INTEGRATION OFASSISTIVE TECHNOLOGY IN INSTRUCTION FOR LEARNERS WITH DISABILITIES IN INCLUSIVE SECONDARY SCHOOLS IN CENTRAL SENATORIAL DISTRICT KADUNA STATE, NIGERIA

By

JIMADA ABDULLAHI

E83F/26403/2013

A RESEARCH THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN THE SCHOOL OF EDUCATION KENYATTA UNIVERSITY

NOVEMBER 2016

DECLARATION

I affirm that this research thesis is my original work and has not been presented for a degree in any other university. The study has been complemented by referenced works properly acknowledged. Where text, data, graphics, pictures or tables have been on loan from other works including the internet, the sources are specifically recognized through referencing in agreement with the anti-plagiarism regulations.

Signature _____ Date 7/11/2016

Jimada Abdullahi

Department of Educational Communication and Technology

Supervisors

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as the university supervisors.

Signature _____ Date 7/11/2016

Dr. Bernard Mugo

Department of Educational, Communication and Technology

Kenyatta University

Signature _____ Date 7/11/2016

Dr. Hamisi Babusa

Department of Educational, Communication and Technology

Kenyatta University

DEDICATION

This thesis is devoted to almighty Allah. It is also dedicated to my dear wife, Rukaiyya, and my children, Mahmud, Aisha, Nabila, Muhammad Almin and Abdullah for their support and patience even when my presence is most needed.

ACKNOWLEDGEMENT

It is not possible to express all my thanks in terms of the kind heartedness tireless work and total dedication bestowed upon me by my supervisors, Dr. Bernard. C. Mugo and Dr. Hamisi Babusa of the Department of Educational Communication and Technology- Kenyatta University-Kenya. Their expert proficiency coupled with resourcefulness, continuous feedback and ever cheering spirit enabled me to do this research within the limited time frame.

I would wish to thank Chairperson Dr. Sophia Ndethiu, members of academic staff and support staff of Communication Technology Department for their help and administrative support guidance while writing this thesis. I am extremely grateful to Kaduna Polytechnic administration for the financial contribution to my tuition fees and research, without which I would not have made it. I am greatly Indebted to formal Director College of Science and Technology late Mrs. E. O. Ahmad and my Head of Department Education Technical Kaduna polytechnic Dr. D.M. Dangana for their kind heartedness and support towards completion of my study. I would like to register my appreciation to the colleagues in the Kaduna polytechnic for their encouragement and willingness to support my efforts. I wish to thank Alhaji Isah Kadu Mohammed, Dr. Adamu. A. Bagudu, Hajiya Rashidat. O. Shuaibu, Dr. Amina Ahman and Dr N. I. Nuhu for their support towards the professional presentation of this thesis. I sincerely appreciate and thank the Jimada family for their encouragement and support they accorded me during my study. All praises and gratitude be upon almighty Allah for the bountiful mercy and grace bestowed upon me during the course and other days of my life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACROYNMS

AT	Assistive Technology
BECTA	British Educational Technology Agency
CAST	Centre for Applied Special Education Technology
DI	Differentiated Instruction
ICT	Information and Communication Technology
IDEA	Individual with Disability in Education Act
IE	Inclusive Education
IEP	Individual Education Plan/ Program
JAWS	Job Access with Speech
LWD	Learning With Disability
NVDA	Non Visual Desktop Access
PCS	Picture Communication Schools
PSE	Public Service Agreement
RTI	Response to Intervention
TAM	Technology Acceptance Model
TDD	Telecommunication Devices for Deaf
TTS	Text to Speech
UN	United Nations
UNESCO	United Nations Educational Scientific and Cultural Organization

ABSTRACT

Learners with disabilities (LWDs) in inclusive Education (IE) settings need access to quality education just like their able peers. Accessing quality instruction is a major step to the success of their education, their independence as well achieving quality IE. This study critically examined the integration of Assistive Technology (AT) in support of instruction of LWDs. The study restricted itself to the education of Learners with visual challenges, hearing impaired and mobility impaired in secondary schools in Nigeria, with a focus on integration of (AT) and instructional technique that would address the problem of these students in accessing information for their education This study was based on the following objectives: To establish government policy to guarantee quality instructions for LWDs in IE set up in Nigeria, to ascertain the availability of the ATs for teaching the LWDs in IE schools in Nigeria, to establish ways in which the teachers in the IE schools design and conduct their instructions to ensure LWDs learn effectively, To establish how teachers use AT for instruction of LWDs; To find out challenges facing teachers when using ATs for instruction and to assess the attitude of teachers towards integration of AT in teaching LWDs in IE schools. It was envisaged that the findings, recommendations and the suggestions of this study will be valuable to the Ministry of Education and the Nigerian government in general, in decision making in terms of policy and budgeting in the areas of provision of appropriate assistive technology for LWDs in inclusive secondary education. The results of this research are also expected to offer teachers with special knowledge on the integration of the AT in their teaching. It is also expected that the study will enlighten other stake holders in the field of education on LWDs including sponsors on the assistance they would give to enhance the education of LWDs. The study adopted the survey research design. The location of this study was Central Senatorial District of Kaduna State of Nigeria. A sample of 16 schools, 120 students, 340 teachers, 16 resource center personnel and 16 school principals were selected for the study. Data for this study was gathered using questionnaires, observation schedule, check lists, interview and documentary analysis guides. A pilot study was carried out before the real data collection to ensure that the instruments effectively gathered the required information for the study. The quantitative and qualitative data generated were analyzed using Statistical Packages for Social Sciences (SPSS) version 17.0. The analyzed data was then presented in form of frequency tables, charts and graphs. The research found that the disabilities law only spelt out real meaning of the idea of equalizing learning opportunities for all children in spite of their disabilities without particularly taking into account the nature of environmental requirement and terms of ATs services for each student's disability; The study established that ATs were not adequate to take care of the need of LWDs in the IE classrooms and school environment in Kaduna State Nigeria is not conducive for LWDs; The study also found out that the teachers were using lecture methods to teach LWDs. Also the study further found out that blind and visually impaired learners did not take mathematics due to lack of special methods or skills in teaching mathematics by their teachers, as well as lack of ATs resources in the schools. It was further found out that teachers lacked of skills to use AT. Among other recommendations the study recommended that teachers of learners with disabilities should undergo teacher professional development and that AT resources should be provided in all schools.

CHAPTER ONE

INTRODUCTION

Integration of assistive technology (AT) in teaching learners with disabilities (LWDs) is vital. Integration of ATs to a large extent contributes to the quality teaching of LWDs in all aspects of education. This chapter contains an introduction to the study, background of the study, statement of the problem, purpose of the study, objectives of study, research questions; significance of study, theoretical framework, conceptual framework, limitations and delimitations of the study, and ends with operational definition of terms.

1.1 Background of the Study

Globally, Education is recognized as an important tool for individual and national development (Yusuf & Fakomogbon, 2012; Bosick, Starcher, Kelly & Hapke, 2008). Educating learners with disabilities in the general classroom setting can enhance the learners' learning as well as enhancing their abilities in social interaction. This approach is commonly known as Inclusive Education. According to Mukhopadhyay, (2009), Inclusive Education (IE) is acknowledged as the best way of increasing access for education by learners with disabilities (LWDs).

However, teaching learners who have disabilities among many without disabilities in the inclusive setting poses an instructional problem for teachers (Mugo, 2013). This instructional setting requires teachers to employ diverse set of special instructional approaches and methods. In essence, inclusive theory emphasizes that mainstream schools should respond positively to all learners. The theory states that inclusion is

about the learner's rights to partake fully instructional processes in the general school setting and it is the duty of the teachers to accept the learner and offer them the necessary educational support(Mntmal: file: if:/new folder encyclopedia. Mint).

Inclusive education is presently in practice worldwide. For instance, in the United States of America (USA), it has been reported that fifty four (54) percent of deaf students who were of school age are in full-inclusion programs. (Elekewe, 2000). Indeed, since the United Nations Universal Declaration of Human Rightsin1948, and the convention on the rights of people with disability which entered into force 2008 which was ratified by the United Kingdom (UK) in 2009, 145 countries had put their signatures as at June 2010. Moreover, the World Education Round-table meeting held in Dakar, Senegal in 2000 resolved for action and declaration on Education for All (EFA). EFA pronouncement implies that all learners irrespective of socio- economic status and exceptionality should have had access to basic education by 2015, and special learning needs of learner should have been considered; (Dakar frame work of Action, 2000).

Meeting the EFA goals particularly for the exceptional students is a herculean task for many countries but must be achieved (Ahon, 2011). This is however not happening. For instance, (Karen, Jeni, Monique, Lindu and Molloe, 2011) observed that special education personnel shortage persist across the globe in spite of strategic, forced recruitment and retention initiatives. They stress that the demand and supply of special education teachers and related personnel service providers has been the cause of concern among schools administrators and state education officials in USA and internationally for several decades. Indeed the problem of shortages of personnel in

special education has been identified as a universal challenge around the world. Karen, et.al (2011) points out that the need for qualified specialist teachers in the field of special education will continue to rise faster than all the other types of teaching personnel.

Moreover, numerous studies over the years have attributed teacher preparation, recruitment and retention as a big challenge. Also lack of teamwork between general education and special education specialists, inadequate time to complete mandated policy paper work, lack of equipment and managerial support has contributed to this challenge. In Australia for instance, the increase in population and inadequate teachers training programs are key factors in the special education crisis. Worse of, in Qatar inclusive educational opportunities are still at infancy levels. Implementation and development of comprehensive policies on inclusive education at the national level by the government has taken enormous time and has come under public criticism exponentially (Karen, et.al. 2011).

The problem of lack of qualified personnel and specialists to handle education for LWDs in IE schools is not only unique to developed countries. This predicament is more severe in the developing countries. For instance, in Botswana two major challenges have been identified, these are: the negative attitude of teachers towards inclusion, lack of trained personnel and lack of special resources to aid the required learning (Janine and Neo, 2011). In Nigeria, the state of IE is not different from that of other developing countries. Although there are internationally well laid down laws to support the inclusive education, the law does not guarantee quality instruction for learners with disabilities. For example, despite the Nigeria's National Policy of

Education NPE (2004: 49) ruling that all essential amenities, resources and learning material that guarantee straightforward access to quality education shall be made available to schools, complaints about inaccessibility especially for quality instruction for learners with disabilities still prevails (Olutokun, 2011).

It is vital that the learners with disabilities have right to quality education just like their non-disabled peers (Mugo 2007). Mugo affirms that sophistication in technology in the most recent time has generated new ways for individuals who are challenged to partake in class activity, carryout tasks and allow all the students to reach their potential. Further, Hopkins (2004) posits that assistive technology assists several LDWs to access information, link up with others, and take part in ways that would not have been feasible without the use of the AT devices. In other words, AT is an instrument to unchain learners with disabilities and increase their horizons of learning.

Now that most ATs for learners with disabilities are getting advanced, schools need to be equipped with the current AT facilities and the services for the purpose of enhancing effective instruction for learners with disabilities in the mainstream classrooms. It is necessary to note that the AT does not provide the ultimate answer to the circumstance or disability. It only assists the users to complete an otherwise difficult learning task. Voice synthesizers/ screen readers or text to speech (TTS) is a specialized type of software that converts electronic text to speech. This is used by unsighted and low sighted to receive instruction, transmit response, access web browser and the web content. Equally voice recognition software allows mobility impaired students to operate computer and enter data using voice rather than mouse or key board. Also, learners with hearing impairments use telecommunication devices

for the deaf (TDD) connected to a modern and standard phone with input device and screen to amplified either typed messages or call the recipients. They then relay responses back to the TDD user. Well matched AT provides solutions for group persons experiencing challenges in their learning (or other pursuits) resulting from upshot of disabling conditions (Hopkins, 2004). In essence AT is an important part of an inclusive classroom since it increases, sustains or develops the efficient capabilities of a learner with a disability.

However, this has not been the case. In many developing countries and even in some developed countries, the learners are provided with AT to just address their basic needs. In Kenya, for example, assistive technology devices are simply used to meet the needs of learners with disabilities (Ministry of Education Science and Technology (MOEST, 2003). Learners with special educational needs require resources both at an individual and classroom level depending on the extent and nature of their disability. However, it is noted that in Kenya most schools operate on basic instructional learning aids as the existing ATs devices are obsolete and nonfunctional due to lack of spare parts and technical know-how. Since the problems experienced by the learners are related to mobility and manipulation of learning resource there is serious need for the provision of functioning AT devices (Nyaga, 2010).

Hopkins, (2004) posits that having realized that learners with disabilities require AT devices both at the individual and at the school level, the focus should be towards increasing the ability of learners with special needs to participate effectively in instruction. This should include provision of AT devices and software for learners with disability by the government. This will enable them to access quality education

and there is also need to train more in–service teachers handling learners with special needs. This should be preceded by an assessment of the learners to determine the nature of their disability. This will then enable appropriate choice of ATs for effective instruction. Marino, Marino and Shaw (2006) assert that insufficient preparation of teachers on training entering into the profession has great effects on the utilization of AT in the classrooms. Teachers on training require advocacy as well as to be equipped with knowledge on how to utilize modern ATs which bridge many of the gaps for LWDs" (Nelson, 2006). Furthermore, the level of skills required for teachers who are expected to utilize AT for instruction has been limited (Sze, 2009). Sze adds that even knowledgeable teachers who struggle to remain up to date in the AT have difficulty doing so. Further, Sze (2009) stress that incorporation of ATs only is not sufficient to guarantee an inclusive environment despite its important, but teamwork approach among personnel is one of the paramount prerequisite for any goal of program to be achieved.

The role of teachers in the successful integration of assistive technology in the inclusive school system cannot be over emphasized. In a UNESCO (2001) report that, "it is the work of government to set policies and objectives of inclusive education but it is individual person (teachers) who determines the success or failure of inclusive education" (p.33). Unfortunately the teachers who should ensure that inclusive education does not fail in majority of developing countries are not trained. Indeed one could argue that inclusive education has not been taken seriously in many parts of the world. Literature in the field of effective inclusion is still scarce. Indeed it has been observed that there has been very little study on the use of AT in instruction for learners with disabilities in less developed countries. Actually, globally there has been

relatively scanty research on the appreciation of information communication technologies (ICTs) to support inclusive practice (BECTA, 2003). For instance, the situation in Nigeria indicates that studies on the accessibility of ATs as well as application of ICT for instruction of LWDs in the country are very few. (Farell and Shafiaka, 2007; Yusuf & Fakomogbon, (2008).Owing to the growing needs of ATs in all aspects of instruction and life of individual with education challenges, it is imperative that learners with disabilities have access to quality instructions where assistive technology is integrated.

A pertinent question one may be prompted to ask at this point is whether learners with disabilities in Nigeria are accessing quality instruction. This study therefore endeavored to establish how assistive technology was being integrated in instruction for learners with disabilities in inclusive secondary schools in central senatorial district of Kaduna state in Nigeria.

1.2 Statement of the problem

Despite increasing access to technology, the academic performance of learners with disabilities in Nigerian secondary schools still falls far below expectation. This is because learners with disabilities in secondary schools do not have the opportunity to access effective instruction. The learners face abundant and varied difficulties especially in obtaining information for their studies. This case is understandable since teaching a small number of learners with disabilities among many able bodied learners in the inclusive setting poses a problem to the teachers. Further, in secondary schools generally, students have to interact individually on considerable amount of information at their disposal. Due to their disability, these students find it difficult to

do so. It therefore requires specialized and meaningful assistive technological and methods support for them to benefit from the classroom instructions.

In spite of the detail information of well-known established relationship between what teachers trust and what they do, generally the views on inclusion of LWDs in regular schools "has been clearly absent from deliberations of changes in policy and practices" (Soodak, Podell and Lehman, 1998). Also Wong & Cohen, (2011) reveals that the post primary schools have been facing challenges of demand for inclusion, changes in instructional practices and incorporating assistive technologies into curriculum is a matter of concern. Also, anxiety amongst the instructors and others using ATs is on how to use these new or 'strange' technologies. Their inability to use them due to lack of training consequence upon this, the students lag behind their able-bodied in the schools. This is particularly so in the developing countries in which Nigeria is included.

Upon all the benefits attached to the use of ATs for instruction of LWDs in general schools system in terms of its flexibility in method and materials that can enrich the lesson of LWDs is elusive in Nigeria. To this end the study examined the extent to which the Assistive technology is being used for instruction for learners with disabilities in the secondary schools.

1.3 Purpose of the study

This study critically examined how assistive technology is integrated in the instruction for learners with disabilities in inclusive secondary schools.

1.4 Objectives of the study

The following specific objectives were formulated to guide this study:

i) To establish Government policies put in place on the use of ATs to guarantee quality of instructions for learners with disabilities in the inclusive secondary setup in Nigeria.

ii) To ascertain the availability of the assistive technology for teaching learners with disabilities in an inclusive secondary schools in Nigeria.

iii) To find out ways in which the teachers in the inclusive secondary schools design and conduct their instruction to ensure that learners with disabilities learn effectively.

iv) To establish how Assistive Technology is being employed for use to ensure quality instruction.

v) To investigate challenges experienced by teachers while integrating ATs into instructions in inclusive schools.

vi) To assess the attitude of teachers toward integration of assistive technology in teaching learners with disabilities in inclusive settings in secondary schools in central senatorial district of Kaduna state Nigeria.

1.5 Research Questions

The following research questions were generated to guide this study.

i) Which government policies on ATs are in place to guarantee quality instructions for the learners with disabilities in the inclusive setup?

ii) What kinds of Assistive technologies are available for the instruction of learners with physical challenges in inclusive schools in Nigeria?

iii) How do teachers teaching in inclusive secondary schools design and conduct their instructions to ensure the students with disabilities learn effectively?

iv) How is assistive technology being used to ensure that learners with disabilities access quality instruction in inclusive schools?

v) What are the challenges facing the teachers in integrating assistive technology to ensure the learners with disability access quality instruction in the inclusive secondary schools?

vi) What attitudes do teachers 'have towards integration of assistive technology in teaching learners with disabilities in inclusive schools?

1.6 Significance of the study

The goals of enrolment of learners with disabilities into mainstream learning environments are to ensure that the learners acquire similar knowledge and skills as their able peers despite their disabilities. Mainstream education should enable learners to be competent and efficient as their non-disabled counterpart (Mugo, 2013). In view of this, it is expected that the findings and suggestions of this study will benefit the government of Federal Republic of Nigeria as well as the state Ministry of Education, teachers, profession itinerants, paraprofessional, parents, private organizations, non-Governmental Organizations, stake holders and policies makers. More precisely, the findings of the study are envisaged to be beneficial to the government officials in their decision making process in terms of policy and budgeting in the areas of provision of appropriate assistive technology for programs of inclusion for learners with

disabilities in secondary as well as in the facilitation of in service programmes for the teachers of the disabled students in Nigeria.

These findings are also expected to regularly provide teachers, itinerant and other supportive personnel with adequate knowledge required to design and conduct effective instructions using assistive technology for learners with disabilities. The results of this study are expected to be of great use to Non- governmental organizations (NGOS) concerned with the welfare and education of learners with disabilities.

The study results will also enlighten the stakeholders in the field of special education with adequate information on types of assistive technology available in the market and benefits for each. The study also provides appropriate information on how these ATs can be obtained and maintained. In essence, it is envisaged that the findings of this study would have more value to the already existing literature in the field of education for learners with disabilities.

1.7 Scope and limitation of the Study

This study was conducted within the following scope and limitations

1.7.1 Scope of the Study

This study is focused on use of assistive technology by learners with disabilities to access quality instruction technique that would assist them to acquire in inclusive secondary schools in Nigeria.

1.7.2 Limitations of the study

This study was conducted under the following limitation

i. While there are many secondary schools in Kaduna and Nigeria at large, data for study were gathered in only secondary schools in central senatorial district of Kaduna state. This indicates the extent to which the findings of this study could be generalized.

ii. The research was limited to only assistive technology for instruction for learners with disabilities in inclusive education set-up and instructions focused mainly on Blind and visually impaired, Hearing impaired and physically challenged students, while there are other students in the schools.

iii. The study was based on education for the learners with disabilities challenges in accessing quality instruction inclusive schools settings at lower levels of schooling.

1.8 Assumptions of the Study

The following were assumptions of this study:

1. The researcher assumed that the respondents included in the study provided the researcher with accurate information.
2. Researcher assumed that the respondents had provided documents for the study and also allow the researcher to observed their duties
3. Researcher assumed that attitude of the respondents had certain toward the integration of ATs for instruction of learners with disabilities.

1.9 Theoretical Framework

This study adopted the Technology Acceptance Model (TAM) theory of Davis, Bagozzi, and Warshaw (1989).This theory sees how person's condition selves and accept to utilize a new technology. It recommends that the best way of comprehending information system is determined by two key points namely perceived usefulness and perceived ease of use. In essence, the theory reveals that perceived usefulness and perceived ease of use with which an individual's persona come into term to utilize a technology as an intermediary of real system use. Moreover, Perceived usefulness is seen as directly influencing perceived ease of use.

The TAM theory adds more belief factors, and examines antecedent and modulators of perceived usefulness and perceived ease of use (Wixom & Todd, 2005). This theory hence has strong attitudinal elements and predicts what persons have in mind or intention to act, that they will be free to act devoid of restriction.

In practice, difficulties such as restricted capability, time, location in terms of environment or managerial confines, and uninformed habits will hinder the freedom to act. Perhaps one would understand better guided by the following schematic diagram.

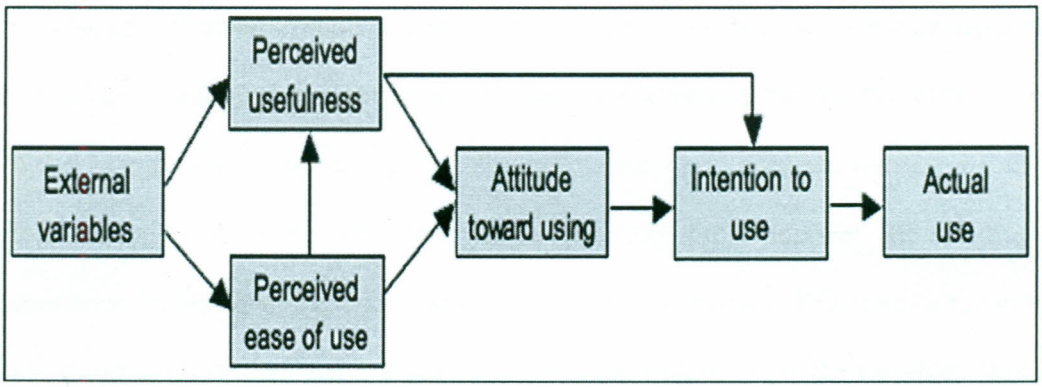


Figure 1.1: Schematic Representation of TAM theory

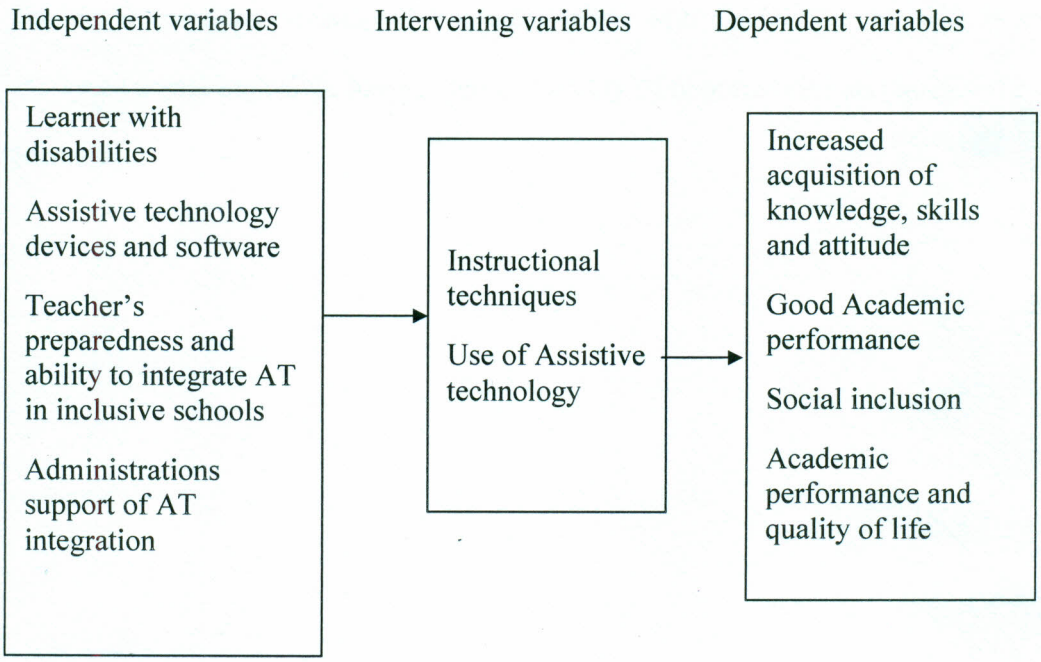
Source: Adopted from Davis theory, (1989)

In brief, basing the study in this theory could help in gathering information about how the teachers of learners with disabilities perceive usefulness of AT integration to facilitate learning. Further, despite the high cost of the AT and the constraints of using the ATs as pointed out by Mugo, (2013) the effort to make the AT available for use in the inclusive schools could be understood based on this theory.

1.10 Conceptual framework

The conceptual framework of this study relates assistive technology and achievement of quality inclusive education. If there is lack of accessibility to quality assistive technology in inclusive settings, the achievement of quality education of learners with physical challenges may be elusive. On the other hand if assistive technology is integrated to support quality education of LWDs inclusive education may likely improve. In this study, achievement of inclusive education will be quantified in terms of quality of instruction learners with LWDs receives in inclusive institutions.

Additionally, teacher's preparedness is a key determinant into the extent of assistive technology integration in instruction. One can then argue out that the higher the level of AT integration in supporting inclusive education, the better the mastery of new dispositions by learners. This in essence does not only improve the academic attainment by the learners with disabilities but also increases their opportunities in future and improve their lives. Figure 2 schematically shows how the variables of this study will interrelate.



Source: (Researcher Design, 2013)

Figure 1.2 conceptual frameworks in integration of assistive technology in support of inclusive education

Education of learners with disabilities in mainstream school setting is influenced by several factors, some of which operate independently (independent factors) and others

dependently (dependent factors). In this study, the independent factors will be integration of AT for instruction learners with disabilities in mainstream schools, availability of quality of AT devices and software's for the LWDs and administrative support set to ensure quality education for these learners in the inclusive school setting all these are independent variables. These factors influence the acquisition of quality education, access to curriculum and functional capabilities of learners with disabilities (intervening variables).When proper intervention is done using broad collections of assistive technology devices as well as use of well-designed and flexible instructional techniques to teach learners with disabilities, this will lead to increased social inclusion, independence, equality of opportunities and quality life of learners with disabilities.

1.11 Operational definitional of key term

This section presents the definitions of key terms in this study

Assistive technology service: any services or direct assistance rendered to aperson with physical challenges to work effectively despite their disabilities.

Adaptive technology: external assistance rendered to improve an individual's functionality within his or her surroundings such as adaptive technology voice recognition/ synthesizer, and Braille embosser.

Disability: this refers to any loss or reduction of functional ability (resulting from any form of physical challenges) that hinder the individual's functionality to take in any task within the context generally well thought-out for able-bodied individuals.

Mainstreamed/ Integration: Define as the social and instructional integration of learners with disabilities into instructional programs. It represents a common interpretation of the principle of educating learners with disabilities in least restrictive environments.

Inclusion: denotes making commitment to do whatever it takes to enable every learner to belong regardless of learner's ability to achieve educational success. It is aimed at fostering acceptance of diversity by ensuring that each student has access to learning in general educational community.

