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INSTRUCTIONAL SUPPORTS AND LEARNING STYLES AS PREDICTORS OF ACADEMIC ACHIEVEMENTS OF STUDENTS WITH HEARING IMPAIRMENT IN BIOLOGY IN OYO STATE, NIGERIA.

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Abstract: The study examined Instructional supports (sign language interpreters, Note takers) and learning style as predictors of academic achievement of students with hearing impairment in biology. The study adopted Survey design of correlation type. 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 Grasha-Riechmann Student Learning Style Scale (GRSLSS) 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' learning style scale was determined using Cronbach Alpha and it was found to be 0.85. Based on the findings, it was recommended that students with hearing impairment should be provided with instructional supports since most of them were visual learners. Also, School principals should organize sign language workshops and seminars for teachers to improve academic performance of students with hearing impairment in Biology among others.

Keyword: Sign language interpreter, note takers, biology, Hearing loss

Introduction

A learner who is hearing impaired or who have difficulties in hearing have language and speech deficiency as a result of a decrease or lack of sound response. (Sue Watson 2017) .Hearing impairment means complete or partial loss of the ability to hear from one or both ears. It is a condition that does not permit an individual to perceive sound in all forms. 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). World Health Organisation 2021) stated that sign Language Interpreters are needed by this category of students.

Sign language interpreters are set of people who help in facilitating communication between students with hearing difficulties and their instructors as well as other stakeholders in a classroom setting. Sign language interpreters provide services to students with hearing impairment so that the speech of the hearing is transmitted to them by using conventional signs, finger spellings, oral cues and body language to enable them understand what is being discussed or taught 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). Another set of people that assist student with hearing impairment in a classroom setting are the note takers.

A note taker is a person who takes accurate note while watching an interpreting or speech reading the instructor at the same time (DeafTEC, 2018). Students with hearing impairment rely on their vision, which makes it hard or almost impossible to look at their teacher or interpreter while taking adequate notes. In lectures and tutorials, a note taker records what is said. They take notes on everything that happens in the lecture/tutorial, which the deaf student reads as the note taker writes – the notes can be read later as well. Taking notes can be done manually or electronically. Manual note taking may be preferable in subjects with a lot of diagrams, formulae, or flow charts, as well as during out-of-town visits. The language may be changed to accommodate the student's reading abilities. The note taker sh0uld record as many student discussi0ns, asides, and j0kes as possible. A student's laptop is connected to an electronic note taker, who types notes into it. Students can add their own notes using special software such as Speed text, Stereotype, and Typewell. Because electronic note takers use a standard ‘qwerty' keyboard, they can't type as quickly as spoken language. Hastings, Breclein, Cermak, Reynolds, Rosen, Wilson (2018)

Another factor that should be considered in improving academic achievement of students with hearing impairment is personal factor. One of the personal factors that can affect such student either positively or negatively is learning style. Learning style is one of the factors that influences academic success or a student's success in class. Individuals learn in different ways and have personal preferences when it comes to gaining and processing knowledge, according to studies. Ugochi (2018) opined that learning styles of individuals have a significant positive relationship with academic achievement. For instance, Abidin, Razaee, Abdullah and Singh (2011) found that there is a strong link between overall academic success and learning styles. based on a study, discovered that teaching methods which agree with the students’Learning styles influenced a better performance. In the same vein, For trimodal learners, as well as male and female students, Mutua (2015) discovered a positive and statistically significant relationship between learning styles and academic achievement. According to Al-Hebaishi (2012), learning style preferences did not appear to affect or predict any change in students' academic achievement. Gappi (2013) also discovered that there

was no statistically significant link between academic achievement and students' preferred learning styles. Mumtaz (2013) expressed that viable studies have recommended that learning style of students should be considered by teachers in order to ensure higher achievement.

