Sign Language Interpreters and Self Efficacy as Predictors of Academic Achievement of Students with Hearing Impairment in Biology in Oyo State, Nigeria

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Abstract: **The study examined sign language interpreters and self-efficacy as predictors of achievement of students with hearing impairment in biology. Survey design of correlation type was adopted for the study. The population comprised all schools with students with hearing impairments in Senior Secondary Schools in Oyo State, Nigeria. 224 students with hearing impairment were drawn from seven schools that offered biology in West Africa Senior Secondary School Certificate Examinations. A purposive sampling technique was used to select students with hearing impairment from the schools. Students' Inventory on Instructional Supports (SIIS) and Students' Self Efficacy Formative Questionnaire Scale (SSEFQS) were used to collect data. The face and content validity of the instruments were ascertained. The reliability coefficient Of Students' Inventory on Instructional Supports (SIIS) was determined using Cronbach Alpha and it was found to be reliable at 0.77 while the students' self- efficacy scale was determined using Cronbach Alpha and it was found to be 0.78. Based on the findings, it was recommended that teachers should provide opportunities in class and support to students with hearing impairments to enable them participate in the teaching and learning processes in a bid to create better teacher-students' interactions and enhance learners' academic achievement in Biology. Students should improve on their ability to complete a task successfully. School principals should organize sign language workshops and seminars to improve academic achievement of students with hearing impairment in Biology among others.**

Keywords**: Sign language interpreter, Hearing loss, Self efficacy**

I. INTRODUCTION

Hearing impairment can be defined as a condition that results in a full or partial decline in the capacity to detect or understand sound (USlegal, 2019). Individuals with disabilities Education Act (IDEA, 2018) defined hearing impairment as hearing difficulty which may be either permanent or fluctuating and adversely affect the child's educational achievement. A major and obvious effect of hearing impairment is on spoken communication. Hearing loss does not affect the person physically, but it can cause communication issues (Hear-it, 2018). Individuals with Disabilities Education Act (IDEA, 2018) indicated that Sign Language Interpreters are needed by such students.

Sign language interpreters are professionals who play a significant role in facilitating communication between students with hearing loss and their teachers as well as other stakeholders particularly in an educational environment. This is an individual who provides services to learners with hearing impaired so that the speech of the hearing is transmitted to the student with hearing impairment by using conventional signs, finger spellings, oral cues and body language to enable such individuals understand what is being discussed simultaneously and relay information or question asked by the student with hearing impairment in the classroom. Depending on the student's preference, a sign language interpreter will translate what is said into British Sign Language (BSL) and or Sign Supported English (SSE). They can also convert signed documents into written documents and vice versa. If a deaf student's speech is difficult to understand, they may voice over what they are saying. An interpreter would not normally assist a deaf student in completing tasks, explaining things to them, or advocating for them.

In improving academic achievement of students with hearing impairment, Self efficacy is one of the personal factors that should be considered. Self-efficacy is the belief in one's own ability to complete a task successfully (Bandura, 1977). These beliefs are domain-specific, rather than focusing on the individual judging himself as a whole. For example, one can have high self-efficacy for learning mathematics but low self-efficacy for learning science. Self-efficacy beliefs are based on one's assessment of one's personal capabilities. People's self-efficacy beliefs influence how they feel, think, motivate themselves and act. These beliefs have a variety of effects on four major processes: cognition, motivation, affect, and selection (Bandura, 1982, 1997). According to Bandura, students are more likely to develop a strong sense of self-efficacy if they record multiple successes in a row, especially in difficult tasks. His theoretical framework reflects that in order to be successful, one must have a sense of self-efficacy, or the belief that one can perform well. Self-efficacy beliefs, for example, influence how a person chooses goals, invests effort, and persists in those efforts (Bandura, 1997).