Inclusive education: the practice of instructing learners with disabilities alongside their able-bodied peers. Way individuals with physical challenges attend the same classes' with their able peers, as if they do not have disability general schools.

Special educational needs' learners: learners with challenges or facing difficulties in accessing quality education compared to other able-bodied learners of the same age as consequence upon their disabilities.

Technology integration: the use of technology devices to facilitate instructional practices in classroom teaching and learning.

1.12 Chapters Summary

This chapter has described what prompted this study. It also has stated the problem of study, the objectives, the significance, the scope, limitations as well as the theoretical framework guiding this study. Also this chapter has explained how the study was conceptualized; the scope and limitation of the study as well as the basic assumptions of the study have also been explained. Finally the chapter has presented the definition of operational terms. The following chapter entails the literature review based on the objectives of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The previous chapter dealt with background information and what this study intended to find out. This chapter has reviewed the literature related to the current study. The literature was reviewed based on the study objectives and hence under the following sub-headings: inclusive education, assistive technology, integration of assistive technology in sustaining instruction for learners with disabilities in IE setting, availability of AT in support of instruction of learners with disabilities in IE setting, instructional approaches in education of physically challenged learners in inclusive setting, policies that are in place to guarantee quality instruction of learners with disabilities in inclusive schools' setup and a summary of the existing gaps in the literature.

2.1 Inclusive Education

Inclusion purports that students with disabilities can be active, valued, fully involved as active members of a class in which dynamism is viewed as the standard and excellence in education is provided through a combination of important programs of study, efficient instruction and essential supports (Smith, Holloway, Patton, Dowdy, 1998). This current trend of education agitates for the assignment of learners, in respective of their disabilities in the inclusive classroom. Whichever special services or assistance required are to be brought to the learners with any form of disabilities to improve and sustain all aspects of teaching/learning taking place in the inclusive classroom setting. Inclusion means a drastic change in terms of school program of

study, pedagogy, appraisal and assemblage of students. It is this note a worthy system that ushers in diversity arising from sex, ethnic group, language of origin, community locale disability" (Mittler, 2000, p12). Under the inclusion model, learners with disabilities expend nearly all of their moment along with able-bodied students. Inclusive theory emphasizes that mainstream schools should respond positively to all learners as individuals and not only assimilate handicapped individuals and mainstream them but accommodating and educating them.

In essence, inclusive education differs from the formerly held opinion of integration which was principally concerned with accommodating and educating learners with disabilities in mainstream schools. In essence, inclusion is concerned with individual's rights to partake in school activity as well as school recognizing the child. Inclusion rejects the issue of special schools or special classrooms which isolate students with disabilities. Moreover, United Nation Scientific and Cultural Organization Salamanca statement of 1994 states values, guidelines and follow practice of learners with disabilities education and asserts that instruction for all cannot be realized without adding all types of learners in one school environment(UNESCO, 2001)

Despite the importance of inclusive education, Karen, Jeni, Monique, Lindu and Molloe (2011) observed that a review of the literature indicates that shortages in special education personnel has been on the increase across the world in spite of the strategic and forced recruitment and retention initiatives. They further stress that the demand and supply of special needs teachers as well as others personnel has called for concern among school administrators and state education officials in the USA and

internationally. Indeed for several decades; shortages of personnel in special education have been identified as a universal challenge around the world. This triggers one's mind to think about the situation in developing countries for example Nigeria. A question one may ask is if there is a problem of shortages of personnel in the developed country that create a barrier toward achieving goals of inclusion, is what then would be happing in the developing countries? This study attempted to establish the extent to which inclusive education was being implemented in a developing country and particularly Nigeria.

2.2 Assistive Technology

Assistive Technology (AT) has been in existence for a very long time and it refers to both goods and services for learner with disabilities (Casely – Hayford and Lynch, 2003). The Assistive Technology Act (1998) and the Individual with Disability Act (Amended 1997) USA defines an AT devices as every bit of tools or equipment (whether picked up from mantelpiece, customized, or modified) to boost, sustain or develop the practical competence of a learner with disability. AT devices may be classified as low technology, medium technology, and high technology, as by its level of sophistication (Blackhurst, 2001; Hopkins, 2006a; King-sears and Evmenova, 2007; Netherton and Deal, 2006).

Low technology are those devices which are simple to make or obtain (Evans, Williams and Metcalf, 2010; Scherer, 2005). Such items consist of a built up spoon handle, slate and stylus, sticky notes and pen grips, and bowls with lips, The Low-technology are less complex devices with little or no maintenance required and

generally useful in classroom instruction of LWDs. The Medium-technology devices on the other hand are sensibly complex equipment which includes audio-tape recorders, wheel chairs, talking calculators and visual timers (Evans, Williams & Metcalf, 2010; King-sear and Evmenova, 2007). The dissimilarity among medium and high-tech AT is mainly cost effectiveness and comparatively sophistication of the equipment. That is the more expensive the equipment, the more sophisticated the equipment as well as complex to utilized the device. Medium-tech equipment is moderately low cost equipment compared to high-tech equipment due to less intricacy as such necessitate only basic instruction or little ability to utilize the device for teaching/learning process in an instructional setting. Medium-tech assistive technology include digital tape recorders, talking books, visual timers, wheelchairs, electronic spinner, voice output device, audio calculator among others.

High-tech are sophisticated devices often used to accommodate for a particular disabilities among the physically challenged individual to function and workaround their disabilities (Bryant, Bryant, Shih and Seok, 2010; Evans, Williams and Metcalf, 2010). Such devices include canes, voice synthesizer, Braille embosser, prosthetic limbs, note taker, electronic page turners, computer hardware and software. The High-tech AT usually request that students, the teachers, and resource center personnel be trained on how to appreciate the use of High-tech AT. Incorporation of the AT in inclusive school and particularly in the developing country is an issue that might require scrutiny. In essence this study considered joining other research in the world to establish the availability of the AT for use in inclusive secondary schools in a developing country and in this case Nigeria.

2.3 Integration of Assistive Technology in sustaining Instruction of Learners with Disabilities:

Disability limits efficiency of a person's ability in various ways depending on the type or nature of the disability (Ahon, 2011). Over the years, several means of helping individuals overcome these limitations to their functional capabilities have been devised through the use of assistive or adaptive technology. In essence assistive technology is utilized by persons with physical challenges so as to carryout tasks that would have been hard or unfeasible. (Szlamkowicz, 2007).Szlamkowicz further observes that incorporation of assistive technology for instruction of LWDs in inclusive school is an efficient way of increasing the quality of instructional outcomes as well as improving efficiency of the self-determination and quality of life of individuals with physical challenges to be involved actively in all their societal roles within their communities.

Following this argument, lack of opportunity to suitable technology creates more additional barriers to integration of AT as well as rising in the discriminations against individuals with disabilities. In the past few decades, many developments in technology have been applied to learners with disabilities, especially visually impaired learners and hearing impaired. Some of the areas that have benefited from this development include mobility, information and communication. In mobility, for example, several electronic travel aids have been designed which substitute aural or tactile signals for information normally detected through sight.

In a bid to become more responsive to inclusive education practices, Tomlinson (2003) observes that educators try to discover a suitable AT that fit between the

disability, obvious in learner attribute and the AT to be obtained. But in practice, there is still little match; to bridge the gap for this mismatch teachers must be skilled in instructional strategies that include whole group, small group and individual instruction adaptation of teaching materials (AT) modification of curriculum; development of various assessment tools and knowledge of multiple intelligence theory (Blecker and Broakes, 2010).

Although, increase in incorporation and utilization of AT by mainstream users who are under pressure to keep pace with complex and demanding society, there is a need for effort to be made to train majority and especially educators to use the available AT in their instruction. In essence, owing to the growing need and dependence on technology in our entire life, this include the way we communicate and comprehend information for instructional realization, just having access to this technology in the school, or utilizing it because it is there, is not enough, but having knowledge and skill on how to use the AT is paramount (Besio & Salminen, 2004; Nelson, 2006; Rapp, 2005). Further, according to Blackhurst, (2005), the technology devices did not possess any mythical power by itself; to a certain extent the teaching/ learning process received through the assistance of technology is the major component. Deprived teaching will result to deprived instructional outcome. Therefore, learners must be trained on effective ways of gaining access to the available assistive technology and facilitators must strive to guarantee that suitable methodologies are employed for instruction of learners with dishabilles in inclusive classroom.(Besio and Salminen, 2004; Duhaney and Duhaney, 2000; King-sears and Evmenova, 2007).

In same vein, Rose & Meyer (2000) proposed that advancement in technology served as instruments for changing the nature of how technologies were employed for instruction of LWDs in inclusive school setting. However, this gave rise to the foremost universal design for learning (Centre for Applied Special Technology (CAST), 2010). Universal Design for Learning (UDL) "provides a blue print for developing educational objectives, pedagogies, resources and assessment that labor for every person – not a single, one-size-fit-all situation but relatively create dynamic approaches that can be adapted and accustomed for personal needs".

The Universal Design for Learning gives LWDs a sense of picturing information both textually, graphically, and orally), diverse means of learning (video, text, voice, picture) and various means of assurance with the resources(novelty, similarity), based on their personality requirements and learning ability" (CAST, 2010, p2). Through the use of accessible assistive technology, an individual with physical, psychological or sensory impairment can have access to right curriculum and social/leisure surrounding the school neighborhood, where this may have initially be extremely hard or unfeasible for the learners (Borg, Larsson and Ostergren, 2011; Netherton and Deal, 2006).

It is true that if the students with disabilities are assisted to obtain the tools that will enable them to learn better and independently throughout their lives, these learners would not only benefit more from their instructions in the learning institution but they would also live more independent and wealthier lives after schooling. This contemporary approach to education of the learners with disabilities could be

successful but an important question one would raise at this juncture is how is the inclusive school approach implemented in developing countries?

Teachers occupies a prominent position in the use of AT in inclusive school setting. Teachers Preparedness to effectively use assistive technologies is hence one thing which is vital in the use of AT (Abner and Lahm, 2002). However research has shown that teachers have insufficient knowledge in identifying and implementing assistive technology services (Abner and Lahm, 2002; Edyburn, 2000; Todis, 1996).All is not lost though, since it is also evidence that scholars and teachers are recognizing instructional need of assistive technologies in their programmes. This is a big step forward towards integration of AT for instruction for learners with disabilities in inclusive schools. The extent to which the teachers do this in an inclusive setting is a concern especially in the developing countries. This attempted to establish the availability of AT for instruction for learners with physical challenges, explore ways teachers in inclusive secondary schools design and conduct their instructions, explore how the AT is being used to ensure quality instruction in inclusive secondary schools, and further establish policies in place to guarantee quality instruction in inclusive secondary schools.

2.4 Policy in Place to Guarantee Quality Instruction of Learners with Disabilities in Inclusive Schools

There have been numerous policies and laws in existence to help the Nigeria governments to improve the right to use AT. For instance, in the United Kingdom Special Education Needs and Disability Act (2001) requested institutions to expand

methodologies for user-friendliness as well as deployment of AT in schools. The policies enacted by the various countries in the world differ significantly.

However, the IDEA grants equal access to education to learners with disabilities and further provides extra special need education services and procedural safeguards. Another current law which further emphasizes on educating the people with physical challenges says that all Children have a right to education and no one should Left Behind (NCLB, 2002). The law stipulates that the inclusive educational institutions must be responsible for all learners with disabilities and their performance in inclusive institutions. While Assistive Technology Act of 1998 stipulates that AT should be available to learners with disabilities and the suitable services must be provided for the maximum use of the technology. Americans with Disabilities Act (ADA, 1990) as well as section 504 of the Rehabilitation Act (Rehab Act, 1973), colleges and universities are banned from excluding qualified people with disabilities from their programs, services, and benefits by reason of their disability. They are thus accountable for establishing practices that allow learners with disabilities to have meaningful opportunities to take part and benefit from higher education.

For this to be realized, research has shown that it requires a variety of supports. These include, "philosophy, policies, people, materials, assistive technology and curricula" (Innes, Archibald and Murphy 2004). Apart from the American laws, the passage of the Commonwealth Disability Discrimination Act (DDA, 1992) of Britain provided a uniform legislative framework to ensure that people with physical challenges have equal rights to take part in instructional and community life like counterpart able-bodied students. Following this, the Government of Kenya in the year 2003 passed the

Persons with Disability Act (PDA). The act was predetermined to prohibit all form of bias against people with disabilities.

On instructional matters, Section 18 of the PDA states that: (1) No individual or academic schools shall refuse to admit any individual with physical challenges to any programme of study for any reason on the basis of such physical challenges, if the individual has the capability to attain broad learning in that course; (2) Academic schools shall put into consideration the needs of persons with physical challenges with regards to the entry requirements, pass marks, curriculum, examinations, auxiliary services, use of school facilities, class schedules, physical education requirements and other similar considerations (Kenya Law Reports,). In spite of these laws; one would argue that none of them guarantee quality of instruction for the persons with disabilities in inclusive schools.

On the legal basis in the USA, IDEA requires student success. In this case curricula can be modified and outcomes varied. Unfortunately in higher education all that is required is non-discrimination. Although universities in USA are compelled by law in (Section 504 of the Federal Rehab Act of 1973) not to discriminate against disable students on the basis of their physical challenges, it merely ensures that learners with disabilities (LWDs) have the same access to instruction "good or poor", like their peers without disabilities have.

Equally, in Kenya, the PDA gives general clarification of the practices that are not necessarily discriminatory (Opini, 2012). Furthermore, Mugo, (2013) argues that while much emphasis is on the admission of LWDs to the institutions, there are no

clear directives to the institutions to offer quality AT support to accommodate these students. In essence, the quality and the quantity of the students support in terms of ATs' is done at the discretion of the schools. In Kenya, assistive technology devices are simply used to meet the basic requirement needs of these students (Ministry of Education Science and Technology (MoEST, 2003). Learners with physical challenges require resources both at individual and classroom levels depending on the degree and type of disability. However, it has been noted that in Kenya, most schools operate on the basic instructional learning aids as the existing devices are obsolete and not functioning due to lack of spare parts and technical know-how. Since the problems experienced by the learners are related to mobility and manipulation of learning resources there is a serious need for the provision of functioning AT devices (Nyaga, 2010).

Despite the considerate ovation and promises of inclusive education notwithstanding, an inclusive practice world over, Nigeria is still grappling with the issues and challenges such as lack of legal framework for policy implementation, problem of funding and lack of professionally trained teachers, inadequacy in the curriculum content, inadequate access of quality AT for instruction of learners with disabilities and lack of awareness among the administrators and teacher among other things. These factors are continuously hindering IE (Ozoji 2003).

However, Nigeria education system is built on the National Policy on Education launched in 1977, revised in 1998 and reviewed in 2004.Since its first edition in 1977; the National policy on Education has always acknowledged the issues and different potential needs of groups of learners, physical, Social, mental, economic status

notwithstanding and in relation to formal system of education. Section 1 paragraph 4 (c) States that "every child in Nigeria shall have a right to equal instructional opportunities regardless of any actual anticipated physical challenges, each base on his or her capability", while paragraph 4 (a) state that "school instructional programs require related, skills and user, while attention and capability should decide the person's direction of education". Nigeria government is always fast in endorsing international protocols, even when these protocols have not been adequately researched into or tested in developing countries.

In essence, Nigeria adopted an inclusive education policy to ensure learners with disabilities are educated alongside with their able peer in the regular school system, but the country is yet to make any meaningful achievement in implementation of inclusive education. The challenging task is attributed lack proper framework in terms of nature of training both the pre-teacher trainees and in-service teachers should receive, as well as lack provision for AT support and lack of enabling environment for instruction of learners with disabilities. For instance wheel-bound LWDs scenario of which may necessitate need for custom- built facilities as well as architectural designs of school buildings to cater for their disabilities needs in inclusive settings. Such facilities include ramps and power-driven wheel chairs meant ease the movement of wheel-bound LWDs was not available in Nigeria schools. (Maccido 2013) Furthermore, in Nigeria, lack of AT infrastructure, trained qualified teachers and other instructional materials are prominent in inclusive schools (Ajobiewe 2007). In the same vein, Danesy (2005) in his study posited that pedagogical methods used by special teachers coupled with low funding by the government had hindered technical delivery services of quality instructions LWDs in Nigeria. This being the situation, it

is therefore imperative for this study to find out the measures the government of Nigeria has on ground to ensure ease of access to AT for quality instructions of LWDs and especially those in inclusive secondary schools.

2.5 Access to Assistive Technology for Instruction for Learners with Disabilities in Inclusive Secondary Schools

The Individuals with Disabilities Act of 1992 of United State of America, further promote incorporation of AT for instructions of LWDs in inclusive schools. The Assistive Technology Act was passed into law in 1998 (Library of Congress, 1998). This act put together condition of financing the build-up state-wide programmes to assist individuals, stakeholders, and private organizations gain access to AT and related services, and to develop the knowledge and consciousness of the facilitators and person who use the AT. The right to quality instructions for learners with disabilities in inclusive schools is realizable through access to right quality AT which creates least preventive environment, equal chance, build self-confidence, become self-sufficient and allow them to be included in inclusive settings, and assist teachers to meet the goals of their students. (Loeding, 2002; Duhaney and Duhaney, 2000; Scherer, 2005; Campbell, Milbourne, Dugan and Wilcox, 2006).

However, lack of theright to use quality assistive technology that is essential to raise a person's functionality has been identified as barrier to instruction of LWDs (Borg, et al., 2011; Schere, 2005). To ensure availability of the AT in the schools, different measures have been considered worldwide and more so in the developed countries. In the USA for instance, AT is an essential part of the Individual Education

Plan/Program (IEP) which is important and recognized as an integral part of learner who is identified to require specialized instructional needs provision. Successive financing by government to assist in the purchase of AT to be accessible for LWDs is laudable for inclusive education (Bausch, Mittler, Hasselbring and Croiss, 2005). In Western Australia, government institutions have a right to quality AT all the way through the collection centre of Inclusive studies (Department of Education, 2010b). AT collectively allows schools as well as teachers a right to a wide range of hardware and software consultancy services. Unlike US and some other industrialized countries whose governments have a legal mandate to provide assistive technology to learners with special needs, Nigeria has no such law. (Felix, 2011).As a result, most learners who need assistive technology might not access them.

Lack of access of the AT could be a great barrier to implementation of curriculum and hence difficulties to fit in social environment due to lack of skills that are required through the use of the AT. Though majority and especially in the developing countries may not access wide range of AT devices and software increasing rapidly across the globe.(Evan, et al., 2010; Loeding, 2002)Simpson, McBride, Spencer, Laudermilk and Lynch (2009) state that over 29,000 AT devices available, as against fewer than 100 in the 1970s. As the AT becomes more widely available, it is expected that the price of AT become low more affordable and a reasonable stage for the provision of the ATs to all intended users. What would be reasonable in this case is for measures to be put in place to guarantee that the technology is easily accessible to all the learners in schools. It would be cost effective to investigate the policies put in place especially in the developing countries and in this case Nigeria to ensure access of the AT in the inclusive schools.

2.6 Effect of Disability on Learning

The key to providing instruction that addresses the specific needs of each learner lies in the assessment and teaching through planned and research based interventions by a group of informed and talented teachers, parents and related service professionals (Copland, 2010). A learner, who cannot communicate well, be it due to autism or traumatic brain injury or deafness will have a barrier in learning (Notborn and Zysk 2010). Mugo (2013)postulates that lack of sight is a barrier to acquisition of new disposition especially for blind or visually impaired persons, the question that individuals needs to ask is; how does someone with disabilities gain access to instruction or clear descriptive relationship to objects and experiences from the real environment?

Similarly, a Norwegian study analyzed how environmental factors such as lack of access to quality AT for instruction for LWDs influences their learning and literacy development especially severely impaired or blind students?(Vik, 2008). He adds that conceptualization which does have a clear descriptive relationship objects or possible experiences in the world is only possible through imagination. To gain the experience of the world, the persons who are visually impaired or blind need to have ability to navigate independently, safely and efficiently. This could only be made possible through quality instruction where varieties of AT and flexible curriculum are considered (Notborn and Zysk, 2010).

Many barriers to learning emanate from the environment. Mugo (2013) in his study found out that in spite of the technological innovations, there still exist significant barriers for learners with varied disabilities to access most common

types of information. This requires proper use of AT in the instruction for the learners with disability and more so both the social and physical environmental conditions. On this basis, the current study sought to observe how teachers practically carried out classroom practices for instruction for learners with disabilities in IE setting.

2.7 Challenges of Integrating of Assistive Technology in Instruction for Learners with Disabilities in Inclusive Schools

Integrating assistive technology into teaching of LWD in inclusive schools and the curriculum in general is not an easy task. Teachers and stakeholders in education in general face a number of challenges, both fundamental and extrinsic, which they have to overcome as they try to fully integrate technology into their teaching. One of the challenges is the level of preparedness and willingness of the teachers to recognize and embrace the ATs themselves (Roblyer, 2003). Teachers sometimes view technological devices and software as a burden to their simple teaching life. However, teachers need to build up a more positive view toward technology if they desire to remain relevant and competitive in the 21st century.

In essence, rather than considering technology as some strange invader coming to create confusion and complicate the simple life of the past, teachers need to recognize that ATs are very much our own response to overcoming obstacles that stand in the way of a better, more productive way of life. They need to realize that ATs are intended to be part of our path to a better life, rather than an obstacle in its way. Grabe and Grabe (1998), argue that those teachers interested in technology integration must understand that some of their colleagues and others with whom they may interact will

not always share their interest. They need to exercise patience as they try to encourage and persuade others towards embracing ATs, particularly when a teacher lacks knowledge and training concerning the technological devices in question.

In a related development Roblyer, (2003) argue that most teachers have inadequate training in technological device and software usage and, even contemporary teacher training is not keeping up with technological developments. Grabe and Grabe, (1998) stressed that teacher preparation and teacher training in terms of technology integration continues to pose a big challenge to education, institutions have not been responsive to the expectation that new teachers will come into classrooms prepared to use the resources the schools have purchased, consequently many teachers graduate but still feel either not prepared or poorly prepared to use technology.

On another front, Grabe and Grabe, (1998) observe that the other reasons for such feelings of inadequacy on the part of fresh teachers is because higher institutions are less equipped with these technology devices and software than some of the schools where their graduates will be working. He stress further that most of the academic members of higher institutions are also unable to make appropriate use of ATs in their own classrooms and unwilling to try because of anxiety or lack of interest. Moreover, the common teacher preparation curriculum is designed in a manner that most experiences with technologies are focused in a single course that concentrates on learning to use the technologies rather than on learning how to facilitate learning with technologies.

In another development, Roblyer, (2003) posited that another challenge directly related with training is teachers' inadequacy knowledge of understanding the terms and concepts related to ATs. However, teachers with a good understanding of ATs are able to comprehend information with other users and professionals to exchange ideas in order to expand their knowledge. These teachers without such understanding blurt what to communicate, what to ask or answer and even where to start when faced with the challenge of integrating ATs in their teaching. They instead develop a phobia for anything ATs and fear trying out new ideas thereby disadvantaging themselves and their learners.

Though, teaching is the art of exchanging ideas, knowledge and concerns about teachers cannot utilize technology for their professional development to improve educational outcome of their learners. Shelly, Cashman and Waggoner (2010) opine that there are still lots of customary, impermeable teachers who cannot use technology devices and software, yet their students continue to encounter a bombardment of information technology devices outside the classroom - computers, mobile phones, internet, e-mail, social media platforms, text messaging etc. – vesting them with more technological skills than their teachers.

Also frequent technological changes pose a big challenge to educators. A general impression of the history of technology continues to show that the resources and methods of applying them will change, sometimes quickly and dramatically, placing a special burden on the already overworked teachers to continue learning new resources and changing their teaching methods (Roblyer, 2003). Yet, it seems evident that teachers have failed to keep up with the very fast technological changes. The

implication, thus, is that the latest technology devices and software are in limited use in education and in schools in particular. Grabe and Grabe (1998) assert that the challenge of remaining current is so real for teachers. This is because technology keeps changing daily and so should teachers update themselves, whether already trained or not.

However, financial constraints and strict budgets, schools rarely afford to assign funds to bring up to date their ATs. Educators cannot pay for most recent technologies since their schools are almost ever in dire monetary straits. According to Beukes-Amiss & Chiware's (2006) and Tella, *et al.* (2007) the implication will be that schools will more often than not have out-of-date equipment and material, moreover, the same monetary challenge leads to schools lacking the infrastructure essential to keep up with new technologies. In effect, this will simply imply that schools cannot take advantage of the newest, most powerful technological developments and innovations in the market. Tella, *et al.,* (2007) argue that inadequate budgetary allocations for the provision of ATs facilities even when teachers are generally skilled, and are willing to integrate ATs in their schools, may be constrained because of limited and unreliable ATs, as well as insignificant time allocated to them and their learners to use the facilities. According to Cox, *et al.* (1999), the factors influencing a teacher's frequency of using ATs include regular and sufficient access, use and experience with the ATs both inside and outside the classroom, and sufficient time to use them.

2.8 Attitudes of Teachers towards Integration of AT in Instruction for Learners with Disabilities in IE Setting.

The identification of suitable AT to assist LWDs should be a group task in terms of students' institutional stipulation (Marino, Marino and Shaw, 2006; Parette and Stoner, 2008). A dearth of properly trained manpower to help in purchasing matching and utilization of AT for instruction of LWDs is referred to as a general barrier; in that community which place less priority in this regard. (Schere, 2005). It is imperative to note that individuals with adequate training in this area and who are up-to-date with current trend of technologies are rare; as well they lack methodologies, principles that are connected with the utilization of these technologies. Despite the possible support of AT for instruction of all LWDs in inclusive schools, it is not widely implemented due to various barriers, including teachers' inadequate training (Hasselbring and Glaser, 2000). Introduction of AT in teachers training programs has been suggested by foremost researchers and AT professionals' in this area (Bausch and Hasselbring, 2004; Edyburn, 2004; Judge and Simms, 2009; Parette, Peterson-karin and Wojcik, 2005; Silver-paculla, 2006) cited in Denis, Lynette and Kathleen (2012).

Significance of incorporating AT into teacher training has been recognized, few institutions offer certificate or training in AT (Alper and Raharinirina, 2006; Bausch and Hasselbring, 2004; Lahn, 2005; Todis, 1996). Insufficient preparation in term of training has restricted the figure of teachers and therapists on utilization of AT in inclusive schools. (Bell, Ghak and Judge, 2010; Judge, 2001).

However, literature posits that one of the greatest determinants of successful inclusion of learners with physical challenges in general school classroom is the thoughts of teachers (Coates, 1989; Bacon and Schultz, 1991). Findings of research by Bacon (1991) and Wilczenski (1993) revealed that beliefs held by teachers of regular schools towards learners with disabilities determine the achievement or collapse of inclusion. If the teachers hold optimistic thoughts towards individuals with disabilities, this permits and thrust for the founding of policies that will guarantees the child right to be literate in general schools, while pessimistic thoughts towards individuals with disabilities in all ramification restricts their opportunities to be included in inclusive school(Altman, 1981; Jamieson, 1984).Majority of research under taken on inclusion of learners with disabilities in general schools point that teachers' negative behavior affects inclusive education.(D'Alonzo and Ledon, 1992).

The paramount position of teachers in giving rise to a truthfully inclusive classroom is uncertain (Anderson, 2007), but such significant work needs an appropriate; efficient and friendly environment as instructional means used in inclusive practices. From this viewpoint, AT facilities are hopeful to assist most learners to overcome barriers to learning. Research gives great proof that AT is both a strong huge tool in sustaining inclusion programme. It offers great deal of assistance in terms of exchange of information and ideas mostly for learners to engage in learning and assists them to breakdown some of the barriers that lead to lack of attainment of goals of inclusion and elimination of instructional exclusion (Becta, 2007).

