

**Title:**

**An Exploration of Technology Enabled Learning for Inclusive Pedagogy in Selected Nigerian Schools: Interpreting Practitioners' Perceptions Through Visual Research Methods.**

By

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## **Abstract**

The use of technology for teaching and learning is gaining increasing acceptance in both developed and developing countries, and there has been growing advocacy for the use of technology to meet the needs of all learners in inclusive classrooms. However, it appears to be the case that frequently the practitioners are not confident in their use of new technologies, as they are either inadequately equipped or lack knowledge of best practice for inclusive pedagogy. Studies have revealed that much use of new technology in education lacks a firm pedagogical grounding, and this has resulted in a gap between practice and theory. Moreover, concern continues to be expressed about the extent to which technology is being integrated within the learning experience.

This study explores the perceptions and experiences of education practitioners in their current pedagogical practice using Digital Technology (DT) for inclusive pedagogy. The PhD has adopted an inductive qualitative research approach that is informed by an interpretive ontology, based within selected primary and junior secondary schools in the Imo state of Nigeria. The sample for the study comprises of 25 participants drawn from primary and junior secondary schools in Imo State, Nigeria, using purposive sampling. Multi-method approaches were applied for the data collection, using photo elicitation and semi-structured interviews, including a reflective journal written during the research process, allowing for a degree of crystallization. The data collected was analysed using thematic analysis. The study also applied the SAMR (Substitution, Augmentation, Modification, Redefinition) model to the research as a framework to evaluate technology use in the Nigerian schools in meeting the

needs of learners, alongside considering a CPD model to derive insights into teachers' training needs for effective pedagogy in the Nigerian schools.

The key findings of the PhD reveal that disability identification is a challenge as some of the teachers have varying perceptions about inclusion and disability. Many of the research participants revealed an understanding of disability from the medical model perspective of disabilities. Alongside this, some teachers appear to lack an awareness of how to apply technology to pedagogy effectively, as their training needs are not always met. Another important finding reveals that the pedagogical practice in Nigeria using technology appears to revolve around just 'substitution' and 'augmentation' (S-A) on the SAMR model, which is more akin to 'enhancement' as opposed to being 'transformational'.

## **Dedication**

This study is dedicated to the loving memory of my dearest father Mr Bernard Ohaegbu who slept in the Lord on 15<sup>th</sup> September 2007. He was my biggest fan and supporter, who always made me believe I could achieve anything I wanted in life, but never lived to witness the woman I have become following his tutelage, and now I hope that his dreams will be fulfilled.

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## **ACRONYMS**

AT	Assistive Technology
BDA	British Dyslexia Association
BEC	Basic Education Curriculum
CPD	Continuing Professional Development
DfE	Department for Education
DT	Digital Technology
EHC	Education, Health and Care
EFA	Education for All
FGN	Federal Government of Nigeria
FME	Federal Ministry of Education
ICT	Information Communication Technology
IE	Inclusive Education
IEP	Individualized Educational Programme
IT	Information Technology
IPA	Interpretative Phenomenological Analysis
LD	Learning Disabilities
LEA	Local Education Agency
NPE	National Policy on Education

OFSTED	Office for Standards in Education
PEI	Photo Elicitation Interview
PD	Professional Development
SEN	Special Education Need
SEND	Special Education Need and Disability
TPACK	Technological Pedagogical Content Knowledge
UBE	Universal Basic Education
UBEC	Universal Basic Education Commission
UNCRC	United Nation's Convention on the Rights of the Child
UNCRPD	United Nation's Convention on the Rights of Persons with Disabilities
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education
WHO	World Health Organisation

## **Chapter One**

### **Introduction**

#### **1.0 Introduction**

This chapter of my PhD thesis introduces the context of the study and the content provides an overview of my research. In this chapter the statement of the problem, the purpose of the study, the research objectives and aim, the research questions, the significance of the study and the contribution to new knowledge are all explained. Equally, the researcher presents an overview of the research methodology adopted in the study in order to give an insight into how the research process has been pursued.

#### **1.1 Research Overview**

This PhD research explores the perceptions and experiences of education practitioners in their current pedagogical practice using Digital Technology (DT) for inclusive pedagogy. The main aim of the research is to investigate and understand the 'how' and the extent of teachers' application of technology in their current pedagogy. The study also seeks to understand teachers' perceptions and experiences about inclusive pedagogy to determine the extent of inclusion of learners with disabilities in general education classrooms in the Imo State of Nigeria. A subsidiary aim of this research is to examine teachers' views on their Continuing Professional Development (CPD) in respect of technology application to pedagogy. The research seeks an in-depth understanding of the current practice in technology integration, the extent of its application, and the views of educational practitioners as they select technologies for pedagogy. The study examines the effectiveness and appropriate use of technology in pedagogy. By appropriate use, the researcher means selecting and applying the right technological tools in order to enable creative and innovative pedagogy in line with emerging research. It is the objective of the research to use Puentedura's (2006) SAMR model to ascertain the level and mode of DT (Digital Technology) use in

inclusive classrooms in the Nigerian context. This will help to identify whether the technologies are used in didactic or creative forms in pedagogical practice within selected Nigerian schools. The study places an emphasis on exploring whether selected educational practitioners use technologies to generate new opportunities for all students to learn and enhance their academic engagement. The adoption of the SAMR model is a framework to aid with understanding current practice through the participants' reflections on how they integrate digital technology into their pedagogy in Nigeria. The study proposes a number of recommendations to help improve the practice of technology use and inclusive pedagogy in the Nigerian schools in the PhD research.

## **1.2 Context of the Study**

The context of this study is Nigeria, a sub-Saharan West African country. Nigeria is a densely populated country with an estimated population of about 187,000,000 according to United Nations data (UNdata 2017). Nigeria is a diverse society with more than 250 ethnic groups and languages (Eskay et al., 2012) with English as the official language. It is the most populated country in the African continent and politically influential. The major ethnic groups and languages in Nigeria are predominantly the Igbos of the Eastern part, the Hausas of the Northern part, and the Yorubas of the Western part of Nigeria. This research has its study context set in the Eastern part of Nigeria where education practitioners were drawn from across selected general education settings, comprising of teachers from both private and state primary and secondary schools.

## **1.3. The System of Education in Nigeria**

Since the past fifty years, significant progress has been made to improve educational attainment in Nigeria. After independence in 1960, the federal government of Nigeria initiated several policies and educational reforms in order to make access to education more feasible (Onwuameze, 2013). The system of education in Nigeria has evolved over time with a series of changes in educational policies. Wokocha (2011) posits that the system of education varies from country to country and every culture has its method of educating its citizens. In Nigeria, the educational policy has been changing from one system to another. The policy changes in the Nigerian educational system

were introduced in a bid to meet local educational demands, international best practice in education, and the attainment of the Millennium Development Goal (MDG) in education among other goals (Federal Republic of Nigeria National Policy on Education 2004, 2013). As a result of these policy changes, the Nigerian educational system witnessed a significant number of reforms between 1977 and 2013 (Nigerian Educational Research and Development Council [NERDC], 2013; Onwuameze, 2013). These educational policies include; the introduction of Universal Primary Education (UPE) to aid tuition-free and universal education for all children of primary school age. This occurred in 1977 (Onwuameze, 2013, Osokoya, 2012). It is worth noting that the revisions of the National Policy on Education were necessitated by the need to address shortcomings in previous and existing educational policies.

The first National Policy on Education (NPE) (1977) recognised the United Nations Universal Declaration of Human Rights 1948, which made distinctive provision and guaranteed a child's universal right to education. The issue of SEN was first addressed in the Nigerian National Policy on Education in 1977, and further revised in 2004, 2006 and 2013. The NPE (1977) offered what was referred to as 'a two route' educational structure of 6-5-2-3 and 6-5-4. The 6-5-2-3 system of education is broken down into 6 years of primary education, 5 years of secondary education, 2 years of Higher School Certificate (HSC) study, and 3 years of tertiary education (FME, 2015). This route applied to students who progressed to university education via the Higher School Certificate (HSC) after completing 5 years of secondary education. The 6-5-4 system of education consists of 6 years of primary education, 5 years of secondary education, and 4 years of tertiary education. This route applies to students who progress directly to university education after 5 years of secondary education. The UPE programme came to an end in 1981 as a result of a federal government policy change (Imam, 2012).

Subsequently, by 1982, the country experienced another educational reform that ushered in a shift from the 6-5-2-3 / 6-5-4 system to a 6-3-3-4 system, which took effect from 1982 (Uwaifo and Uddin, 2009). However, some 'flaws' identified in the 6-3-3-4 system of education in the Nigerian educational system prompted yet another shift from the 6-3-3-4 system to the 9-3-4 system, called the Universal Basic Education (UBE) Programme in 2006 ( and Uddin, 2009). The Federal Government of Nigeria, through the Nigerian Educational Research and Development Council (NERDC),



developed and introduced the 9-year Basic Education Curriculum (BEC) in schools by readjusting all existing school curricula to meet the key targets of the UBE programme. In view of some contemporary and national concerns, the Nigerian government introduced a reform agenda, for example, the 9-year BEC was revised in 2012 and was launched in September 2014. Achieving the objectives of these educational policies is largely dependent on the successful implementation of this programme (Domike and Odey, 2014).

