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A SURVEY OF TEACHERS' AWARENESS AND USE OF ASSISTIVE TECHNOLOGY IN TEACHING CHILDREN WITH SPECIAL NEEDS IN NORTH CENTRAL NIGERIA

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Abstract

The purpose of the study was to find out teachers' awareness and use of assistive technology in teaching children with special needs in North Central Nigeria. The study's objective was to find out teachers' competence in assistive technology devices, two research questions and two hypotheses guided the study. A cross-sectional survey research design was adopted for the study and the population was made up of all regular and special education teachers teaching children with special needs in the seven states that make up the North Central Zone. Using the stratified random sampling technique, a sample of 450 teachers was selected from four states out of the 792 teachers teaching persons with special needs in the zone to participate in the study. Two of the instruments centred on teachers' assistive technology awareness and competency while the remaining two were observation schedules to check the availability of the devices and teachers' competence in using them. Data for the research was collected through the administration of the questionnaires and observation of teachers teaching using some of the assistive technology devices in their schools. Hypotheses one was tested using the t-test for related samples while hypothesis two was tested using ANOVA at 0.05 level of significance. The model's correlation and t-test were estimated using the estimated likelihood method of Statistical Package for Social Sciences (SPSS) version 22. Recommendations were drawn that, there is a need for an enlightenment campaign on the importance of assistive technology devices in schools. This will create more awareness among teachers and students particularly those who claim that they are not aware of the existence of assistive technology devices.

Keywords: Assistive Technology (AT), Children with Special Needs and Teachers' Awareness

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Introduction

The Nigerian school system, particularly the primary and secondary schools, has undergone some changes due to the adoption of the policy of inclusive education. This means more students with special education needs who were educated in separate classrooms or schools are now educated in the same class as other children who do not have any special education needs. The special and regular teachers are vested with the responsibility of making the curriculum accessible to children with special education needs; this they do by adopting different tools and devices. The broad term assistive technology is used to describe a variety of devices and services that help ensure that students with disabilities are included in a full range of social experiences and can function more independently, thus improving their quality of life. Examples of these devices include Braille machines, wheelchairs, electronic communication devices, pencil grips and computers. Assistive technology devices can reduce barriers in the environment, enhance the ability to communicate and also improve independence. It enhances the educational attainment of persons with disabilities which helps them gain employment and become contributors to the development of society instead of begging on the streets. This implies that without these devices, learning for children with special needs becomes a big problem.

Teachers' awareness of assistive technology will enable them to compare specific devices based on performance, affordability, reliability and so on. The knowledge will equally be useful in obtaining and utilizing evaluation and training resources, information on maintenance and repairs, as well as funding. Teachers' awareness of the device will help the teachers to advise and make requests for the purchase of the appropriate device for their institutions as well as parents for their affected children. Teachers need to know the existence and locations where these devices can be acquired and how to select appropriate devices according to the learning needs of the children.

Children with special needs are educated in special schools (for example, a school for the visually impaired) or in an inclusive school where children with various special education needs and those without any are found depending on the nature of handicaps and availability of the school. They are educated by either a special education teacher or a regular teacher. Some of the advantages of special schools are that special schools are designed with special needs children in mind, so they are adjudged better than inclusive schools particularly because they are assumed to have more materials (assistive technology devices) than the inclusive schools.

The current educational programme demands that all children should have free access to the curriculum for the attainment of proper education for all children with special needs. For many of these children, free access to the curriculum will require the use of assistive technologies. As a result, many teacher training institutions prepare their teachers in a way and manner that suits them; in most cases, assistive technology device is omitted from their curriculum. These young teachers on getting jobs find themselves incapable of meeting the assistive technology needs of the students with special needs in their classes. Many of them are begging on the streets for survival, many are burdens to their parents, community and the nation rather than contributing to the development of the nation.

Research Questions

The following research questions were raised for investigation:

1. To what extent are teachers aware of the existence of different assistive technology devices that are used in the education of children with special needs?
2. What is the level of provision of assistive technology devices in schools in North Central Nigeria?