Becta, (2004) reports that teachers readiness and their attitude towards integration of AT in support of inclusive education posits inadequate time, insufficient information

of the methodological employed for use of technology and insufficient knowledge on existing software are some of the major factors affecting use of technology. Becta further indicated that most of teachers (75%) admitted that AT and ICT apparatus and facilities have a great deal of possible support towards achieving the dream of inclusion of LWDs in general schools. These shows positive option offered by technologies and publicly state their importance and willingness of person to exploit its possible reimbursement. Despite this, almost all the beneficiaries of this technology make it clear they still require definite knowledge and supervision on how to utilize the suitable ICT/AT products.

Accessibility to ICT/AT are considered as crucial and important instructional materials even though, there was clear acknowledgment that AT facilitate access to information and improve quality of life of LWDs, Wong, Meng and Libby, (2010) shows that there are missing links between AT comprehension and capability to use AT amongst the teachers and claimed to be at ease with low and medium technologies such as Braille, slate and stylus, talking calculator and hand held magnifier many described themselves as "IT illiterate" when referring to high-tech AT devices such as screen readers and OCR (optical character readers) software. Still others had biased interpretations to technology. Misconception between AT and ICT was noticed when using both ICT faculties (internet) and AT in teaching. Despite the missing link there were personal agitators who championed the course of incorporation of AT to enhance quality instruction. Wong, Meng and Libby (2010) stress further that appreciating the different variety of AT for people with disabilities, instructors of general schools were not conversant with the varied types of AT accessible for specific disability needs. Characteristically, learners may need an AT support for:

speech access; Braille access; large print access; tactile communication systems, or any combination of these modes. In addition, instructors look AT, ICT and web instructional applications developed for regular instruction to be the same as ATI in spite of obstacles in terms of ATs awareness, at least one instruction made unprecedented effort to learn about AT and acquire basic knowledge to ensure that ATs were used amongst LWDs and their instructors.

In the same vein, regardless of the dynamism of these equipment, the influence of AT as a facilitator in all aspects of learners 'lives with physical challenges is evidently revealed in the literature (Abner and Lahm, 2002; Alper and Raharinirina, 2006; Mull and Sitlington, 2003; Okolo and Bouck, 2007; Wong & Tan, 2012).In a related development, Smith, Kelley, Maushak, Griffin-Shirley, and Lan, (2009) Wong and Cohen, (2011) reveals that learners with disabilities and their instructor insufficiently utilize the existing AT accessible to them Alper and Raharinirina (2006) affirmed that persons with physical challenges are not completely gaining from the use of AT in their houses, class and community settings. The researchers acknowledged major factors as the knowledge, incorporation and instruction of professionals of AT in school settings. Other areas of worry included lack of supportive services for training of instructors,' lack of group cooperation among instructors, parents, and service providers. According to Kapperman, Sticken, and Heinze, (2002) in USA 60% learners with visual impairments do not gain access to ATs.

However, Mugo (2012) postulate that there are numerous problems facing the integration of AT in instruction for learners with disabilities in an inclusive institution, such obstacles emanate from the inadequate technical skills on the part of

teachers to utilize some of the AT devices and software. Mugo asserts that despite the federal regulation that AT integrated services be provided in institutions of learning, most of the LWDs higher institution are not provided AT services. He also observed that lecturers in Kenyatta University where he taught did not have skills to use most of the AT. The Advisory Commission on Accessible Instructional Materials in Postsecondary Education for Students Disabilities of USA, (ACAIMPESD, 2011) recognizes that learners and teachers in an inclusive schools are not accessing most of the AT based resources and services. The commission further stipulates that all secondary school teachers should be sufficiently trained in relevant technologies to (a) support the accessible instructional material (AIM) needs of students with disabilities and (b) interact effectively with sources of AIM. This definitely shows that even the staff that is supposed to train the LWDs on how to manipulate the ATs for their instruction also lacks the skill. This further creates a challenge in the utilization of the AT for the disabilities learner. Cultural beliefs on the part of the teachers could be another deterrent to the utilization of the AT. According to Mugo, (2012) both Kenyatta University and Syracuse University lacked adequate ATs for their Blinds and visually impaired students and other related resources. This is not a new trend in developing countries has research shown that in both students and their teachers suffer due to the lack of sufficient ATs and other relevant resources. D'Andrea, (2010) postulates that a very few of LWDs gain access to adaptive technology in the developing countries. Survey researches in the developed countries including the USA have also shown that the universities suffer from the same problem of lack of enough ATs for the blind and VI students (ACAMPESD, 2011).

In Nigeria, the condition is gloomier. in spite of the reality that the National Policy on Education (NPE) of (2008) contains information that provides for the execution of inclusive education, very slight stipulation has been made to vigorously engage instructors in the integration of AT. Inclusive education is yet to mandate schools most especially teacher training schools to present basic courses in inclusive education at every level of teachers training program for prospective teachers to receive knowledge on how to use AT for instruction in an inclusive schools. For instance the University of Nigeria, Nsukka with the largest Faculty of Education in Sub-Sahara Africa, is yet to introduce or include any core courses in special education in her teacher training program.

Consequently upon this, Nigeria universities and teacher training colleges produce graduates who are not experts and unable to overcome the challenges of inclusive education. Numerous instructors are against the implementation of inclusive education simply because they are not trained in inclusive practice. Insufficient training of instructors on use of AT instills fear in instructors who as a result look at themselves as not prepared to embark on the rigors of teaching LWDs. As a result teachers build uphill-fated behaviors towards inclusion.(Ozoji 1998 and Obani 2002).Strengthening this information, Okeke-Oti (2010) posits that increase in teacher training in the field of special needs education will serve as an impetus for teachers' in appreciating concept of inclusion and their orientation towards inclusive education programs. The conducive and motivating environment necessary for achieving the goals of inclusion can only be gained if instructors adjust correctly to inclusive education practices.

In another development, Nalylor, (2005) and Villa and Thousand (1995) explain pre-suppositions such as morals, ideas and principles as well as wrong perceptions of learners, teachers on inclusive education which are all-encompasses obstacles to change. Preparedness and willingness of general educators to include LWDs is critical to the implementation of integration of AT in instruction in inclusive schools, policies and successful practice. in spite of the detail information of well-known established relationship between what teachers trust and what they do, generally the views on inclusion of LWDs in regular schools "has been clearly absent from deliberations of changes in policy and practices" (Soodak, Podell and Lehman, 1998)

Many studies conducted on the challenge of implementing inclusive education emphasizes more on attitude of regular teachers towards learners with disabilities in mainstreaming, aspect of resources such as AT devices to enhance effective quality inclusive education, which all create existing gaps that needed to be filled.

2.9 Instructional Approaches applicable in teaching learners with Disabilities in Inclusive Setups

Inclusive education is particularly designed to reduce discrimination through enabling learners with and without disabilities to grow up together. It gives the learners with disabilities skills to allow them to become positive role models to others and reduce dependability (World Bank 2004). Research shows that persons with disabilities have lower educational attainment than their peers which leads to their lower economic status. There is, therefore, need to ascertain the type of pedagogical approaches that will facilitate learning, improve performance and ensure goal attainment. Education of learners with disabilities should, therefore, be restructured to react to the variety of

disabilities in their neighborhood and enrich opportunities for all learners to learn with their peers in least restrictive environments. To this end, the students should be helped to become active self-directed and productive members of the society.

For years, research has been conducted on how best a learner with disabilities can be helped to learn. This is more so in the developed world led by USA. In the past 30 year for example, research has focused on helping the students with disabilities to adapt themselves to the environment and curriculum hence overcoming the learning challenges brought by their disabilities. Through research, it was found that focusing on helping the learners with disabilities to adapt to general school curriculum was in itself narrow.

The shift then, focused on the curriculum and its shortcomings. Research focused in finding out how curriculum limitation created barriers to learning for the students with disabilities This was a great step forward since the burden of adaptation was then placed on the curriculum and no longer on the students (Connell, Jones, Mace, Mueiller, Mullick and Ostroff, 1997). A research conducted in architecture, on drive to propose construction bore in mind all possible beneficiaries of architectural designs at the beginning and inspired the same adaptation for further research in education. Rose and Meyer (2002) assert that UDL theorizes curriculum plan by first considering the learner characteristic, diversity and backing up the plan or the curriculum that is flexible and accommodating diverse learners at the planning stage and must build an environment that hold up complete user-friendliness for LWDs in inclusive. Moreover, the idea of UDL incorporates not only features that will guarantee right to information but right to learning in inclusive schools (Rose and Meyer, 2002). In

Principles of UDL, for instance, Rose and Mayer, (2002) found that there were three broad neural networks in all aspects of instruction which include the identification patterns, the preparation and production of patterns as well as the collection and preference of patterns. Rose & Mayer's theory of learning recognizes knowledge to be acquired as appliance of methodologies to process that information, and commitment of instructional task. Consideration that students differ in ability by proponent of UDL makes it distinctive to all the previous research and theories.

The UDL principle guides the flexibility design of the curriculum which could support quality instruction for learners with disabilities in inclusive schools, this suggest recognition and support for differences in cognition, strategic and effective networks. The principle describes how to go about these options that support learning and that the multiple, flexible methods of presentation should be employed. With these principles, aspects of curriculum namely goal, material, method and assessment are flexibly done (Rose and Mayer, 2002). Just like is the case with other learners, it would be argued that quality learning should be aimed at not solely the mastery of content knowledge, but should be mostly aimed at mastery of the learning process. More importantly, the instructors should make the learner want to learn tactically and give the learners the urge to want to learn throughout their lives. In teaching learners with special needs, the teacher's interest should be more than meeting the minimal requirements for functioning and life satisfaction. Other instructional approaches have emerged from latest research to show how people learn in inclusive education and how inclusive schools should incorporate those ideas. The educators should therefore consider: Differentiated instruction (DI), Response to intervention (RtI), and Use of Picture Communication (PCS). These are as briefly described as follows.

2.9.1 Differentiated Instruction. (DI)

Differentiated instruction is an instructional pedagogy that acquaints teachers to instruction of individual student differences, because all students do not learn in the same way, at the same time or at the same rate. Differentiated instruction begins with gathering facts about students' so that instructional personnel can react responsively to students' varying background knowledge, culture, life circumstances, readiness, language, learning preferences, strength and interest, based upon this, student-centered information (content and material), making sense of ideas (process), and expressing what they have learned (products and grading). (Thousand and Villa 2011).

The things to be considered when thinking of differentiating instructional content and material include curriculum standards or objectives, academic/social languages of the learners the recommendations from professional organizations, the order in which concept/content will be taught, what multi-level and multi-sensory material will best convey concepts and content to each student, the way we can use technology to assist and how we will differentiate level of knowledge or proficiency.

2.9.2 Response to Intervention (RtI)

Response to intervention is an educational model that includes early intervention services as well as a method of disability identification for elementary school students who are struggling in reading and mathematics (Fuchs and Fuchs 2009). It is understand as an important incorporation of evaluation and mediation within a multi-tiered scheme of instruction with a goal of preventing school failures. Students who are not achieving at the rate of their peers are identified failures, intervention becomes

more precise, and learning disability identification is based on specific- learning outcome data. There are two goals of RtI; early intervening services and learning disability identification.

RtI is a multi-tiered streamlined intervention model consisting of high quality, validated instructional practices. Thinking of a pyramid, most schools have between three and five levels of intervention before a special needs education placement is considered for the learners who did not react progressively to rigorous intervention. On the base of the pyramid, tier one is general education instruction. At this level, validated, quality instructional programmes are presented to every student and universal screening is completed to assure mastery of skill. Careful attention to quality programme selection at this level rules out ineffective teaching when seeking a cause for school failure. When a leaner is not able to perform up to expectation to attain learning goals, the student is referred to tier two services (Wizikowski 2011). In the same vein, there are two types of tier two interventions for students who have a problem with the first tier of instruction. Standard-protocol intervention includes using the same research-validated method or programme intervention for every child who is labeled as non-responsive to general educational teaching (Fuchs, Morgan and young 2003). This intervention standardized approach chart is easy to replicate from teacher to teacher or classroom to classroom, of variety of school personnel including regular teachers, specialists, or paraprofessionals who may administer it for intervention using the standard-protocol interventions approach.

RtI is another education change strategy that contributes significantly to supporting diverse needs of learners in general education in a UDL environment (Basham, Israel,

Graden, Poth and Winsten 2010). RtI systematically and universally accesses the progress of all learners to ensure that those with persistent difficulties are identified and receive appropriate support for learning. To address these major changes, initiatives in education are critical that existing teacher preparation programme support diversity, flexibility and choice in their curriculum with instruction in concepts of UDL, AT and RtI.

2.9.3 The Use of Picture Communication Schools (PCS)

Picture communication schools is of great value including the creation of communication system for daily schedules, worksheet and communication boards; PCS also provide a low tech communication solution (Heflin and Alaimo, 2007). Through the system of picture exchange communication symbols (PECS), learners can learn from imitating communication and exert more control over their environment (Bondy and Frost, 1995). PECS has been researched extensively for its effectiveness for training spontaneous imitation of speech encouraging the acquisition of spoken language, decreasing problem behavior and increasing communication behavior in play and academic setting (Heflin and Alaimo 2007). With the described approaches and methodology of instructions, it means that the teachers in inclusive schools setting must be able to offer quality instructions to the learners with disabilities in their schools. What remains to be verified through the research though is whether the teachers are doing so. This research therefore strove to establish the degree to which the teachers in Nigeria's inclusive secondary schools offer quality education to their students.

2.10 Summary of Existing Gaps in the Literature

In concluding this chapter, it is imperative to present in summary form the existing major gap this study intended to bridge. To commence with, in spite of the positive bang and innovation of assistive technology in the recent years, studies on integration of AT in instruction in inclusive education is scanty in developing countries. Furthermore, despite the availability of high technology AT worldwide that is increasing access to AT by `students with disabilities, these students have continuously received poorer instructional achievement than their able-bodied age groups. It has been found that the learners with disabilities in secondary school setting loose opportunities in accessing quality instructions, face numerous and varied difficulties in accessing information for their studies (Mugo, 2013).

Moreover, literature reviewed has shown that scholars in education are recognizing instructional needs concerning assistive technologies in their programmers. This means that there is a gap between the production of the AT and utilization of the same. The dilemma of this study is that scholars who are conducting these mentioned programs are from the developed countries. It means that a research to establish the disparity between the availability and the use of AT in the developing country would be cost effective.

Many studies have been carried out in terms of availability of AT and teachers attitudes towards use of AT however, very few studies have been conducted to show how teachers design and conduct instruction for learners with special needs in an inclusive set-up. Mugo (2013) conducted a study in this area and compared the practice in USA with Kenya but concentrated on university education. Since no

study of this nature has been conducted in Nigeria, it was cost effective for this study to establish the teaching practices in inclusive secondary schools in this country. In particular, the study conducted an in-depth survey in Central Senatorial District of Kaduna State, Nigeria.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter deals with the methodology used in this study. It is discussed under the following sub headings; Research design, location of the study, target Population, sampling techniques and sample size, Instruments for data collection, Pilot study, validation and reliability of instruments, Methods of data collection, data analysis, logistical and ethical considerations.

3.1 Research Design

This study adopted a descriptive survey research design. Descriptive survey research is the process of assembling information that explains events as they are. It organizes and depicts information in tabular form. This design seeks to reveal the nature of factors involved in a given situation. It seeks to determine the degree to which the factors exist and attempts to describe the link in relationships which exists between the factors (Creswell and Yin, 2009). Descriptive studies often tend to gather more of qualitative data and hence the research commonly takes place in a natural setting so that the information collected reflects accurately what is happening in reality (Yin, 2009). Moreover, the descriptive design allows the researcher to draw data from various resources and employs different strategies for collection of data and analysis (Creswell, 2012). In this respect, this research sought to explore the utilization of AT in an inclusive set up, the design was appropriate for ensuring that substantial and accurate data would collected and analysis effectively done. According to Cook and Campbell, (1979) the use of mixed research methodologies is powerful when examining data involving respondent's attitudes. These features of descriptive survey

design were, therefore well thought-out as the most suitable in carrying out the study on integration of ATs in instruction for learners with disabilities.

3.2 Location of the Study

This study investigated the Government secondary schools in Central Senatorial District of Kaduna State. The Senatorial District comprises of five (5) Local Government Area Councils, these are: Brinin Gwari, Giwa, Igabi, Kaduna North and Kaduna South. Kaduna State is the headquarters of old Northern region of Nigeria, whose name was changed to Kaduna State in 1976. The state is cosmopolitan and it is located to the North –western Nigeria with a high prevalent rate of people with disabilities (Census,2006). There are a total of 541 secondary schools in the state. Both students and teachers enrolments in to these schools served as target population of this study. Inclusive education was not included in the education sector analysis reform conducted in 2008; this location was particularly selected because of its proximity and easy access for researcher to obtained accurate and in-depth data for the study.

3.3 Target Population of the study

According to Orodho (2005) target population is a population from which a sample population is selected. The target populations of this study included 3400 teachers who taught in the inclusive schools, with 80 principals of these schools, 80 resource center personnel and 1200 learners with disabilities studying in these inclusive schools.

3.4 Sampling procedures and Sample Size

The study used the following sampling procedures. Purposive sampling was used to select the respondents. Purposive sampling technique involves targeting respondents who provide information rich useful for this study. Patton, (2002) affirms that purposive sampling method issued to obtain information-rich for in- depth studies. Purposive sampling occurs when the researcher chooses a sample from population which is more realistic (Merriam, 1998).

Also, for students samples a total of one hundred and twenty (120) out of one thousand two hundred (1200) learners with disabilities representing 10% were purposively selected from three (3) categories of disabilities (Blind and visually impaired, Hearing impaired and physically challenged).

3.4.1 Sample size

A sample is a portion selected from the available population and should be representative of the real population. Gay, (1983) suggested at least a minimum sample size of ten percent (10%) for a huge population and twenty percent (20%) for small population. In concurring with this opinion Gay, Amedahe, (2002) notes that a sample size between ten percent (10%) to twenty percent (20%) is generally suitable enough for any descriptive study. taking into account the experts' views coupled with the nature of available population, a proportional twenty percent (20%) sample size was used to select the schools' sample and ten percent (10%) for teachers in inclusive schools. In the case of students ten percent (10%) was used and for both principals and resource center personnel twenty percent (20%) was used. In total, sample size of

493 was used in this study. Table 3.1 provides a breakdown of sample size grid with respect to the accessible group.

Table 3.1: Sampling Grid

SN	School	Students LWDs	Percentage sampled	No. Of teachers	Percent sampled	Percent used	Principal sampled	Resource personnel sampled
1	A	75	08	230	23	10%	01	01
2	B	90	09	202	20	10%	01	01
3	C	86	09	210	21	10%	01	01
4	D	65	06	222	22	10%	01	01
5	E	84	08	252	25	10%	01	01
6	F	80	08	118	12	10%	01	01
7	G	60	06	280	28	19%	01	01
8	H	75	O7	128	13	10%	01	01
9	I	74	07	114	11	10%	01	01
10	J	74	07	252	25	10%	01	01
11	K	84	08	170	17	10%	01	01
12	L	92	09	252	25	10%	01	01
13	M	94	09	232	23	10%	01	01
14	N	50	05	254	25	10%	01	01
15	O	56	06	242	24	10%	01	01
16	P	61	06	262	26	10%	01	01
Total	16	1200	120	3400	340		16	16

(a) Schools sample

The sample schools were selected through a purposive sampling technique from a list of 80 public secondary schools in Central Senatorial District of Kaduna State, Nigeria. The sample comprised 20% of the total number of schools in the District. This means that 16 schools were purposively sampled.

(b) Students' sample

The students sample was obtained from 1200 target population out of which 120 students were sampled which accurately represented 10% of the population under survey. A purposive sampling technique was used to sample of LWDs in inclusive schools and the samples were collected according to number of LWDs in the 16 respective schools sampled. The Following are breakdown of the students' samples according to their schools.

In school A 08 LWDs out of 75 were sampled which represented 10% of the total population. While in school B 09 LWDs were sampled out of 90 which represented 10% of the total population, school C has a total of 86 LWDs out of which 09 were sample represented 10% of the total population. For school D 07 LWDs were sampled of 65 which represented 10% of the total population, in school E out 84 of 08 LWDs were sampled which represented 10% of the total population, also in school F 08 LWDs were sampled out of 80 which represented 10% of total population, while in school G a total of 06 were sampled out of 60 LWDs which represented 10% of the total population and in school H 08 LWDs out 75 were sampled which represented 10% of the total population.

Also in school I a total of 07 LWDs were sampled out of 74 which represented 10% of the total population, while in school J 07 out of LWDs were sampled which represented 10% of total population, in school K 08out of 84 LWDs were sampled which represented 10% of the total population, while in school L out of 92 LWDs 09 were sampled which represented 10% of total population and in school M 09 out of 94 LWDs were sampled which represented 10% of total population. Also in school N out 50LWDs 05 were sampled which represented 10% of the total population, while in school O a total 06 out of 56 LWDs were sampled which represented 10% of total population and in school P 06 out of 61 LWDs were sampled which represented 10% of total population.

(c) Teachers' sample

Teachers' samples were collected according to number of teachers in the16 respective schools sampled. In school A 23 were teachers out of 230 were sampled which represented 10% of the total population. While in school B 20 teachers were sampled out of 202 teachers which represented 10% of the total population, school C has a total of 210 teachers out of which 21 were sample represented 10% of the total population. For school D 22 teachers were sampled of 222 which represented 10% of the total population, in school E out 25 of 252 teachers were sampled which represented 10% of the total population, also in school F 12 teachers were sampled out of 118 which represented 10% of total population, while in school G a total of 28 teachers were sampled out of 280 teachers which represented 10% of the total population and in school H 13 out of 123 teachers were sampled which represented 10% of the total population.

Also in school I a total of 11 teachers were sampled out of 114 which represented 10% of the total population, while in school J 25 out of 252 teachers were sampled which represented 10% of total population, in school K 17out of 170 teachers were sampled which represented 10% of the total population, while in school L out of 252 teachers 25 were sampled which represented 10% of total population and in school M 23 teachers were sampled which represented 10% of total population. Also in school N out 254 teachers 25 were sampled which represented 10% of the total population, while in school O a total 24 out of 242 teachers were sampled which represented 10% of total population and in school P 26 out of 262 teachers were sampled which represented 10% of total population.

For the selection of teachers' sample, purposive sampling technique was used this because purposive sampling has advantage of providing the researcher with selected information rich cases for in-depth and accurate data for the study. In this case only the teachers engaged in teaching the classes including the learners with disabilities were involved as respondents of the study.

(d) Resource Personnel Sample

A total of 16 resource personnel of the schools participating in the study also served as respondents, this represent 20% of total school population.

(e) Principal sample

The principals of the sixteen (16) sample schools participated were use as respondents in the study. The sixteen (16) principals represent 20% of 80 schools in the Central Senatorial District of Kaduna State, Nigeria

3.5 Research instruments

The researcher used five sets of instruments for data collection in this study. These included teachers' questionnaires, students', principals' and resource center personnel's interview schedule, class observation schedule, observation checklist and documentary analysis.

3.5.1 Teachers Questionnaires

Questionnaires have the power to obtain data from a large sample in the most efficient way and do not necessarily place pressure on the research participants (Thietart, 1999).The questionnaire has both open ended and close items. The open ended items will give the respondents an opportunity to express themselves freely while the closed items offered the researcher an opportunity to collect quantitative data. The teachers questionnaire had three sections, section A contained biography as well as general information about teachers, while section B mainly sought information about the way the teachers design and conduct their instructions, challenges they face in integrating AT in their instructions and the benefits they have seen in the integration of AT in their instructions and section C sought for the pedagogy teacher used in the utilization of AT in inclusive education. (Refer Appendix A)

3.5.2 Students' Interview schedule

Creswell (2005) observes that interviews are beneficial in that they give valuable information when one can easily observe participants and that the interviews allow recipient to fully explain individual data. The researcher used structured interview schedule for the students. This instrument was used to gathered information from the students with disabilities on their experiences in the inclusive classroom including

how they interact with the AT present in the school and the challenges they face as they use the AT in their academic work. It was also used to find out the students' knowledge about AT available for their use. The questionnaire included both open ended and closed ended items. (Appendix B)

3.5.3 Principal interview schedule

A structured interview was used to obtained responses from the school principals. The instrument contained twelve questions which include information on accessibilities of ATs, teachers skills on use of ATs and the challenges faces the schools in terms integration of ATs and suggestions on way forward to improve integration of ATs in inclusive schools. This research was used to sought for information about support principals give to both teachers and the students in the utilization of AT and the challenges they face as they support this activity.(Appendix D)

3.5.4 Class Observation Schedule

Observation involves systematic presentation of behavior of the participants in this study, by taping the information like field notes, and depicting conclusions about their events from these examinations (Patton, 1990). The instrument contained principles of Universal Design (UD) on teaching/ learning components: Representation, Expression, and Engagement. This research instrument was therefore used to observe how both the teachers and the learners were interacting with the AT during the teaching learning process. (Appendix E)

3.5.5 Observation Checklist

The observation checklist of this study contained relevant AT devices and software appropriate for use in instructions for students with various disabilities, which include, blind and visually challenge, Hearing impairment and physically challenge. This instrument was designed to ascertain the AT devices available in the secondary schools and compare this with what the participants said they were aware of and what accessible to them. (Appendix G)

3.5.6 Documentary Analysis

The document analysis requires the collection and review of specific documents that are peculiar for organization in terms of the characteristics of the individual group members. In this study therefore, documents including statements of philosophy, and policy documents guide to the education of LWDs in IE were reviewed to examine the stated policies and support systems set up to address the needs of the LWDs (Appendix H)

3.6 Pilot Study

Before the beginning of gathering of information for this study, the research instruments were pre-tested. This was to determined their precision and appropriateness. The pilot study was carried out in schools which were not involved in the actual study. The pilot study involved a total of five schools and teachers who taught LWDs in inclusive schools. Vagueness, inaccuracy or inappropriateness of any items on the instruments were detected and rectified before the final collection of data for this research.

3.7 Validity and Reliability of the Study Instruments

The validity and reliability of this study were ensured as follows.

3.7.1 Validity

It is vital to ensure care and quality of questionnaires is authenticated prior to the actual data collection. Validity according to Mugenda and Mugenda, (2003) refers to level to which result collected from analysis represented the real feature beneath the research. This precisely has to do with whether data gathered in the study reflect the factors of the study. As shown by Ridley, (2005) and Orodho (2005), basically there are three types of validity that can be related to instruments: construct; content; and criterion validity. For the purpose of this study construct and content validity was used.

3.7.2 Construct Validity

Validity assesses the level to which information obtained from the questionnaire significantly and exactly represents or reflects a theoretical concept. Ridley, (2005) argues that construct validity is evaluated by comparing tendency or relationships from data collected via a self-report questionnaire with established tendency or association that preceding research findings are in clear agreement with. Consequently an instrument with construct validity provides information on a tendency or affiliation that sensibly or hypothetically occurs if the instrument is valid. In this study precautionary measure was taken in developing the instrument related to earlier studies conducted and the theories reviewed in terms of associations among the variables developed.

3.7.3 Content Validity

Content validity, according to Mugenda and Mugenda, (1999) measured of level to which information gathered using questionnaire, interview schedule and observation schedule as an instrument to represents a particular domain of a specific concept and ensure that content validity of instrument was adequate, also take into cognizance independent variables necessary to validate the content of questionnaires of this study in relation to existing literature and theoretical framework reviewed were adequately identified. In furtherance to gauge wide-range coverage of the content, mixed methodology was used to explore various facets of integration of ATs in instruction for LWDs from the adoption and utilization and from adopters to the final users' perspective. To ensure that the instrument met the criteria for content validity, expert opinion from lecturers in Kenyatta University were incorporated.