It is worth pointing out that section 8 of the Nigerian National Policy on Education (1977) highlights the education and services of children and individuals with special needs which classifies SEN into three categories (Obiakor 1998). In the National Policy on Education (NPE), the three categories of SEN featured are:

- i. The disabled: this includes children and young people with visual impairments; hearing impairments; the 'mentally retarded'; those with speech impairments; the emotionally disturbed; and those with learning disabilities.
- ii. The disadvantaged: this includes children of nomadic farmers; and children who do not have access to conventional education based on their lifestyles and livelihood.
- iii. Gifted and talented: these are children and young persons who possess very high intelligent quotients and are naturally endowed with special traits, and therefore find themselves inadequately challenged in schools.

Section 8 of the NPE policy document highlights in detail the directional policy of special education in Nigeria. The purpose and objectives of this policy are to ensure equal educational opportunities for all children irrespective of their physical, mental and emotional disabilities. Records show that since the launch of the first National Policy on Education in 1977, there has been an increase in the enrolment of children with disabilities in Nigeria. According to The National Planning Commission (NPC) and The National Bureau of Statistics, there are no reliable statistics on disability in Nigeria. It was estimated that there are approximately 19 million people with disability in Nigeria, representing about 10% of the nation's population (Premium Times 2018). Moreover, The World Health Organisation (WHO) in 2008, recorded that 14 per cent of Nigerian families were reported as having at least one child with special

needs. Similarly, The United Nations estimated that one in every ten people in Nigeria has a form of disability (NILS, 2010). According to the 2006 Federal Republic of Nigeria Gazette (2009) census records, the number of people with a disability is 3,253,169, with the total number of women and children with disabilities listed as 1,544,418 and 1,002,062 respectively. However, this figure appears dubious, given that there are no clear assessment criteria to classify those with disabilities in Nigeria.

The National Policy on Education 2013 section 7 and the NPSNE 2015 outline steps and procedures in line with international recommendations of best practice with regards to special needs education, to ensure the early intervention and the effective inclusion of children in education. Building on the success of policy development at state level, in 2016 ESSPIN offered technical advice to the Federal Ministry of Education (FMoE) in developing a new federal inclusive education policy. Previous policy approaches focused on special educational needs and only focused on disability, rather than expressing Nigeria's commitments to inclusive education in line with its ratification of the UN Convention on the Rights of Persons with Disabilities (UNESCO, 2015).

Consequently, Salami (2014), argues that since the provision of free pre-school education, the education of children with SEN and their inclusion into mainstream schools has been limited to policy documents. As Ainscow and Cedar (2006) posit, many schools do not have a clear understanding of the development of inclusive practices. This is apparent in the Nigerian education system where many schools still reject children with disabilities, irrespective of the government declaration and policy statements (Odebiyi 2016).

The Federal Republic of Nigeria National Policy on Education (NPE 2013) records that Nigeria will apply certain strategies for achieving each of the Education For All (EFA) goals. This policy noted that the use of Information and Communication Technologies such as; computer-based systems, television, and radio should be used to enhance and improve access to learning (Education for All Review Report 2015). Consequently, in theory, the Nigerian government appears to have good intentions for the educational sector and to have initiated promising educational policies. However, it is generally believed that the educational system has failed to achieve these intended objectives as a result of a lack of will to enforce and implement these policies (Domike and Odey

2014). This lack of implementation has also resulted in a dearth of positive changes in the area of special education in Nigeria. Although in recent times, special education programmes appear to have made some progress in Nigeria (Eskay et al., 2012), this progress does not exempt the Nigerian educational system from the general implementation drawbacks that have characterised developing countries. This can be attributed to a myriad of factors ranging from inadequate infrastructure, poor planning, teacher perceptions and poor utilisation of technology, including assistive technologies in supporting children with learning disabilities (Adebisi et al 2015; Ahmad 2015; Domike and Odey 2014; Akanbi & Akanbi, 2012; Yusuf et al, 2012).

#### **1.4 Background to the Study**

This research is focused on the application of technology to pedagogical practice for inclusive education in selected Nigerian schools. The policy and research often places an emphasis on the practitioner's responsibility to ensure that ICT in teaching and learning is effectively utilised in generating new opportunities for all students to learn and achieve. Although the use of technology for teaching and learning is gaining widespread acceptance in both developed and developing countries, Price and Kirkwood (2014) contend that the effectiveness of the application of new technology to pedagogy remains questionable in some quarters. A recent study by Price and Kirkwood (2014) reveals that much use of new technology in education lacks pedagogical grounding and, as a result, additional efforts or interventions are required to align technology use to pedagogy in an attempt to bridge the gap between practice and theory.

UNESCO and the UN have contributed significantly in the improvement of education of children with SEN, both in policy and in action (Uchem, Ngwa and Asogwa 2014). According to Ainscow & Cesar (2006), The Salamanca Conference held in Spain is the most substantial international document regarding special educational needs. At the 1994 World Salamanca Conference it was emphasised that the learning needs of the disabled demand special attention within the framework of Education. The Salamanca conference on Inclusive Education also urged all state members to give the highest priority to inclusive education (UNESCO, 1994). Moreover, the United Nations Standard Guidelines on equal opportunities for individuals with learning

difficulties has recommended equal participation as well as equal opportunity for all in the day-to-day functioning of all societies (UNESCO, 2005). The Equality Act 2010, which commenced in October 2010, made it unlawful to discriminate against any child based on their disabilities. It called for schools to make 'reasonable adjustments' to remove the barriers children may face as a result of their disabilities. Some countries have witnessed a number of examples of legislation in respect of SEN for instance; in the United Kingdom the key legislation includes; The Special Educational Needs and Disability Act (2001), The Children Act 2004 (DfES, 2004, The Equality Act (2010), and The Children and Families Act 2014. It is recognised that the achievement of the objectives and agenda of the policies is dependent upon the capacity building of teachers, which makes teachers' training needs pivotal in meeting the diverse needs of these children with SEN (Florian and Ainscow, 2004). The Children and Families Act (2014) and The Special Educational Needs and Disability Code of Practice (2014) were introduced with the aim of replacing the 'School Action' and 'School Action Plus' strategies. 'Statements of SEN' developed into 'Educational, Health and Care (EHC) plans' and the use of person-centred planning (PCP) emerged (Peacey, 2015). It was suggested that the idea of the new policy was to carry out major changes and improvements to the SEN system through a new, holistic and person-centred framework (Gardiner, 2017). Peacey (2015), however, argues that, despite the positive changes that have emerged as a result of the new policies, fundamental issues and questions remain regarding the definitions of SEN and disability that still need to be addressed. Moreover, Dunne (2009) argues that the ideas embodied within inclusion policies remain tenuous and vague. This is why Acedo, Ferrer and Pàmies (2009) suggest that inclusive education is one of the greatest challenges facing educational systems throughout the world today, with growing debates as to what actually constitutes inclusion. The international picture is further complicated because, as Dunne (2009) notes, the definition of inclusion varies from country to country which has, in turn, resulted in varied interpretations of its pedagogical application.

It has been emphasised that ICT, when coherently integrated into pedagogy, enables learning and this pedagogical process is popularly known as 'technology enhanced learning' (Kirkwood and Price, 2013). This concept of technology enhanced learning offers the potential benefit of efficiency, enhancement, and transformation to the

processes of teaching and learning (Kirkwood and Price 2014). Despite this claim, there is a lack of sufficient evidence to ascertain the effectiveness of technology application to pedagogy in inclusive classroom practice, hence Loreman (2017) recommends further research into this area. This has formed a key aspect of my PhD research. It is argued that a commonly identified practice in the use of technology in teaching and learning is that technology is mostly used for replicating, or supplementing, traditional activities (Blin and Munro, 2008; Eynon, 2008). This practice is devoid of any innovative or transformational agenda of technology enhanced learning. Kim et al. (2013) argue that pedagogy with technology ought to provide 'deep' learning experiences for students by considering effective ways to support inclusive learning. In the work of Kim et al. (2013), an emphasis is placed on ensuring that education practitioners use technologies to generate new opportunities for the students to learn and achieve.

