strategy is commonly used in the presentation of local and international news so as to increase the outreach. Unfortunately, the strength of this strategy has not been fully maximized to meet the need of persons with hearing impairment in Nigeria. Television can potentially improve reading skills and comprehension when used intentionally for this purpose. Catapano (2018) reported that children in Finland scored higher than most of the rest of the world in their reading skills. According to Shanna and Rao (2018) the use of captions requires basic reading skills. In deaf population the utilization of captioning involves use of applicable knowledge base, memory processes, linguistic adequacy and word base of the language in which captioning is done. Studies show that captions are limited in their benefits for prelingual deaf population because of the need of appropriate reading skills and processing difficulties in captioned language's syntax, vocabulary, accessing phonological representations, making inferences, understanding figurative language, and utilizing short term memory efficiently

## **Statement of the Problem**

These strategies have not been accorded their due place in the affairs of persons with hearing impairment. Their collective and individual strengths have not been ascertained because of the haphazard usage. For instance, the use of close captioning as subtitles or headlines during national news alone in Nigeria may send a wrong message to the deaf communities. It may be seen as if the other programmes are not for them, since they are not subtitled. Also, the selective use of sign language interpreters or sign language insert for some national issues like political programmes is not only patronizing but selfish. Although these strategies have helped in different respects to inform the deaf community, its usage in the educational realm is nothing to write home about. This informs the need for this study to compare the strength and weaknesses of the sign language insert and close captioning strategies on the comprehension ability of students with hearing impairment in south west Nigeria.

## **Purpose of the Study**

Tills research investigated the individual strengths of Sign language insert and Close captioning strategies in television programmes for persons with hearing impairment so as to identify which one is preferred by persons with hearing impairment in relation, to their comprehension ability. When this is ascertained, it will help in packaging audio-visual educational



programs for students with hearing impairment. The study is also to shed light on the strengths and weaknesses of each of them.

## Research Hypotheses

**Research Hypothesis 1:** There is no significant difference in the performance of students in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Level of Hearing.

**Research Hypothesis 2:** There is no significant difference in the performance of respondent in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Gender

**Research Hypothesis 3:** There is no significant difference in the performance of respondents based on Signed Comprehension Passage Test and Caption Comprehension Passage Test

## Methodology

This study adopted a comparative quasi experimental design using a 2x2x2 factorial matrix. The population for this study was students with hearing impairment in tertiary institutions in South West Nigeria. The sample for this study was forty (40) students -with hearing impairment in tertiary institutions in South-West zone of Nigeria. The South West zone of Nigeria consists of six (6) states namely Oyo, Osun, Ogun, Ekiti, Ondo and Lagos. A multi-stage sampling technique was used for this study. First, purposive sampling technique was used to select Federal College of Education (Special) Oyo, being the only tertiary institution in the target zone that has more than twenty (20) students with hearing impairment in the identified states. Secondly, simple random sampling techniques was used to select twenty (20) male students (10 deaf and 10 hard of hearing) and twenty (20) female students (10 deaf and 10 hard hearing) to make up forty (40) respondents. A researcher made instruments titled "Sign Comprehension Passage" (SCP) and "Captioned Comprehension Passage" (CCP) was used. The SCP was a 10 minutes video recorded comprehension passage with sign language insert, while CCP was a video recorded comprehension passage with close captioning. Also, there was "Signed Comprehension Passage Test" (SCPT) and Captioned Comprehension Passage Test (CCPT) which was drawn questions from the comprehension passages administered at the end of each treatment.

## Result of Data Analysis.

**Null Hypothesis 1:** There is no significant difference in the performance of students in Signed Comprehension Passage Test (SCPT) and Captioned Comprehension Passage Test (CCPT) based on their Level of Hearing.

**Table 1:** Difference in Respondents' SCPT and CCPT Based on their Level of Hearing



	F	Sig-	T	Df	(2-tailed)
Performance score variances In signed assumed Comprehension equal Passage not Test assumed	1.514	.226	.42	38	.673
Performance score variances In signed assumed Captioned comprehension equal Passage not Test assumed	.014	.907	6.18	38	.000
Performance score variances In signed assumed Captioned comprehension equal Passage not Test assumed			6.18	37.43	.000

In Table 1, both the Significant 2-tailed value of 0.637 which is greater than 0.050 and the t-calculated value of 0.425 which is less than the t-tabulated at 38 degrees of freedom suggests the non-rejection of the null hypothesis and it is therefore concluded that there is no significant difference in the performance of students in Signed Comprehension Passage Test based on their Level of Hearing,

Both the Significant 2-tailed value of 0.000 which is less than 0.050 and the t-calculated value of 6.180 which is greater than the t-tabulated at 37.43degrees of freedom suggests the rejection of the null hypothesis and it is therefore concluded that there is a significant difference in the performance of students in Captioned Comprehension Passage Test based on their Level of Hearing.