3.7.4 Reliability

Reliability of an instrument is tested using internal consistency procedure by using Cronbach's Co-efficient Alpha for testing the research instruments. Internal consistency of data was determined by correlating scores obtained with scores obtained from preceding times in the research instrument. Cronbach's Alpha co-efficient is usually used to gauge the inner constancy or reliability of the instrument at value of 0 to +1. According to (Mugenda and Mugenda, 2003), the co-efficient is higher when its absolute value is greater than or equal to 0.7: or else it is low. A greater co-efficient implies high correlation between variables representing greater consistency among the variables.

The reliability of the integration of assistive technology in terms of quality of instruction of LWDs, availability of ATs, teachers' preparedness in AT integration in IE and administration support of ATs integration was determined through piloting of the instruments. The internal consistency was obtained when the instrument was administered, analyzed and the reliability established using the following method of the Cronbach Co-efficient Alpha of 0.8. Cronbach Alpha

Cronbach Alpha

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum_{i=1}^{n} S_i^2}{S_X^2}\right)$$

Where s_i^2 = variance of single item

S_x^2 = variance of the test

n = number of items in the test

A reliability coefficient of 0.76, 0.87, 0.84 and 0.96 for quality of instruction of LWDs, availability of ATs, teachers' preparedness in AT integration in IE and administration support of ATs integration in that sequence were obtained from data. The cronbach alpha reliability coefficient of scales was above the critical value of 0.70. Even though research has shown that from 0.05 the instrument is reliable and it moves toward one (1) the more the instrument is reliable. Having determined the reliability, the instruments were reliable and therefore, adopted for the data collection.

3.8 Data Collection Procedure

With an introductory letter from graduate school of Kenyatta University, permission was sought from Commissioner of Education, Kaduna State Ministry of Education to carry out the research in secondary school in the state. After a thorough discussion of the study and its benefits for instruction of LWDs in the inclusive schools, the researcher requested the Commissioner to give him introductory letter to schools principals. After which completed questionnaires were analyzed by organizing, coding, interpreting, tabulating and, drawing inferences. Since data were collected in both quantitative and qualitative forms, for quantitative which involved descriptive statistics data were organized, coded and entered into computer and then data were presented in frequencies, percentages, tables, graphs and mean using Statistical Packages for Social Sciences (SPSS). For qualitative which involved interview and open ended items on the questionnaires the data were transcribed in categories, coded, organized, summarized into themes identified and represented in tables and figures.

Miles and Huberman (1994) indicated three major components of qualitative data analysis which include; data display; data reduction as well as drawing conclusion and verification. Data display involved both words (extended piece of text) and illustrative form which were used to extrapolate the data in other to determine logical patterns and relationships. Data reduction entailed the process of selecting and simplifying the data that appeared in the interview transcriptions. Drawing conclusion and verification involved considering what to analyzed data meant for and also assessed their implications in relation to the research questions of the study. Verification entailed revisiting the data as many times as needed to confirm these emergent conclusions.

3.8.1 Teachers' Questionnaire

Questionnaire for teachers' comprised mixture of question that were employed to elicit responses from the teachers on how they use ATs and challenges facing them in using the ATSs for instruction of LWDs. The questionnaire was administered by research assistants who were effectively educated by the researcher concerning handling of the research instruments and ethical issues as well as ensured that accurate data were collected.

3.8.2 Students Interview Schedule Guide

The interview schedule guide was used to seek for information from LWDs on how they received lessons in their classroom, treatment they got from their teachers when teaching, accessibility to ATs and challenges facing them on the use ATs. The researcher conducted interview with respondents which was arranged prior to time.

3.8.3 Principal Interview Guide

Due to the nature of respondent's engagement, the researcher formally scheduled interview with principal using interview guide to seek for information on policies document on inclusive education, challenges facing their schools in terms of availability of ATs as well as support they gave their teachers to ensure that LWDs received quality instruction.

3.8.4 Resource Center Personnel Interview Guide

The researcher officially scheduled interviews with resource personnel using interview guide to seek for data on availability of ATs as well as services they offered

to teachers and LWDs to ensure they have access to quality instruction, challenges facing them in terms of using ATs

3.8.5 Documentary Analysis

The document analysis requires the collection and review of specific documents that are peculiar for organization in terms of the characteristics of the individual group members. In this study therefore, documents including statements of philosophy, and policy documents guide to the education of LWDs in IE were reviewed to examine the stated policies and support systems set up to address the needs of the LWDs. Sarsedt, (2011) sees document Analysis as a method used to gather information in research that describes the act of reviewing the existing documentation of comparable processes or systems in order to extract pieces of information that are relevant to the study. This was used to ensure triangulation in support of series of instruments used to collect and analyze both qualitative and quantitative data.

3.9 Data Analysis

In this study both quantitative and qualitative data was obtained from primary sources. Qualitative data obtained from interview schedule was organized according to main themes of the study and depicted in descriptive form on the basis of the research objectives and research questions. Since this study employed the use of mixed method of data analysis approach, the study used data triangulation, Gay (1983), posits that triangulation allowed wide coverage of education characteristics as well as crosschecking of information.

The purpose of triangulation is to guarantee that accurate data was obtained using various instruments to collect information from the respondents. While quantitative data obtained from the questionnaires and observation schedule were coded and entered into a computer programme: Statistical Packages for Social Sciences, analyzing qualitative data gathered from principals, resource center personnel and students' data were synthesized and arranged under the main themes of the objectives as described in the following.

Objective (i) sought to find policies put in place to guarantee quality instruction in inclusive schools. After conducting the formal interview with Director of special needs and the principals of the schools, the data collected from the interviews the audio recorded information was transcribed into printed word. After whichthe researcher move to transcribed information or thoughts that seemed to capture ideas that emanated from the data gathered into code by using the precise words of the respondents. Also documentary analysis guide was used to analyze the content of policy document.

Objective (ii) sought to establish availability of ATs in inclusive schools using both observation checklist and interview schedule guide. After interview with resource center personnel, data collected from the interviews, the audio recorded information was transcribed into printed word. Then the researcher read these transcriptions thrice prior to penciling down notes on the papers. The researcher then moved to transcribe the thoughts or ideas that seemed to capture information that emanated from data gathered into codes. Statistical Package for Social Sciences (version 17) were used to analyzed quantitative Data collected on availability of AT.

(Objective iii & iv) which sought to established how teachers design instruction and how to use ATs for instruction of LWDs in inclusive schools respectively. Also SPSS (version 17) was used to analyze quantitative data collected. Descriptive analysis was drawn in percentages, as well as mean and standard deviations of variables and presented the information in the form cross tabulations to illustrate the results.

(Objective v & vi) which sought to established challenges facing teachers on the use of ATs and assess attitude of the teachers towards integration of AT using both open ended and closed ended questionnaire. For close ended questions, 5point Likert scale was used; the data were classified, coded, organized, entered into computer and presented in tables and figures.

3.10 Logistic and Ethical Consideration

Participation in this research was voluntary. Direct consent was sought from all the respondents before collection of data. The researcher assured all the participants, full confidentiality and anonymity. Director in Ministry of Education was unaware which schools principals, teachers or students agreed or declined to take part. As this protect the study from ethical problems.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.0 Introduction

This chapter covers presentation and discussion of study findings. The study set to examine integration of AT in the instruction of learners with disabilities in inclusive secondary schools in Kaduna state of Nigeria. Presentation and discussion of the findings are organized based on the research objectives, as follows: Government policies in place to guarantee quality instructions for the learners with disabilities, Types of assistive technologies available for the instruction of learners with disabilities in secondary schools, Teacher design and presentation of instructions for learners with disabilities, behaviours of instructors towards integration of AT in instruction of learners with disabilities and challenges facing the integration of AT for instruction of learners with disabilities in the secondary schools.

4.1 Demographic data of the Respondents

This section sought the demographic information of the respondents of this study. The teachers' demographic data sought included their sex, age, working experience and academic qualification. Table 4.1 presents their distribution by gender.

Table 4.1: Teacher's distribution by gender per school

SN	Schools	Male (M)	%	Female (F)	%
1.	A	12	3.5	15	4.4
2.	B	16	4.7	12	3.5
3.	C	10	2.9	08	2.3
4.	D	14	4.1	11	3.2
5.	E	09	2.6	07	2.0
6	F	13	3.8	12	3.5
7	G	16	4.7	06	1.7
8	H	13	3.8	10	2.9
9	I	08	2.3	09	2.6
10	J	09	2.6	07	2.0
11	K	12	3.5	09	2.9
12	L	13	3.8	07	2.0
13	M	10	2.9	10	2.9
14	N	11	3.2	07	2.0
15	O	09	2.6	08	2.3
16	P	08	2.3	09	2.6
	Total	193	56.8	147	43.2

Table 4.1 indicated that out of 340 respondents 193(57%) were male and 147(43%) were female. The distribution of male to female teachers in all the schools shows that

in 14 schools male teachers were more than the female teachers. It is only in 2 schools where the number of female teachers was slightly more than their male counterparts. Although gender can influence adoption of technology; it was not one of the main considerations of this research.

Teachers' teaching Experience of students with disability was vital for this study since the teachers would be "information rich". They would then offer accurate and in-depth information for this study. Following this, the study sought the teacher's information on years of experience in teaching. The data is graphically presented in figure 4.1

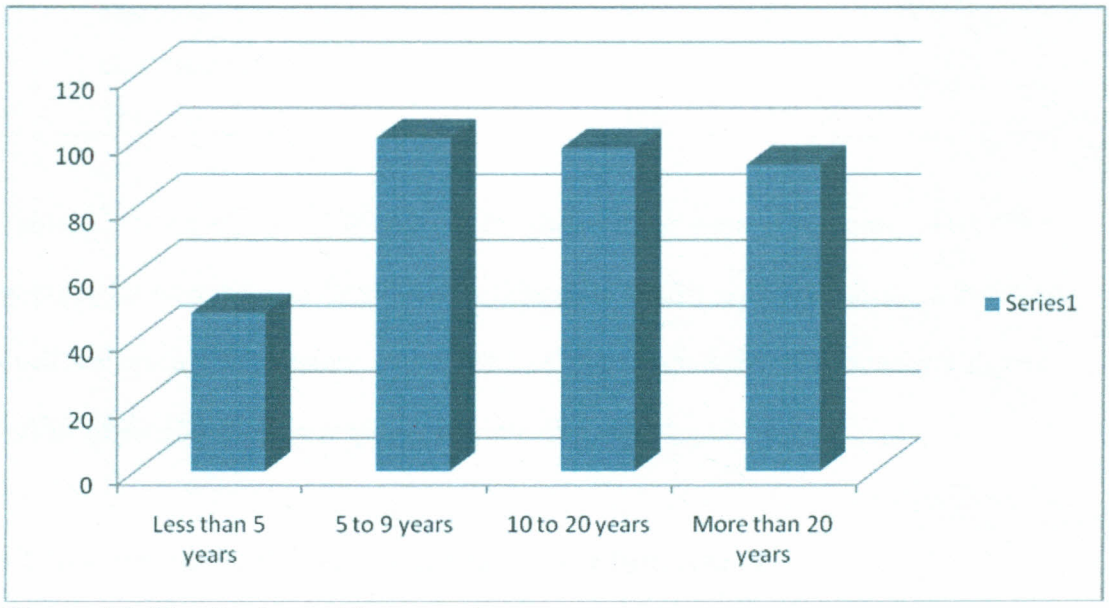


Figure 4.1: Teacher's working experience

The level of education attained by teachers is important. One of the reasons that make teachers (and hence schools) tend to differ in terms of performance, innovation capacity and other characteristics is the quality of teachers in the schools. Studies

have indicated that educational qualification (academic and professional) influences the adoption of a new idea (Rogers, 2003; Schiller, 2003; Afshari *et al.*, 2009).Furthermore, for teachers to productively integrate ATs, they ought to be academically and professionally qualified to ensure that they know how to and the reasons for interweaving content, pedagogy and technology thoughtfully and successfully (Mishra and Koehler, 2008; 2006; Roblyer, 2003) the level of the teacher's academic qualifications is presented in Table 4.2.

Table 4.2: Level of Education Attained by the Teachers

Level of education	Frequency	Percent	Cumulative Percent
Nigeria certificate of education	110	32	32
Bachelor's Degree(B.sc/B.Ed)	133	39	39
Master's(M.sc/M.Ed)	91	27	27
Doctorate	6	2	2
Total	340	100.0	100.0

Table 4.2 revealed that 133(39%) of the respondents were B.sc holder, 110(32%) respondents have Nigeria Certificate of Education (NCE) as their highest education qualification, a total number of 91(27%) of the respondents were master's degree holder while 6(2%) of the respondents were doctorate degree holders.

4.2 Government Policies on Guarantee Quality Instructions

This objective sought to establish government policies put in place and practical requirements predetermined to guarantee quality instruction for the learners with disabilities in inclusive secondary schools the finding indicates that secondary schools neither had their own set of legal frameworks nor even policy documents for people with disabilities. In the Ministry of Education, the document on inclusive education

was not available. It was revealed that the ministry was drafting the policy document. The document available to guide the secondary schools was the Disability Decree of 1993 renowned in section 2 (c) and section 5, sub section 4 (2) as later articulated in the National Policy on Education in Nigeria (2004).Despite the fact that the policy documents are important in guiding school administrators and education officer on the implementation process, it was revealed that neither of them had a copy of the documents in the office.

The strength of these laws in terms of ensuring equality and the right to educate people with disabilities has been generating some contending issues and challenges. Such challenges include poor implementation of Acts establishing IE due to lack of legal backing for such policy for LWDs to gain access to quality instruction in inclusive schools as well as access to modern ATs devices and software require for their instruction.(Ozoji, 2003) From the analysis of these documents which only spelt out real meaning of the philosophy of equal right instructional opportunities for all children regardless of their incapacitation; make sufficient provision for education for all people with physical challenges so that they contributes to the development of the nation; and plan a dynamic and suitable curriculum for all the beneficiaries. The laws are not specific and clear on what, how, when, where and to whom beneficiaries were in order to ensure that the learners gain access to sufficient services.

For instance, giving equal right to educational opportunities to all individuals with disabilities is the key factor of the rehabilitation Act of 1973 and the Americans with disabilities Act of 1992. The pertinent question one would ask is; what kind of access, by whom in particular to what extent and in which kind of environment?

For example, a physically challenged student, who does not enjoy right to social and informational privileges because of the physical disability, is not included in this Act, regardless of the physical setting. This means that unless the student's distinctive instructional needs for LWDs were resolved by specialist, skilled manpower in suitable environments, as well as providing the students with equal right to core and specialized curriculum through provision of suitable materials and equipment, then the issue of accessibility does not apply. With the laws and policies not clear and with the discretion to the provision of the AT and the required services left to the institutions of learning, it is clear that not much will be achieved.

4.3 Availability of AT for Learners with Disabilities in the Inclusive Schools

To ascertaining the AT available for integration in the instruction for learners with disabilities, the study first identified the learners in terms of categories of disabilities. These categories were visually challenged, hearing impaired and physically handicapped. From the 16 schools, the numbers of students in each category were as follows: Visually challenged fifty six (56), Hearing impaired, twenty five (25), and physically handicaps, thirty nine (39).

The first thing the research did was to obtain a list of the modern technologies for the LWDs from recognized sources and then with the list sought information regarding the availability of AT for each of these categories in the schools. The data was collected from the resources personnel in each of the sixteen schools who were interviewed on the types of AT and functional devises and software that were available. Further using observation checklist the research determined the AT

available for use by both teachers and the students. The data is presented based on the categories of disabilities as follow in figures.

Figure 4.2: Status of Available and Functional AT's for Blind and Visually Impaired in the 16 Schools Sampled

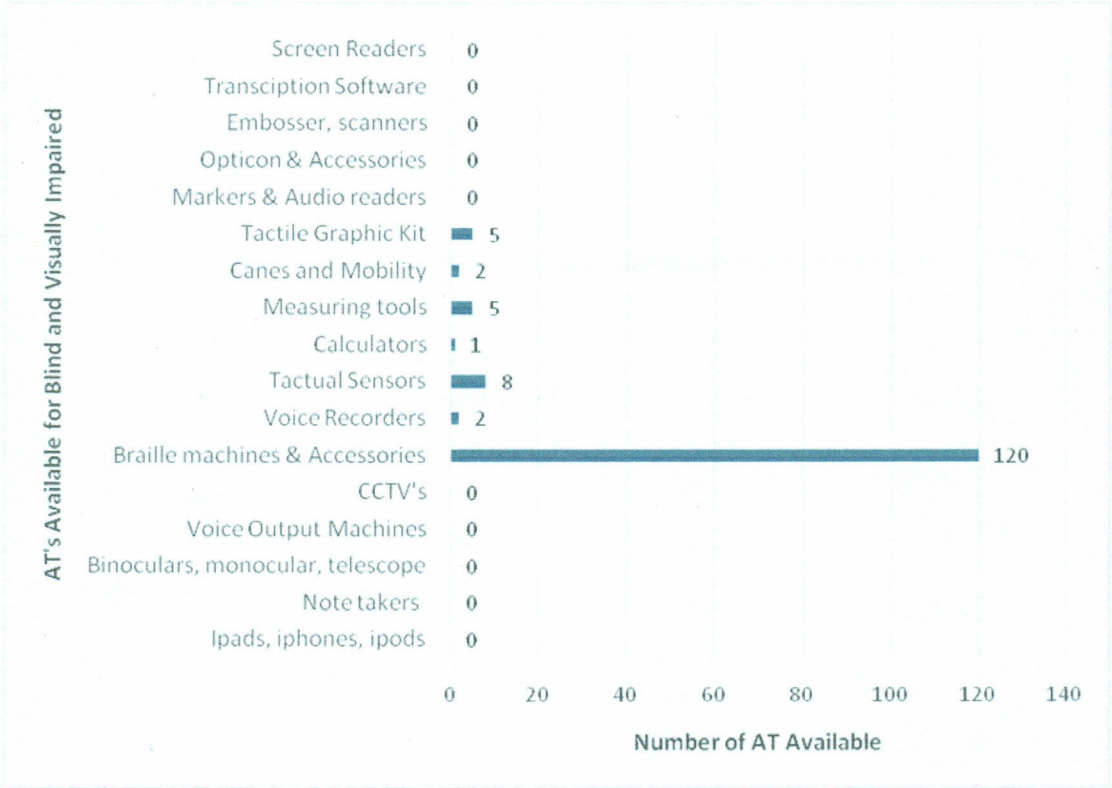


Figure 4.2 indicated that all the 16 schools sampled had a 120 total of slates and stylus which were accessible to blind and visually impaired students. Also there 2 tape recorders which considered in adequate, while 8 brail books, 1 brail ruler, 6 non foldable canes, 2 graphic kits and 5felt pens were available across the 16 schools sampled and these were low/medium tech ATs which were grossly inadequate compared to number of students. For high tech ATS such as brail embossers, note taker, hand held magnifying mirror, brail writer, I phones, CCTV systems, screen

readers, JAWs, NVDA and optical tactual converters were not available in all the 16 schools sampled.

Figure 4.3: Status of Available and Functional ATs for Students with Hearing Impairment in 16 Schools Sampled

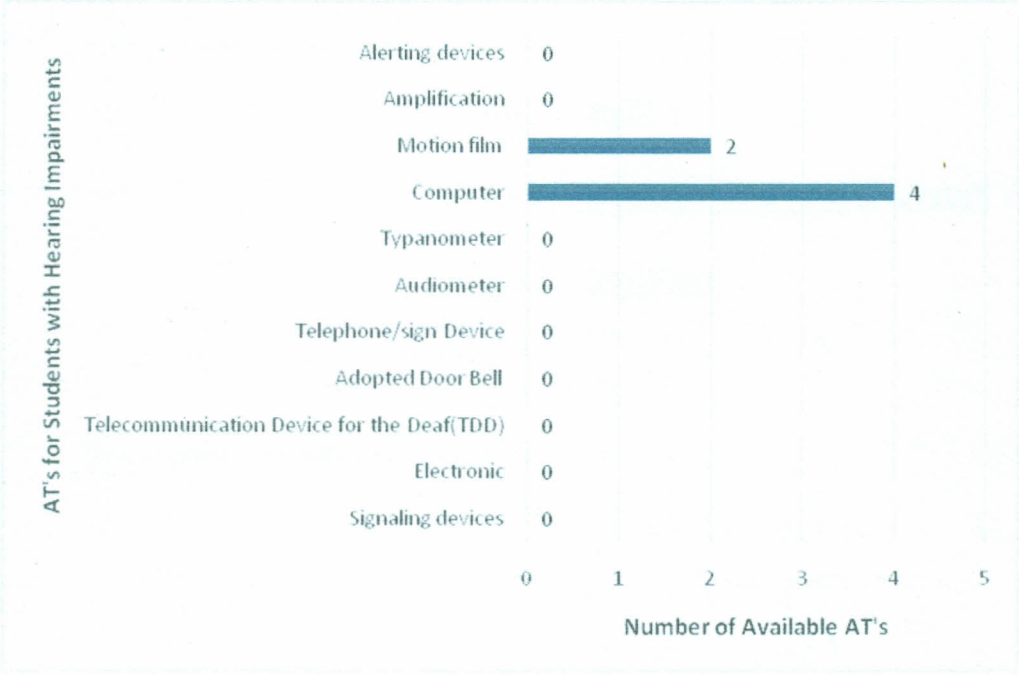


Figure 4.3 above shows that electronic hearing aid, accele-glove, and telecommunication devices for deaf, adopted doorbell, audiometer and typanometer were not available in all 16 schools sampled. While only 6 computers were available in all the 16 schools sampled and only 4 computers were functioning as at the time of the study and 2 of the computers were not functioning, also there are 6 motion films out of which only 2 were functioning this considered inadequate compared to number of students in the schools.

Figure. 4.4: Status of Available and Functional ATs for Learners with Physical Disability in 16 Schools Sampled

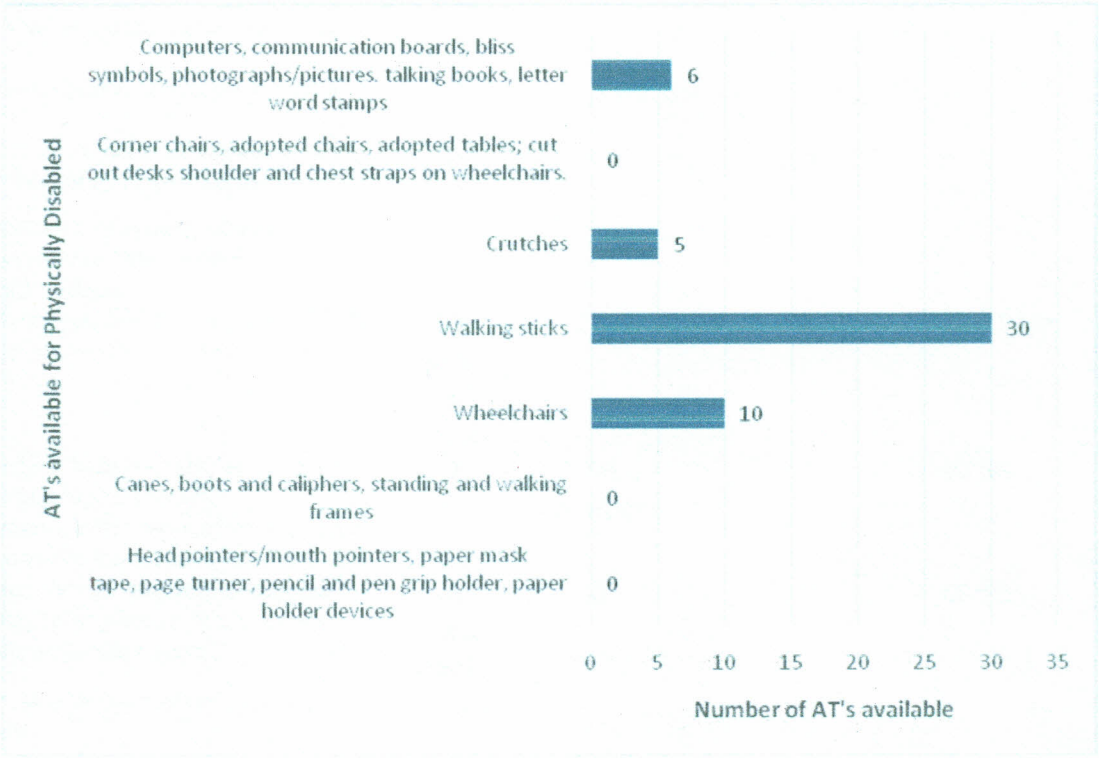


Figure 4.4 above revealed that there a total of 10 wheel chairs, 10 walking sticks and 5 crutches which are locally fabricated were available. While ATs, such as head pointers, joysticks, corner chairs, adopted chairs, adopted tables and talking books were not available in all the 16 schools sampled.

Table 4.3, on pages 69-70 indicated aggregate of available AT for blind and visually impaired students in inclusive schools in Kaduna State in Nigeria. It is clear from the table that those inclusive schools in Kaduna state lacked access to a variety of modern ATs that could be helpful to learners with disabilities in accessing quality instruction in the schools. It can be said that the schools had adequate but old technology that is the slate and stylus (120:56). Table 4.3 also reveals that the schools did not have modern technology such as hand held magnifiers. Further the schools did not have adequate mobility canes for the student (6:56). The schools did not even have adequate basic requirements for instance Braille books for the students who are blind (8:56).

The study further revealed that inclusive schools in Kaduna state lack access to variety of modern ATs that could be helpful to learners with disabilities in accessing quality instructions in inclusive schools. The learners with disabilities do not gain access to quality AT for instructions and as well there being denied of every benefit of this modern variety of AT. For example, Ipods and Ipads have many built in functions that help improve productivities and academic performance for these students. The in-built features include screen magnification, adjustable, display colour contrast, refreshable bailer display support and text to speech technology which include talking alert, talking calculator and even talking watch. In virtually all the schools visited, blind students did not offer mathematics because of lack of availability of AT required for teaching mathematics such as talking calculator, math Braille, talk to create mathematics equation in MS Dos which also gives room for

translation of equations to their Braille equivalents, cubic rhyme and Taylor frame among others.

According to Mugo (2013), lack of sight is a barrier to acquisition of instruction is evidence of blind or visually impaired student. In tandem with the findings learners who are blind or visually impaired do have access to modern ATs that will help in eliminating the barriers. Such ATs include text to speech technology (voice over) is highly advanced where by unlike many other screen readers for example, the Job Access With Speech(JAWS) for windows, the students can hear a spoken description of what is on the screen and can also integrate more than 40 Braille displays via Bluetooth. The content that can be accessed includes spreadsheet columns, graphics and even photo captions. The student can also browse the web, chart, send and received emails and so on.

Furthermore, Braille sense note taker technology uses keyboard similar to that of Braille keys to input information that gives both Braille and speech output. Its offers the ability to perform various tasks simultaneously some of them virtually provide the function of computer laptop including Wifi, MSN chart, text processing, daisy playback and so on. Also compact portable note taker with a 9 – key Perkin – style Braille keyboard and LCD display were use in teaching Braille for basic classes. The visually impaired student is also able to write, email, surf the web and even use the word processor.

Additionally, the advanced computer based assistive technology has also brought about the invention of Braille printers/embossers software use in generating the

tactile graphics (create drawing and illustrations for blind students to be felt) and also to make copies of Braille. These are majority of two types; the desktop embosser which transcribes Braille writing straight on paper, and at time often called Text Embossing Device (TED) printers and the Plate Embossing Device or (PED) printers which are classically used in Braille publishing where zinc embossing plate is generated by computer and then used to emboss numerous copies. Having identified the important function of Braille Embosser as transcribing Braille writing to print texts, which were found not available in all the schools under this study, the schools engaged the services of blind teachers to transcribe Braille writing in to written text for inclusive teachers.