On the other hand, Information and Communication Technology (ICT) is considered by many as a key tool for promoting inclusive practice in order to ensure equity and equality in educational opportunities for students with cognitive disabilities (Della, 2016). This means that teachers' awareness of suitable assistive technologies that meet the needs of their various learners is of discernible importance in the effective implementation of inclusive education. This potentially calls for a shift in instructional delivery approaches that apply technology to pedagogy. However, inclusive education has remained a constantly evolving process of change in attempting to make educational processes learner-friendly and welcoming to all learners. Accordingly, Loreman (2017) posits that the underlying fundamentals of good teaching are at the basis of inclusive educational pedagogy. Therefore, inclusive educational practice entails 'good teaching' in order to assist all learners in achieving their potential (Mittler, 2000).

It is noticeable that some countries, contexts, settings, schools, and teachers adapt to this process of applying technology for inclusive pedagogy more effectively than others (Cifuentes et al., 2011; Wachira & Keengwe, 2011). In developing countries, however, there may be inadequate infrastructures and this mitigates against successful pedagogy in this area (Akanbi & Akanbi, 2012; Yusof et al., 2012). The use of technologies in the classroom demands that teachers are knowledgeable and

competent in order to enhance its effective and appropriate use. Aduwa-Ogiegbean (2005) and Kim et al. (2013) argue that it is not just the mere integration of these technologies into pedagogical practice, yet also the alignment of their use with student learning goals that engage learners in the pursuit of enhanced learning and academic progress. This means that technology should be used as part of a creative approach that enhances the existing broader pedagogy if technology application to teaching and learning is to be successful (Ingleby, 2016). If educators are to integrate assistive technologies in supporting students effectively, this necessitates innovative pedagogical practice (Williamson-Henriques, 2013; Levin & Wadmany, 2008). Gorder (2008) and Beckett et al. (2003) argue that debates on technology integration in both mainstream and special education are no longer about availability yet more about teachers' effective use of the technology. Adebisi et al. (2015) and Liman et al. (2015) argue that some of the prevalent challenges that confront practitioners in meeting the needs of learners with learning disabilities in inclusive classrooms are based on selecting and evaluating effective technology. Gronlund et al. (2010); Singal (2008); Chitiyo (2007); Ellsworth and Zhang (2007) argue that ineffective and inefficient use of assistive technologies has been identified as one of the major obstacles hindering inclusive education, particularly in developing countries such as Nigeria. Though many schools in both developed and developing countries still have constraints and challenges in the effective use of technology in classroom instruction (Lim, Zhao, Tondeur, Chai, & Tsai, 2013), it is argued that this is more significant in developing countries like Nigeria (Akanbi & Akanbi, 2012). Many teachers in developing countries are 'nervous' about the integration of ICT in schools due to the inadequate training they experience (Oralbekova, 2016). In consequence, the integration of technology in delivering classroom instruction may become 'difficult and demanding' within schools in developing countries (Cifuentes, Maxwell, & Bulu, 2011; Joshi, Pan, Murakami, & Narayanan, 2010) and Wachira & Keengwe, 2011).

Against this backdrop surrounding the application of technology to pedagogy it is worth noting that inclusion requires new approaches to teaching and learning (Lacey, 2006) as well as the use of valuable, new, suitable and barrier-free tools. Ahmad (2015) suggests that there is a need to tailor the teaching strategies or means of instructional delivery that support, promote and ensure that the needs of diverse learners are met in inclusive classrooms. It is essential for teachers to have appropriate insight and

support as they face this challenge. However, the overarching goal of the effective integration of technology to pedagogy is to reflect on the ways that teachers teach and learners learn in order to ensure that the needs of all learners are met, as much as possible. In this respect, Loreman (2017) argues that pedagogy is about the way teachers teach and the way learners learn. It is emphasised that applying technology to pedagogy requires a new way of working for teachers. This requires the adoption of different teaching and learning strategies. Thus, it is argued that teachers need to reflect in innovative ways on how to apply technological resources to pedagogy ((Pfaffe 2017; Romrell et al 2014).

Ajoku-Christopher (2012) argues that there is no effective and significant application of Assistive Technology in classroom instructional delivery in many Nigerian schools. Ajoku-Christopher (2012) further contends that teachers may display a lack of awareness of using Assistive Technology in classroom instructional delivery. Currently, it appears that the challenges confronting classroom instructional delivery in many Nigerian schools have not been given adequate attention by governments and other educational stakeholders. Against this backdrop, the effective and appropriate use of assistive technology tools in inclusive education remains a problem in the education sector. Seemingly, this calls for a new research agenda to address the problem. Adebisi et al. (2015) reveal that a lot of regular classroom teachers, special educators and other related professionals in the field of special education are yet to adjust to the advent of both high-tech devices like computers and low-tech, manually operated devices that can deliver and facilitate learning. This suggests that learning with technology is an interesting research theme that requires in-depth exploration.

While it is argued that it is important to enable technology integration (McKnight and Davies, 2012), the successful integration of ICT in schools has met with a myriad of difficulties over time (BECTA, 2004; Hew & Brush, 2007). The argument runs that there ought to be an alignment of technology to pedagogy in which technology application is grounded in pedagogy for the enabling of 'deep learning' (Yelland and Kilderry 2010; Ingleby 2016; Price & Kirkwood 2014).

In a study conducted in Nigeria, Yusuf et al. (2012) argue that there is relatively little research publication in the area of the use of Assistive Technology to support inclusive practice. Additionally, Farrell & Shafika (2007) and Yusuf & Fakomogbon (2008) also emphasise that there are few research publications that examine the application of ICT for learners with learning disabilities in the context of developing countries in sub-Saharan Africa. This gap in research and the circumstances that impede effective and appropriate application of technology in pedagogy to meet the needs of learners with learning disabilities in Nigerian schools is a main theme of this study. This research therefore explores current practice in the use of technology to promote inclusion by presenting an in-depth understanding of how practitioners perceive their pedagogical practice with technology.

### **1.5 Statement of the Problem**

Regardless of the global advancement of the use of modern technology in education and the potential benefit of efficiency, enhancement and transformation to the process of teaching and learning offered by technology (Kirkwood and Price 2014), concern continues to be expressed about the extent to which technology is being integrated within learning. As noted previously, this has resulted in a gap between practice and theory within the discourse of technology and pedagogy. In this respect, Kim et al. (2013) and Odua-Ogiegbean (2005) argue that it is not just a question of the mere integration of these technologies into pedagogical practice, but an alignment of their use with student learning goals in order to enable enhanced learning and academic progress.

The education of learners with disabilities poses challenges to educational practitioners in schools. In an attempt to overcome these challenges, various studies have identified that one of the major difficulties confronting teachers and other professionals in meeting the diverse needs of these learners with learning disabilities in the classrooms is the application of technology (Adebisi et al., 2015). Other associated problems include its appropriate use, how to select assistive technology, and how to evaluate its efficiency (Liman, et al. 2015). In the context of Nigeria, efficient integration of assistive technology to support students' learning is not well developed as the majority of Nigerian teachers are not adequately equipped to provide technology-supported learning opportunities for their students. This is because of the



poor nature of effective technology use within the Nigerian schools (Ahmad, 2015; Yusuf et al., 2012). If technology is not adequately integrated and utilised in the correct manner in pedagogical practice, then the application of technology to pedagogy may remain questionable, and, therefore, susceptible to a lack of pedagogical grounding (Kirkwood and Price, 2014). In this consideration, Loreman (2017) also expresses concern about the extent to which the effective and appropriate use of technology is being integrated to improve students' learning experiences.

Despite the endorsement of the United Nation's Convention on the Rights of the Child (UNCRC) and the global campaign leading to the implementation of the United Nation's Convention on the Rights of Persons with Disabilities (UNCRPD) (UNICEF, 2007), children with disabilities and their families continually face challenges that range from marginalisation, discrimination and sometimes total exclusion from education (Olufemi, Josiah and Kehinde 2015; Srivastava, Boer and Pijl 2015; Udeme and Olisaemeka 2016). There appears to be a great level of lack of awareness and support provision for children with SEN, particularly those with specific learning difficulties such as Dyslexia, Dyspraxia, Dyscalculia, Autism, Aspergers, and ADHD as revealed in this research. It is noticeable in the context of this research that children with special educational needs in the Imo State Nigeria are not adequately embraced in mainstream schools. Moreover, where children with SEN are included, they are not appropriately supported. Regardless of the global advancement of the technology use in education and the potential benefits that technologies offer, the application of technology to pedagogy lacks pedagogical grounding and as a result, its application has remained questionable in some quarters (Kirkwood and Price 2014). Nigeria is a typical example of where the efficient integration of technology to support students learning is not well developed and it appears that many educational practitioners in this part of the world are not well equipped to provide technology supported learning.