Hypotheses

The following hypotheses were tested:

1. There will be no significant difference between the assistive technology awareness mean scores of teachers in special schools and teachers in regular schools.

2. There will be no significant difference in the availability of assistive technology devices between schools located in urban and those in rural areas.

Theoretical Framework

This study derived its theoretical and conceptual frame from the social learning theory of Albert Bandura, (1986). Social learning theory is a term that has been used to apply to the views of many theorists and researchers. Bandura performed several research and experiments with children using films and models (assistive technology) and the result was very encouraging. His most comprehensive presentation of this theory is found in his book: Social Foundations of Thoughts and Actions: A Social Cognitive Theory, (1986). After much research and experiments, Bandura (1992) redefined his theory and came out with assumptions and hypotheses about thinking, reasoning and the concept of reciprocal determinism (mutual relationship). Reciprocal determinism sees behaviour as a continuous reciprocal interaction between an individual's thoughts, behaviours and environmental factors. This triadic model sees human functioning as a three-way interaction among behaviour (B) cognition and other internal events that affect perception and action (P), and a person's external environment (E). Each of these three elements can affect the other two elements. In special education classes, the self-efficacy of teachers will result in greater progress and competence in the subjects they teach. Bandura (1992) states that persons who have self-efficacy will make realistic judgments about their ability to perform tasks, will tend to see appropriately difficult tasks and will persist in them until completed. Reynolds and Fletcher-janzen (2002) believe that Bandura has done the most to conceptualize and advance the ideas of social learning theory which is seen by many as being very comprehensive in its ability to handle diverse ranges of human experiences and problems.

Conceptual Illustration

The broad term assistive technology is used to describe a variety of devices and services that help ensure that students with disabilities are included in a full range of social experiences and can function more independently to improve their quality of life (Batshaw, 2012).

Assistive technology as it concerns persons with special needs is divided into two; these are: (1) Assistive technology devices and (2) Assistive technology services.

Assistive Technology Devices: the Wisconsin Assistive Technology Initiative WATI, (2008) defined assistive technology devices as any item, piece of equipment or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain or improve functional capabilities of a child with a disability. These assistive technology devices include among others: magnifying glasses, adapted spoons, canes, walkers, wheelchairs, pencil grips, picture communication books, electronic communication devices, adapted computer equipment and specialized software. The Individuals with Disabilities Education Improvement Act IDEIA (2014) defines assistive technology as any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is to increase, maintain, or improve the functional capabilities of students (or individuals) with disabilities.

Assistive Technology Services: The Wisconsin Assistive Technology Initiative (2018) defines assistive technology service as any service that directly assists a child with a disability in the selection, acquisition or use of assistive technology devices. Wisconsin Assistive Technology Initiative lists types of assistive technology services to include:

1. The evaluation of the needs of such a child includes a functional evaluation of the child in the child's environment.
2. Purchasing, leasing or otherwise providing for the acquisition of assistive technology devices by the child.
3. Selecting, designing, fitting, customizing, adapting, maintaining, repairing or replacing of assistive technology devices

Assistive Technology Skills and Professional Needs of Teachers

This review critically examines the indicators for the successful implementation of assistive technology and the professional development needs of teachers. These indicators include technology policies, assistive technology funding, assistive technology competence of teachers and professional development. In countries like the United States of America, technology policies are developed at state, district and local levels. A comprehensive technology plan provides consistent policies and procedures for: (a) funding (b) development of educator knowledge and skills (c) provision of training and professional development (d) maintenance of technology and (e) assessment of the successful use of the technology (Hart, 2010). While the Individuals with Disabilities Education Improvement Act (IDEIA) of 2014 mandates the consideration and selection of assistive technology for students with disabilities, there is no formal federal policy or procedure for doing so in Nigeria. In the United States each state is left to develop its policies guiding the selection and implementation of assistive technology and educational technology plans are developed by individual states to address infrastructure needs, computer purchasing, internet connectivity, and professional development.