In essence, the question that one needs to ask is; how do LWDs gain access to instruction or clear descriptive relationship to objects and experience from the real environment? Many barriers to learning emanate from the environment. Mugo (2013) in this study, there still exist significant barriers for the learners with varied disabilities to access most common type of information. This require the availability and proper use of AT for instruction for LWDs, considering both the social and physical environmental conditions.

Table 4.3,further reveals that all the schools under this study do not have a variety of print enlarging technologies including the enhanced vision system which enables magnification of very small print for easy reading by the students who are visually impaired and the Close Circuit Television (CCTV) which also enables the students to read print text easily. For instance, Helen a pen-name is in a junior secondary

school (JSS3) in a government girls' secondary school, Zokwa is visually impaired but compelled to use Braille like her blind peers, because the magnifying camera is not available for her use.

The screen readers which include JAWS, Dolphin pen, and the NVDA that allow the blind and visually impaired learners to relate autonomously and competently with computers are not accessible for use in inclusive secondary schools in Kaduna State. Some of this software for instance Non-Visual Desktop Access (NVDA) and the Jobs Access with Speech (JAWS) have features that enable enlargement of print text on the computer screen, for easy comprehension of students who are visually impaired.

Concerning the ATS for the students with hearing impairments, the researcher first obtained a list of appropriate ATs from resources personnel's of each schools sampled and then used the list to check what was available in the schools. The findings were as indicated in the following table.

Table 4.4: Aggregate of Assistive Technology Available for Students with Hearing Impairment in Inclusive schools

Types of Assistive Technology Available	Available	Functioning	Not functioning	Ratio of functioning AT to the number of students
Electronic hearing Aids, accele- glove, test to sign	-	-	-	-
Telecommunication Device for the deaf (TDD)	-	-	-	-
Adopted Door Bell	-	-	-	-
Telephone/sign Device	-	-	-	-
Audiometer	-	-	-	-
Typanopmeter	-	-	-	-
Computer	6	4	-	4:25
Motion film	6	2	-	2:25
Amplification	-	-	-	-
Alerting devices	-	-	-	-

Source: *Hersh & Jonson (2003)*

Table 4.4, clear shows that inclusive secondary schools in Kaduna state do not have adequate modern AT for deaf and hearing impaired students. Only very few computers (4:25) were available and functional to be shared by the total of 25 students in the sixteen (16) schools. The two more computers that were available were old and not repairable. The other technology that was available in the sixteen schools was motion film (6) but only two of them could function properly. The other four had serious scratches and some parts were missing hence there was lack of cohesion.

From Table 4.4 above, it was obvious that inclusive secondary schools in Kaduna state do not have modern AT for deaf and hearing impaired students. Learners with

hearing impairment could gain from new ATs that may include the use of Accele Glove. Accele Glove is a wearable glove that translates sign language over short distances using Bluetooth technology. Also sound application systems give room for learners with hearing impairment and central auditory disorders in enhancing their performance. Also complicated speech recognition technologies accessible, include communicator, which interpret instructor stone of voice to written text as well as sign language on a computer screen for learners with hearing impairment to gain access to information teacher is passing at the course of instruction in an inclusive classroom settings

Table 4.5: Aggregate of Assistive technologies available for learners with physical disability in Inclusive Schools

Types of Assistive technology available	Available	Functioning	Not functioning	Ratio of functioning AT to the number of students
Head pointers/mouth pointers, joysticks, paper mask tape, page tuner, pencil and pen with grip holder, paper holder devices	-	-	-	-
Canes/Walking sticks, boots and ciphers, standing and walking frames, wheelchair crutches.	10 wheel chairs, 30 walking sticks, 5 crutches	10,47 ,5	-	10:39, 30:39,5:39
Corner chairs, adopted chairs, adopted tables, cut out desks shoulder and chest straps on wheelchairs.	-	-	-	-
Computers, communication boards, bliss symbols, Talking books, letter word stamps.	6 computers	4	-	4:39

Berker, et al, (2012)

Table 4.5, indicate that modern AT for physical challenged students was not available with the exception of wheel chairs which are locally fabricated (10:39) and which were obtained by the parents of the students. This meant that the wheel chair could only be used by the ten students who had them. Thirty nine (39) students had walking sticks and five (5) of them had crutches. The information from the resource personnel revealed that all the devices the students used were personal. The schools only provided storage and simple repairs. The use of the technologies by the students was also very difficult given the fact that in most of the schools visited the physical environments were not conducive enough because ramps were not built

across the schools to facilitate free movement of students on wheel chairs. This clearly shows that the student had to crawl to access the building, staircases have no rails and this could expose the student to the danger of falling down or Instead of the stairs there should be a ramp to enable the student to use the wheelchair.

Lack of access to the AT could be a great barrier to the implementation of the school curriculum and hence difficulty to fit in the social environment. The LWDs end up lacking skills that are required for employment. The lack of access to AT by students is not a unique case in Nigeria but an issue in the developing countries. It is only in developed countries like the USA and some other industrialized countries like Australia whose governments have a legal mandate to provide assistive technology to learners with special needs. Many developing countries Nigeria included do have such existing law (Felix, 2011). As a result, most learners who need assistive technology might not have access to them. This makes these learners to lag behind their peers in education. Felix further observes that ATs are expensive and hence not easy to access. This means that majority of parent might not be able to afford them for their children. Perhaps it would be essential for the sponsors to come in and assist the schools to acquire the devices and software. Additionally the governments in the developing countries should strive to assist the schools since the LWDs have equal rights to be educated.

This study revealed further on availability of AT for learners with mobility challenges, do not have access to modern ATs for physical with the exception of wheel chairs which are locally fabricated and were obtained by the parents of the

students. In most of the schools visited the physical environments ramps were not built across the schools to facilitate free movement of students on wheel and gain access to classroom with his/her wheel chair. Physically challenged students require a great variety of instructional facilities to facilitate learning within their institutional settings. For example, learners who do not have hands but use their limb to relate with a computer can use alternate key board devices such as head pouters/mouth pointers, head mouse which require a high weigh reflective dot be worn-by the student and arrangements made for two wireless switches for click action.

Some of these ATs devices and software, used by these physically challenge learners include, speech recognition software, switch activation and scanning software touch pads and touch screens and alternative keyboards, foot mouse, joy stick, and sip and puff activation technologies. Foot mouse has two foot controllers, one for cursor position and one for left – right clicks. While sip and puff works stand alone, but partners well with original instruments. Head mouse extreme all these enable the students mobility impaired to move cursor of the computer to carryout instructional task like every other students. In addition, during the interview with the 16 principals of schools under survey on available AT for instruction of learners with disabilities in their various schools. They responded that only older ATs were available and that modern ATs were not available in their respective schools. Lack of availability of modern assistive technologies meant that students and teachers who required these technologies were unable to use them. Inadequate access of quality AT for instruction of learners with disabilities and lack of awareness among

the administrators and teachers continuously hinder inclusive education (Ozoji, 2003).

In the school set up, this kind of constraints needs to be resolved in various ways including establishing policies to ensure procurement of AT and ensuring that the members who require the resources have good knowledge of how to use AT in the school

4.4 Ways Teachers Designed and Conducted Instruction for Learners with Disabilities in the Inclusive Schools

Objective three of this research was to establish ways in which teachers in inclusive secondary schools design and conduct their lessons for learners with disabilities. Accordingly a questionnaire was used to gather information from the teachers. Section one was set to collect information on years teachers spent in teaching inclusive classes, class taught in a current year, how they organized the students for instruction in the class and the instructional methods they used in the inclusive classes. Apart from finding out the experience of teachers in teaching in regular schools, the research for the purpose of in-depth information opted to establish the experience of the teacher in teaching the learners with disabilities. This would inform the study better about the teacher's challenges and success in integration of ATs for instruction for learners with disabilities. The information gathered is presented in Table 4.6.

Table 4.6: Number of years' respondents taught classes that include learner with disabilities

Responses	Frequency	Percent	Cumulative Percent
I have never taught an inclusion class	60	17.6	17.6
Fewer than 5 years	140	41.1	58.7
5 to 9 years	110	32.3	91
10 to 20 years	30	8.1	100
More than 20 years		-	-
Total	**340**	**100.0**	

Table 4.6, reveals that 60 out of 340 (17.6%) respondents indicated they had no experience in teaching LWDs in inclusion classes. About140(41.1%) indicated that they had taught in inclusive classes for less than 5 years. Also 110(32.3%) of teachers indicated they had taught in inclusive classes for upward of 5to 9 years, while a total of 30(8.1%)respondents indicated that they had taught in inclusion classes between 10 to 20 years. Assistive Technology cannot be useful without effective instructional methods. Figure; 4.5 present's information on the instructional methods the teachers commonly used in inclusive classrooms.

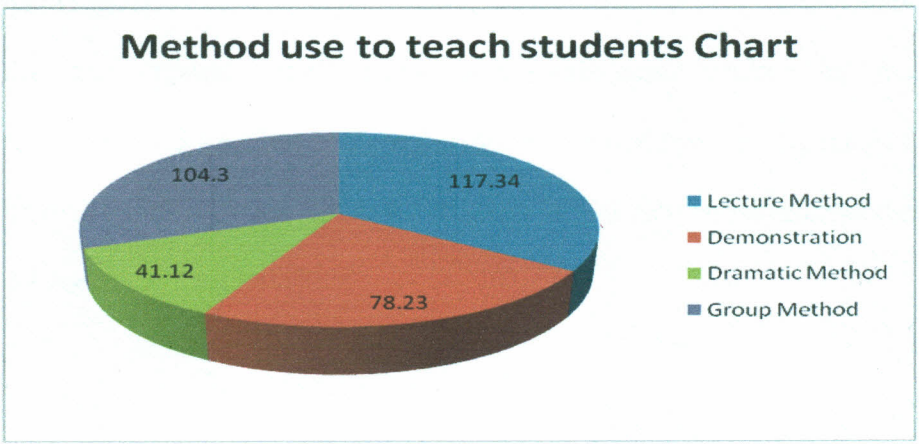


Figure 4.5: Teachers Response to Methods Commonly used to Teach Students with Disabilities

It is evidence that the teachers mostly used lecture method for instruction for learners with disabilities. This is clear that there is less learner participation in the teaching and learning process via this method. To find out how teachers then used the ATs the teachers were asked to explain how they organized their learners in the classroom when using the ATs. The findings are presented in figure 4.6

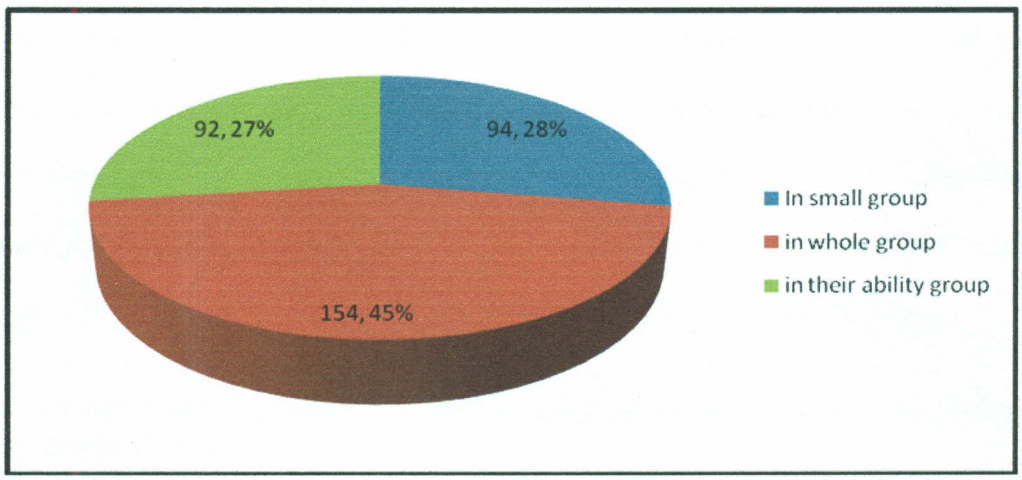


Figure 4.6: Teachers Responses on how they organized their Learners for Instruction in the classroom

From Figure 4.5, 154(45%) of the respondents said that they organized students in a whole group while using the assistive technology, 94(28%) respondents indicated that they organized the students in a small group while using the assistive technology and 92(27%) of the respondents indicated that they organized the student in mixed ability groups. Table 4.7 presents information on whether teacher used the ATs or not in their lessons.

Table 4.7: Teachers' Responses on use of Assistive Technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	230	67.6	67.6	67.6
	No	110	32.4	32.4	100.0
	Total	340	100.0	100.0	

Table 4.7above shows that 110(32.4%) of the respondents indicated they had not used assistive technology in teaching, while 230(67.6%) indicated to have used assistive technologies for instruction even though they were old ATs. Whether they used the ATs often or not the teacher gave the following information as is in table 4.8

Table 4.8: Number of years Respondents engaged in uses of assistive technology for instruction in the classroom

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	60	17.6	17.6	17.6
	Less than 5 years	140	41.1	41.1	58.7
	5 to 9 years	110	32.3	32.3	91
	10 to 20 years	30	9.0	9.0	9.0
	20 years and more	-		-	
	Total	340	100.0	100.0	100.

Table 4.8, shows that 140(41.1%) respondents have been using assistive technology for less than five years, 110(32.3%) have used the assistive technology for 5-9years, 30(9.0%) revealed that they have been utilizing the assistive technology for 10-20 years .and 20years and more of the utility of assistive technology was not recorded from the respondents. Further the instructors were asked to show how frequent they

used ATs in their classes. Out of the 340 teachers only 53 (16%) responded that they rarely used the ATs because the technology was not available. The rest 287 (84 %) stated that they had never used the ATs since they were rare and that they did not have the skills to use it.

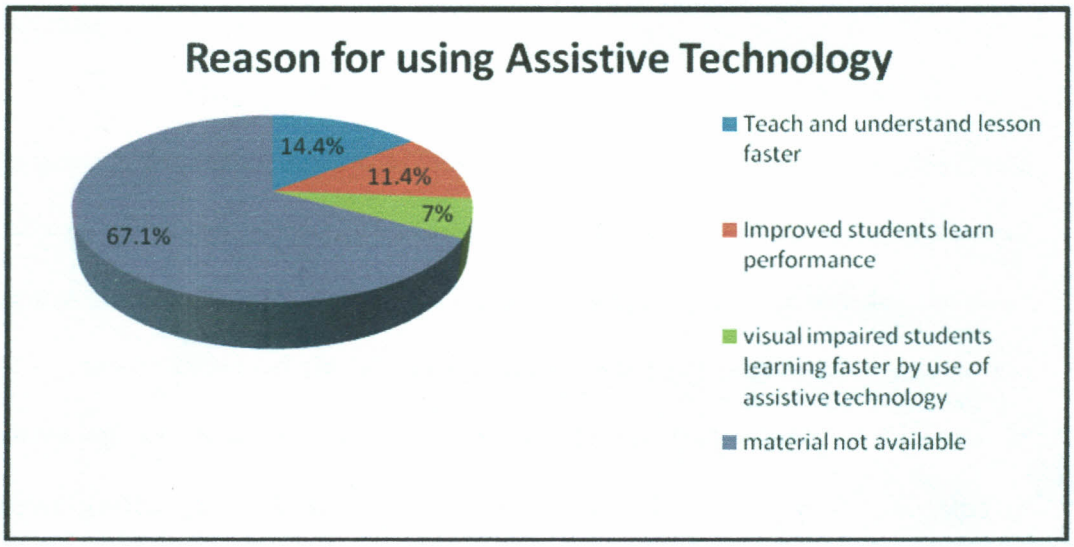


Figure 4.7: Teachers Reasons for using Assistive Technology to teach LWDs

The pie chart show that out of 340 of the respondents, 228 (67.1%) indicated they did not benefit since they never used the ATs due to lack of the assistive technologies, 49 (14.4%) indicated that it aided the students in understanding concepts faster, 40 (11.4%) respondents indicated that the use of assistive technologies helped the student in remembering the content. and 23(7%) of the respondents revealed that the use of the ATs help to work independently and see reality of the content.

Methods used by the teachers to teach LWDs in inclusive classes could be said not to be very helpful. Use of lecture method for instance would make the students to

interact with ATs minimally. The teachers also indicated that they used group discussion in their classes but this only happened due to the fact that the ATs were not adequate for the learners and hence the few that were there had to be shared. Some of ATs for example monocular is an individual user technology. This means that in case it is shared by majority at the same time the usage benefit would be minimal.

In terms of instruction, for LWDs, use of the Universal Design (UD) has proved to a large extent an efficient way to present quality teaching for all learners in secondary levels of education (CAST, 2010). Rose and Meyer, (2002) assert that the three principles of Universal Design for Learning (UDL) are important in guiding the designing of dynamic curricula using options that sustain differences in identification, planned, and emotional networks. They call for: (i) provision of manifold and dynamic pedagogies of presentation to sustain and acknowledge learning, (ii) provision of manifold and dynamic pedagogies of expression and apprenticeship to support strategic learning, and (iii) provision of manifold and dynamic options for engagement to sustain emotional learning. They argue that by using these three principles, one is able to meet and make flexible all aspects of the curriculum which are: goals, methods, materials, and assessments.

Further, Rose and Dolan (2000) observe that a diversity of channel, platforms, and reply choices should be used so that a learner's comprehension and skills are not at a loss by his or her ability with the channel. One would at this point argue that the UD approach to instruction has proven useful. It could therefore be suggested that the

UD based teaching for learners with disabilities could apparently benefits teachers and might not provide the learners with dynamic choice for production, interest and even commitment. This could not be done unless the instructors used a diversity of ATs and leaner centered teaching strategies. In essence LWDs in inclusive secondary schools did not benefit fully from the teaching and learning process.

Further, this study was interested in finding out the challenges the secondary schools faced in using the ATs. Accordingly, both the teachers and the students were requested to give the challenges they faced in using the ATs. Using the teacher's questionnaire, respondents were told to arrange responses in terms of strength (most challenging down to least challenging) things that created obstacles to utilization of ATs in inclusive schools. Teacher's response is presented in Table 4.9.

Table 4.9: Challenges faced by the teachers in using ATs

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Lack of budgetary allocation	35	10	10	
Inadequacy of assistive technology devices	85	25	35	
Lack of knowledge of assistive technology	65	19	54	
Inadequacy of skills to use Assistive technology devices	80	24	78	
Lack capacity building training on use of assistive technology	75	22	100	
Total	**340**	**100.0**	**100.0**	

Table 4.9, revealed that 35(10%) of the respondents indicated that their challenges were inadequate budgetary allocation to procure recent ATs, while 85(25%) of the respondents indicated that the constraints encountered in using ATs were mostly inadequacy of these devices, also 65(19%) revealed that the challenges were due to lack of knowledge of ATs and 80(24%) of the respondents attributed the challenges to inadequacy of skills by teachers to use ATs. While 75(22%) of the respondents said that lack of capacity building training on use of ATs were part of the challenges facing them. The teachers complained that the ATs were very rare or not at all in the schools and that were they not trained at all to use the ATs.From this data, it is obvious that integrating assistive technology into teaching of LWDs in inclusive schools were facing many fundamental challenges, which both the teachers and stakeholders have to overcome as they try to fully integrate technology into their teaching. These findings Concur with Roblyer, (2003)'finding that most of the teachers have inadequate training in technology devices and software and their uses and, even contemporary teacher training is not keeping up with technology developments. Grabe and Grabe, (1998) stresses that teacher preparation and teacher training in terms of technology integration continues to pose a big challenge to education, institutions have not been responsive to the expectation that new teachers will come into classrooms prepared to use the resources the schools have purchased, consequently many teachers graduate but still feel either not prepared or poorly prepared to use technology in their lessons. According to Roblyer, (2003) the challenge directly related with training is teachers' inadequacy knowledge of understanding the terms and concepts related to ATs.

According to Beukes-Amiss and Chiware's (2006) Tella, *et al.* (2007) financial constraints and strict budgets, schools rarely afford to assign funds to bring up to date their ATs. Educators cannot pay for most recent technologies since their schools are almost ever in dire monetary straits. However the implication will be that schools will more often than not have out-of-date equipment and materials. Moreover, the same monetary challenge leads to schools lacking the infrastructure essential to keep up with new technologies. In effect, this will simply imply that schools cannot take advantage of the newest, most powerful technological developments and innovations in the market.

Futher, the students with disabilties were interviewd concerningthe challenges they faced when usingthe ATs. Their responses are as presented in Table 4.10

Table 4.10: Challenges students faced when using Assistive technologies

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Inadequate skills by student to use the devices	134	39.4	39.4	39.4
Inadequate resource centre personnel	74	21.8	21.8	61.2
Inadequate consideration for learner with disabilities inclusive classroom	39	11.5	11.5	72.6
No challenge	54	15.9	15.9	88.5
Poor maintenance of the devices	39	11.5	11.5	100.0
Total	340	100.0	100.0	

From Table 4.10, out of 340 respondents, 134(39%) indicated that the challenges they faced when using Assistive technologies in the class was inadequate skills in the use of the high-tech device, 74(22%) of them indicated that there were

inadequate resource centre personnel qualified to assist them with skills to use the high-tech ATs and to assist in repairing the ATs Fifty four 54(16%) stated that they were comfortable with the old technology they had since that is what they could afford 39(12%) of the respondents indicated inadequate availability of high-tech ATs as the challenge they faced especially in classes.

From the responses given by the LWDs and their teachers, it is clear that scarcity of high-tech ATs in the school was a real challenge. This definitely affects the quality of instruction in the secondary schools. The issue of scarcity of the ATs is not unique to Nigeria's secondary schools but a serious problem particularly in developing countries. The challenge of accessibility and usability of AT for the LWDs is evident world over. In fact, D'Andrea (2010) asserts that to a great extent the general instructional software and additional technology devices obtainable in schools are not reachable for the learners. It is obvious that lack of ATs would lead to poor or no skill to use them. This is a challenge that was shared by both the students and the teachers. It is hence clear that the LWDs cannot access quality instructions in the secondary schools.

On establishing the suggestion teachers would offer in terms of improving instruction for LWDs in inclusive classrooms teachers were asked to suggest ways in which the education of the students would be improved. Their responses are presented in Table 4:11

Table 4.11: Teachers Suggestions of Better Instructions of the students in an Inclusive School Set Up

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Adequate training of teachers on new instructional approaches to teaching in an inclusive set up.	36	10.6	10.6	10.6
Training of more specialist	62	18.2	18.2	28.8
Adequate provision of Assistive technology devices	166	48.8	48.8	77.6
Provision of awareness and training on the use of device Assistive Technology	76	22.4	22.4	100.0
Total	340	100.0	100.0	

Table 4.11, shows that 166 (49%) of the respondents suggested that provision of adequate assistive technology device would improve the application of assistive technology in the classroom, 76 (22%) suggested the provision of awareness and training on the use of device assistive technology, 62(18%) were of view that more specialist should be employed for the use of the assistive device in the classroom and 36(11%) respondents suggested that adequate training of teachers on new instructional approaches to teaching in an inclusive set up be initiated. Table 4.12 presents suggested ways in which ATs could be used in the classrooms.

Table 4.12: Suggestions to improve the use of Assistive Technology in classroom

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Constant maintenance	36	10.6	10.6	10.6
More specialist	62	18.2	18.2	28.8
Adequate provision of Assistive technology devices	166	48.8	48.8	77.6
Provision of awareness and training on the use of device Assistive Technology	76	22.4	22.4	100.0
Total	340	100.0	100.0	

Table 4.12indicates that 166(49%) of the respondents suggested that provision of adequate assistive technology device would improve the application of assistive technology in the classroom, 76 (22%) suggested training on the use of assistive technology would help, while 62(18%) were of view that more specialist should be employed to assist use of the assistive device and software in the classroom and 36(11%) respondents suggested that constant maintenance of the assistive technology devices would improve the use of assistive technologies in the classroom.

In addition the classes observed, the teachers orally and systematically explained the concepts of the topic and made notes available for students to copy after the lesson. The teachers also wrote on chalkboards that were available in the classrooms to explain some aspects of the concepts while the students including learners with disabilities, on the other hand, listened quietly and scribbled down some points. Also, in three of the sessions observed, blind and visually impaired did not participate in mathematic classes, because the teachers presented lessons referring to equations on the chalkboards without considering the blind students.

Though it was not in the plan of this research to interview the teachers, the researcher was curious to find out from some teachers about how they assisted the blind and visually impaired students during the mathematics classes. The researcher got the opportunity to talk to ten teachers after the classes. The teachers expressed a lot of sympathy to the students. They blamed the government for the introduction of inclusive education without a proper legal framework on instructional

materials/resources (assistive technology) and their lack of knowledge on how to assist the students. The teachers lamented that the last time they attended a workshop/seminars or any form of capacity training was in 2008.

During the interview with the students, all the 28 students interviewed expressed their dismay in the way the instruction was conducted in the schools. They complained that some of the teachers do not at all recognize their presence in the classes. Jemima one of the students for example, complained that some of the teachers just go ahead in presenting contents using whatever means at their disposal. The students further reported that some of the teachers are speak in low tone that is they do not talk loudly and due to the kind of noise their Braille machines make the students with hearing impairment are not able to hear what is presented.

Also, personal interactions with teachers at course of classroom observation they were ask whether Universal Design for Learning (UDL) could improve inclusive schools, all the 16 teachers which they classroom teaching were observed agreed that knowledge of UDL could improve the pedagogical skills of both inclusive education teachers and general education teachers. They also said lack of knowledge of UDL by inclusive education teachers could affect students' performance. From the analysis of the UDL document, it was clear that its principals advocate for inclusion of students with disabilities in mainstream schools. For best practice in teaching, it advocates that the students be taught in a more conducive environment which is accessible to the students in all aspects.

The document describes how to conduct instruction and in a bid for inclusive education practices, Tomhnson (2003) observes that educators try to discover suitable equivalent ATs to be accessed by learners' based on prevalent physical disability characteristic. But in practice, there is still little match to bridge the gap of this mismatch, teachers must be skilled in instructional strategies that include whole group, small group and individual instruction adaptation of teaching materials (AT) modification of curriculum, development of various assessment tools and knowledge of multiple intelligence theory (Blecker and Broakes, 2010).

Following this, it is evident that variety of ATs must be used for instruction of learners with disabilities in inclusive schools. Additionally, wide range of teaching methods must be used to promote instruction of LWDs in inclusive schools. Considering this, it can be said that the goal of teaching at inclusive secondary schools in Kaduna state is still elusive. For instance, classes were not all that large and blind students placed their Braille machines on where it is available on their laps as they write notes. This was tedious and tiresome. The blind students also had only one option during instruction, they only listened to their teachers as they explained lesson content. There is lack of provision for special tables and chairs as well as position for wheelchairs in the classes and also no ramps were built in some of the school visited which caused physically challenged students to crawl to their classroom. Additionally, the principals indicated that the major challenges affecting the use of ATs in inclusive schools are that of inadequacy and also lack of understanding of ATs by both students and the teachers. Some of the respondents indicated that government should come up with framework on provision of adequate

and functional ATs for use in the schools as well as training of both teachers and students on utilization of ATs for instruction.

It is obvious that there is lack of modern ATs for the blind, deaf and hearing impaired, and physically challenged in the inclusive schools in Kaduna state. Also teachers did not have skills to better instruct learners with special needs. However, if teachers are adequately trained on how to do this, the students could benefit more from the instruction.

The developed countries are known to have a higher level technology for instruction compared to the developing countries. In this aspect, it was necessary for this study to find out how the ATs were being employed to ensure quality instruction in the inclusive secondary schools. Having ATs, with teachers' wealth of experience and qualifications might matter, but what is the stage of awareness of the instructors towards the use of ATs for instruction for learners with disabilities in inclusive schools. It is therefore imperative to establish the attitude of teachers towards the use of ATs.