Technology is a rapidly evolving area and what is available for students and teachers to use within a certain period of time may become obsolete within a short period of time (Loreman, 2017). This means that there is a need for teachers to be kept up to date with technology as it evolves, and this can only be achieved through effective CPD programmes, seminars, workshops, research, and conferences. The full potential of technology can only be unlocked in the classroom when teachers are in a

position to use it judiciously. Gronlund et al. (2010) argue that the use of these technologies in teaching and learning needs careful consideration. Currently, it appears that the challenges that are confronting classroom instructional delivery in many Nigerian schools are not adequately addressed or resolved by the Nigerian government and other stakeholders. In consequence, Nigeria appears inadequately equipped to provide technology enabled learning opportunities for students. Against this backdrop, the effective and appropriate use of technologies for assisting the education of children with SEN remains a 'great problem' within the Nigerian educational sector in particular, and in Sub-Sahara Africa in general. Nigeria is considered to be on the wrong side of digital divide when it is viewed from a global perspective. Nigeria, for instance, experiences an inadequate technological infrastructure, and as a result, ICT facilities do not appear to be universally available in this part of the world.

### **1.6 Purpose of the Study**

The central focus of this research explores the perceptions of educational practitioners about using digital technologies to promote inclusive practice in meeting the needs of learners with special educational needs. The research also examines and considers the influence of CPD on teachers' use of technology in pedagogy. The aforementioned problems in the preceding section have motivated my interest in exploring and attempting to understand the current status-quo of inclusive practice and how teachers promote the education of children with SEN using technology in their pedagogy. That is, to know the how and why of technology use in teachers' current pedagogy in the Nigerian schools. In this respect, the study explores and demonstrates what technologies are used, how they are being used, and why and how they are viewed as part of wider pedagogy. The research further highlights the importance and values of digital technology use in inclusive pedagogy, and how educational practitioners' views, beliefs, attitudes and knowledge of technology use may influence the application of technology in pedagogy for inclusion.

### **1.7 Significance of the Study**

This study is of significance to the educational policymakers in the Nigerian educational system as the research provides insights into the current trends in

technology integration from a global perspective. The research also provides suggestions for the effective application of technologies in inclusive classrooms. This study provides useful insights for the government of Nigeria to reflect on Education for All (EFA) as it affects learners with SEN. Furthermore, the study also benefits teachers in the inclusive classroom as it will provide them with innovative guidelines and considerations in applying technologies in order to meet the needs of all learners in their classroom. The research will be of benefit to the students by exploring the alignment of technology to pedagogy in improving students' learning experiences and academic achievement. These elements are considered to be important factors in curriculum development and it is also seen as a crucial element of teaching and learning (Hall et al., 2011).

### **1.8 Research Aim**

This research aims at achieving these goals:

The research aims to establish an in-depth understanding of how practitioners conceptualise and perceive their current pedagogical practice using technology in sustaining inclusive best practice in selected Nigerian schools. The PhD also aims to provide insights into the current practice and trends in the use of technologies, and the factors that moderate effective integration of various technologies for pedagogical practice in the Nigerian context.

### **1.9 Objectives of the Study**

Objectives of this research include the following:

- i. To understand teachers' perceptions and interpretations of inclusion and disability in relation to technology integration in pedagogy.
- ii. To identify teachers' understanding and awareness of SpLD and the ability to identify and support these learners in inclusive classroom practice.
- iii. To explore teachers' conceptions and experience on the extent of technology application in their current pedagogy in supporting the education of persons with SEN in the classroom.
- iv. To identify the influence of teachers' knowledge on effective use of technology in pedagogy.

- v. To identify the practitioners' experiences of their Continuing Professional Development (CPD) in relation to applying new and emerging technologies in pedagogy.

### **1.10 Research Question**

The research questions featured in the study are as follows:

- a) How do teachers perceive and understand the inclusion of children with SEN in their pedagogy?
- b) How do teachers apply digital technology to support children with SEN in their pedagogy?
- c) What are the challenges in integrating technology in pedagogy in the Nigerian schools?
- d) How does the professional development of teachers influence technology use in promoting inclusive practice?

### **1.11 Scope of the Study**

The scope of this study is limited to primary and junior secondary schools in the Imo state of Nigeria. This level of education in Nigeria is currently regarded as the 'basic education' level of schooling. A child's typical educational trajectory comprises of 6 years of primary school education followed by 3 years of junior secondary education. As there are various categories of technologies, the technology scope of this study is limited to Digital Technologies (DT) that are used to assist learning (ICT). This pedagogy provides a wide-range of support in attempting to enhance learning. These technologies include but they are not limited to 'smartboards', 'computers', 'iPads', and 'smartphones' which are all equipped with software that can enhance learning.

### **1.12 Overview of Research Methodology**

This section of the study presents an overview of the methodological thought that underpins this research. The research applies an inductive qualitative research paradigm that is informed by an interpretive ontology. This study is based within

selected primary and junior secondary schools with a sample comprising of practitioners drawn from both primary and junior secondary schools in the Imo State of Nigeria. The research approach is a qualitative inductive study involving interviews via photo-elicitation, that is a key form of qualitative research methods. Creswell (2014) argues that qualitative research places an emphasis on exploring and understanding the meaning that individuals or groups ascribe to social or human contexts. However, the qualitative approach focuses on drawing meaning from the experiences and opinions of the participants, and it recognises meaning, purpose or reality (Cohen et al. 2011; Merriam, 2009). Although it can be argued that qualitative research may be potentially problematic because it is 'time-consuming', it is, however, worth completing qualitative research particularly when the researcher relies significantly on the participants' interpretations of realities that exist in the society or context of the study (Creswell, 2009).

The research involved 25 participants who have a range of experiences working within SEN and applying technology to pedagogy. The sampling method employed is purposive sampling. The study employs a multi-method approach towards data collection, using more than one type of data source including a reflective journal that I have written during the research process, allowing for a degree of crystallization (Arksey and Knight, 1999). The data collection was completed in three main stages. The first stage of the data collection involved photo elicitation in which the researcher tried to identify participants' core ideas of the images in order to make sense of the photos and to probe and prompt more information from the participants in the subsequent semi-structured interview. This process was more of a loosely structured discussion. The second stage of the data collection followed a semi-structured photo interview involving 25 participants. The third stage of the data collection was a follow up Skype interview with 10 participants drawn from the initial 25 participants. These participants provided more reflections on technology application to pedagogy with children with SEN, and teachers who presented their views on the professional development needs of the teachers. The data analysis was carried out using thematic analysis, and the researcher adopted the SAMR model to identify the extent of technology use by teachers for their pedagogy in this area.

### **1.13 Research Rational and Justification**

The qualitative method of research is more interested in the particularity of findings rather than generalizability (Cresswell 2009). Testing case study research findings in other research settings is also a measure of the robustness of the findings (Saunders et al. 2009), and represents a proof of concept. Hence, qualitative research offers the researcher the opportunity to engage in generating meaning alongside gathering the views of the research participants. This qualitative research enables the researcher to understand shared meanings about technology with pedagogy and SEN in the Nigerian educational system.

### **1.14 Contribution to Knowledge**

The study explores the perceptions and experiences of educational practitioners on their current pedagogical practice using Digital Technology (DT) for inclusive pedagogy. Although there are various examples of research around ICT and pedagogy, the application of technology to the pedagogy of students with special educational needs in Nigeria is limited. An extensive literature search has not yielded a match to the title and context of this study. This, together with the rapid advancement of new technologies globally, calls for research in this area of study. This study intends to understand and establish how technology is applied in meeting the needs of learners and to support the education of learners with SEN in the inclusive classroom. This research provides an insight into teachers' application of technology in their current pedagogy using the SAMR model that has worked as an effective framework for shedding light into teachers' pedagogical practice using technology. Additionally, the research also contributes to new knowledge through a relatively novel methodological approach by the application of complementary visual methods involving visual data collection in addressing the phenomena identified in this research area and the application of visual methods has been a helpful element of the research. Moreover, the study also identifies a connection between how a teacher's CPD style/model relates to how technology can be applied to develop inclusive pedagogy in selected Nigerian schools.

## **1.15 Summary**

This research explores the application of technology to pedagogical practice for inclusive education in the Nigerian schools. The emphasis is placed on exploring whether or not selected educational practitioners appropriately and effectively use technologies to generate new opportunities for all students to learn and enhance their academic achievements. A main aim of the study is to investigate teachers' thoughts and experiences on how they apply digital technology tools in their current pedagogy, and to identify how TEL tools are being integrated and analyse why this practice has not led to transforming pedagogic practices and enabling effective inclusive learning. The research seeks an in-depth understanding of the current practice in technology integration, the extent of its application, and educational practitioners' knowledge in selecting appropriate digital technologies. The analytical questions in this study consider key texts revealing the practitioners' perceived views of the application of technology to pedagogy. A further analytical question explores the influence that CPD has on the effective integration of technology in classroom practice. Subsequently, the study applies the Puentedura's (2006) SAMR model to contextualise the research and understand the current practice through participants' reflections on how they apply technology to pedagogy in the Nigerian schools.