The Division of Research and Practice at the Office of Special Education Programs (OSEP) suggested that state special education directors develop assistive technology policies that include: (a) a statement of desired assistive technology outcomes (b) procedures for delivering assistive technology services (c) staff development and technical assistance procedures (d) verification that the technology plan includes research-based practices (e) mechanisms for interdisciplinary involvement (f) procedures for purchasing, using, and managing equipment (g) procedures for obtaining funding and (h) procedures for communicating assistive technology policies. An additional resource which can be used to guide the development of assistive technology policies and procedures to improve assistive technology services and educational results for students with disabilities is the Quality

Indicators for Assistive Technology Services (QIAT). State and local agencies utilize these indicators in the identification of strengths and weaknesses within current policies (Zabala, Blunt, Carl, Davies, Deterding and Floss 2019). The following indicators are addressed by QIAT: (a) administration support (b) consideration of assistive technology (c) assessment of assistive technology needs (d) IEP development and documentation, (e) implementation and training and (f) evaluation.

Teachers' Awareness of Assistive Technology

The awareness of teachers about the existence of assistive technology and where they can acquire it is of great importance. Teachers need to be aware of the services that are available to acquire assistive technology and the people who are providing the different services that they need. Special education and regular education teachers must focus not only on course content and pedagogy but also on technology by the national policy on education. Teachers must also be trained to use technology with students who have special learning needs. Yet both special and general education teachers lack an awareness of both the availability and effective use of assistive technology (Holmes, Burton and Heaton, 2016). In a recent survey by Margolis and Goodman (2017) for the United Cerebral Palsy Project, they found that 87% of the survey respondents (parents of students with disabilities) said that students had access to some form of assistive technology in schools but primarily computers. But there is more to assistive technology than computers.

Teacher Preparation in Special Needs Education in Nigeria

Teacher education programme in Nigeria is generally geared towards ensuring that teachers are adequately equipped with teaching strategies needed for effective teaching and learning. Teacher preparation refers to the process of equipping individuals with the knowledge and skills that will enable them to effectively direct learning situations in educational institutions. It is aimed at equipping individuals with the knowledge of special education and at the same time equipping them with the knowledge of how to teach persons with special learning needs. Teacher training Institutions are supposed to structure their programmes in such a way that their students will be able to teach learners with special needs on graduation.

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Obani (2015) and Uyanwa (2017) describe special needs education as a type of education aimed at meeting the special learning needs of learners to assist them in obtaining their optimum development and living a meaningful interactive life in the mainstream of the community. Special needs persons whose needs this system of education is aimed at meeting are children who deviate from the average or normal children in mental characteristics, sensory abilities, neuromuscular or physical characteristics, social or emotional behaviour, and communication abilities, to such an extent that they require a modification of school practices or special education services to develop to their maximum capacity (Okunrotifa, 2016). Okwudire (2018) describes special needs education as the kind of instruction that is specially designed to meet the unique needs of individuals with exceptionalities.

Obani (2015) had earlier described what special needs education is. This he described as a concept introduced to minimize, if not abolish, practices which are dehumanizing, such as labelling categorizing and segregating of learners with disabilities and other learning difficulties. The special needs of these people who require special needs education are those that may be categorized as the fundamental, material physiological and intellectual needs that are not normally anticipated, planned and provided for in the regular or ordinary school system (Osatuyi, 2016). In this research, special needs education refers to educational programs aimed at meeting the special learning needs of the learners so that they can develop to their maximum level and live a meaningful life in their community. Special needs education is a phenomenon in special education service which focuses on the special learning needs of the individual so affected in the whole education system and how to solve those problems rather than focusing on disability such as deafness, blindness, mental retardation and learning disability.