Findings showed that students with hearing impairment learn better from visual activities like demonstration teaching which are mostly supported by instructional materials (models, videos, charts and other concrete materials). They learn better when they watch demonstration, use visual aids to represent a subject, create mental picture of what they read and hear, solve problems or answer questions before any other else can and prefer to work with other students. This supports the study of Ilcin, Tomruk, and Yesilyaprak (2018) which established a relationship between the learning style and academic perf0rmance of students with hearing impairment. This also corroborate Qi and Mitchell (2012) in their own study which clearly stated that there is relationship between student learning styles of students with hearing impairment and their academic performance because of provision or availability of SignLanguage. It also supports Econlearningstyle (2020) which stated that most people are visual learners. Also, learning style (2020) opined that visual learners learn better by seeing what they need, to be able to see the whole concept they need to understand. This connotes that as adoption of a particular learning style could determine the academic achievement of gifted students. (Ugochi, 2018) affirmed that learning styles has a significant positive relationship with and contribute significantly and positively to high academic achievement of gifted students.

Public Broadcasting Service (PBS, 2018) stated that hearing impaired learners' education in a conventional classroom setting rests largely on the belief that they are expected to learn to read, write and do mathematics. This is because the aim of special education in Nigeria is to equalise all people, regardless of their genetic makeup, social or physical disabilities, sensory, mental, psychological, or emotional disabilities, should have access to educational opportunities. (National Policy on Education, 2013) Children with disabilities have equal opportunities to learn and perform optimally as their age mates who are without limitations (Spring School, 2018). Deafness has no effect on the acquisition of literacy abilities, according to Raymond (2019), students with hearing impairment have the same intellectual capability just like every other person.

The development of any country is rated by her scientific innovations. Science is a main subject taught in Nigerian schools, Biology, Chemistry, Mathematics and Physics among others are the subjects that are offered and taught in schools both at the senior secondary and tertiary institutions. 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, note takers and students learning style would play paramount role in the teaching of biology to this category students.

Statement of the problem

Performance of students with hearing impairment in WASSCE over the years have been poor. Students with hearing impairment have been having challenges with academic achievement in biology both at internal and external examinations. The major challenge is the unusual language and communication structures. Literature reveals that this category of students have problem with abstractness and wide covering area of biology content as a result of their hearing difficulty. Students with hearing impairment 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. Many researchers have used various teaching and learning strategies to reduce the challenges facing students with hearing impairment, still their performances are very poor. This study therefore looked into sign language interpreters, note takers and learning styles as predictors of academic achievements of students with hearing impairment in biology in Oyo state, Nigeria.

Purpose of the study

The purpose of this study is to investigate the effect of sign language interpreter, note takers and students' learning style in improving academic performance of students with hearing impairment in biology in Oyo State, Nigeria.

Research Questions

1. What is the availability, accessibility and utilization of instructional support (sign Language Interpreters and note takers) for students with hearing impairment?

2. What are the descriptive indices of students with hearing impairment with respect to learning style?

RESULTS

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

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Table 1

S/N	Statements	A	NA	AC	NAC	U	NU
Human support							
1	Sign language interpreter	90 40.2%	134 59.8%	22 24.4%	68 75.6%	22 100%	- -
2	Notetakers	74 33.0%	150 67.0%	21 28.4%	53 71.6%	21 100.0%	- -

KEY

A- AVAILABILITY

NA- NON AVAILABILITY

AC- ACCESSIBILITY

NAC- NON ACCESSIBILITY

U- UTILIZATION

NU- NON UTILISATION

Table 1 revealed 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. 74 (33.0%) of the respondents indicated that note takers were available, 21 (28.4%) of the 74 respondents agreed that they were accessible and utilised. This implies that sign language interpreters were available but not sufficient and those that were available were not readily accessible, note takers were not sufficient and out of the available ones, only few were utilized.