The study demonstrates how technology can be applied in meeting the needs of all learners and to support the education of learners with Learning Disabilities (LD) in an inclusive classroom. This research gives an insight into how various digital technologies can enhance students' learning experiences, and facilitate students' equal participation in an inclusive classroom settings. Moreover, emerging literature in this research area emphasises the need to tailor the teaching strategies or means of instructional delivery to support, promote and ensure that the needs of diverse learners are met in inclusive classroom. The study attempts to understand the dimension of technology use in classroom practice in the Nigerian schools. Thus, is technology being used for creative purposes (to transform learning) or is it being used to replicate existing teaching practice? The next chapter, details the literature review element of the study with the necessary discussion that guilds the study.

## **Chapter Two**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This literature review chapter is focused on three key themes that are associated with the research topic that is being explored. The first section of the chapter begins by discussing the TPACK and SAMR conceptual framework that informs the study. This section further explores literature on technology application including the Assistive Technology (AT) tools which are used in promoting inclusive pedagogy. The second section of the chapter presents literature relating to the provision of Special Educational Needs (SEN) with a key focus on the practice and development of SEN particularly in the area of Specific Learning Difficulty (SpLD). Inclusive practice debates and issues surrounding pedagogical practice are all discussed. The review explores teachers' perceived views on the use of ICT tools for inclusive practice. The third section of the chapter reviews related studies on professional development in education in order to identify the influence of professional development in the effective integration of TEL in pedagogy. For this literature search, the secondary sources of data accessed included the 'theses database' (Electronic Theses Online Service [EThOS]); the Education Resources Information Centre (ERIC); the ACM digital library; Science Direct; Elsevier, Emerald journals; Researchgate; the Tees repository and a range of academic journals and networks. The review was drawn from both global perspectives alongside the specific context of Nigeria.

#### **2.1 Theoretical Frameworks**

To understand the purpose and manner of technology application to pedagogy, this chapter begins by reflecting on theoretical frameworks/models for technology integration in education such as; the Technology, Pedagogy and Content Knowledge (TPACK), and the Substitution - Augmentation - Modification – Redefinition model popularly known as (SAMR) model popularised by Puentedura's (2006). These models are discussed in an attempt to understand how teachers' knowledge influences their classroom practice on one hand, and how new technology is applied



by teachers in their practice to support learners in meeting their learning needs with technology.

### **2.1.1 TPACK Model**

The Technological Pedagogical and Content Knowledge (TPACK) model is associated with the work of Mishra and Koeller (2009), and it is a framework or model that explores the knowledge teachers need for effective technology use in pedagogy (Di Blas 2016). The TPACK framework helps to identify what knowledge the teachers need, to effectively apply technology to their pedagogical practice (Di Blas and Paolini 2017). In this sense, the TPACK model appears to establish a nexus with the work of Kennedy (2005) in exploring the nature of transformative professional development in education. The TPACK model considers the knowledge that teachers need if they are to apply technology effectively to their pedagogy, and Kennedy's (2005) work also explores this theme. Together, these explorations of CPD can be used in order to enable teachers to understand and determine the kinds of knowledge needed for effective pedagogical practice in technology enhanced learning instruction.

The TPACK framework is based on the principle that Technology, Pedagogy, and Content Knowledge should not be treated in isolation for effective technology integration in classroom practice. Digital technologies have influenced how teachers develop their instruction with pedagogy and content. Koehler and Mishra (2009) argue that learning techniques using pencils, calculators, rulers, and microscopes are often used in unidimensional or relatively simple ways. In contrast, the application of digital technology tools is potentially multidimensional and creative, and therefore holds the potential to enhance the teaching practices that can be utilized in the classroom. However, Koehler and Mishra (2009) also argue that if this innovative application of pedagogy is to occur, it is important to avoid a 'one size fits all approach', as this will not work because of the complexity of pedagogical contexts. Moreover, the variation in how content and pedagogy have been applied with TEL reveals that changes in how professional development is delivered in this area is also necessary. Effective pedagogy with technology is considered to be an amalgamation of what teachers know (content knowledge), how teachers teach (pedagogical knowledge), and how the technology is used by teachers (technological knowledge). However, Green (2014) argues that technology integration and technology enabled learning is

overemphasised, and in consequence there is not a balanced emphasis placed on teachers' technology practice in teaching and learning. Green (2014) also argues that CPD needs to be transformative if there is to be an impact on effectively developing the application of technology to pedagogy.

However, much of the CPD that the teachers receive is centred more on learning to use technology, and not learning how to use technology for pedagogy. That is to say that technology use is not aligned to pedagogy as argued by Kirkwood and Price (2013). In this regard, it is argued that pedagogical change places a great responsibility on teachers to be knowledgeable not just of acquiring technology skills yet, more importantly, to also understand the methods for teaching that enable the enhancement of student learning with the use of technology (Krug & Arntzen, 2010). The teachers' technological needs go beyond the mere gathering of computers in a classroom or ICT laboratory as it is important to enhance teachers' technological, pedagogical, and content knowledge (TPACK) in learning spaces (Mishra & Koehler, 2006). Furthermore, many teachers in schools have indicated that a lack of transformative CPD is a challenge for their professional practice (Kennedy 2005). It is also identified that effective collaboration between teachers in schools is especially important for knowledge transfer (Kennedy 2005). In the opinion of Tondeur et al. (2015) a greater emphasis needs to be placed on how to use technology for teaching specific content to specific learners.

Pfaffe (2017) argues that the TPACK framework can help in developing professional development for teachers in respect of teacher technological pedagogical content knowledge, and that this can also raise awareness of the Substitution, Augmentation, Modification, and Redefinition (SAMR) model. This can in turn enable the effective development of evaluation strategy for technology tools in order to result in the application of different levels of technology use in learning spaces.

### **2.1.2 The SAMR Model**

The SAMR model is a framework developed by Dr. Ruben Puentedura as part of his work with the Maine Learning Technologies Initiative (Puentedura, 2006 cited in Romrell et al. 2014; Thornton 2017). This model generally provides a tiered four-level approach that guides educators in selecting, using, and evaluating technology use in

classroom practice. The SAMR (2006) framework demonstrates and classifies how technology is used in pedagogy. The four components of the SAMR model are simply outlined as Substitution, Argumentation, Modification, Redefinition (SAMR). The SAMR model has attracted huge discourse among academics and researchers (Tseng 2019). Regardless of how the model is visualised among academics, the SAMR model can be a simple and effective way to evaluate how technology is incorporated into pedagogy (Tseng 2019). Educators and Administrators employ this model as a means of identifying and labelling aspects of teachers' technology use in their pedagogic practice (Thornton 2017; Pfaffe 2017; Nakapan 2016, Tseng 2019). Recently researchers have employed SAMR framework to explore the ways TEL tools and application have influenced pedagogy (Hilton,2016; Geer, White, Zeegers, Au & Barners,2017; Kihoza, Zlotnikova, Bada, & Kalegele,2016). Thornton (2017) defines the SAMR model as a framework for teachers to reflect upon how effectively teachers incorporate technology into their instructional practice and reflect on its impact on students' learning.

The SAMR model enables educational practitioners to develop their use of technology by providing an opportunity to reflect on how technologies can be applied in pedagogy through a reflection on the four potential ways that educators can use technology (Hamiton et al.; Nakapan 2016). Moreover, it is also helpful for policy makers to consider the purpose of the integration of digital technology into pedagogy and to consider how to develop effective technology use in pedagogy. Among the several theoretical models that have been developed within the context of technology enabled learning, Nakapan, (2016) contends that the Substitution Argumentation Modification Redefinition (SAMR) model is particularly useful. Nakapan (2016) further argues that the SAMR model is like a lens, which allows educators to reflect on how they apply technology in their pedagogic practice. In recent times the SAMR model has gained prominence across the globe, and it has featured in many scholarly studies including the work of Hamiton et al. (2016); Romrell et al. (2014); Pfaffe (2017); Thornton (2017); Tseng (2019). Heggert (2015); and Nakapan (2016).

The SAMR model was developed to encourage educators to significantly enhance the quality of education provided via technology (Romrell et al. 2014). The model offers an opportunity to consider how the various levels of technology use can be applied in

classroom practice, alongside outlining how technology can be applied and integrated into classroom practice (Pfaffe 2017; Romrell et al 2014 Thornton 2017). Additionally, the model offers teachers the opportunity to continually assess teachers' pedagogical practice in making the best possible use of technology (Hogan, 2009 cited in Nakapan 2017). The model reveals four categories of technology integration in pedagogy, which has a direct influence on the students' learning experiences and the students' learning outcomes when technology is applied to pedagogy (Harris, 2014, Nakapan 2016). Ideally, pedagogy with technology ought to realise a level of transformative education (Ingleby 2016), while Nakapan (2016) is of the view that the SAMR model can achieve this goal by applying technology effectively in learning spaces. There are four levels in the SAMR model.