4.5 Teachers Attitude towards the use of Assistive Technology

Attitude of teachers to use any type of technology is vital. Literature has shown that one of the greatest determinants of flourishing inclusion of learners with disabilities in the general school settings is the attitude of regular teachers (Coates, 1989; Bacon and Schultz, 1991). Result of research by Bacon (1992) and Wilczenski (1993) affirmed that attitude held by both general and special education teachers towards

learners with physical challenges decide the accomplishment or the malfunction of inclusion. If the instructors embrace an optimistic attitude towards learners with disabilities, this gives rooms and support the founding of policies that guarantees the use of ATs and in general the right of the students to be knowledgeable in inclusive school, whereas a pessimistic attitude towards individuals with physical challenges in all ramifications restricts the LWDs their chances to be included in general schools settings. (Altman, 1981; Jamieson, 1984). In considering this, this research established the teacher's attitudes towards not only accepting the LWDs in their classes but also to integrate ATs in their instructions. Table 4.13 indicates the teacher's responses to questions that led to their attitudes.

Table 4.13: Teachers' Attitude towards Integration of Assistive Technology

Statement	SD	D	U	A	SA	Mean
	f (%)	f (%)	f (%)	f (%)	f (%)	
a) Age doesn't bound me using assistive technology to teach	0 5(1.5)	27(7.5)	09 (2.6)	129 (37.9)	160 (47.1)	4.68
b) Always enthusiastic using assistive technology to teach	48(14.1)	6 (1.8)	81(23.8)	132 (38.8.)	122 (35.8)	3.52
c) My teaching now better enhanced due to assistive technology	0 (0.0)	0 (0.0)	009 (2.6)	189 (55.6)	152(44.7)	3.86
d) I can confidently use assistive technology	10 9(32.1)	192(56.5)	15(4.4)	24(7.1)	0(0.0)	1.86
e) Assistive technology make my teaching more pleasant	0(0.0)	0(0.0)	40(11.8)	72 (21.2)	228(67.0)	4.37
f) Anyone can easily grasp assistive technology related	12 (3.5)	72 (21.2)	09 (2.6)	120(35.3)	90(26.5)	3.27
g) Assistive technologies are good for any teaching	20 (5.9)	32(9.4)	39 (11.5)	93 (27.4)	156 (45.9)	3.97
h) Assistive technology make my teaching pleasant	0 (0.0)	0 (0.0)	40(11.8)	155 (45.6)	145 (42.6)	4.07
i) Assistive technologies are good for any teacher in inclusive class	7(2.1)	34 (10.0)	34 (10.0)	109 (32.5)	156 (45.9)	4.09
k) I am aged to use assistive technology in my teaching	162 (47.6)	140(41.2)	10 (2.9)	18(5.3)	10 (2.9)	1.34
l) Using assistive technology is time consuming.	120 (35.3)	172 (50.6)	20 (5.9)	10 (2..9)	18 (5.3)	1.63
m) assistive technology affect my productive better teaching life	10 (2.9)	15(4.4)	25 (7.5)	110(32.4)	180(52.9)	4.27
n) I was not yet ready for assistive technology	10 (2.9)	18 (5.3)	10(2.9)	140(37.9)	162 (47.6)	4.82
o) I have phobia of using assistive technology	05 (1.5)	27 (7.9)	0 9(2.6)	12 9(37.9)	160 (47.1)	4.68
p) I fear assistive technology embarrassing me before the students	0 (0.0)	24 (7.1)	15 (4.4)	109 (32.1)	192(56.5)	4.58

Table 4.13 reveals responses of respondents on attitude of teachers on integration of ATs in instruction of LWDs. On first statement whether age bound was not a barrier to the teachers in using ATs in teaching, 160 (47.1%) teachers strongly agreed, 129 (37.9%) agreed, 27 (4.5%) disagreed, 5(1.5%) strongly disagreed, while 9 (2.7%) were neutral with the mean responses of 4.68 in support of the statement. The second statement was that whether teachers' were always excited using ATs while teaching. 122 (35.9%) respondents strongly agreed, 132 (38.8%) agreed, 81 (23.8%) were undecided, 48 (14.2%) strongly disagreed, while 6 (1.8%) disagreed with mean rate 3.52 in support of the statement.

The third statement was that teaching using ATs had improved teachers teaching skills. 152 (44.7%) strongly agreed, 189 (55.6%) agreed, while 9 (2.6%) teachers were undecided with mean of 3.86 in support of the statement. The fourth statement was on whether teachers were confident enough to use ATs. 24 (7.1%) respondents agreed, 192 (56.5%) strongly disagreed, 109 (32.1%) disagreed, while 15 (4.4%) were neutral with mean responses of 1.86 disagreeing with the statement.

The fifth statement was on ATs make teaching pleasant. 228 (67.5%) of the respondents strongly agreed, 72 (21.2%) agreed, while 40 (11.8%) undecided. with mean of 4.37 in support of the statement. The sixth statement suggested that anyone could easily grasp the terms and concepts related to the ATs. 25 (7.4%) respondents agreed, 120 (35.3%) strongly disagreed, 180(54.1%) disagreed, while 15 (4.4%) were neutral with a mean of 1.84 disagreeing with the statement. The seventh statement was on ATs were good any teacher in inclusive. 156 (45.9%) respondents

strongly agreed, 93 (27.4%) agreed, while 39 (11.8%) were undecided, 32 (9.4%) disagreed, while 20 (5.9%) strongly disagreed with of mean 3.97 backing the statement. The eighth statement suggested that the ATs could made teaching more interesting. 155(45.8%) of the respondents agreed, 145 (42.6%) strongly agreed, while 40 (11.5%) were undecided, with mean response of 4.07 supporting the statement.

The ninth statement suggested that ATs were good for every teacher in inclusive schools.109 (32.5%) respondents agreed, 156 (45.9%) strongly agreed, while 34 (10%) were neutral, 34 (10%) disagreed, 7 (2.1%) strongly disagreed; with mean of 4.09 in support of the statement. The tenth statement was whether teachers were too old to use ATs for teaching. 10 (2.9%) respondents strongly agreed, 18 (5.3%) agreed, 10 (2.9%) were neutral, 140 (41.2%) disagreed, while 162 (47.6%) strongly disagreed, with mean response of 1.34 disagreeing with the statement.

The eleventh statement suggested using ATs for instruction is time consuming. 120(35.3%) respondents strongly disagreed, 172 (50.6%) disagreed, while 20 (5.9%) agreed, while 10(2.9%) strongly agreed with mean of 1.63 against the statement. twelfth statement suggested whether use of ATs instruction improve output production of teachers. 15(4.4%) respondents disagreed, 10 (2.9%) strongly disagreed, 110 (32.4%) agreed, while 180 (52.9%) strongly agreed with a mean of 4. 27 supporting the statement. On item thirteen asking teachers whether they were ready to use ATs 162(47.6%) respondents strongly agreed, 140 (41.2%) agreed,

10(2.9%) undecided, 18(5.3%) disagreed, while 10(2.9%) strongly disagreed with the mean of 4.82 agreeing with the statement.

On item fourteen suggested whether the teachers have phobia using ATs. 160 (47.1%) respondents strongly agreed, 129 (37.9%) agreed, 9(2.6%) were undecided, 27(7.9%) disagreed, 5(1.5%) strongly disagreed with mean of 4.68 supporting the statement. Fifteenth statement was on whether the teachers decline to ATs for fear of embarrassment before students. 192(56.5%) respondents strongly agreed, 109(32.1%) agreed, 15 (4.4%) undecided, while 24(7.1%) disagreed with response of the mean 4.58 to support the statement.

In line with the findings Becta, (2004) reports that teachers readiness and attitude towards integration of AT in support of inclusive education and also challenges of inadequate time, insufficient information of the methodological employ for use of technology and insufficient knowledge on existing software were amongst other factors affecting incorporation of technology. Teachers and assistance need training so as to put together well knowledgeable decisions concerning the technological needs of all learners, including those with disabilities. Research findings indicated that most of the teachers (75%) admitted that AT and ICT apparatus and facilities have a great deal of possible support towards achieving the dream of inclusion of LWDs in general schools. These shows positive options offered by technologies and publicly state their importance and willingness for persons to exploit its possible reinforcement. Despite this, almost all the beneficiaries of this technology make it

clear they still require definite knowledge and supervision on how to utilize the suitable AT products.

According to Wong, Meng and Libby, (2010) accessibility to ICT/AT are considered as crucial and important instructional materials even though, there was clear acknowledgment that AT facilitate access to information and improve quality of life of LWDs. Despite there being a missing link between AT comprehension and capability to use AT amongst the teachers who claimed to be at ease with low and medium technologies such as Braille, slate and stylus, talking calculator and hand held magnifier many described themselves as "IT illiterate" when referring to high-tech AT devices such as screen readers and OCR (optical character readers) software. Still others had biased interpretations to technology. Misconception between AT and ICT was noticed when using both ICT faculties (internet) and AT in teaching. Despite the missing link there were personal agitators who championed the course of incorporation of AT to enhance quality instruction. Wong, Meng and Libby, (2010) stress further that appreciating the different varieties of ATs for learners with disabilities, instructors of general schools were not conversant with the varied types of AT accessible for specific disability needs. Characteristically, learners may need an AT support for: speech access; Braille access; large print access; tactile communication systems, or any combination of these modes.

In addition, instructors took AT, ICT and web instructional applications developed for regular instruction to be the same as AT. Without understanding that AT devices vary in general applications upon this consequence. AT is not fully adopted and

utilized to benefit LWDs in inclusive schools. In essence, while all instructors have inadequate ability and information in AT, a few of the instructors emerged as champions of ATs at different degrees. In spite of obstacles in term of ATs awareness, at least one instructor made unprecedented effort to learn about AT and acquire basic knowledge to ensure that ATs were use amongst LWDs.

4.6 Summary of the Chapter

This chapter has presented a detailed analysis and discussion of findings of the study. This has been presented under the following: Government policies put in place to guarantee quality instructions for the learners with disabilities, Types of assistive technologies available for the instruction of learners with disabilities in secondary schools, Teacher design and presentation of instructions for learners with disabilities attitudes of instructors towards integration of AT in instruction of learners with disabilities and challenges facing the integration of AT for instruction of learners with disabilities in the secondary schools.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses the major findings and conclusion of the study. This chapter further gives recommendation of the study; the chapter ends with suggestions on area where further studies can be carried out to enhance the right to quality education of learners with disabilities in an inclusive setting.

5.2 Summary of Findings

Summary of the findings is discussed according to the objectives of the study.

5.2.1 Policy in place to guarantee quality instruction for learners with disability

This study found that the government of Nigeria has policies governing special needs in secondary schools. Nigerians with a disability decree of 1993 noted in section 2(c) and section 5, subsection 4(2) as later articulated in the National Policy on Education (2004) to ensure that disabled learners were not discriminated in anyway. The study found that the policy only spelt out actual thought of the right to equal instructional chances for all persons not withstanding their physical disabilities without specifically considering the nature of environment requirement and provision of services for each student's disability. The law has taken a relaxed approach by not clearly making compulsory for inclusive secondary schools to provide the ATs for the students with specific disability. The study also noted that neither of the inclusive secondary schools under study had its own institutional policy to guarantee access to quality instruction for the learners with disabilities.

5.2.2 Assistive technology available in inclusive secondary schools

The study found that schools under study have a variety of technologies for the learners with disabilities, the technology solely from middle-age technology and mostly for blind students, such as Braille machine and Braille papers, typewriters, slate and stylus and white canes. Modern technology including desktop computers, embossers, CCTV magnifier and modern software like JAWS and NVDA are however, not available. The study also found that modern technology for hearing impaired and deaf students such as AcceleGlove, and amplifier communicator are not available. Same is applicable for learner with mobility challenges, modern ATs such as touchpad, alternative keyboards, touch screens speech recognition software, foot mouse and joysticks are not available too.

The study also established that the school environment is not conducive for students; they are suffering and no any effort to transform the environment to meet up the need of disabled students in inclusive settings as well as procuring modern ATs for the students. These technologies are extremely important for instruction for learners with disabilities and it will require that proper mechanism be put in place to obtain the technology.

5.2.3 Design and conduct of instruction for the learner with disabilities in inclusive secondary schools

According to this objective, the study established that the teachers were using lecture methods more to present their lesson content when teaching students with special needs. Also the study found that blind and visually impaired learners do not

take mathematics. This was due the following: lack of skills by the teachers on how to teach the students with special need, lack of ATS in the schools and lack of skills by the teachers to use ATS. However, due to lack of teaching and relevant ATS for the student with special needs, the issue of quality instruction becomes elusive as the students do not get the benefits of education. One student even complained of being frustrated and at times intimidated.

5.2.4 Teachers employed use of AT to ensure quality instruction in the inclusive secondary school

This study noted that teachers appreciate the fact that the use of ATs for instruction for LWDs can facilitate learning and make students to learn faster and work around their abilities. The study also establishes that most of the teachers use low-tech ATs and never use high-tech ATs to teach; this is so because they are not available for them to use. The utilization of ATs driven by conventional users who are struggling to keep abreast in this more complex world needs effort to be made to train majority teachers and resource centre personnel to use the available high-tech AT in their instruction.

5.2.5 Attitude of Teachers Toward Integration of AT in Instruction for Learners with Disabilities in Inclusive Secondary School

Based on this objective, this study established that despite the scarcity of ATs in the schools there were no teacher professional development programs to give the teachers adequate skills to integrate ATs in the instructions of LWDs in the inclusive set-up. The teachers had positive attitude toward the integration of ATs for

instruction of LWDs. They were also interested in training to acquire knowledge and skills in ATs.

5.3 Implications of findings

It is clear that the policy on the education of learners with physical challenges in Nigeria is in tandem with other conventional policies. The Nigerian law affirms that all Nigeria children shall have a right to equal instructional opportunities regardless of any actual or anticipated disability. The law does not specifically tell what kind of education whether it is quality education or poor. Further the law does not specify measures to be taken to ensure that the LWDs get quality education.

In essence, there is need for the Nigeria government to strength these laws to ensure equality of access to education by students with disabilities. This is because the study reveals that there is no any strong legal back to guide against the discriminations of LWDs in inclusive schools as well as access to quality instruction. Also provision for enabling environment, lack of train teachers and lack of access to quality ATs were amongst others factors affecting implementation of IE Secondary Schools in Kaduna State Nigeria.

Emphasis is on the admission of LWD to mainstream schools; there is no clear directive to the schools to offer quality support and accommodations. In essence, the quality and the quantity of the students' support in terms of ATs' are done at the discretion of the schools. It was evident that inclusive secondary schools in Kaduna state lack access to a variety of modern ATs which could be helpful for learners with

disabilities to access quality instructions in inclusive schools. The learners with disabilities do not gain access to quality AT for instructions and as well they are being denied the benefits of this modern variety of ATs and improve productivities and academic performance for these students.

Lack of access to the ATs could be a great barrier to implementation of curriculum and this could also makes these learners to lag behind their peers in education. ATs are expensive and hence not easy to access. This means that majority of parent might not be able to afford them for their children. Perhaps it would be essential for the sponsors to come in and assist the schools to acquire the devices and the accompanying software. Additionally the government of Nigeria and stakeholders should strive to assist the schools since the students with disabilities have got equal rights to be educated.

Having ATs does not mean that the students with disabilities access quality education. Methods used by the teachers to teach LWDs in inclusive classes could be said to be very helpful. Use of lecture method for instance would make the student interaction with ATs minimally. In terms of instruction, for LWDs, use of the Universal Design (UD) has proved to a large extent an effective way to offer quality instruction for all students in the secondary level of education. The government should brace-up to challenges facing teachers in inclusive schools to put machineries' in place to train teachers on new instructional approaches and skills on how to use ATs.

5.4 Conclusion

According to the finding of this study, there are numerous problems affecting the integration of AT for instruction of learners with disabilities in inclusive secondary schools in Nigeria. the problem range from the scarcity of essential ATS for the instruction of learners with disabilities in the secondary schools to the lack of knowledge and the skills by both students, resource centre personnel and the teachers to use the available ATS for instructions, to this end, it can be concluded that the students with special needs do not get access to quality instruction in the secondary school in Kaduna state. In essence this could be seen as same around of problem across other states in Nigeria.

This further concludes that due to the lack of awareness of the modern AT among the administrator of the school, teachers and the students. The desire of students with special needs to access quality is defeated. This study also noted that the schools environment is not in conform to inclusive education frame work and therefore not conducive for students. This study also concludes that due to high costs of the technologies for varies disabilities; there had been serious scarcity of this essential technology in secondary schools. The desire of student with disabilities to access quality instruction and the students does not arise because there is no intense pressure to the schools or any indication to procure the AT and train on how to use it. This has led to stigmatization or intimidation and neglecting of disabled students in inclusive schools to the extent that they express their fear, frustration, stress and feeling of unwanted. This situation further creates a great barrier to the access to quality education of learner with disabilities in an inclusive education setup.

This study also notes that there are no any specific laws or legal framework and institutional policies pre- determined to guarantee access to quality instructions for the learners with disabilities in secondary schools in Nigeria. The laws that are available are too general to ensure provision of ATS and appropriate service that go for learners with disabilities. Instead the law generalizes the needs of all the students with disabilities to access equal education without considering their unique needs .The laws also are not clear on the qualification and kind training required of those who offer instruction to this students. There should be a specific laws demanding that those who offer the educational services to the specific types of disability to be trained in the field. Also the law should be clear that all the teachers should be sensitized on the need of the students they teach and be trained to solve simple problems these students might be facing in their classes. This study also include that the best practice in teaching in an inclusive setting which is the best described in the universal design and particularly in the universal design for learning have not been well practiced in the secondary school in Nigeria .although UDL is in some extent dependent on the modern technology it is also true that its guideline are also applicable in the situation where the high technology is scarce.

5.5 Recommendations

The finding of this study clearly showed that there is generally shortage of modern AT for the learner with disability in inclusive secondary school in Nigeria. The finding also showed clearly mismatched of the AT, which included the number of students requiring ATs and types of ATs users need to access quality education. Additionally, the findings have revealed that the school environment is unfriendly to

the students, and there is apparent lack of knowledge and skills in the utilization of the available ATs by both students and the teachers in the inclusive secondary schools. Furthermore the study has found that there is generally lack of legal framework and institutional based policies to guarantee the access of quality instructions for the student with special needs .the finding also precisely indicate that the teacher whose duty is to teach instruction for the students and that majority generally lack skills to teach the students. Finally, this study has inferred that the students with disabilities do not have access to quality instruction in inclusive secondary schools in Nigeria. This study therefore recommends the following;

5.5.1 Establishment of specific legal framework and institutional policies.

Due to the uniqueness in different types of disabilities and due to their specific needs in their education as a result of differences in their disabilities, apart from that general laws governing all types of disabilities in all the schools. It is therefore most appropriate within the current educational system ,government particularly federal ministry of education should clearly state ,the legal requirement for including students with special needs in an inclusive schools, what kind of services and support the particularly type of disability should be given in all the schools. This study would further recommend that each school establish their own specific legal and practical policies, in particular administration support given to schools, individual to implement AT and other relevant resources, facilities and services and access to quality instruction by the students.

5.5.2 Government support and Partnership with Non-Governmental Organization in the provision of AT in inclusive secondary schools.

This study has found out that there are many legislation in the world including the law by individual with disabilities education act to ensure all the student with special needs received access to education and prohibit discrimination of student with disabilities in schools .in order not to frustrate and discriminate these students, the schools should make available relevant ATs and other specialize services to the learner with disabilities .this study has established that the modern ATs for varied disabilities is very expensive and that the school could not afford to purchase this ATs to meet the demand of their students .it is therefore recommend that the same government that makes the laws should be able to support the schools the provision of ATs other required services for the learner with disabilities and canvass for these ATs devices and software from relevant donor agencies.

5.5.3 Public Private Partnership Training on the use of AT in the Inclusive Secondary

This research established that learners with disabilities more particularly blind and visually impaired struggle to use the available middle-age ATs. This is so because they do not gain access to few modern AT device and software which are otherwise designed to enable them access quality education. The study therefore recommend that the government should partner with stakeholders, relevant non-governmental agencies, private organization and international agencies to come up with mechanisms to improve the provision and access to AT, training of the instructors and resource centre workers in the area of AT and also develop a collaborative

approach between staff working in the classroom and the teachers .there is also need to organize formal training on the use of the AT to all the learner with disabilities as per their different disabilities in inclusive schools.

5.5.4 Teachers design and conduct instruction for the specific needs students in an inclusive setup.

The study discovered that the teachers in inclusive schools often get frustrated when teaching learners with disabilities more especially blind and visually impaired students. It was established that the major reasons for this was due to lack of knowledge and skills required to meet the desires of LWDs during the teaching learning period. .This situation is even worse in mathematics classes as teachers lack pedagogical skills to handle the blind students. This study recommends that the government through the ministry of education organizes in-service training of teachers following the universal design for the learning principal of best practice in teaching. The principal of UDL is that all the resources and facilities are set and designed to cater for a variety of user and to enable performance of a variety of tasks by the users in various kind of environment.

5.6 Suggestion for further research.

The following are the suggestions for further research.

1. A study should be conducted on, utilization of assistive technology in teaching mathematics to blind and visual impaired student in inclusive primary, post primary schools and institution of higher learning.

2. Research should be conducted to establish, effective training of classroom teachers and resource centre personnel on utilization of AT for instruction of learner with physical disabilities in inclusive practices in schools.
3. A study should be conducted on the effects of using a model of training on AT devices that make learners with disabilities more independent in accessing quality education.

REFERENCES

Abner, G.H. & Lahn, E.A. (1998). Implementation of assistive technology with students who are visually impaired: Teachers' readiness. *Journal of Visual Impairment & Blindness, 92 (2)98-105.*

ACAIMPESD, (2011) Report of the Advisory Commission on Accessible

Adeolle, A.O. (2005). Teaching reading to children with learning disabilities. Basic tips for regular teachers; *The Journal of Advocacy and Rehabilitation in Special Education (HARSE), 3 (3), 17-2-.*

Ahon, A.T (2011) achieving the education for all Goals: the place of special needs conference of international association of special education. Windhoek, Namibia – July 10-14,roll

Ajobiewe, T. (2007).Educational program for visually impaired children. In E.D. Ozoji, & E.Okuoyibo (eds) Nigeria in practice and future of special needs Education in Nigeria. Jos. Oxford binders.

Ajzen, I. (2001). Nature and Operation of Attitudes. *Annual Review of Psychology, 52, 27-58*

Ake, G., Nona, L. & Hannu, L. (2010). Effective use of Assistive Technologies for Inclusive Education in Developing Countries: *Issues and Challenges from Two Case Studies. Development using Information and Communication Technology. 6 (4) 5-26.*

Alaverdyan, A. & Simon, J.(2009*). Inclusive education Tokit world vision Armenia*: Yerevan 2009

Alper, S. & Raharinirina, S. (2006). Assistive technology for individuals with disabilities: a review and synthesis of the literature: *Journal of Special Education Technology, 21 (2), 47-64.*

Altman, B.M. (1981). Studies of Attitudes towards the handicapped: *The Need for a new direction, Social problems, 28.321-337.*An overview. Retrieved from http://www.Idonline.Orglarticle/learning disabilities 3% An overview? Theme=print.

Amedahe, F.K. (2002). Introduction to Educational Research. Accra: Mecury Press

Americans with Disability Act, (1990).Retrieved, November 13, 2011.

Americans with Disability Rehabilitation Act (1973). Retrieved November 12,

Anderson, C.J., Klassen, R.M., & Georgiou, G.K. (2007). Inclusion in Australia: What teachers say they need and what school psychologists can offer. *School Psychology International, 28 92), 131-147.*

Anumonye, F.O (1991) *problems of mainstreaming handicapped children in Nigeria.* In E.D. Ozoji, J.M. umolu & S.O. Olaniyan (eds) contemporary issues in mainstreaming exceptional children in Nigeria's 6-3.3.4 system of education (pp65-70). Jos, Nigeria: national council for exceptional children. *approaches.*(Revised edition), ACTS Press: Nairobi, Kenya.

Assistive Technology Act, (1998).Retrieved. October 10, 2011. Association for supervision and Curriculum development.

Austin, V.L. (2001). Teacher beliefs about co-teaching. *Remedial and special education*, 22(4), 245-255.

Avramidis, E., Bayliss, P.& Burden, R. (2000). A survey into mainstreaming teachers attitudes towards the inclusion of children with special education needs in the ordinary schools in one local education authority. *Educational Psychology, 20 (2), 191-211.*

Bacon, E.H., & Schultz, J.B. (1991).*A survey of Mainstreaming Practices, teacher Education and Special Education, 14 (2), 144-149.*

Barker, B. S, Weal, G. and Adamchuk, V.I, (2012)*New Technology for learning* London: library of congress cataloguing. Publication data.

Bartleh, S. & Burton, D. (2005).*Practitioner. Research for teachers. London*: Paul Chapman

Basham, J., Israel, M., Graden, N., Poth, R., & Winsten, M. (2010).A comprehensive approach to RtI :Embedding universal design for learning and technology. *Learning Disability Quaterly, (33),243-255*

Bausch, M.E, Mittler, J.E, Hasseibring, T.S & Croiss D.P (2005). The assistive technology act of 2004: what does say and what does it mean? Physical disabilities: education and related services, 23(2), 59-67

Baush, M.E. & Hasselbring, T.S. (2004).Assistive technology. Are necessary skills and knowledge being developed at the pre-service and in-service level? Teacher Education and Special Education, (27), 190-201.

Becta (2004). What the research says about ICT supporting special educational needs (SEN) and inclusion, Becta Publication ID: BEC 1-15009, retrieved June 15, 2014 from http://www.becta.org.uk/page documents/research/wtrs ictsupport.pdf

Bell, S.M., Cihak, D.F. & Judge, S. (2010). A preliminary study. Do alternative certification route programs develop the necessary skills and knowledge in assistive technology? *International Journal of Special Education.* 925), 110-118.

Bell, S.M., Cihak, D.F. & Judge, S. (2010). A preliminary study. Do alternative certification route programs develop the necessary skills and knowledge in assistive technology? *International Journal of Special Education.* 925), 110-118.

Berrmann, M. (1998).Assistive Technology for Young Children in Special Education: It makes a difference. Retrieved from www.edutopia.org/assistive-technology-young-children.sp on 25 May 2014.

Besio, S. & Salminen, A. (2004).Children and technology and Youngsters. *Technology and Disability, 16, 115-117.*

Best, J.W. & Kahn, J.V. (2006).*Research in Education.* India: Pearson Education.

Beukes-Amiss, C.M. & Chiware, E.R.T. (2006).The impact of diffusion of ICTs into educational practices, how good or how bad? A review of the Namibia situation. Available at: http://www.dspace.unam.na:8443/dspace/bitstream/1995/244/impact+diffusionICTedupdf (Accessed 10 February 2007)

Blackhurst, A.E. (2001).What is assistive technology? Retrieved from http:// natri-uky.edu/resources/fundamentals/continuum.

Blackhurst, A.E. (2005). *Perspective on application of Technology in the Field of Learning disabilities. Learning Disability Quarterly,* 28(92), 175-178.

Bleckers, N.S & Broakes, N.J (2010) creating a learning environment for all children: are teacher able and willing, *international journal of inclusive education, 15(4), 435-447*

Bocconi, S. Benigno, V. & Ott, M., (2007*). Inclusive Education: Helping Teachers to Choose ICT Resources and Use them Effectively. eLearning papers, no.*6. ISSN 1887-1542.