**Null Hypothesis 2:** There is no significant difference in the performance of respondent in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Gender

**Table 2: Difference in Respondents' SCPT and CCPT Based on their Gender**





	Gender of Respondents	N	Mean	.Std. Deviation
Performance Score in signed Comprehension Passage test	MALE	20	2.50	.827
		20	2.20	.616
Performance Score in captioned Comprehension Passage test	MALE	20	3.80	.768
		20	3.50	1.192
	FEMALE			

In Table 2, out of a total of 40 respondents in the study, twenty (20) of them are male, while the remaining twenty (20) are Female. Male Students obtained an average score of 2.5 in the Signed Comprehension Passage test\*while Female students obtained an average score of 2.2 in the Signed Comprehension Passage test with respective standard deviations of 0.827 and 0.616. In the Captioned Comprehension Passage test Male Students obtained an average score of 3.8 while Female students obtained an average score of 3.5with respective standard deviations of 0.768 and 1.192. Both the Significant 2-tailed value of 0.351 which is greater than the alpha value (0.050) and the t-calculated value of 0.946 which is less than the t-tabulated at 32.449 degrees of freedom suggests the non-rejection of the null hypothesis and it is therefore concluded that there is no significant difference in the performance of students in captioned Comprehension Passage Test based on their Gender.

**Hypothesis 3:** There is no significant difference in the performance of respondents based on Signed Comprehension Passage Test (SCPT) and Caption Comprehension Passage Test (CCPT)

**Table 3: Independent Samples Test of Respondents in SCPT and CCPT**

	F	Sig-	t	df	Sig. (2-tailed)
Equal variances assumed	5.353	.023	-6,618	78	.000
RES Equal variances not Assumed			-6,618	71.599	.000

In Table 3, both the Significant 2-tailed value of 0.000 which is less than the alpha value (0.050) and the t-calculated value-of-6.618 whose absolute value is greater than the t-tabulated at 71.599 degrees of freedom suggests the rejection of the null hypothesis and it is therefore concluded that there is a significant difference in the performance of students examined based on Signed Comprehension Passage Test and Caption Comprehension Passage Test.



## **Discussion of Findings**

### **The performance of students in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Level of Hearing.**

Hypothesis 1 stated that there is no significant difference in the performance of students in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Level of Hearing. Table 1 shows that out of a total of 40 respondents in the study, twenty (20) of them are students with hard of hearing while the remaining twenty (20) are deaf students. In Signed comprehension passage test, hard of hearing students have a mean score of 2.4 while deaf -students have a mean score of 2.3 with respective standard deviations of 0.598 and 0.865. Also, Table 2 shows that both the Significant 2-tailed value of 0.637 which is greater than 0.050 and the t-calculated value of 0.425 which is less than the t-tabulated at 38 degrees of freedom suggests the non-rejection of the null hypothesis and it is therefore concluded that there is no significant difference in the performance of students in Signed Comprehension Passage

Test based on their Level of Hearing. This result shows that the deaf and the hard of hearing benefit from sign language insert and this corroborates the assertion of Ugbo (2013) and Great Mountain West (2015) the objective of sign language insert technique is to allow users who cannot hear or read text rapidly to be able to access synchronized media materials. Since this strategy is the sign language presentation of the audio information in a television/video programme, it is meant for those persons with hearing impairment who may not be able to comprehend text in captions but depend primarily on sign language

In Captioned comprehension passage test, hard of hearing students have a mean score of 4.35 while deaf students have a mean score of 2.95 with respective standard deviations of 0.671 and 0.759. However, Table 2 shows that both the Significant 2-tailed value of 0.000 which is less than 0.050 and the t-calculated value of 6%180 which is greater than the t-tabulated at 37.433 degrees of freedom suggests the rejection of the null hypothesis and it is therefore concluded that there is a significant difference in the performance of students in Captioned Comprehension Passage Test based on their Level of Hearing. This result is in consonance with Catapano (2018) and Sharma and Rao (2018) whose research show that the use of captions requires basic reading skills. Therefore, the hard of hearing benefit more from captioning because of the post lingual nature of their loss.