The S - Substitution represents the direct replacement of existing tools or methods used in traditional classrooms, for example, students using word processors instead of pens and paper to write their reports. Another example of 'substitution' is seen with teachers using iPads to read novels in classrooms as opposed to reading directly from text books. The A- Augmentation reveals that technology can be applied to improve existing pedagogical practice. For example, students working with word processors may annotate documents and share the documents with instructors on Google Docs and teachers may use power point presentations to teach in more innovative ways to develop pedagogical processes. The M- Modification is when key elements of pedagogical processes are redesigned in unique ways, for example undertaking 'collaborative writing' using Google Docs and using 'highlighting' and 'chat functionality' to give dynamic feedback to peers, in this 'modification' example, technology is being applied to pedagogy in a powerful way and the pedagogical processes are being changed. The R-Redefinition is the highest level of technology use in pedagogy, which allows teachers and students to do tasks that were previously inconceivable in traditional classrooms, such as recording videos to submit their homework and then posting the work on social media to ask for feedback from an audience beyond the classroom.

To exemplify 'redefinition' further, another example is using assistive technology alongside listening to digital versions of books for students who have particular needs. In this instance, the students are aiding an aspect of learning difficulty with technology. Moreover, if the students focus on computer screens as highlighted words are read

out aloud, they can learn unfamiliar words. In this example, all of the learners can be included in pedagogical processes. This is an example of where technology becomes highly useful and benefits the educational development of children with special educational needs.

The first two levels in the SAMR model are referred to as 'Enhancement', where technology assists in the accomplishment of traditional pedagogical tasks (Nakapan 2016). The other two levels are referred to as 'Transformation', and this is where the real transformation of innovative technology application is made manifest in classroom learning activities. This form of technology application allows creative activities to take place, which are very different to those found in traditional classrooms where technology is not enabled.

## **2.2 Applying Technology to Pedagogy and the Big Debate**

The purpose of this section is to explore existing literature associated with technology application to pedagogy and the big academic debate about applying new technology to pedagogy from a global perspective and Nigerian perspective. However, other relevant research pertinent to teachers' use of technologies including assistive technology in inclusive practice has also been reviewed.

### **2.2.1 Integration of technology tools to transform pedagogy.**

Integrating educational technologies into the classroom to enhance the modern day teaching and learning experiences of learners continues to be an essential aspect of teachers' pedagogy (Hyndman, 2018; Windschitl, 2009). Wordu et al. (2021) argue that the global integration of technology use in education in recent times has resulted in considerable debates among academics across the world. Technology use in pedagogy has the tendency to impact positively on students' learning outcomes (Borawska-Kalbarczyk et al., 2019; Daniela, 2019; (Chai et al., 2015; Zogheib & Daniela,2021).

A key debate in applying technology to pedagogy is to consider how teaching and learning is being influenced in positive ways amidst growing pressure on schools to integrate technology into their pedagogical practice in meaningful and learner-centred ways (Ingleby 2016). According to Nordlof et al. (2019), a perceived enjoyment affects

the perceived ease of use, in essence, students derive joy using technology such as cell phones and their enjoyment enables the subsequent ease of using these technologies. Moreover, perceived mobility affects perceived usefulness, and behavioural intentions can affect academic performance in positive ways. This indicates that students can potentially utilize technology in order to develop their academic performance (Nordlof et al. 2019),

Integrating digital technology in pedagogy holds the potential to transform teaching and learning (King, Joy, Foss, Sinclair, and Sitthiworachart, 2015). King et al. (2015) argue that despite years of technology integration in pedagogical practice, there is still no clear explanation as to why a transformation of teaching and learning has not yet occurred. This is evidenced in a study by Smirnova, Lazarevic, and Malloy (2017) that reveals that teachers using digital technology in the classroom do not always appear to understand how the instructional goals in applying technology are any different to traditional pedagogical practices.

Notably, if effective teaching and learning are to be achieved through the application of technology, caution needs to be applied in considering the complexities that these new technologies bring with them and the ways that technology is applied to pedagogy (Wordu et al. 2021; Daniela, 2021, Earle, 2004; Peck et al. 2002). Pedagogical knowledge is needed to guide the learning process and digital literacy is essential in order to lead pedagogical processes (Biezā, 2020). This draws attention to the importance of pedagogical competence in using technology, and this is considered to be the driving wheel which ensures that the use of technology in classroom activities has pedagogical value (Ingleby 2016). It has been emphasised that regardless of the advancement of technology into all facets of society, there is a continued emphasis placed on how this affects a student's learning. It is also argued that there is a need for teachers to incorporate technological resources and tools into their teaching, and alter their pedagogy and mode of instruction towards more student-centered approaches (Cloete, 2017; Budhwar, 2017).

It is important to reiterate that the use of technology depends to a large extent not only on the technology itself but also on the attitude(s) towards technology and its perceived ease of use (Mayer, 2014). This suggest that if we want teachers to use technology to enhance learning, they need to understand the 'how and why' of the

technology integration (Chai et al., 2015). Therefore, it is necessary to think about what exactly technology improves (Steffens et al., 2015), whether it helps to create a sustainable environment, or helps to achieve other sustainable development goals, such as helping to ensure access to education for all groups in society (Daniela et al., 2018; Visvizi & Daniela, 2019; Visvizi et al., 2020). Successful and effective use of technology in education can also be a driving force for inclusive education and an inclusive society, both by providing support to students with specific learning needs and by providing opportunities for students to acquire knowledge that would not have been possible without technological support (Rodriguez-Ascaso et al., 2011).

Moreover, it is also argued that technology has the potential to become a valuable and well-functioning instructional implement (Becker 2000; Borawska-Kalbarczyk et al., 2019; Daniela, 2019, Becker and Ravitz 2001). Despite the academic research on the effectiveness and appropriate use of technology, it has become evident from the academic research that the desired transformation of schools intended by the policy-makers, is yet to be attained.

Accordingly, the global interest in the adoption of ICT in education is increasingly progressing across the world (Balogun 2013; Onwuagboke & Singh 2015). Irrespective of the increased campaign for technology integration by various governments across the globe, the considerable disparity in the access to ICTs is identifiable especially in teaching and learning around the world (Olakulehin 2007; Michaelides 2011; Damkor et al. 2015). This divergence in the availability and integration of ICTs in different countries represents a 'stark digital divide' (Manjulika & Reddy 2002). As studies suggest, ICT use in the educational system of developing countries like Nigeria is still in an emerging phase (Olakulehin 2007; Ogechukwu & Osagwu 2009). It is also argued that the number of schools including universities that have embraced the ICT culture and embedded any form of ICT application to their instructional practice is significantly low (Onwuagboke & Singh, 2016; Ajadi, 2008). Despite the ICT policy introduced by the Nigerian government in 2001 which stipulates that ICT should be utilised in instructional delivery at all levels of education (FRN, 2008), its implementation and the expected transformation still remains a challenge (Olakulehin;2007; Damkor et al., 2015).

Nigeria still experiences a lag in its ICT implementation, and this continues to widen the digital and knowledge divide (Damkor et al., 2015). Notwithstanding, the Nigerian government has been relentless in promulgating policies to advance the campaign for ICT use in education. To this end, the federal ministry of education in Nigeria launched an ICT- driven project known as 'school net' which was an initiative to equip all schools in Nigeria with computer and ICT equipment (FRN,2006; Adomi 2005; Okebukola,2004). Other efforts of the Nigerian government towards the inclusion of ICT in Nigerian schools includes the commissioning of a Mobile Internet Unit (MIU) operated by the National Information Technology Development Agency (NITDA) which takes the internet to different areas of the country (Balogun, 2013). The new Partnership for African Development (NEPAD) e-schools' initiative also covers several African countries including Nigeria which was launched in 2003 to equip all African High Schools with ICT equipment. Unfortunately, it is disappointing that serious and sustained effort has not been made towards ensuring the full implementation and integration of technology in a meaningful manner in educational institutions in developing countries like Nigeria (Onwuagboke & Singh 2015). Given the potential role that ICTs can play in education, schools in Nigeria are yet to extensively apply the use of technology in teaching and learning. It is further argued that efforts geared towards the integration of ICTs into the school system have not yielded much impact. Problems such as poor policy and project implementation strategies and poor information infrastructure appear to mitigate against these efforts (Damkor et al., 2015).

It is argued that the use of ICT is seemingly an opportunity to those who can respond to the new paradigm and a threat to those who cannot (Olakulehin 2007). Moreover, it appears that a range of factors such as personal, social and professional factors can influence practitioners' technology use in pedagogy (Ingleby 2016). Other emerging literature identifies that there are myriad of challenges that impede the application of technology in pedagogy (Olakulehin, 2007). These factors include limited ICT infrastructures to enhance pedagogical processes, particularly in terms of facilities and staff who are competent and knowledgeable about new technology (Olakulehin 2007; Buabeng-Andoh 2012; Damkor et al. 2015).