Bondy, A.S., & Frost, I.A.(1995). The picture exchange of communication system. *Focus on Austic Behavior 9 (3), 1-20*

Borg, J. Larson, S. Ostergren, p.(2011). The right to assistive technology; for whom, for what and whom? *Disability and society*, 26(2) 151-167

Bosik, N., Starcher, K., Kelly, S.M., & Hakpe, N. (2008).Accessibility and universal design. In commonwealth of learning (COL, Ed.), Education for digital world: Advise guidelines, and effective practice around the globe(143-180). Vancouver, Canada: Commonwealth of learning. http://www.col.finder.net/ materials/education for digital world complete. Pdf.

Bradburn, N., Sudman, S. & Wansink, B. (2004).Asking question: *The definitive guide to questionnaire design – for market research, political polls and social/health* questionnaires. San Fransisco, CA: Jossey-Bass.

Bradshaw, L. & Mundia, L. (2006). Attitudes to and concern about inclusive education: Bruneian in service and pre-service teachers. *International Journal of Special Education*, 21 91), 35-41.

British educational communication technology agency (BECTA, 2007) ICT for learning and teaching disability and legislation: guidance for commissioner and suppliers retrieved September 20, 2014 and s from http//www.b3cta.org.uk/pagedocument/wtr ICT support pdf

British Educational Technology Agency BECTA (2003). *What the research says about IC supporting special education* London: author.

Brownlee, J. & Carrington, S. (2000). Opportunities for Authentic Experience and Reflection: A teaching programme designed to change attitudes towards disability for pre-service teachers. *Support for Learning,* 15 (3), 99-104.

Bryant, B.R., Bryant, D.P., Shih, M., & Seok, S. (2010). Assistive Technology and Support Provision*: A selective review of the Literature and proposed areas of Application. Exceptionality*, 18 (4), 203-213

Burns, R.B. (2000). Introduction to research method (4th Ed.). French forest, NSW: Person

Buultjens, M. & Aitken, S. (1993). *The Challenge of New Technology in Education*: In A.R. Fielder, A.B. Best & M.C.O. Bax 9Eds.) The Management of Visual Impairment in Childhood. London; MacKeith Press.

Campbell, P.A., Dugan, L.M., & Wilcox, M.J., (2006). Making decisions about assistive technology with infants and toddlers. *Topics in Early Childhood Special Education*, 26 (1), 25-3

Casely- Hayford and Lynch, P. (2003). ICT and Special Needs Education in Africa, Imfundo Disability education page Australia. Human rights and equal opportunity commission website http//www.hrex.gov.an/disability rights/ education/ education html Education Australia.

CAST, Inc (2010) What is meant by the term curriculum? National Centre for Universal Design for Learning [online]. Retrieved June 3, 2014.

Challenges implementing inclusive education in Indonesia: Jakarta post Saturday June 2008 p.1

Chambers, D.J. (2011). Assistive Technology: Effects of Training on Education Assistant Perceptions of themselves as users and Facilitators of Assistive Technology and

Consequent Transfer of Skills to the Classroom Environment (Doctoral Dissertation). University of Notre Dame, Australia, Fremantle, WA.

Chamlin, M., Diska, A. E., Felson, R.B & Baccaglini, W. (1984). Estimating Attitude – Behaviour Reciprocal Effects within a Theoretical Specification, *Schools Psychology Quarterly* 47 (1), 15-23.

Charema, J. (2007). From special schools to inclusive education: the way forward for developing countries South of Sahara. *The Journal of the International Association of Special Education, 8 (1), 88-97.*

Chhabra, S. Srivastava, R. & Srivstava , I. (2010) Inclusive education in Botswana: the perception of school teachers. *Journal of disability policy studying* 20(4), 219-222

Chitiyo, M. (2000). Special education in Zimbabwe: Issues and trends. *The Journal of International Association of Special Education, 7 (1) 22-27.*

Coates, R. D. (1989). The Regular Education Initiative and Opinions of Regular Classroom. Teacher. *Journal of Learning Disabilities,* 22,532-536.

Collarbone, P. (2009).Creating Tomorrow: Planning, Development and Sustaining Change in Education and Other Public services. London GBR: Continuum International Publishing.

Common wealth of Australia (2005).disability standards for education 2005.retrievened from http://www.dest.govert.all/sector/school education/ standards for education.html

Connell, B.R., Jones, M. Mace, R., Muellar, J., Mullick, A.,& Astroff, E. (1997). The principles retrieved July 12, 2014, from http://design. Ncsuedu: 8120/cud/uniu= design/ princ over-view htm.

Connor, C., Snell, M., Gansneder, B. & Dexter, S. (2010). Special education teachers' use of assistive technology with students who have severe disabilities. *Journal of Technology and Teachers Education*, 18, 369-386.consumers: Exploring the potential of the I Phone. *Journal of Visual Impairment and Blindness.* 18(3), 29-44.

Cook, T.D., & Campbell D.T., (1979). Quasi-experimentation: design and analysis for field settings. Chicago: Rand McNally.

Copland, J. (2010). Making sense of Autistic Spectrum Disorders. NY: Bantam Instructional Practice Upper Saddle New Jersey; Pearson Education.

Copley, J., & Ziviani, J. (2004) Barriers to the use of Assistive Technology for Children with multiple disabilities. *Occupational Therapy International,* 11 94), 229-243.

Coutinho, M. 1995). In *Learning Disabilities Association* (Ed.), secondary school and beyond: Providing opportunities for students with learning disabilities (pp 13-48), Pittsburg: Learning |Disabilities Association.

Cox, M. J., Preston, C., & Cox, K. (1999). "What Motivates Teachers to use ICT?" Paper presented at the British Educational Research Association Conference. Brighton. September.

Creswell, J.W. & Yin, A. (2009).Research Design: Quantitative, Qualitative and mixed methods approach, 2nd Edition. Sage Publications Inc, Carlifornia.

Creswell, J.W. (2005). *Educational Research: Planning, conducting and evaluating quantitative and qualitative research* (2nd Ed.). Upper Saddle River, NJ: Pearson.

Creswell, J.W. (2012). Research Design: Quantitative, Qualitative and Mixed Method Approach (2nd Ed.). SAGE Publications Inc., California.

D'Alonzo, B.J. & Ledon, C. (1992) successful Inclusion of Children with Disabilities with Non-disabled Peers in Early Intervention and Pre-school Settings. *The Transdisciplinary Journal, 2,277-283.*

Dada, O.C. (2011). Attitude of Pre-service Teachers towards Training and Teaching of Persons with Intellectual and Developmental Disabilities. Proceedings for the Twelfth Biannual Conference of International Association of Special Education: Windhoek, Namibia – July 10-14, 2011.

Dakar, (2000).Framework of Action. World education forum Accessed from www.innesco.org.efa.

Danesy, A .H. (2005).Psycho-social Factors as Correlates of Academic Performance and Correlate learning of Adult Students with Disabilities in Oyo State; An unpublished PhD Thesis in the Department of Adult Education University of Ibadan.

Davis, F. Bagozi, R. & Warshaw, R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, volume 35, 1998,99982-1003.

Defence on 5 August 2008 at the International Conference on Teaching and Learning with Technology. Retrieved from http://www.moe.gov.sg/media/speeches/2008/08/05/opening-address-by-dr-ng-eng-h-1.php

Denis, D.M., Lynette, K.C. & Kathleen, L. (2012).Integrating Assistive Technology into Teacher Programs: *Trials, Tribulations and Lessons. Falls, 8* (1), 32-47.

Department of Education (2010) centre for Inclusive Schooling. Retrieved from http://det.wa.edu.au/studentreport/statewidespecialist

Department of Education (2010b) centre for Inclusive Schooling. Retrieved from http://det.wa.edu.au/student report/statewide specialist services/detcms/navigation/centre-for-inclusive-schooling/?oid=Multi Part Article - id-8026117.development. Remedial and special education 28 (1) 58-64

Disabilities. Washington DC: BookShare.

Disability education page Australia. Human rights and equal opportunity commission website http//www.hrex.gov.an/disability rights/ education/ education html

Discrimination Disability Act, (1992) Retrieved, September 10, 2011. http://www.edweek.org/ew/issues/no-child-left-behind

Duhaney, D.C. & Duhaney, A.C. (2000). Assistive technology: meeting the needs of learners with disabilities. *International Journal of Instructional Media,* 27 (4), 393-401.*Education and Disability,* 25(1)65-79Education Australia. education of students with learning disabilities: A review of the literature. *Journal of Special Education, 37*(1), 26–32.`

Edyburn , D.L. (2004). A synthesis of Special Education Technology Literature. Journal of Special Educational Technology,18 (3), 5-28

Edyburn, D.L. (2000). Assistive technology and students with mild disabilities. *Focus on Exceptional children, 32(9),1-24*

Eleweke ,C.J. & Micheal, R. (2000) enhancing inclusive educational developing countries: a paper presented in the international special education congress 2000. Including the excluded, university of Manchester 24th-28th July 2000.

Eleweke, C.J.& Micheal, R. (2000) enhancing inclusive educational developing countries: a paper presented in the international special education congress 2000. Including the excluded, university of Manchester 24th-28th July 2000.

Elkins, J. (2007). Legislation policies and principles. In A. Ashman & J.Elkins (Eds) education for inclusion and diversity (3rded), (pp.35-56). French's forest, NSW: Pearson Education Australia.

Ellisworth, N.J. &Zhang, C. (2007). Progress and challenges in China's special education

Eskay, M. (2011). Educating children with expectation needs in Nigeria: past, present and future perspectives: proceedings for the twelfth biennial conference of the international association of special education, windhoek, Namibia- July 10-14, 2011.

Evans, C; Williams, J.B & Metcaf, D. (2010).*Using high- and low- technology to enhance self- and peer assessment and feedback for pre-service teachers. Journal of Special Education Technology, 25 (4), 55-60*

Farrell,G. & Shafika, I (2007) . Survey of ICT and education in Africa: a summary report, based on 53 country surveys. Washington, DC: info Dev. world bank. Retrieved on 15 may 2014 from http://www. Info dev: org/en/publication 353htm

Farrell,G. & Shafika,I (2007) . Survey of ICT and education in Africa: a summary report, based on 53 country surveys. Washington, DC: info Dev. world bank. Retrieved on 15 may 2014 from http://www. Infordev: org/en/publication 353htm

Federal Republic of Nigeria (FRN), (2004). National Policy on Education (4th Ed,) Lagos: NERDC.

Federal Republic of Nigeria (FRN), (2008). National Policy on Education (5th Ed,) Lagos: NERDC.

Felix ,O.N. (2011). The challenges of assistive technology and application for special education personnel preparation in Nigeria: Proceeding of twelfth Biennia conference of international Association of Special Education. Windhoek Namibia-july10-14, 2011.

Ferguson, D.L. (2008). "International Trends in Inclusive Education: The Continuing Challenge to Teach Each One and Everyone" *European Journal of Special Needs Education.* 28 (1), 21-32.

Fishbein, M. & Ajzen, I. (1972) Attitudes and Opinions. *Annual Review of Psychology*, 23, 487-544.

Fishbein, M., & Middlestadt, S. (1998). Non Cognitive Effects on Attitude Formation and Change: Fact or artifact? *Journal of Consumer Psychology, 4* (2), 181-202.

Funchs, D. & Funchs, L.S. (2009) Responsiveness to intervention: *multilevel assessment and instruction as early intervention and disability identification. Reading teacher,* 63(3), 250- 252

Funchs, D., Mock, D., Morgan, P., &Young, C. (2003). Responsiveness- to- Intervention: Definitions, evidence and implication for the learning disabilities construct: *Learning Disabilities Research and Practice, 18(3). 157-171.*

Gay, L.R. (1983) *Educational Research Competencies for analysis and application* (2nded), Columbus: Charles E. Merril Publishing Company.

Gokhan, A. & Emine, M (2010). Comparison of the theory of reasoned action and the theory of planned behavior: An application on accountants' information technology usage. Africa journal of Business Management 5(1), pp. 50-58 (online). Retrieved: 24/6/214 from http://www.academic journal.org

Grabe, M. & Grabe, C. (1998).*Integrating Technology for Meaningful Learning.* Boston: Houghton Mifflin Co.

Graham, S.(1999) The role of test production skills writing development: *a special issue*
Guilford, R. & Upton, G. (1992) *Special Education Needs*. London: Routledge.

Hackman, J. R. & Anderson, L.R. (1968).The Strength relevance and source of beliefs about an object in Fishbein's attitude Theory. *The Journal of Social Psychology*, 76, 55-67.

Hannan.A.(2006) Observation Techniques. Retrieved from http://www.ed.plymouth.ac.uk/
Hasselbring, T.S. & Glaser, C.H. Williams (2000).Use of Computer Technology to help students with special needs. *Future of Children*, 10 (2), 102-122.

Heflin, L.J. & Alaimo, D.F.(2007).Students with Autism Spectrum Disorders: Effective Instructional Practices, Upper Saddle River, New Jersey: pearson Education.

Hersh, A.M and Johnson, A.M.(2003) Assistive technology for the Hearing-impaired, Deaf blind. London: springer.

Hopkins, J. (2006). Assistive technology: 10 things to know. *Library Media Connection,25(1), 12-14.*

Hopkins,J. (2004) assistive technology to support students with special needs. Accessed from www. curriculum. Org Http://www.childinfo.org/disability resources. Html. Retrieved June 6, 2014. http://www.ada.gov/pubs/ada.htm

Huston, J. (2007). Inclusive education updated www.cvs.k12.mi.us/ismith.inclusion mthll.

Huston, J. (2007). Inclusive education updated www.cvs.k12.mi.us/ismith.inclusion mthll. instruments, revised. New York: Institute for matching person & Technology Retrieved from http:// members.aol.com/ImpT97/MPT.html # news.

Igbokwe, U.L., Mezieobi, D.I. &Eke, C. (2014) teachers attitude to curriculum change: implications for inclusive education in Nigeria: *journal of research on humanities and social sciences, $, (11), 92-99.*

Innes, A., Archibald, C. & Murphy, C. (2004). Dementa and Social Inclusion: Marginalized groups and marginalized areas of dementa research, care and practice 1st edition:

Jamieson, J.D. (1984). Attitudes of Educators Special Education: Theory and practice (pp.206-222). Reston, VA: Council for Exceptional Children.

Jenine, K. & Neo. M. (2011) a teacher from Botswana and assistant professor of special education: learning about inclusion from each other: proceedings for the twelfth biennial conference of international association of special education. Windhoek, Namibia- July 10-24,2011

Jordan, A. & Stanovich, P. (2001).Pattern of teacher – student interaction in inclusive elementary classrooms and correlates with self-concept. *International Journal of Disability, Development and Education*, 48 (1), 33-52.

Jordan, A. & Stanovich, P. (2002).Preparing general educators to teach in inclusive classrooms: some food for thought. *The Teacher Educator*, 37 (3) 173-185.

Jost, M.B. & Mosley, B.F. (2011). Where IT's AT? Teachers, Assistive Technology and Instructional Technology. *Journal of Technology Integration in the Classroom*, 3 (2),5-16.

Judge, S. & Simins, K.A. (2009). Assistive technology training at the pre-service level: a national snapshot of teacher preparation programs. *Teachers Education and Special Education,* (32), 33-44.

Judge, S. & Simins, K.A. (2009). Assistive technology training at the pre-service level: a national snapshot of teacher preparation programs. *Teachers Education and Special Education,* (32), 33-44.

Judge, S., Puckett, K., & Vabuk, B. (2004). Digital Equity. New Findings for the Early Childhood longitudinal study. *Journal of Research on Technology in Education.* (36), 383-396.

Judge, S.L.(2001). Computer applications in programs for young children with disabilities: Current Status and Future Directions. *Journal of Special Education Technology*.2(1),20-25

Kaplan, K.J. & Fishbein, M. (1969).The Sources of Beliefs, their Saliency, and Prediction of Attitude. *Journal of Social Psychology*, 78 (1), 63-73.

Kapperman, G., Sticken, J., & Heinze, T. (2002).Survey of the use of assistive technology Illinois students who are visually impaired. *Journal of Visual Impairment & Blindness, 96,* 106-108.

Karen, L.K., Jeni, A., Monique, B., Lindi, C.,& Mollie, k. (20011). Personnel shortage in special education: challenges and success conference of international association of July 10=14,Rolls.

Kelly, S. M. (2008). *Correlates of assistive technology use by students who are visually impaired in the U.S.: Multilevel modeling of the Special Education Elementary Longitudinal Study*. Unpublished dissertation. Northern Illinois University, Illinois

Kelly, S.M. & Smith, T.J. (2009). The digital social interactions of students with visual impairment: Findings from two natural national surveys. *Journal of Visual Impairment and Blindness,* 102 (9), 528-539.

Kholi, T.(1993). *Special education in Asia*- in P.Mittler,R. Broullette, & D.Harriss (eds), special needs education (118-129)

King-sears, M.E. & Evmenova, A.S. (2007).Premises, principles and processes for integrating technology into instruction. *Teaching Exceptional Children,* 40 (1) 6-14.

Kombo, D.K. & tromp, D.L.A. (2006). *Proposal and thesis writing: An introd*uction. Makuyu. Paline Publication, Africa.

Lahm, E. (2005). Improving practice using assistive technology knowledge and skills. In D. Edyburn, K. Higgins & R. Boone (Eds.), Handbook of Special Education Technology *learning with disabilities quarterly 22(2): 75-77*

Library of Congress (1998).Assistive technology Act. Retrieved from http://thomas.loc.govt/cgl-bin/query/z? C 105:5.2432.EWR.

Library of Congress (1998).Assistive technology Act. Retrieved from http://thomas.loc.govt/cgl-bin/query/z? C 105:5.2432.EWR.

Liska, A.E, Felson, R.B., Chamlin, M; & Baccaglin, W. (1984). Estimating attitude behavior

Loeding, B.L. (2002). *The use of Educational Technology and Assistive Devices in Special Education.* In J.L. Paul (2002), rethinking Professional Issues in Special Education. Westport, USA: Greenwood Publishing Group.

Loreman, T., Earle, C. Sharma, U. & Forlin, C. (2007).The development of an instrument for measuring pre-service teachers' sentiments, attitudes and concerns about inclusive education. *International Journal of special Education,* 22 (2) 150-159.

Lovell, K. & Lawson, K.S. (1970).*Understanding research in education.* Edinburgh: Neill and Company Limited.

Maccido, M.I (2013). Enabling Policies and Disabling Barriers. Addressing Challenges of Persons with Special Needs in Nigeria. In A. Olobisi (Ed) Childcare and Special in Nigeria in A, Olobisi (Ed) child care and special needs education in Nigeria, Abuja, CELDA)

Manduchi, R & Kurniawan,S (2013) Assistive technology for blindness and low vision New York: Tailor & Francis group.

Maria- crisina, C, Esther, C.S. & Marcos, G.P.(2011). Teachers perception of preparedness and practice for teaching diverse learners inclusive classroom in Spain: proceedings for the twelfth Biennial conference of the international association of special education, Windhoek, Namibia- July 10-14, 2014/

Marino, M.T, Marino, E.C,& Shaw, S.F (2006) making informed assistive technology decisions for students with high incidence disabilities. *Teaching exceptional children*, 38(6), 18-25.

Meijer, J.W. (2003). Summary report: inclusive and classroom effective practice available online at <www. European- agency. Org> (accessed 24 june4 2014)

Meng, D. (2008). The attitudes of primary school teachers toward inclusive education in rural and urban China. *Frontiers of Education in China, 3*(4), 473-492.

Meng, D., & Libby, K. (2010).Meeting the needs of students with disabilities in general education classrooms in China. *Teacher Education and Special Education, 3*(3), 195–207. doi: 10.1177/0888406408330631

Merriam, S.B. (1998) *Qualitative research and case study applications on education.* SanFransico, C.A: Jossey Bass.

Micheals, C.A. & Mcdermott, J. (2003) Assistive technology integration in special education, teacher preparations of current attainment and importance. *Journal of Special Education Technology*, 18 (3),

Milne, J. (1999). Questionnaires, advantages and disadvantages, learning technology dissemination initiative, Aberdenan University, UK. Retrieved: 29/8/2014 from http://www.ibc.hw.ac.uk

Ministry of Science and Technology (2003). A report on taskforce on special needs in education. Nairobi: government printers

Mittler, P. (2000). *Working towards inclusive education, social context.* David Fulton Publisher : London.

Mugenda, O.M. & Mugenda, A.G. (1999).*Research Methods: Quantitative and qualitative approach.* Nairobi. ACTS Press.

Mugenda, O.M. & Mugenda, A.G. (2003).*Research Methods: Quantitative and qualitative*

Mugo, B.C. (2013). Assistive technology and access to quality instruction for blind and visually impaired students: A comparative study of Kenyatta University Kenya and Syracuse University USA. The Kenyatta University: unpublished PHD thesis.

Mugo, K. (2001). Testing Youth Transitions in Kenya: Are young people with disabilities falling through the cracks? RECOUP working paper No. 34. Retrieved: July 7th 2014 from www.dfid.gov.uk/R4D/PDF/outputs/impoutcomps_RPC/WP34-JKM/PDF.

Mukhopadhyan ,S, Molosiwa, S.M & Moswela, I. (2009) Teachers Trainee's level of preparedness for inclusive education international; *Journal of Science Research in education*, @(2),ST- 58

Mull, C. A., & Sitlington, P. L. (2003). The role of technology in the transition to postsecondary

Mwiria, K. & Wamahihu, S.P. (1995).*Issues in educational research in Africa*, Nairobi: Fotoform National Institute on Mental Retardation.

Naylor, C. (2005). Inclusion in British Columbia's Public Schools: always a journey never a destination. Paper presented at the Canadian Teachers Federation Conference, "Building inclusive schools: A search for solution". November 2005, Ottawa, Ontario.

NCLB,(2002). No Child Left Behind Act *Elementary and secondary education.* Retrieved from http://www.ed.gov/policy/elsee/leg/eseaO2/index.html

Nelson, B. (2006). On your mark, get set wait! Are your teacher candidate prepared to embed assistive technology in teaching and learning? *College Student Journal*, 40(3) 485-494.

Netherton, D.L & Deal W.F, (2006). Assistive Technology in the Classroom. *The Technology Teacher,66(1), 10-15*

Ng, E. H. (2008).*Opening address by Dr Ng Eng Hen, Minister of Education and 2nd Minister of*

Njoroge, M.C. (1991) factors influencing initiation of successful mainstreaming of visual handicapped students in Kenya. The University of Texas: unpublished PhD thesis

Njoroge, M.C. (1991) factors influencing initiation of successful mainstreaming of visual handicapped students in Kenya. The University of Texas: unpublished PhD thesis.

Notborn, E., & Zysk, V. 1001 Great ideas for Teaching and Raising Children with Autism or Asperger's. Arlington, TX: Future Horizons.

Nwazuoke,I.A. (2010) paradigms perspective and issues in special needs education. An inaugural lecture deliver at university of Ibadan, Ibadan: university press

Nworgu, B.G. (2001). *Educational Research: Basic Issues and Methodology*. New Edition, Ibadan. Wisdom Publisher Ltd.

Nyaga. E.M. (2010) Adequacy and effectiveness of assistive devices used to instruct learners with physical disabilities: a case of APDK MASAKU School, Machakos, and Kenyans. The Kenyatta University: unpublished master thesis.

Obani, T.C. (2002). Teaching pupils with special education needs in the regular classroom. Ibadan: Oluben printers

Obidoa Mabel, A., Eskay, M.,& Onwubolu, C.O. (2013). Remedial help in inclusive classroom: Gender Differences in the Enhancement of Mathematics Achievement of students through PAL *(peer-Assisted Learning*), 3 (3), 172-180.

Okolo, C. M., & Bouck, E. C. (2007). Research about assistive technology: 2000–2006. What have we learned? *Journal of Special Education Technology, 22*(3), 19–33

Olutokun J.O. (2011). Pedagogic strategy for enhancing learning inclusive schools setting: an advocacy for expand core curriculum for learners with visual impairments:

proceedings for twelfth biennial conference of international associations of special education. Windhoek, Namibia- July 10-14, roll.on teacher education.

Opini, B. (2012) Barriers to Participation of women Students with Disability

Orodho, J.A. (2005). *Element of Education and Social Science Research Methods.* Nairobi: Masola Publisher.

Ozoji, E.D (1998). Special education perspectives for the future. In E.D Ozoji &I.A Nwazuoke (ed.s). Professionalism in special education in Nigeria (pp.174-180). Jos Nigeria: national council for exceptional children.

Ozoji, E.D. (2003). *Special Education for Beginners* (2nded). Jos: Deka Publication Paine, L (1990). Orientation towards diversity: *what do prospective teachers bring*? (Research rep. no 89-91). East launching, MI: National centre for research

Parette, H.P. & Stonner, J.B. (2008). Benefits of assistive technology use groups for early childhood education. Journal, 35 (4), 313-319.

Parette, H.P., Peterson-Karlan, G.R. & Wojcik, B.W. (2005). The state of assistive technology services nationally and implications for future development. *Assistive technology outcomes and benefits,* 2 (1), 13-24.

Parsons, S. & Cobb, S. (2011). State-of-the-art of Virtual Reality Technologies for Children on the Autism Spectrum. *European Journal of Special Needs Education*, 26 93), 355-366.

Parsons, S., Daniels, H., Porter & Robertson, C. (2008). Resources, Staff beliefs and Organizational Culture: factors in the use of Information and Communication Technology for adults with intellectual disabilities. *Journal of Applied research in Intellectual Disabilities,* 21, 19-33.

Patton, M.Q. (1990*). Qualitative evaluation and research method* (2nd Ed.). Newbury Park, London: SAGE Publications.

Patton, M.Q. (2002*). Qualitative research and evaluation method* (3rdEd.).Thousand tales, CA: SAGE Publications.

Pudlas, K. (2005). *Inclusive education: affective considerations.* Trinity Western University, Langley, British Columbia.

Rapp, W.H. (2005). Using Assistive Technology with Students with Exceptional Learning Needs: when does an aid become a crutch? Reading and Writing quarterly, 21, 193-196

Report- phase 1 (online). Department for International Development Available from :http://imfundo.digitalbrain.com/imfundo/web/papers/refpapers/?verb=view..resume d/ observation/ obshome.htm.

Richards, G., & Clough, P. (2004). ITE Students Attitudes to Inclusion. *Research in Education, 72, 77-86.*

Ridley, K. (2005). The multimedia activity: recall for children and adolescents; development and validation. PhD thesis, University of Australia, School of Health Sciences, pp. 60-67 retrieved: 26/5/2014 from htt:///www.upup.gov.au/documents/psysact/validity.pdf.

Roblyer, M. D. (2003).*Integrating Educational Technology into Teaching* (3rd ed.). Upper Saddle River, N.J.: Pearson Education, Inc.

Rose, D. & Meyer, A. (2000). The future is in the margins: The role of technology and disability in educational reform. Retrieved from http://uuoline.cas.org/resources/images/future.in.margins.pdf

Rose, D. & Meyer, A. (2002). Teaching every students in the digital age: Universal design for learning. Alexandria, VA: Association for Supervision and Curriculum Development.

Ruddra, A. & Arora, (n.d.). Ethical organization, coorperate codes and ethics. Retrieved, May 30, 2014 from http://www.geocities.com/webasanshul/present.html

Scheeler, M. Congdon, M. Stansbery, S. feedback to co-teacher through bug-in- ear

Scheler, M. Congdon, M. Stansbery, S. (2008). Feedback to co-teacher through bug-in-ear technology. An effective method of peer coaching in inclusive classrooms. Teacher Education and Special Education,33(1) 83-86

Schensul, S.L., Schensul, J.J. & Lecompte, M.D. (1999).Semi-structured interviewing. In S.L. Schensul, J.J. Schensul & M.D.Lecompte (Eds).Essential 170 Ethnographic Methods. Observations, interview and questionnaires pp149-164) Walnut Creek, CA: Altamira Press.