Mazoue (2011) stated that sign language interpreters

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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

Table2 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

Result of the study showed that there was a negative, low non-significant relationship between use of instructional supports and performance of students with hearing impairment in Biology. This indicated that there was no significant relationship between the use of instructional supports and performance of students with hearing impairment in Biology. 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 impairmen in US. This was contrary to the findings of Mazoue (2011) who reported that instructional support such as sign language interpreters have no significant relationship with students with hearing impairment poor literacy in Durban University. Learning Disabilities Association of America (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.

Research question 1d: What are the descriptive indices of students with hearing impairment with respect to learning style?

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Table 4.4: Learning style of students with hearing impairment

S/N	Statements	SA	A	D	SD	Mean	STD.D
Visual							
1	I prefer to learn by reading textual materials	111 49.6%	71 31.7%	19 8.5%	23 10.3%	3.21	0.98
2	I learn better when I watch educational programmes	53 23.7%	98 43.8%	40 17.9%	33 14.7%	2.76	0.98
3	I create mental picture of what I want to study	53 23.7%	61 27.2%	57 25.4%	53 23.7%	2.51	1.10
4	I learn better when my teacher uses instructional materials in class	75 33.5%	65 29.0%	53 23.7%	31 13.8%	2.82	1.05
5	I create mental picture of what I read	104 46.4%	79 35.3%	25 11.2%	16 7.1%	3.21	0.91
6	I learn better when someone presents information in a pictorial form (e.g., pictures, flow chart)	60 26.8%	79 35.3%	48 21.4%	37 16.5%	2.72	1.03
7	I enjoy watching other students discussion about issues raised in the class with the help of interpreter	39 17.4%	95 42.4%	32 14.3%	58 25.9%	2.51	1.06

8	I learn better when someone uses visual aids (e.g., white board, power point) to represent a subject	90 40.2%	58 25.9%	36 16.1%	40 17.9%	2.88	1.13
9	I learn better when I watch demonstration	169 75.4%	34 15.2%	20 8.9%	1 0.4%	3.66	0.66
10	I make lists and notes because I remember things better if I write them down	66 29.5%	102 45.5%	29 12.9%	27 12.1%	2.92	0.95
Weighted mean = 2.92							
Kinaesthetic							
11	I prefer to work with other students in the laboratory during practicals	96 42.9%	78 34.8%	32 14.3%	18 8.0%	3.13	0.94
12	I learn practical tasks better than theoretical ones	71 31.7%	97 43.3%	34 15.2%	22 9.8%	2.97	0.93
13	I learn better when I manipulate learning materials on my own	75 33.5%	65 29.0%	53 23.7%	31 13.8%	2.82	1.05
14	Most of my free time is spent doing physical activities or making things	151 67.4%	48 21.4%	23 10.3%	2 0.9%	3.55	0.71
15	I enjoy discussing my ideas about course content with other	112	69	28	15	3.24	0.92

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	students	50.0%	30.8%	12.5%	6.7%		
16	I learn better through seminal and training	46 20.5%	97 43.3%	52 23.2%	29 12.9%	2.71	0.94
17	I learn better when I am involved in a task	51 22.8%	38 17.0%	56 25.0%	79 35.3%	2.27	1.17
18	I like to solve problems or answer questions before any body else can	121 54.0%	49 21.9%	34 15.2%	20 8.9%	3.21	1.01
19	When I am in the class, I learn better when my teacher asks me to practise	61 27.2%	80 35.7%	48 21.4%	35 15.6%	2.75	1.03
20	When I am reading I move my lips.	88 39.3%	82 36.6%	33 14.7%	21 9.4%	3.06	0.96
Weighted mean = 2.79							
Grand weighted mean = 2.94							
Standard mean = 2.50							

Table 4.4 shows the responses of students with hearing impairment to their learning styles. The results indicated the grand weighted mean of 2.92 and 2.79 for visual and kinaesthetic learning style respectively which are higher than the standard mean of 2.50. This shows that most of the students with hearing impairment are visual learners, while the remaining ones were kinaesthetic learners. The results also shows that most of them preferred the following visual activities; learn better when they watched demonstration (3.66>2.50), prefer to learn by reading textual materials (3.51>2.50), create mental picture of