Science subjects like Biology, Chemistry, Mathematics and Physics among others are offered and taught in schools both at the senior secondary and tertiary institutions. Biology is the study of life that entails all activities that living organisms engage in such as nutrition, respiration, growth and development, reproduction, evolution, and ability to adapt and cope effectively with their environment. It is concerned with life and its processes. The subject engages students in varied process abilities like examining, categorising, interpreting, designing, organising and reporting events, experiment and making prediction adequately. Biology should be taught in senior secondary schools, according to the National Policy on Education (2013). It is one of the eight (8) subjects in the Science and Mathematics field of study. As a result, it is an important subject in the Nigerian secondary school curriculum, with the majority of students enrolling in the Senior Secondary School Certificate Examination (SSCE) (West African Examination Council, 2018) irrespective of their special needs. However, many students with hearing impairment performed poorly in the subject in the WASSCE conducted over the years. The supports by sign language interpreters, lip speakers and students self efficacy would play paramount role in the teaching of biology to these students.

Statement of the problem

Students with hearing impairment have been having challenges with teaching and learning of biology over the years. This category of students have problem with abstractness and wide covering area of biology content as a result of their hearing difficulty. They have difficulty in understanding concepts presented to them in verbal form, limited vocabulary in their repertoire as well as inability to process the various messages. Therefore, verbal means of imparting knowledge does not favour this set of students who have hearing challenges. As a result, many of them develop negative attitude towards learning.

Although many researchers have found out that there are various teaching methods like the use of concept maps, cooperative learning, peer tutoring, inquiry – based activities, use of 5-E learning cycle, team-based learning among others to reduce the challenges facing students with hearing impairment still their performances are still poor. This study therefore looked at sign language interpreters and Self efficacy as predictors of achievements of students with hearing impairment in biology in Oyo state, Nigeria.

Purpose of the study

The purpose of this study is to look into how sign language interpreter and students' Self efficacy can improve academic achievement of students with hearing impairment in Oyo State, Nigeria.

Research Questions

1. What is the availability, accessibility and utilization of Sign Language Interpreters for students with hearing impairment?
2. What are the descriptive indices of students with hearing impairment with respect to Self efficacy?

Table 1.1: Performance of Oyo State Students with Hearing Impairment in May/June West African Senior School Certificate Examination (WASSCE) in Biology in Ibadan (2010-2018)

Year	Total Number of candidates	Candidates with credit Passes		Candidates with failure	
		Number	Percentage	Number	Percentage
2010	6	2	33.33	4	66.67
2011	25	-	0	25	100
2012	12	-	0	12	100
2013	1	-	0	1	100%
2014	-	-	-	-	-
2015	15	1	6.67	14	93.33
2016	19	4	21.05	15	78.95
2017	23	21	91.30	2	8.70
2018	21	08	38.10	13	61.90

Source: Methodist Grammar School Bodija (Deaf Unit) 2019

Table 1.2 Performance of Oyo State Students with Hearing Impairment in May/June West African Senior School Certificate Examination (WASSCE) in Biology in Oyo (2010-2018)

Year	Total Number of candidates	Candidates with credit Passes		Candidates with failure	
		Number	Percentage	Number	Percentage
2014	33	1	3.03	32	96.97
2015	17	0	0	17	100
2016	13	13	100	0	0
2017	15	14	93.33	1	6.67
2018	45	25	55.56	20	44.44

Source: Durbar Grammar School Oyo (Deaf Unit) 2019

Tables 1.1 and 1.2 indicated increase in the failure rates in WASSCE Biology between 2017 and 2018 for the Deaf Unit of Methodist Grammar School, Bodija, Ibadan and Durbar Grammar School, Oyo. Adigun (2016) affirmed that learning outcomes of students with hearing impairment in Biology has not been satisfactory. Nwagbo (2015) is also of the view that one subject most students opt for in their final examination is Biology, yet, performance has not been encouraging. Abimbola and Abidoye (2013) as well as the Chief Examiner's report of West Africa Examination Council (WAEC) in 2018 observed that there is a yearly increasing enrolment in science subjects, especially Biology but the performance of students, including those with hearing impairment, in the Senior Secondary Certificate Examination (SSCE) has been rather poor.