Problems of Using Assistive Technology for Persons with Special Education Needs in Nigeria

Despite the benefits of Assistive Technology in the education and rehabilitation of persons living with disabilities, some problems hinder teachers from effectively using it to teach students with special needs. Some of these problems are discussed below:

Epileptic Power Supply: The nature of electricity supply in Nigeria is bad such that most institutions are using generating sets to power their electronics. Anyebe (2008) states that power supply by the nation's Power Holding Company of Nigeria (PHCN) is scarcely available in most of the urban cities not even for 12 hours at a stretch daily. Anyebe further states that a stable power supply is the hub of an ICT classroom since computers, television, radio, projectors, and video recorders are solely dependent on a stable and uninterrupted power supply.

High Cost of Assistive Technology Devices: Assistive technology devices are mostly produced overseas. The cost of production and importation is very high thereby making it difficult or impossible for many institutions to purchase. This has made most teaching on the use of some of these devices to be theoretical instead of practical Owobi (2018).

Teachers' Attitude: Most of the teachers who are in service training have a negative attitude towards some of these devices.

Poor Funding of Education: Funding for education is still very poor in Nigeria compared to other countries. Sometimes the funds are not even released or they are diverted to other sectors or private pockets.

Poor Remuneration: In Nigeria, teachers' salaries, whether in the primary, secondary or tertiary sector are very poor. This is amplified by frequent strikes in the educational sector. Many qualified lecturers have left their places of work and many who went on study leave overseas have refused to return home; this has led to brain drain.

Empirical Studies

Zhou, Parker, & Griffin-Shirley, conducted research (2019) to examine teachers' perception of assistive technology knowledge. The researchers selected a sample of 165 teachers of the visually impaired in Texas. The teachers were from a Texas school for the blind and visually

impaired. The researchers used a web-based for the collection of data. This was done through telephone calls to the administration of the school. A survey questionnaire was used which contained two parts; the first part addressed the demographic information of the respondents while the second part consisted of 74 assistive technology competencies of teachers of students with visual impairment that were selected from a set of 111 competencies developed by Smith and Kelly (2007). The 74 competencies that were used by these researchers are from the six domains such as —the access to information domain. For each of the 74 competencies, the participants were asked to rate the level of expertise that they thought they currently possessed and the level of expertise that they thought the teachers of students with visual impairment, in general, should have. The four-point Likert scale (1 = novice, 2 = basic, 3 =proficient or 4 = advanced) was used in the study. The data in this research was analyzed with the following descriptive statistics: the mean, standard deviation, percentages and Pearson correlation. These were used to find the relationships between participants' overall confidence in assistive technology. All the statistics were conducted using the Statistical Package for Social Sciences version 17.0. The t-test result shows that there were significant differences in the participant's perception of their current and expected levels of expertise in 65 (74.32%) of the 74 assistive technology competencies. For all 55 competencies, the participants reported that their level of knowledge and skills were significantly lower than they thought teachers of students with visual impairment in general should have. The study also discovered a small positive relationship between the participants' years of working with students with visual impairments and their confidence level (r =+23, N=164, P=.003 two-tailed).

Methodology

A cross-sectional survey research design was adopted for the study and the population for the study was made up of all regular and special education teachers teaching children with special needs in the seven states that make up the North Central Zone. Using the stratified random sampling technique, a sample of 450 teachers was selected from four states out of the

792 teachers teaching persons with special needs in the zone to participate in the study. Four instruments developed by the researcher were used to collect the data to answer the two research questions and test the two hypotheses raised. Two of the instruments centred on teachers' assistive technology awareness and competency while the remaining two were observation schedules to check the availability of the devices and teachers' competence in using them. Data for the research was collected through the administration of the questionnaires and observation of teachers teaching using some of the assistive technology devices in their schools. Research questions were answered using simple percentages and mean scores. Hypotheses one and two were tested using the t-test for related samples. The model's correlation and t-test were estimated using the estimated likelihood method of Statistical Package for Social Sciences (SPSS) version 22.

Result and Discussion

Hypothesis One: There will be no significant difference between assistive technology awareness mean scores of teachers in special schools and teachers in regular schools.

