

EFFECT OF ASSISTIVE TECHNOLOGY ON ACADEMIC PERFORMANCE OF PUPILS WITH HEARING IMPAIRMENT IN SCHOOL FOR THE DEAF, BASSA

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Abstract

This research investigated the effects of assistive technology on academic performance of pupils with hearing impairment in School for the Deaf, Bassa, Plateau State. Three hypotheses were formulated to guide the study. Quasi-experimental research design was employed in the study. A total of 20 primary four pupils consisting of 10 pupils in the experimental group and another 10 pupils in the control group participated in the study. The hypotheses formulated in the study were tested using t-test statistics. From the analysis of data collected, it was discovered that assistive technology instruction led to an improvement in the English language academic achievement of pupils with hearing impairment in School for the Deaf, Bassa. Assistive technology instruction led to an improvement in the Mathematics academic achievement of pupils with hearing impairment in School for the Deaf, Bassa. Also, it led to an improvement in the PHE academic achievement of pupils with hearing impairment in School for the Deaf, Bassa. Based on the findings of the study, it was recommended among others that adequate assistive technology media aids such as computers, internet, hearing aids, assistive listening devices should be made available in schools in order to improve the standard of instructional delivery to students with hearing impairment. Teachers should always use assistive technology media aids in teaching pupils with hearing impairment. Also, teachers should be given adequate training on the use of assistive technology to teach pupils with hearing impairment through workshops and conferences.

Keywords: Assistive Technology, Academic Performance, Hearing Impairment, Pupils

Introduction

Modern technology is a major catalyst where advancement in the field of education is hinge. Educational institutions these days craves toward ensuring that teachers and learners

are well rooted and conversant with modern trends in science and technology so as to produce positive result that will evolve our generation. Assistive technology (AT) encompasses devices, equipment, and services that help individuals with disabilities or impairments perform tasks they might otherwise find difficult or impossible. It aims to improve daily living, enhance participation, and promote independence. According to Elewekere (2017), assistive technology (AT): products, equipment, and systems that enhance learning, working, and daily living for persons with disabilities. It includes any piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with visual impairment particularly in areas such as academic performance or daily life activities.

Academic performance refers to a student's success in completing educational tasks and achieving learning goals. It is typically measured through grades, test scores, and overall academic accomplishments. Several factors influence academic performance, including individual student characteristics, learning environment, and the quality of instruction. According to McCarthy (2020), academic performance refers to the outcome of education, it is the extent to which students have excel in their academic pursuit in school.

Over the years, there has been serious concern by educational administrators and scholars about the academic performance of children with hearing impairment in schools in Nigeria. Hearing impairment, also known as hearing loss, refers to any degree of hearing reduction, from mild to profound. It can affect one or both ears and impact the ability to hear sounds and understand speech. Hearing loss can be present at birth or develop later in life due to various factors. Pupils with hearing impairment are described as those whose impairment makes them hard of hearing or completely deaf (Carney, Engbretson, Scammell, & Sheppard, 2023). They are those categories of individuals who need augmentation in either- educational, social, physical and other aspects of livelihood to strive well within their environment. Without any iota of doubt the advancement in today's technology has much to offer to the students in question both as tools for instruction and as independent tools that is capable of compensating for any specific impairment. These devices offer several functions ranging from assessment, lesson planning, lesson presentation, record keeping and classroom management as well. Therefore, the appropriate selection of devices and technology, and subsequent training on the use of the devices is crucial for ensuring proper use of such devices (Carney, Engbretson, Scammell, & Sheppard, 2023).

There has been an emerging trend in recent years is the place of Information and Computer Technology in the education of students with special needs globally. Assistive technology is of great benefit to pupils with special learning needs. Learning requires necessary facilities to communicate in depth fads and it must result in achievements that have relevance beyond school environment. Therefore, for authentic learning to take place in an inclusive school setting, technological device is inevitable to enhance and motivate learning. Hence, with the coming and application of assistive technology in teaching of children with hearing impairment, their academic performance needs to be examined to see if there is any improvement compared to when assistive technology was not used. It is in the light of the above that this study was prompted to investigate effects of assistive technology on the academic performance of pupils with hearing impairment in School for the Deaf, Bassa.