Perhaps most students with hearing impairment have

difficulties with understanding concepts in Biology which led to their poor performance as revealed in the Tables above. Auwalu, Mohd and Muhammed (2014) explained that abstract nature of biology, as well as the absence of knowledge of certain biological constructs including terms are said to be reasons adduced for poor performance of students in the subject. Achor, Ochnogor and Daikwo (2011) also stated that in spite of the importance of Biology to Nigerian students, the performance of students with hearing impairment at senior secondary school stage is reported to be poor as most students still learn Biology as an abstract subject. This poor performance of students with hearing impairment can still be hinged on difficulties in solving questions on concepts such as gene, chromosomes, Mendelian genetics and hormones (Hadiprayitno, Muhlis and Kusimiyato, 2019). Ahmed and Abimbola (2011) thus submitted that with the persistent use of conventional method of instruction in Biology, students' tendency of become passive rather than active learners will continue to be relatively high as the method does not promote adequate learning and long-term retention of some abstract concepts in Biology.

Researchers have adopted different types of instructional strategies to enhance academic achievement of students in Biology. Mind (2019) opined that concept maps aid in improving awareness of concepts by presenting the correlations with other concepts. National Science Teachers' Association (NSTA, 1996) believes that there are a number of specific concepts in Biology where students could benefit more from inquiry-based activities than traditional learning by lecture. Studies by Ajaja and Eraavwoke (2010) found a significantly higher retention of Biology and Chemistry by students taught with learning cycle than those taught with lecture method. Despite all the strategies that have been used, literature revealed that there is still low performance in Senior Secondary Certificate Examination (SSCE) by students with hearing impairment. Etobro and Fabinnu (2017) indicated that many science teachers prefer the traditional expository or lecture method of teaching and therefore sees the need for a shift to a more progressive mode of teaching – learning process which increases the interest of learners. Bukoye, (2017) asserts that instructional materials play a vital role in teaching learning process, teaching should be activity based through the use of visual materials (Video, 3D materials, real life objects, technology instruments) through practical work (experiment, observation and inquiring) connecting the topics with the real world and establishing the links with the topics. Ndihokubwayo (2017) argued that many schools do not have the required laboratory facilities quality materials for teaching biology practical. Hence, students fail to acquire the necessary science laboratory skills because their teachers were faced with difficulty in conducting practical as they would like to and this has always had inevitable consequences on students' learning. Other factors include: Inability to identify the appropriate instructional strategies for effective learning (Ajaja, 2013); Teachers' quality (Melissa, 2011); Overcrowded classroom and large classroom size (Michael, 2016); Poor teaching methods (Ige, 1998). Despite all the strategies that have been used, literature revealed that there is still low performance in Senior Secondary Certificate Examination (SSCE) results on students with hearing impairment.

II. METHODOLOGY

Research Design

This research work adopted the survey research design of correlational type. Some of the variables considered in the study were inherent in the participants and no intervention was provided.

Population

The population comprised all students with hearing impairments offering Biology in Senior Secondary Schools in Oyo State, Nigeria.

Sample and Sampling Techniques

A sample of two hundred and twenty four (224) students was used for the study comprising the senior secondary class II. One hundred and ninetyone (191) from public school and thirty-three (33) from private schools were used. The average age of the participants was 16 years. A purposive sampling technique was used to select students with hearing impairment from seven schools that offered biology in West Africa Senior Secondary School Certificate Examinations. The schools are located in Eruwa, Ibadan, Iseyin, Ogbomoso and Oyo.

1. Availability, accessibility and utilization of Sign Language Interpreters for students with hearing impairment

KEY

A- AVAILABILITY
NA- NON AVAILABILITY
AC- ACCESSIBILITY
NAC- NON ACCESSIBILITY
U- UTILIZATION
NU- NON UTILISATION

Table 3

S/N	Statements	A	NA	AC	NAC	U	NU
1	Sign language interpreter	90 40.2%	134 59.8%	22 24.4%	68 75.6%	22 100%	- -

Table 3 reveals that 90 respondents (40.2%) agreed that sign language interpreters were available, out of which 22 (24.4%) agreed that Sign Language Interpreters were accessible and utilised. This implies that sign language interpreters were available but not sufficient and those that were available were not readily accessible.