### **2.2.2 Benefits of Assistive Technology Tools for Inclusion**



It has been emphasised that ICT, when coherently integrated into pedagogy, enables learning and this pedagogical process is popularly known as Technology Enhanced Learning (Kirkwood and Price, 2013). The correct technology, in other words, Assistive Technologies, offers the potential to bypass, augment, and compensate for a number of disabilities. Although people of all abilities have the potential to use technologies interactively across the globe, Leyton et al. (2016) argue that Assistive Technologies are vital for providing a learning environment where all users are treated fairly and are enabled to participate in inclusive communities. Moreover, Berry (2008) argues that the application of TEL can help in respect of fairness with respect to inclusion, because the pedagogy that is based on TEL holds the potential to enable students to receive the support, and instruction they need to realise their academic potential.

This concept of Technology Enhanced Learning (TEL) offers the potential benefit of efficiency, enhancement, and transformation to the process of teaching and learning (Kirkwood and Price 2014). 'Assistive Technology' typically refers to devices and services that are used to increase, maintain, or improve the capabilities of students with disabilities (Dell, Newton, & Petroff, 2012; Abbott et al., 2011). According to the British Educational Communication and Technology Agency (BECTA), Assistive Technology is also viewed as technology and software which helps those with disabilities and special needs to overcome the additional barriers that they encounter in learning and communication (Becta, 2004; Acaimpesd, 2011; Kilda, 2008).

Assistive technology devices vary from low-tech to high-tech technologies (Mosely, 2011). The low-tech assistive technologies can comprise of items like flash cards, pencil grips, and highlighters, while the High-tech assistive technologies may involve speech-to-text, text-to- speech, spell check, e-books, audio books, and reading pens (including the Echo Smartpen; the Interactive White Board [IWB]; concept mapping software and associated websites). It is also revealed that page turning tools, course materials printed in Braille, magnifiers, voice recognition software and screen reader software can be used as assistive technologies to support the reading skills of students (Adebisi, et al. 2015; Edyburn, 2020; Reed, 2009). These TEL pedagogical tools when incorporated appropriately, can positively influence the reading skills of students with special educational needs in different ways (Earman-Stetter and Tajero-Hughes, 2010). These technological tools have equally been considered useful in classroom

instructional delivery (Mosely, 2011). However, the cost of acquiring, and installing these technologies and employing experts in the field has been identified as one of the key factors moderating the integration and use of assistive technology in many schools in developing countries like Nigeria. This could contribute to the reason why its adoption in developing countries is not progressing as quickly as expected compared to its adoption in developed countries like the USA and the UK. It is argued that many schools in the developed and developing countries still have constraints and challenges regarding the effective use of technology in classroom instruction (Lim, Zhao, Tondeur, Chai, & Tsai, 2013).

It is also argued that there exists a digital gap between urban, semi-urban, and rural schools in Nigeria (Akanbi & Akanbi, 2012). The application of Digital Technology (DT) is influenced by enormous challenges such as a lack of basic supportive Infrastructures (Gorder 2008), and many teachers in Nigeria are nervous about the utilisation of ICT in schools due to their inadequate training experiences (Oralbekova 2016; Messmer, 2013). There are several barriers that affect the implementation, and successful use of DT in general. Teachers' lack of adequate knowledge and the absence of the skills to use technologies are significant factors influencing pedagogy (Alkahtani, 2013) and this can limit the application of technology in mainstream schools (Messmer, 2013). Loreman (2017) argues that there is a need for further research in this area and this is supported by (Niemi 2007) if we are to gain a true insight into the cultural factors that are influencing this form of pedagogy (Trowler, 2010).

It is important to acknowledge that technology is viewed as both an educational tool and a resource (Langford et al., 2016). The literature reveals that applying technology to pedagogy can lead to positive pedagogical consequences in general. It is argued that ICTs are able to transform education at all levels as long as thought is given to pedagogical techniques and professional development in this area (Mwangi, 2014). It is also important to consider whether technology enhances or diminishes academic performance and whether technology isolates or brings people together (Langford et al. 2016) and all of these arguments are considered within this PhD research. I argue that this on-going debate in the application of technology to pedagogy and how it influences the learning process lies somewhere between two perspectives.

### **2.2.2 Technology and Pedagogy Debates**

Despite the potential benefits and promise that technology application in education holds, there exist big debates on technology application to pedagogy. Though technology provides the potential for the development of quality pedagogical processes, Toyoma (2011) argues that there is no technology 'quick fix' to good education. This is because successful technology application in education requires specific schools that are already 'well established' as institutions (Toyoma 2011). This argument is supported by Kirkwood and Price (2014) who acknowledge that technological interventions in schools for teaching and learning can often be restricted in the absence of a supportive infrastructure.

The application of technology in pedagogy has been viewed in various ways by different scholars from the perspective of various schools of thought. Though technology application in pedagogy is widely embraced by education, it is argued that it is essential to ensure that thought is given if the application of technology to pedagogy is to be successful (Langford, Narayan, & Von Glahn 2016; Damkor et al., 2015; Ingleby 2016). Since the context in which the practitioners operate has a significant bearing on their engagement with Technology Enhanced Learning (Ingleby and Wilford 2016, Damkor et al. 2015), personal, social, and professional factors influence the application of technology to pedagogy. Whilst some practitioners have been immersed in the use of technology in their pedagogical practice, others have had little exposure to the use of technological tools to support teaching and learning (Ingleby and Wilford 2016; Damkor et al. 2015). As was noted earlier, the use of ICT is perhaps an opportunity for those who can respond to the new paradigm, yet on the other hand, a threat to those who cannot apply technology to pedagogy (Olakulehin, 2007). This may impact on the confidence levels of the educators in applying technology to pedagogy.

Given the continued emphasis that is placed on the effective and appropriate use of technology towards a student's learning needs, it is evident from the respective research that the desired transformation of schools that is intended by the policy-makers is yet to be attained (Earle, 2004; Cuban 2001; Peck et al. 2002). Though much research identifies that the technology use by teachers in schools has been on

a progressive trend, and that technology is permeating the curriculum, convincing evidence has not been provided that schools are being transformed by the technology that is being used in pedagogy (Grabe and Grabe 2001; Tearle 2003; Condie et al. 2005). Notably, the majority of educators argue that ICT is still a tool that is utilised in the margins of the educational process (Plomp et al. 2007). While other schools and teachers have embraced technology and progressively integrate it into their practice with improved children's learning and achievement, on the other hand, many other schools and practitioners reveal a reserved attitude towards the use of technology in their practice (Kozma 2003; Hernandez-Ramos 2005; Norris et al. 2003; Gura and Percy 2005). The above argument reveals that although schools are incorporating technology into their pedagogical processes, in contrast, its application to educational processes is not always occurring as it could do (Gura and Percy 2005). It is argued that this is due to the fact that teachers' perceptions, attitudes, and experiences about technology use vary as noted in the literature (Ingleby and Wilford, 2016; Damkor 2015).

It is evident that the acceptance of technology use is not universal (Grabe and Grabe 2001; Condie et al. 2005; Wozney et al. 2006; Zhao 2007). It is widely acknowledged that the demands and prevailing issues could be met and addressed through effectively training teachers in technology use (Schoales 1998; King 2002; Mouza 2003). It is also argued that planning for and implementing training and professional development for teachers is essential for the successful implementation of technology to pedagogy (Hill et al, 2005). I argue that it is only when teachers are well-trained that an expected change becomes part of the teaching environment (Schoales, 1998). This is because the mere availability of technology does not instantly result in it being used to achieve educational attainment (King 2002). In consequence, teachers' adequate professional development has a profound impact on the effective and innovative use of technology in the classroom if successful student learning is to occur (Brand 1997; Mouza 2003; Staples et al. 2005).

### **2.2.3 Debates On Technology Integration and Academic Performance**

In order to give a balanced perspective on the technology and pedagogy debate, Kirkwood and Price (2014) argue that it is of paramount importance to understand the

purpose of how technology is applied to pedagogy if we are to help practitioners and school management to develop. The authors argue that some practitioners are aligned with either teaching-focused views or learning-focused views and that these perspectives influence the application of technology to pedagogy (Eynon, 2008). A key theme in the literature is that technology in teaching and learning may be used for replicating or supplementing traditional teaching practice (Blin and Munro, 2008; Eynon, 2008; Roberts, 2003). This practice can be devoid of innovative or transformational technology-enhanced learning. Accordingly, the main discussion point concerns the disparity that exists between the presence of technology and the thinking that rests behind the learning interventions that are based on technology.