Statement of the Problem

In most schools in Nigeria today, performance of pupils with hearing impairment is very discouraging. The teaching and learning process for pupils with hearing impairment has been challenging over the years. This is largely due to the fact that assistive technology facilities are not adequately available or teachers do not adequately utilize relevant resources such as assistive technology for instruction. Despite the global attention given to the production and provision of assistive technology in our schools, children with hearing impairment still perform poorly academically. The absence or under-utilisation of the assistive technology facilities makes it difficult for pupils with hearing impairment to function to their maximum capacity. It is against this backdrop that the researcher carried out the study to investigate effects of assistive technology on the academic performance of pupils with hearing impairment in School for the Deaf, Bassa.

Aim and Objectives

The aim of this paper was to investigate the effects of assistive technology on academic performance of pupils with hearing impairment in school for the Deaf, Bassa. The specific objectives of the study include to:

1. to investigate whether there is a significant difference between pre-test and post-test mean score English language performance of pupils with hearing impairment in the experimental groups.
2. to ascertain whether there is a significant difference between the pre-test and post-test mean score in Mathematics performance of pupils with hearing impairment in the experimental groups.
3. to determine whether there is a significant difference between the pre-test mean and post-test mean score in Physical and health education of pupils with hearing impairment in the experimental groups.

Hypotheses

The following null hypotheses was tested at 0.05 level of significance:

1. There is no significant difference between pre-test and post-test mean score English language performance of pupils with hearing impairment in the experimental groups.
2. There is no significant difference between the pre-test and post-test mean score in Mathematics performance of pupils with hearing impairment in the experimental groups.
3. There is no significant difference between the pre-test mean and post-test mean score in Physical and health education of pupils with hearing impairment in the experimental groups.

Methodology

The researcher used the pre-test-post-test, experimental, control groups approach. The design employed two groups of research participants; one is called controlled group who receives no treatment and the other is called the experimental group who receives the intervention or treatment. The target population for the study consisted all primary five pupils in School for the Deaf, Bassa with hearing impairment. There is a total of 30 primary

five pupils with hearing impairment. Seventeen of the pupils are males while thirteen are females. The sample for this study consisted of twenty pupils with hearing impairment in School for the Deaf, Bassa. The sample consisted of ten male pupils and ten female pupils with hearing impairment. 10 pupils with hearing impairment consisting of 5 male and 5 female were assigned to the experimental group and another ten pupils with hearing impairment consisting of 5 male and 5 females were assigned to the control group. The experimental group were taught using assistive technology while the control group were taught using the conventional lecturer method. The study adopted the purposive sampling technique. Teacher-Made Test was used for data collection in this study.

To determine the content validity of the Teacher-Made-Test items, the test was given to experts in special education and rehabilitation sciences in the Faculty of Education, University of Jos who ascertained the instrument adequate and valid for use in the study. The test –retest method was used to determine the reliability of the test. In this case, the same test was repeated administered to the pupils twice within an interval of two-week during trial-testing and then, the two sets of results will be correlated to obtain the coefficient of stability. The Pearson- Product moment correlations was used to determine the reliability coefficient and a reliability index of 0.88 was obtained. All the hypotheses were tested using t-test statistics at 0.05 level of significance.

Results

Hypothesis one

There is no significant difference between pre-test and post-test mean score English language performance of pupils with hearing impairment in the experimental groups.

Table 1: Summary of t – test Analysis of difference pre-test and English language achievement mean scores of pupils in the experimental

Groups	N	$\bar{X}$	SD	Df	p. value	Sig. Level
Pretest	10	40.27	6.28			
				8	0.001	0.05
Post-test	10	69.18	7.91			
P < 0.05						

Data on table 1 show that the p-value of 0.001 is less than 0.05 level of significance. The null hypothesis was therefore retained. The conclusion is that there was a significant difference between the pre-test and post-test achievements mean score of the experimental group in English language.