Scherer, M.J. (2005). Assessing the benefits of using assistive technologies and other supports for thinking, remembering and learning. *Disability and Rehabilitation*, 27 (13), 731-739.

Scherer, M.J. (2005). Assessing the benefits of using assistive technologies and other supports for thinking, remembering and learning. *Disability and Rehabilitation*, 27 (13), 731-739.

Scherer,M.J. (2004). Matching person and technology process and accompanying assessment

Schoyen, K.J. (2004). The impact of social skills training in the friendships of children with special needs: a model of better inclusion. Master's Thesis, trinity Western University; Langley, British Columbia.

Schunk, D.H. (2009). *Learning Theories: An Educational Perspective* (5th Ed.), London: Pearson Education.

Scruggs, T.E. & Mastropieri, M.A. (1996). Teachers Perceptions of Mainstreaming Inclusion 1958-1959.A research synthesis. Exceptional children.

Self- and peer assessment and feedback for pre service teachers. *Journal of special educational technology,* 25 (4), 55-60.services/detcms/navigation/centre-for-inclusive-schooling/?oid=Multi Part Article - id-8026117.df

Shelly, A., Cashmen, B. & Waggoner, P. (2010).*Computer Concepts.* Washington D.C.: Boyd and Fraser Publishing Company

Simpson, C.G., McBride, R., Spencer, V.G., Lowdermilk, J. 7 Lynch, S. (2009). Assistive Technology: *Supporting Learners Inclusive Classrooms. Kappa Delta Phi records, 45 (94), 172-175.*

Singal, N. (2008).Working towards inclusion: reflections from the classroom. *Teaching and Teacher Education*, 24 (6) 1516-1528.

Skeeter, A.O. (2009). Special education in Kenya evolution or revolution: comparison with British system of special education unpublished Wichita state university master's thesis

Smith, D. W., Kelley, P., Maushak, N. J., Griffin-Shirley, N., & Lan, W. Y. (2009). Assistive technology competencies for teachers of students with visual impairments. *Journal of Visual Impairment & Blindness, 103*, 457-469.

Smith, D.D., Tyler, N., Skow, K., Stark, A. & Baca, L. (2003) Effective inclusion of students with disabilities in general education classrooms. Paper presented at annual meeting of the American.

Smith, T., Polloway, E. Patton, J. & Dowdy, C. (1998).*Teaching Students with Special Needs in Inclusive Settings,* 2nd Ed., Boston: Allyn & Bacon.

Soodak, L. Podell, D. & Lehman, L.(1998). Teacher, student and school attributes, as predictors of teachers' responses to inclusion. *Journal of Special Education*, 31 (4), 480-498.

Soodak, L. Podell, D. & Lehman, L.(1998). Teacher, student and school attributes, as predictors of teachers' responses to inclusion. *Journal of Special Education*, 31 (4), 480-498.

Specht, J., Howell, G., Young, G. (2007). Students with special education needs in Canada and their use of assistive technology during transition to secondary school. *Childhood Education, 83 (6) 385-389.* Association of Colleges for the Teacher Education (55th, New Orleans, LA, 24-27,2003). Special Education Technology, 18(3) 5-28.

Stanberry, K. & Raskind, M.H. (2009). Assistive technology for kids with learning disabilities: an overview. Retrieved from http://www.idonline.org/article/Assistive technology for kids with learning disabilities%3an overview? Theme=print

Starr, K. (2011). Principals and Politics of Resistance to Change. Educational Management, administration and Leadership, 39 (6), 646-660.

Stoneburn, A. (1996) *What do we know about the cost of special education 25(4), 344- 370*

Stoner, J.B., Beck, A.R., Dennis, M. & Parette, H.P. (2011).The use of instructional technology in direct vocabulary instruction. *Journal of Special Education Technology*, 26 (3), 35-46.

Sze, S. (2009).The effects of assistive technology on students with disabilities. *Journals of educational technology systems,* 37(4) 419-429

Szlamkowicz, D. (2007). Challenges of Assistive Technology Services in Quebec: A clinicians perspective. Retrieved from www.erudit.org/livre/crir/2007/livre/6-div/3.pdf on 25, May, 2014.

Tella, A., Tella, A., Toyobo, O. M., Adika, L. O. & Adeyinka, A. A. (2007). An Assessment of Secondary School Teachers Uses of ICT's: Implications for Further Development of ICT's Use In Nigerian Secondary Schools. *The Turkish Online Journal of Educational Technology – Volume 6 Issue 3 Article 1.*

Thomas, E.(2005) *Thoughtful planning fosters transfer of learning* 18(3/4)4-8

Thousand, J.S., &Villa, R.A. (2011). Differentiating Instruction in a Mixed-Ability classrooms. Proceeding of twelfth Biennia conference of international Association of Special Education. Windoek Namibia- july10-14, 2011.

Todis, B. & walker, H.M. (1993).User perspective on assistive technology in educational settings. *Focus on exceptional children*, 26 (3), 1-16.

Todis, B. J. (1996).Tools for the task ?perspectives on assistive technology in education settings. Journal of Special Education Technology, 13(3). 49-61

Tomlinson, C.A.(2003). Fulfilling the promise of the differential classroom. Alexandria,

Ugwuanyi, L.T., Onu, V.C., Eskay, M., Obiyo, N. & Igbo, J. (2012). Effect of remedial reading instruction on word recognition problem for inclusive education in Nigeria. *Journal of education practice,* 3 (14).117-125.

UN convention on the right of persons with disabilities.www.un.prg/disabilities/default asp? D=259

UN convention on the right of persons with disabilities.www.un.prg/disabilities/default asp? D=259

UN Universal Declaration of Human Rights. www.un org/en documents /udhr/

UN, 2006 "Convention on the Rights of Persons with Disabilities" United Nations. http://www.un.org/disabilities/convention/convention_full.shtml, retrieved June 18, 2014.

UNESCO (1996) legislation pertaining special needs education. Paris: Author

UNESCO 2002a. "Understanding and Responding to the Children's Needs of Inclusive Classrooms. http://www.unescobkk.org/file admin/user upload/appeal/IE/publications and reports/understanding needs.pdf; retrieved June 4, 2014.

UNESO (1948). Human Rights. Paris: UNESCO.

UNESO (1994) world conference on special needs education: access and equality. Salamanca, Spain, June 7-10 Paris: author

UNESO (2001) strong foundation: early childhood care and education. EFA Global monitoring report 2001 www UNESO. Org/en/efa reports/2001-early childhood

UNICEF.2009."child info. Monitoring the rights of children and women".

United Kingdom special education needs and disability Act (2001).http//www. hmso.gov.uk/acts/2001/2002/0010htm.

United Kingdom special education needs and disability Act (2009). http//www.hmso.gov.uk United Nation Individual with Educational Disability act IDEA (1998).lias res, IDEApractice.org http//www.idea practices.org/law/indexVA: ASDC.

United Nation Individual with Educational Disability act IDEA (2004).lias res, IDEApractice.org http//www.idea practices.org/law/index

Uwe, F. (2005).*An Introduction to Qualitative Research* (2nd Ed.).California: SAGE Publications. VA:ASDC.

Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, M.D. (2003)."User acceptance of information communication technology: *Toward a Unified View". MIS Quarterly,27(3), 425-478*

Vik, A.K. (2008) "Individual and Environmental Conditions for the Literacy Development of Pupils with Severe Visual Impairments". *Journal of Assistive Technology*, 2(4),3-15

Viks, A.K. (2008) "Individual and Environmental Conditions for the Literacy Development of Pupils with Severe Visual Impairments". *Journal of Assistive Technology*, 2(4),3-15

Villa, R. A& Thousand, J.S (2005). *Creating An Inclusive School* (2nd Ed.) Alexandria, VA:

Wagner, M. Blachorby (1996). Transition from high school to work or college: How special education students fare? *The Future of Children*, 6 (1), 103-120.

WHO 2009, "assistive devices/technologies" http://www.who.intl/disabilities/technology/en/ retrieved May 24, 2014.Wikiledia foundation, inc retrieved mhtMi: ele: if new folres (2) inclusion (educati

Wilczenski, F. (1993).Changes in Attitudes towards mainstreaming among Undergraduate Education Students. *Educational research Quarterly*, 17, 5-17.

Wixom, B.H. &Todd, P.A. (2005).A theory of integration of user satisfaction and technology acceptance. Information System Research, 16 (1),82-102.

Wizikowski, H.T. (2011). Response to Intervention: Creating Accessibility Learning Experience for All Students: Proceeding of twelfth Biennia conference of international Association of Special Education. Windoek Namibia- july10-14, 2011.

Wolfenserberger, W. (1972).*The principle of normalization in human services*. Tronto:

Wong, M. E., & Cohen, L. (2011). School, family and other influences on assistive technology use: Access and challenges for special school students with visual impairments in Singapore. *British Journal of Visual Impairment, 29*(2), 130–144. doi:10.1177/0264619611402759

Wong, M. E., & Tan, S. S. K. (2012). Teaching the benefits of smart phone technology to blind

World Bank, (2004).Rethinking teaching capacity in Africa Universities. Washington. D.C: The World Bank

World education forum (2000) Dakar framework of action. Accessed from www.innesco.org.efa.World wide web.muntmal: file:if:/ new folder encyclopedia. Mntz.pdf.

Yadava, S. (2013). Inclusive Education: challenges and prospects in India. *Education confab* 2(4) 39-46

Yin, R.K. (2009) Case Study Research: Design and Methods. (4th Ed). Thousand Oaks, CA: Sage Publications

Yusuf, M.O& Fakomogbon M.A (2008) availability, teaches awareness and attitude towards the use of assistive technology in special schools in Kwara state Nigeria: world conference on educational multimedia, hypermedia and telecommunications, June, 30, 2008 in Vienna, Australia ISBW 978-1-880094-65-5

Yusuf, M.O., Fakomogbon, M.A.& Issa, A.T (2012).Availability of assistive technologies in educational institutions .*International journal of social sciences and education* 2(1) 44-53.

Yusuf, M.O., Fakomogbon, M-A.& Issa, A.T (2012).Availability of assistive technologies in educational institutions. *International journal of social sciences and education* 2(1) 44-53.

APPENDICES

Appendix A: Teachers Questionnaire

This questionnaire is design for purpose of elicit information concerning the use of Assistive technology in inclusive secondary schools. I kindly request you to answer all the questions in this questionnaire with confidence. The information you provide will strictly be used for the reason of this research. No information you give will be disseminated without your consent. Please indicate your response by ticking in the provided box or by precisely writing your answer in the provided spaces.

Survey objective:

Objective one of this survey is to discover problems militating against integration of assistive technology for instruction of learners with disabilities in inclusive schools in Kaduna State Nigeria.

Instruction

Please there is no need to give any form of identification about you on this survey. All person responses will remain secret. Merely the collective results will be reported. Thank you for taking time to give responses to this study.

Section 1: Demographic data

1. Please indicate your sex

   ☐ Male

   ☐ Female

2. Please indicate years you have worked as a teacher.

- ☐ Less than 5 years
- ☐ 5 to 9 years
- ☐ 10 to 20 years
- ☐ More than 20 years

3. Kindly indicate your level of education attainment

Nigeria Certificate of Education ☐

- ☐ Bachelor's Bsc/B.Ed
- ☐ Master's Msc/M.Ed
- ☐ Doctorate
- ☐ Others

4. Please indicate years you have taught classes that comprise learners with physical challenges.

- ☐ I have never taught an inclusion class with students who have learning disability
- ☐ Fewer than 5 years
- ☐ 5 to 9 years
- ☐ 10 to 20 years
- ☐ More than 20 years

5. During the current school year, how many inclusion classes do you teach?

- ☐ None

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5 or more

6. How many years have you been using assistive technology?

None ☐

Less than 5 years ☐

10 to 20 years ☐

20 years and more. ☐

Section 2: kindly express your opinion on the use assistive technology for instruction of learners with disabilities in inclusive secondary schools

1. (a) Do you use Assistive technologies to teach?

Yes ☐ No ☐

(b) Please give reason for your answer

_____

_____

_____

2. Which challenges do you face while using the Assistive Technologies? Please highlight some of these challenges.

_____

_____

_____

3. How do you organize the students when using the Assistive Technology?

(i) In small groups

(ii) Whole class

(iii) In large groups

(iv) In their ability groups

Any other _____

4. Please indicate some of the challenges you think students face when using Assistive Technologies in your class.

_____

_____

_____

5. What would you suggest to improve the use of Assistive Technology in classroom?

_____

_____

_____

6. Which instructional methods do you use commonly to teach your students? Please list them in order of preference.

_____

_____

_____

7. What are suggestions to better the instructions of the students to the school?

_____

Section 3: Teachers pedagogy on the use AT in Inclusive education

For every item in this section, please choose the response that most excellent represents your level of agreement or disagreement with each statement.

Statement	SD	D	U	A	SA	
j) Age doesn't bound me using assistive technology to teach						
k) Always enthusiastic using assistive technology to teach						
l) My teaching now better enhanced due to assistive technology						
m) I can confidently use assistive technology						
n) Assistive technology make my teaching more pleasant						
o) Anyone can easily grasp assistive technology related						
p) Assistive technologies are good for any teaching						
q) Assistive technology make my teaching pleasant						
r) Assistive technologies are good for any teacher in inclusive class						
q) I am aged to use assistive technology in my teaching						
r) Using assistive technology is time consuming.						
s) assistive technology affect my productive better teaching life						
t) I was not yet ready for assistive technology						
u) I have phobia of using assistive technology						
v) I fear assistive technology embarrassing me before the students						

Thank you

Appendix B: Interview Schedule for Learners with Disabilities Challenges

The reason of this interview is to seek information that will offer a broad description of the ability of the learners who are disables to access quality education through the use of assistive technology.

Introduction of the interview

Hello my name is _____ and I would request to interview you. During the interview I would like to discuss the following topics: availability of AT for your use in the secondary schools, services you receive in the utilization of these ATs, and your accommodations during instructions in the secondary schools.

Provision and utilization of ATs for access of quality instruction

Main question	**Additional questions**	**Clarifying question**
Can you tell me about the provision of ATs in the secondary schools	• Which ATs are available for your use in the secondary schools? □□Which other ATs are you aware of that could assist you though are not in the school?	
Please tell me about the services or support you receive for your utilization of the ATs in secondary schools.	□□Which challenges do you face in the use of these ATs? □□What would you propose to be done to improve the services?	Can you tell me more about how you are facilitated or trained to use the available ATs?

Please tell about the support you are given during instruction?	• Which are some of the most beneficial things your teacher do to help you fully benefit from the instruction? • Which problems do you face during the class time? • What are most Worrisome challenges you face in carrying out tasks given by your teachers?	Can you tell me more about the challenges you face in doing homework?
In your opinion do you feel that you gain as much as the able peers students during the instructions?	• What do you think should be done for you to fully benefit from the instructions	
Conclusion of the Interview		
Are there other academic problems we have not discussed and you find worrisome? Do you want to add anything else in our discussion about the academic challenges you face in the school?		

Thank you

Appendix C: Interview Guide for Resource Center Personnel

The interview will seek deep information about the provision of AT services to both Secondary schools students and teachers in inclusive schools

Introduction of the interview

Hello my name is _____ and I would request to interview you. During the interview I would like to discuss the following topics: availability of AT for the, learners with disabilities in secondary schools, services you provide for the utilization of these ATs, and the practical policies (government and institutional) governing the stipulation of services for the learners with physical challenges in inclusive secondary schools.

Services for the students and the teachers

Main questions	**Additional questions**	**Clarifying Questions**
Can you tell me about the services you give to the learners with physical challenges in the secondary schools?	• In which way did you learn to offer these services? □□Which challenges do you face in giving these services? □□How do you organize the training of the students in using the ATs available? □□What would you suggest to be done to improve the services	Could you please tell me more about your training
Can you tell me about the available ATs for the students?	□□Are all the ATs available in functioning condition? □□Which conditions or restrictions do you have in giving these ATs to the students? □□Which other ATs for the Disables learners are you aware of that are not available in the university that could improve the education of these students?	Can you tell me more about how you became aware about those other ATs which are not available in the inclusive secondary schools?
Can you tell me about the	• Which polices come from the government?	Can you tell me your opinion about

policies that put in place guarantee quality provision of the services you give to the students with disabilities?	□□Which policies has the university designed to ensure quality of the services?	these policies
Can you tell me about the support services you give to the teachers	• What kind of support do you give particularly for the blind students during instructions? □□Which advice do the lecturers (professors) mostly seek from you to support the instruction for the blind students? □□What future plans are there to improve the provision of AT and services for the learners with disabilities in the secondary schools? □□What are your suggestions to better the instructions of the students to the school?	
Conclusion of the interview		
Are other services issues that we have not discussed and you find important? Or Is there anything else you would like to add to our discussion?		

Thank you

Appendix D: Interview Schedule Guide for Principal

Principals' interview schedule guide

The interview will seek deep information about the provision of AT services to both Secondary schools students and teachers in inclusive schools

Introduction of the interview

Hello my name is _____ and I would request to interview you. During the interview I would like to discuss the following topics: availability of AT for the, learners with disabilities in secondary schools, services you provide for the utilization of these ATs, and the practical policies (government and institutional) governing the provision of services for the learners with disabilities in inclusive secondary schools.

4. How available is assistive technology in your school for student instruction?

2. How do you identify the ATs needs of students with learning disabilities as it relates to instruction?

3. What assistive devices and technologies you and your teachers have worked with or are familiar with in the classroom setting (for example, software programs)?

4. Please share what professional development activities you have provided for inclusive education teachers and what specific steps you would take to promote and encourage continued professional development in the area of assistive technology.

5. Does your teachers have the idea and knowledge of integration and use of technology in the classroom?

6. What will you do to help teachers that are finding difficulty in integrating assistive technology for their instruction, what would you do to help?

7. What assistive devices are used by learners and teachers in your school and who provides them?

8. Are the assistive devices used by learners and teachers adequate and effective to meet the needs of learners in class during instruction?

9. What challenges are faced by teachers and learners while using assistive devices in your school?

10. What has been your biggest challenge(s) as it relate to technology integration within inclusion classes?

11. How is Assistive Technology integrated in terms of funding in your school?

12. What are your future goals with regard to assistive technology in the inclusive secondary schools?

13. What recommendation can you give as far as adequacy and effectiveness of assistive devices is concerned in your school?

Appendix E: Class Observation Schedule

The class observation is guided by the Universal design (UD) principles in the following learning components: Representation, Expression, and Engagement. The key thing is how the teachers accommodate the students with disabilities in the teaching and learning process.

Students	**Teachers**
Subject	**Content Knowledge**
What is the core objective of the lesson? How is the students with disabilities experiencing instructional content? What kind of thinking are students involved in (procedural, conceptual, problem solving, justification)?	What is the core idea of the topic lesson/teaching? How has the teacher constructed the lesson to address the idea? What experience/medium are being used to teach the idea? How does the teacher assess student understanding? How is the content extended or adjusted for student own learning demands? How does the teacher develop the student's idea about the content?
Learning	**Pedagogy/andragogy**
How are the students using the discipline (subject/course) reasoning? What connection are students making? What understanding are they demonstrating? What misconception are they holding?	How does the teacher use the reasoning of the students? How does the teacher facilitate/encourage students' connections? How is the lecturer assessing student understanding? How is higher level reasoning supported in class?

What are the results of this misunderstanding? What conjectures have students made? What justifications are they making?	How is the proof and justification supported in class?
Learning Environment	**Creation of Culture**
How well do students talk with each other and with their sighted peers? How well do students listen to each other? How do students support each other in the classroom?	What does the lecturer do to support the student centered thinking? In which ways does the lecturer support respect for the student's ideas? Does the lecturer encourage the
How do the students access tools material and equipment? How are ideas respected/dismissed in the class? Are students willing to take tasks? Are students engaged in the teaching/learning process	What does the lecturer do to support the student centered thinking? In which ways does the lecturer support respect for the student's ideas? Does the lecturer encourage the students to use others as resources? How does the lecturer support various learning styles and needs? How does the lecturer manage materials, supplies and equipment? How does the lecturer facilitate ideas as the currency of learning? What interventions are sued in to maintain engagement and success?
General comment on the overall access of instruction by the students with disabilities	

Thank you

Appendix F: Documentary Analysis Guide

The researcher obtained the following documents for analysis.

(i) Inventory and resources of each secondary schools to analyze the availability and accessibility of the AT for the learners with disabilities.

(ii) Secondary school policy documents detailing how AT based resources (hardware and software) should be utilized and the AT services that need to be provided.

(iii) Syllabus/scheme of work

(iv) Documents detailing UDL practice

APPENDIX G: OBSERVATION CHECKLIST

Table 1: Assistive Technology available in the schools for learners with visual impairment

Assistive Technology devices	Available & functioning	Adequate	Not functioning	Not available at all	Not adequate
Ipads, iPhones,ipods					
Note takers: Book Sense, Braille sense, Voice sense, Braille note					
Binoculars, monocular, telescope					
Voice output machines: Ablenet book worm, Aladdin Ambassador, Cicero text reader, etc.					
CCTV's: Potable CCTV system, Hand held magnifying cameras, Telesensory, VTI, Guerilla technologies, etc.					
Braille writers (machine). Braille papers, Braille slates, Templates, Writing and signature guides					
Voice recorders: Tape recorder, Smart pen, Desktop and Laptop computers, Microcomputers with speech synthesis, Screen readers and Braille input and output software.					
Tactual maps, Tactual diagrams and globs, Braille books, Talking books, Braille games, Braille labels (large print books)					

Calculators: Low vision, Scientific, Talking watch/clocks					
Measuring tools: Braille ruler, compass, protractor and tapes, thermometers					
Canes & Mobility: NFB canes, WCIB canes, Ambutech canes, etc.					
Tactile graphic kit: Braille readiness materials, large print resources					
Markers and reading "windows", Felt pens, Tactual symbols and signs					
Opticon (optical to tactual - converter), Book readers, Views can, View sense, Speech compressor, Neo speech voice text					
Embossers, scanners, large print, photocopier					
Book stands, adjustable, adapted chairs, Braille transcription software; Duxbury Braille converter, Siloam Braille professional					
Screen readers, JAWS, Dolphins pen, NVDA, Kurzwell, 1000, Kurzwell 3000					

Table 2: Assistive Technologies in secondary schools for the hearing impaired

S/N	Equipment	Available & functioning	Adequate	Available not functioning	Not available at all	Not adequate
1	Signaling devices					
2	Electronic hearing Aids					
3	Telecommunication Device for the Deaf (TDD)					
4	Adopted Door Bell					
5	Telephone/sign Device					
6	Audiometer					
7	Typanometer					
8	Computer					
9	Motion film					
10	Amplification					
11	Alerting devices					

Table 3: Assistive Technologies in secondary schools for learners with physical disabilities

Assistive technology devices	
Head pointers/mouth pointers, paper mask tape, page turner, pencil and pen grip holder, paper holder devices	
Canes/ Walking sticks, boots and caliphers, standing and walking frames, crutches.	
Corner chairs, adopted chairs, adopted tables, cut out desks shoulder & chest straps on wheelchairs.	
Computers, communication boards, bliss symbols, photographs/pictures. Talking books, letter word stamps.	

Table 4: Assistive Technologies for students with learning disability in the Secondary schools

S/N	**Equipment**	**Available & Functional**	**Adequate**	**Available but not functional**	**Not available at all**	**Not adequate**
1	Computer					
2	Models and mock-ups					
3	Word processing machine (programme)					
4	Art					
5	Talking dictionary					
6	Disc recordings					
7	Electronic organizer					

Thank you

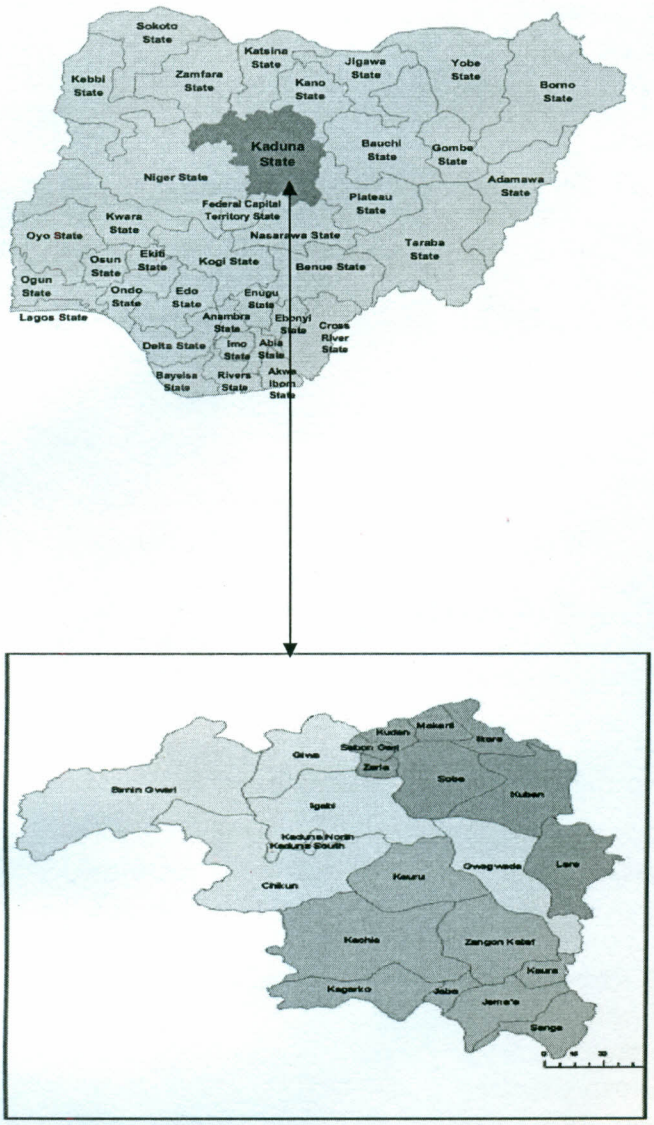
Appendix H: Documentary Analysis

The document analysis requires the collection and review of specific documents that are peculiar for organization in terms of the characteristics of the individual group members. In this study therefore, documents including statements of philosophy, and policy documents guide to the education of LWDs in IE were reviewed to examine the stated policies and support systems set up to address the needs of the LWDs (Appendix H)

Appendix I: Tentative Research Schedule

Time	Activity
October 2014	Proposal Defense
October 2014 to November	Revision of research tools
November 2014	Application for research permit
December 2014	Pilot test
January to April 2015	Data collection
May to October 2015	Data analysis and writing of dissertation
November 2015	Submission

Appendix J: Location of the Study



Appendix K: Consent Letter for Research

MINISTRY OF EDUCATION
KADUNA STATE

Telephone; 242222 PBX
Commissioner: 249721
Perm.Sec.: 062-249722
Telegram: SECEDUCATE

Ref: CNC/B.47/S.1/T

State Secretariat
Independence Way,
Private Mail Bag No. 2017
Kaduna Nigeria

Date: 26/01/2015

Jimada Abdullahi – E83F/26403/2013
Dr. Sophia M. Ndethiu,
Dept. of Educ. Coomunication & Tech.,
P.O. Box 43844-00100,
Nairobi- Kenya.

PERMISSION TO CONDUCT RESEARCH

Reference to your letter dated 24th Nov. 2014 on the above subject matter, I am directed to write and convey approval to your request. Please.

2. Principals of :
   i. Alhudahuda College Zaria
   ii. G.S.S. Fadan Kaje
   iii. GGC Zonkwa
   iv. KASSES are by this approval requested to cooperate with the fellow and grant him all the necessary assistance to have a successful findings, please.

Mr. Ayuba O. Amwe
(AD/SP.Ed & SMBs)
For: Hon. Commissioner