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what they read (3.21>2.50), make lists and notes because they remember things better if they write them down (2.92>2.50), learn better when someone uses visual aids (e.g., white board, power point) to represent a subject (2.88>2.50), learn better when their teacher uses instructional materials in class (2.82<2.50), learn better when they watched educational programmes (2.76>2.50), I learn better when someone presents informati0n in a pictorial form (e.g., pictures, flow chart) (2.72>2.50), I enjoy watching other students discussion ab0ut issues raised in the class with the help of interpreter (2.51>2.50). Table 4.4 further reveals that the remaining students preferred the following kinaesthetic learning styles: Most of their free time they spent doing physical activities or making things (3.55>2.50) they enjoyed discussing their ideas about course content with other students (3.24>2.50), they like to solve problems or answer questions before anybody else can (3.21>2.50), they preferred to work with other students in the laboratory during practicals (3.13>2.50), When I am reading I move my lips (3.06>2.50), I learn practical tasks better than theoretical ones (2.97>2.50), I learn better when I manipulate learning materials on my own (2.82>2.50I learn better through seminal and training (2.71>2.50).

This study showed that students with hearing impairment learn better from visual activities like demonstration teaching which are mostly supported by instructional materials (models, videos, charts and other concrete materials). They learn better when they watch demonstration, use visual aids to represent a subject, create mental picture of what they read and hear, solve problems or answer questions before anybody else can and prefer to work with other students. This supported the study of Ilcin, Tomruk, and Yesilyaprak (2018) which stated that relationship exists between the learning style and academic performance of students with hearing impairment in Turkey. This also corroborate Qi and Mitchell (2012) who clearly stated that there was relationship between student learning styles and the academic performance of students with hearing impairment because of provision or availability of Sign Language or Sign Language Interpreters in Nigeria. It also supported Econlearningstyle (2020) which stated that most people are visual learners in Cebu Technological University- Danao. Also, Cecilia, Cornelius U, Edoho , Richard. (2019) opined that visual learners learn better by seeing what they need in Calabar.

Table 4 Relationship between learning style and achievement of students with hearing impairment in biology

Variables	Mean	S.D.	Df	R	P-value	Remark
Achievement	24.96	4.35	222	0.576*	0.000	Sig.

Learning style	85.09	14.43				

Table 4.9c This study revealed that there was a positive, moderate significant relationship between learning style and performance of students with hearing impairment in Biology. This implies that learning style was related to students with hearing impairment performance in Biology. This may be due to the fact that they learn better when they watch demonstration, uses visual aids to represent a subject, create mental picture of what they read and hear, solve problems or answer questions before anybody else can and prefer to work with other students. This finding supported the findings that learning styles play an important role in student's ability to structure information successfully in New York (She, 2005). This also agrees with the findings of Mutua (2015) who discovered a positive and statistically significant relationship between learning styles and academic performance for the trimodal learners Kenya. This finding was contrary to the findings of Abidin, Razaee, Abdullah and Singh (2011) who in their study found that there was no significant relationship between overall academic performance and learning styles in Jambi. Al-Hebaishi (2012), found that learning styles preferences did not seem to affect or predict academic performance of students Saudi. Also, Gappi (2013) found that there was no significant statistical correlation between the academic performance and the learning style preferences of the students in Chile.

Conclusion

The study determined the relationship between sign language interpreters, note takers and learning style to Biology achievement of students with hearing impairment in Oyo State, Nigeria. It was concluded that sign language interpreters and note takers should be made available in school settings especially in the education of students with hearing impairment, this would enhance their academic performance.

RECOMMENDATIONS

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

1. Teachers should provide instructional materials for teaching of biology since most of them are visual learners

2. Students should improve on their style of learning.

3. School principals should organize sign language workshops and seminars for teachers to improve academic performance 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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