Hypothesis Two

There is no significant difference between the pre-test and post-test mean score in Mathematics performance of pupils with hearing impairment in the experimental groups.

Table 2: Summary of t – test Analysis of difference pre-test and post-test Mathematics achievement mean scores of pupils in Experimental group

Groups	N	$\bar{X}$	SD	Df	p. value	Sig. Level
Pretest	10	40.18	5.39			
				8	0.000	0.05
Post-test	10	69.09	6.801			
P < 0.05						

Data on table 2 show that the p-value of 0.00 is less than 0.05 level of significance. The null hypothesis was therefore rejected. The conclusion is that there was a significant difference between the Mathematics pre-test and post-test achievements mean score of experimental groups.

Hypothesis Three

There is no significant difference between the pre-test mean and post-test mean score in Physical and Health Education of pupils with hearing impairment in the experimental groups.

Table 3: Summary of t – test Analysis of difference pre-test and post-test Physical and Health Education achievement mean scores of pupils in Experimental group

Test	N	$\bar{X}$	SD	Df	p. value	Sig. Level
Pretest	10	39.07	6.48			
				8	0.001	0.05
Post-test	10	68.13	5.80			
P < 0.05						

Data on table 3 show that the p-value of 0.01 is less than 0.05 level of significance. The null hypothesis was therefore rejected. The conclusion is that there was a significant difference between the Physical and Health Education pre-test and post-test achievements mean score of the experimental group.

Discussion

Hypothesis one which states that there is no significant difference between pre-test and post-test mean score English language performance of pupils with hearing impairment in the experimental groups was tested using t-test statistics. The findings from the test revealed a p-value of 0.001 which is less than 0.05 level of significance. The null hypothesis was therefore rejected. The conclusion is that there was a significant difference between the pre-test and post-test achievements mean score of experimental group in English language. This finding is in conformity with the findings of Hallack (2022) who discovered that a significant improvement in English language academic achievement of pupils with hearing impairment after exposure to assistive technology.

Hypothesis two which states that there is no significant difference between the pre-test and post-test mean score in Mathematics performance of pupils with hearing impairment in the experimental groups was tested using t-test statistics and the result shows that the p-value of 0.00 is less than 0.05 level of significance. The null hypothesis was therefore rejected. The conclusion is that there was a significant difference between the Mathematics pre-test and post-test achievements mean score of the experimental group. There was an improvement the mathematics performance of students with hearing impairment after exposure to assistive technology. This finding corroborates the findings of Abdullahi (2022) who discovered that technological aids have a significant impact in improving the academic achievement of pupils with hearing impairment in mathematics

Hypothesis three which states that there is no significant difference between the pre-test mean and post-test mean score in Physical and Health Education of pupils with hearing impairment in the experimental groups was tested using t-test statistics and the result revealed that a p-value of 0.01 was obtained which is less than 0.05 level of significance. The null hypothesis was therefore rejected. This implies that there was a significant difference between the Physical and Health Education pre-test and post-test achievements mean score of experimental groups. This finding is in agreement with the findings of Adekeye (2018) who discovered that there was a significant improvement in the academic achievement of students with hearing impairment in PHE after exposure to assistive technology.

Conclusion

This study investigated the effects of assistive technology on the academic achievement of pupils with hearing impairment in School for the Deaf, Bassa. The introduction of assistive technology in education is a giant and magnificent effort towards academic excellence. From the findings of the study, it was concluded that the use of assistive technology has a positive significant impact on the academic achievement of pupils with hearing impairment.

Recommendations

The following recommendations were made in the light of the findings of the study:

1. Adequate assistive technology media aids such as computers, internet, hearing aids, assistive listening devices should be made available by government and school

administrators in schools in order to improve the standard of instructional delivery to students with hearing impairment.

2. Teachers should always use assistive technology media aids in teaching pupils with hearing impairment
3. Teachers should be given adequate training by school administrators and government on the use of assistive technology to teach pupils with hearing impairment through workshops and conferences

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