This supported the view of Joel, Kochung, Kabuka, Charles and Oracha (2013) that schools who have students with hearing impairment on their enrolment had inadequate learning support services while the available ones were not

easily accessible by the students in Zimbabwe. Mazoue (2011) who stated that sign language interpreters play a unique role in supporting students with hearing impairment in overpowering some of the problems caused by their poor literacy in Durban. Magongwa (2008) stated that sign language interpreters and note-takers are important in facilitating learning by students with hearing impairment learning in Johannesburg. This insufficient and non-availability of human support agrees with the findings of Bell, Swart and Carl (2016) who found that students with hearing impairment lack needed human support in South Africa

Table 4 Relationship between the use of instructional supports and achievement of students with hearing impairment

Variables	Mean	S.D.	Df	R	P-value	Remark
Achievement	24.96	4.35	222	-0.016	0.817	N.S.
Instructional support	9.33	0.47				

N.S denotes non significance at p<0.05 level of significance

This supported the findings of Antia, Reed and Kreimeyer (2005) who found that the use of instructional supports such as sign language interpreter was not related to performance of students with hearing impairment in US. This was contrary to the findings of Mazoue (2011) who reported that instructional supports such as sign language interpreters have no significant relationship with students with hearing impairment poor literacy in Durban University. LDAA (2004) reported that instructional supports such as visual and meaningful presentation were related to students with hearing impairment understanding of the concepts in United State of America.

Table 5 Self-efficacy of students with hearing impairment

S/N	Statements	SA	A	D	SD	Mean	STD.D
Belief in personal ability							
1	I can learn what is being taught in class	56 25.0%	64 28.6%	54 24.1%	50 22.3%	2.56	1.10
2	I will get better grades if my teacher likes me more	39 17.4%	58 25.9%	54 24.1%	73 32.6%	2.28	1.09
3	I can figure out anything if I try enough	73 32.6%	66 29.5%	41 18.3%	44 19.6%	2.75	1.11
4	I will graduate from secondary school	92 41.1%	70 31.3%	38 17.0%	24 10.7%	3.03	1.01
5	If I practice every day, I can develop any skill	60 26.8%	56 25.0%	43 19.2%	65 29.0%	2.50	1.17
6	Once I have decided to accomplish something that is important to me, I keep trying to accomplish it, even if it is harder than I thought	67 29.9%	44 19.6%	63 28.1%	50 22.3%	2.57	1.14
7	I am confident that I will achieve the goals that I set for myself	96 42.9%	49 21.9%	40 17.9%	39 17.4%	2.90	1.14
8	When I am struggling to accomplish something difficult, I focus on my progress instead of feeling discouraged	139 62.1%	38 17.0%	21 9.4%	26 11.6%	3.30	1.03
9	I will succeed in whatever career path I choose	149 66.5%	49 21.9%	18 8.0%	8 3.6%	3.51	0.79
10	I will succeed in whatever course I choose	140 62.5%	49 21.9%	19 8.5%	16 7.1%	3.40	0.92
11	I could get the best grade in class if I try	101 45.1%	75 33.5%	31 13.8%	17 7.6%	3.16	0.93
12	It is not hard for me to get good grades in School	97 43.3%	79 35.3%	32 14.3%	16 7.1%	3.15	0.92
13	I usually understand my homework	106 47.3%	96 42.9%	15 6.7%	7 3.1%	3.34	0.74
Weighted mean = 2.97							
Belief that ability grows with effort							
14	I believe hard work pays off	108 48.2%	90 40.2%	16 7.1%	10 4.5%	3.32	0.79
15	I think no matter whom you are, you can significantly improve on your talent	106 47.3%	90 40.2%	18 8.0%	10 4.5%	3.30	0.80
16	My ability grows with effort	125 55.8%	66 29.5%	27 12.1%	6 2.7%	3.38	0.80
17	I belief the brain can be developed with much task	105 46.9%	69 30.8%	43 19.2%	7 3.1%	3.21	0.86
18	I can change my basic level of ability considerably	93 42.5%	76 34.7%	32 14.6%	18 8.2%	3.11	0.94
Weighted mean = 3.26							
Grand weighted mean = 3.12							