### **The difference in the performance of respondent in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Gender**

Hypothesis 2 stated that there is no significant difference in the performance of students in Signed Comprehension Passage Test and Captioned Comprehension Passage Test based on their Gender. Table 3 shows that out of a total of 40 respondents in the study, twenty (20) of them are male, while the remaining twenty (20) are Female. Male Students obtained an average score of 2.5 in the Signed Comprehension Passage Test while Female students obtained an average score of 2.2 in the Signed Comprehension Passage Test with respective standard deviations of 0.827 and 0.616. In Table 4, both the Significant 2-tailed value of 0.201 which is greater than the alpha value (0.050) and the t-calculated value of 1.301 which is less than the t-tabulated at 38 degrees of freedom suggests the non-rejection of the null hypothesis and it is therefore concluded that there is no significant difference in the performance of students in Signed Comprehension Passage Test based on their result. This result shows that male and female





students with hearing impairment derive almost equal benefit from sign language insert. This is in line with Great Mountain West (2015) which states that the use of sign language insert technique is to allow users who cannot hear or read text rapidly to be able to access synchronized media materials. Since this strategy is the sign language presentation of the audio information in a television/video programme, it is meant for those persons with hearing impairment (male or female) who may not be able to comprehend text in captions but depend primarily on sign language.

In the Captioned Comprehension Passage Test, Male Students obtained an average score of 3.8 while Female students obtained an average score of 3.5 with respective standard deviations of 0.768 and 1.192. Also, in Table 4, both the Significant 2-tailed value of 0.351 which is greater than the alpha value (0.050) and the t-calculated value of 0.946 which is less than the t-tabulated at 32.449 degrees of freedom suggests the non-rejection of the null hypothesis and it is therefore concluded that there is no significant difference in the performance of students in captioned Comprehension Passage Test based on their Gender.

### **The difference in the performance of respondents in Signed Comprehension Passage Test and Captioned Comprehension Passage Test**

Hypothesis 3 stated that there is no significant difference in the performance of students examined based on Signed Comprehension Passage Test and Caption Comprehension Passage Test. In Table 6, both the Significant 2-tailed value of 0.000 which is less than the alpha value (0.050) and the t-calculated value of -6.618 whose absolute value is greater than the t-tabulated at 71.599 degrees of freedom suggests the rejection of the null hypothesis and it is therefore concluded that there is a significant difference in the performance of students examined based on Signed Comprehension Passage Test and Caption Comprehension Passage Test.

### **Recommendations**

Based on the findings of this research, the following are hereby recommended:

1. Television packages for the deaf, especially in education, should contain both sign language insert and close captioning. This is because the two strategies have been found to complement each other in relaying the audio component of a television programme to persons with hearing impairment.
2. The use of television as an instructional material for students with hearing impairment should be strengthened by all stakeholders in the education and welfare of persons with hearing impairment. This can be done through the provision of regular power and television or computer set in the school
3. As agents of socialization, television stations should incorporate sign language insert together, with close captioning, as much as possible, in their programmes to consciously carry students with hearing impairment along in the scheme of things. This is because these two strategies have been found to appeal to different persons with hearing impairment based on their level of hearing.
4. Software developers should channel their creativity towards developing a simultaneous communication software that will not only convert audio components of television programme into readable text but also into sign language simultaneously in real time
5. Parents and guardians should make the television at home accessible to their children and wards with hearing impairment. This will help them switch easily to a channel that meets



their communication needs. It will equally allow them access to recorded educational programmes that are deaf-friendly in terms of means of communication

## Conclusion

The comprehension problem of students with hearing impairment, which is largely due to their hearing loss, has created a noticeable gap between their academic potential and their academic achievement. Overtime, advancement in information and communication technology has incorporated sign language insert and close captioning as means of bridging communication gap between the deaf community and the hearing world. However, these strategies are scarcely used in the educational settings for these students with hearing impairment.

This research work assessed the strengths and weaknesses of the strategies in relation to the comprehension ability of students with hearing impairment. Based on the findings, recommendations were made to stakeholders in the education, care and rehabilitation of persons with hearing impairment to adopt a better strategy that will enhance the comprehension of these students for improved academic achievement.

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