Table 1: T-test analysis of the Difference between the Assistive Technology Awareness of Teachers in Special Schools and Teachers in Regular Schools

Teachers	N	X	DF	t.cal	P.value	Decision
Regular School teachers	304	55.03	448	1.628	0.175	Not sig.
Special school teachers	146	55.56				

Table 1 shows the t-test result of the assistive technology awareness of teachers in special and regular schools. A mean score of 55.03 for teachers in regular schools and 55.56 for teachers in special schools with a t. cal. of -1.628 and a P value of 0.175 was indicated. This result indicated that the difference between the assistive technology competence of teachers in special and regular schools was not significant since the P value was greater than the level of significance which was 0.05. Therefore, we fail to reject the null hypothesis. This result meant that the difference between assistive technology awareness of teachers in special and regular schools is not significant. Teachers in both school types had an awareness of assistive technology.

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Hypothesis Two: There will be no significant difference in the availability of assistive technology devices between schools located in urban and those in rural areas.

Table 2: Difference between the Availability of Assistive Technology Devices for Persons with Visual Impairments in Schools in Urban and Rural Areas

Differences in assistive technology between schools in rural and urban areas

S/N		Location				
		Rural		Urban		
		No	Mean	No	Mean	Mean dif.
1	For the visually impaired	49	3.1	67	6.1	
2	For the hearing impaired	22	1.4	40	3.7	
3	For Learning disabilities/ M R	31	2	47	4.2	**2.3**
4	For the Physically impaired	39	2.4	43	3.9	
	Total	141	8.8	197	17.9	
		Mean	2.2	Mean	4.5	

From Table 2, it can be seen that the provision of assistive technology devices for the education of persons with visual impairment in schools located in rural areas had a mean score of 3.1 while those located in urban areas had a mean score of 6.1. Assistive technology for the education of persons with hearing impairments in schools located in rural areas had a mean score of 1.4 while schools located in the urban areas had a mean score of 3.7. On the other hand, assistive technology devices for the education of persons with mental retardation and learning disabilities in schools located in the rural areas had a mean score of 2 while schools located in the urban areas had a mean score of 4.2. The availability of assistive technology for students with physical impairment in schools located in rural areas had a mean score of 2.4 while those located in the urban areas had a mean score of 3.9. The total mean score for schools located in rural areas was 2.2 while that of those located in the urban areas was 4.5. The mean difference between schools in rural areas and schools in urban areas was 2.3. Thus, the null hypothesis which states that there will be no significant difference in the availability of assistive technology devices between schools in urban areas and schools in rural areas was rejected for an alternative hypothesis. This showed that the difference between the availability of assistive technology between schools located in rural areas and schools located in urban areas was significant since the difference between the mean score for schools located in urban areas and schools in rural areas was lower than 2.5 for the calculation.

Findings of the Study

The result showed that both special education and regular teachers were aware of assistive technology devices that are used in the education of persons with disabilities even though a few teachers claimed ignorance of such devices.

The study also discovered that many of the schools that educate children with special needs in North Central Nigeria did not have most of the assistive technology devices that were used for the education of persons with special needs. Some of the schools that had them did not have them in sufficient quality and quantity; furthermore, some of the available devices were personal to the students and not the school.

Conclusion

Based on the findings of this research, the researcher concluded that though the teachers who taught children with special needs in North Central Nigeria had awareness of assistive technology devices, they were not competent in teaching using the devices. This suggested that they only had a superficial awareness of the devices without deep knowledge. The lack of competence was a result of a lack of integrating assistive technology devices into teacher training programmes and that was why both graduate teachers and non-graduate teachers alike exhibited the same lack of competence.

Recommendations

Based on the findings of this research, the following recommendations were made:

1. There is a need for an enlightenment campaign on the importance of assistive technology devices in schools. This will create more awareness among teachers and students particularly those who claim that they are not aware of the existence of assistive technology devices.
2. The government should come up with a policy on assistive technology devices to make it mandatory for schools to purchase them before they can admit children with special needs into their schools. This should be made into a law backed by the appropriate statute. This

will make local, state and federal governments provide these devices for children with special needs. This is because many concepts and some aspects of the curriculum will not be learned without assistive technology devices.

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