Table 5 shows the responses of students with hearing impairment to self-efficacy. It indicated the grand weighted mean of 3.12 out of the 4.00 maximum obtainable score, which was higher than the Standard Mean of 2.50. This shows that the self-efficacy in Biology of students with hearing impairment was high. Thus, self-belief of students with hearing impairment in Biology as a subject was high. The results revealed that the belief that ability grows with effort (3.26>3.12) was the major one that contributed to this high self-efficacy in Biology among the students. The results further showed that 10 items out of the 18 items contributed to this high self-efficacy in Biology recorded among the students. The 10 items were rated as follow: I will succeed in whatever career path I choose (3.51>3.12) was ranked highest among the mean scores, followed by I will succeed in whatever course I choose (3.40>3.12), My ability grows with effort (3.38>3.12), I usually understand my homework (3.34>3.12), I believe hard work pays off (3.32>3.12), I think no matter whom you are, you can significantly improve on your talent (3.30>3.12), When I am struggling to accomplish something difficult, I focus on my progress instead of feeling discouraged (3.30>3.12), I believe the brain can be developed with much task (3.21>3.12), I could get the best grade in class if I try (3.16<3.12), lastly, It is not hard for me to get good grades in school (3.15>3.12).While the remaining 8 items did not contribute to this high self-efficacy in Biology among students with hearing impairment.

The outcome of this research revealed that the Self efficacy of students with hearing impairment was high as indicated in the study. This finding implies that respondent's self-belief in Biology triggered higher performance in the subject. The study was contrary to the findings of Adigun (2016) who affirmed that there was no significant main effect of Self efficacy on students with hearing impairment performance in Biology in Ibadan. Aderoke, Amos, Tawakalitu and Adenike (2020) discussed that students with hearing impairment need more than ability and skills in order to perform successfully well in their academics; they also need the sense of efficacy to use them well and to regulate their learning in Oyo.

Table 6 Relationship between self-efficacy and achievement of students with hearing impairment in biology

Variables	Mean	S.D.	Df	R	P-value	Remark
Achievement	24.96	4.35	222	0.460*	0.000	Sig.
Self-efficacy	54.71	7.85				

* denotes significant at p<0.05 level of significant

Table 5 reveals that there was a positive and moderate significant relationship (r = 0.46; p<0.05) between self-efficacy and achievement of students with hearing impairment in Biology. This showed that self-efficacy is one of the personal factors of students with hearing impairment that is positively related to their achievement in Biology. This means that as the self-efficacy of students with hearing impairment in Biology improves, there will also be a significant improvement in their achievement in Biology.

This finding supports the findings of Ekeh and Oladayo (2015) who found that self-efficacy was positively related to academic achievement among special needs students in Nigeria. This finding corroborates the findings of Capara, Vecchione, Alessandri, Gerbino and Barbaranelli (2011) that self-efficacy beliefs of students with hearing impairment contribute significantly to their academic achievement and decisions in Britain. This finding also corroborated the work of Ogunmakin (2013) who found that there was positive association between self-efficacy and academic achievement in Ondo. Awoyale and Keshinro (2013) affirmed that students' Self efficacy/beliefs enhanced academic achievement in Ogun State.

III. CONCLUSION

The study determined the relationship of sign language interpreters, lip speakers and Self efficacy to Biology achievement of students with hearing impairment in Oyo State, Nigeria. It was concluded that sign language interpreter and lip speakers should be made available in school settings especially in the education of students with hearing impairment.

IV. RECOMMENDATIONS

The following recommendations were made based on the findings of this study:

1. Teachers should provide opportunities in class and support to students with hearing impairments to enable them participate in the teaching and learning processes in a bid to create better teacher-students' interactions and enhance learners' academic achievement in Biology.
2. Students should improve on their ability to complete a task successfully.
3. School principals should organize sign language workshops and seminars to improve academic achievement of students with hearing impairment in Biology.
4. Ministry of education and school administrators need to employ more of the instructional supports to provide a variety of options for learners to learn and perhaps keep the pace with their hearing counterparts in regular schools.
5. At the home front, parents should provide necessary supports for their children with hearing impairment to enhance their learning outcomes in Biology.

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