Technological tools hold the potential to be innovative for learners with disabilities (Jots & Mosely, 2011; Adebisi, 2015). Certainly, it is argued that technology like assistive technology assures a greater level of certainty in the accuracy of teaching as well as a greater level of self-regard for the user (Scherer, 2005). Besides, it also helps educators in their attempts to meet the specific objectives and needs of 'special needs' learners (Netherton & Deal, 2006). Additionally, it is further argued that there are circumstances and occasions when technology holds the potential to transform learning with students who are affected by ASD (Autism Spectrum Disorder) (Bryant et al., 2010; Loeding, 2002). A key theme in the literature is that technology in teaching and learning may be used for replicating or supplementing traditional teaching practice (Blin and Munro, 2008; Eynon, 2008; Roberts, 2003). This practice can be devoid of innovative or transformational technology-enhanced learning. The integration and the use of technology in teaching and learning has remained a controversial issue in pedagogical practice. Regardless of the benefits that may be promised, there exist debates on applying technology to pedagogy. Toyama (2011) argues that there is no technology shortcut to good education and that the idea that applying technology to pedagogy makes pedagogical processes easier is misguided. Toyama (2011) is of the view that the application of technology to education depends upon the nature of the specific school context. This view is also shared by Kirkwood and Price (2014) as it is argued that technology interventions in schools depend upon the local infrastructure. This argument appears to explain why technology application in pedagogy is more common in urban schools compared to rural settings in developing countries (Toyama 2011). However, the presence of technology in school settings may actually obstruct

learning (Langford et al. 2016). While many educators promote and support the use of technology for enhancing students' learning experiences, it is perfectly possible for technology to impact negatively on students' academic performance and achievement (Langford et al 2016).

Crossgrove & Curran (2008); Fitch (2004); and Smith et al. (2009) argue that technology provides opportunities for educators to develop active learning approaches in their professional practice if thought is applied to the purpose behind this pedagogical approach. Correspondingly, it is argued that technology not only facilitates learning but that it holds the potential for improving student learning (Deslauriers, Schelew, & Wieman, 2011; Edwards, 2013; Gauci, Dantas, Williams, & Kemm, 2009; Wardlow, 2014). Jones (2002) reveals that 46% of students' report that the use of email as a technological tool provides them with the opportunity to express ideas about pedagogy although only 19% of the participants claim that they are more comfortable communicating with professors through email rather than in person (Jones 2002). Additionally, the use of other technologies such as 'polling tools, apps, clickers, and online polls' are acknowledged to enable students to answer questions anonymously and this, in turn can provide higher levels of student engagement in pedagogy (Young, 2010).

The research on technology acknowledges that assistive technology devices hold the potential to reach students with learning disabilities (Jots & Mosely, 2011; Adebisi, 2015). 'AT' can enable a range of interventions which include; helping students to learn how to complete pedagogical tasks alongside providing support to bypass areas of difficulty (Stanberry & Raskind, 2009). In exemplifying this point, when students choose to listen to digital versions of books, they are bypassing an area of difficulty with reading or reading related difficulty. However, if students focus on computer screens as highlighted words are read aloud, they can learn unfamiliar words. This is an example of where ATs are considered useful and benefit the educational development of children with special educational needs. I argue that the application of new technology to pedagogy holds the potential to enable the effective participation of children with learning disabilities in the learning process. Moreover, technology can support the development of a range of learners including both introverted and the extroverted learners (Kirkwood and Price 2014).

#### **2.2.4 The Negative Influence of Technology Application to Pedagogy**

On the other side of the debate, several authors are critical of the use of technology in pedagogical practice (Raja and Nagasubramani, 2018; Biggs & Tang 2007; Fried 2008). It is argued that technology lowers students' learning outcomes as a result of the distraction that results from 'always-present', and 'hard to ignore' mobile devices like cell phones and laptops (Raja, and Nagasubramani, 2018). The authors are of the view that instant access to information stimulates a decline in critical thinking skills. Porter (2014) argues that what is referred to as 'Wikipedia syndrome' has stirred an expectation of easy access to information and instantaneous answers. It is argued that in fact, these electronic devices are more than just a distraction. They signify a 'dark age' due to the loss of the ability to create and preserve wisdom and it is argued that we are slipping towards a time of ignorance that is paradoxically born amid an abundance of information and connectivity (Jackson 2008).

It is argued that technology provokes increased reliance on answers from the internet and in consequence, this hinders the ability of individuals to apply critical thinking skills to problem solving (Friedman & Heafner, 2012; Carr, 2010; Ciarcia, 2012; Hiawatha, 2012; Lowry, 2010). In fact, the digital age has generated access to immense information at the expense of making the era 'less enlightened' (Bauerlein, 2008). Other studies contend that technology use in pedagogical practice can become a distraction that prevents students' participation and achievement (Biggs & Tang 2007; Fried 2008; Kladko 2005; Szaniszlo 2006; Young 2006). It is also argued that a decline in analytical skills can be attributed to learners spending more time with real time media as opposed to reading (Greenfield, 2009). According to Bauerlein (2008), the younger generation is progressively experiencing what is regarded to be a form of 'disconnection' from culture, history, politics, and context and that this is contributing to ignorance and apathy. It is therefore recommended that technology should be used judiciously if effective learning is to be achieved since there are certain complexities that these technologies bring with them. Perhaps, thoughtful utilisation of the technologies has become a paramount need ? (Langford, Narayan, & Von Glahn 2016; Michealides, 2011).

### **2.2.5 Effective Application of Technology in Pedagogy**

The application of digital technologies has resulted in some examples of positive learning in which the DT has become a viable educational tool that supports learners to have wider opportunities in education (Dugan, Campbell, & Wilcox, 2006). The use of digital technologies including AT in educational instructional delivery or academic situations appears vital in fulfilling the education of learners with SEN. This argument is supported by researchers who propose that the purpose of assistive technology is to help maintain or even increase a student's independence (Bryant & Bryant, 1998). The technologies utilised in the education of children with SEN may be viewed as compensatory tools and this suggests that educational technological tools can be employed with a specific purpose to increase the capacity of learners with disabilities (Stanberry & Raskind, 2009). Increasingly, a significant number of authors argue that technology can become a valuable and well-functioning instructional tool, if the technology is well integrated into schools, and appropriately applied by educational practitioners (Becker 2000; Becker and Ravitz 2001).

The use of ICT in education can bring about an increase in productivity and efficiency in pedagogical practice, however, applying technology in pedagogy cannot be easily separated from the debates that exist about how to integrate this type of practice effectively in education (Wordu et al. 2021). It is argued that the challenges usually emanate from the complex and complicated nature of the use of ICT in pedagogy across the globe (Wordu, et al. 2021, Raja and Nagasubramani 2018). This suggests that there are various unintended consequences that are inherent if technology is not well deployed and managed (Ohaka, 2015). Ohaka & Akpomi, (2018); Salehi & Salehi, (2012) reiterate that these limitations can be generally classified into intrinsic and extrinsic challenges at teacher-level and school-level.

The above authors also argue that these challenges, include, however they are not limited to, availability of the necessary infrastructure, in other words, the appropriate number of computer appliances and software; adequate ICT literacy and skills; effective professional development for teachers; the confidence to use the technology well; sufficient time for effective training in solving technical problems; and access to resources for the students. Other important factors influencing pedagogy with TEL include teachers' attitudes towards technology; and beliefs and practices that promote



innovative pedagogy. In view of the above review, Messmer (2013) argues that the use of technologies and its implementation in the regular education classroom appears to be limited (Messmer, 2013). In a study conducted on special educational needs teachers, the findings revealed that some teachers lack adequate knowledge and skills in using assistive technology (Alkahtani, 2013). It is worth noting that available technology is often poorly integrated and underused in classroom practice (Hennessy et al., 2005). Hennessy et al., (2005) argue that teachers may become committed to integrating technology to pedagogy because there is an acceptance of using technology in their pedagogical practice. Nonetheless, increasing investment in technology infrastructures has not always been matched by an investment of time and resources to improve ways of teaching and learning. It is argued that teachers' knowledge has not always been nurtured in applying technology to pedagogy effectively in promoting inclusive practice. Moreover, to initiate pedagogical change and transformation, it is necessary to understand how technology is perceived and used by teachers (Hennessy, 2005).

During a study carried out in Quebec, on teachers' perceptions and practices with respect to computer technology implementation, it was established that teachers' use of digital technologies such as computers was inclined to be lacking creativity (Wozney et al., 2006). The study further indicated that teachers mostly integrate technological resources in practical as opposed to creative ways. Wozney et al.(2006) agree that technology in pedagogy is not always used as effectively as it could be. In a different argument, Umeano and Ifi (2019) highlight that a variety of variables such as personal and contextual factors affect teachers' use of technology. It becomes crucial therefore that staff developers take these factors into consideration as they are designing teacher training programmes (Zango 2019).

In other research reported by Condie et al. (2007), it is argued that ICT use in schools especially prior to the year 2000, was mostly used to support 'drill' or 'practice' activities in previously taught skills or concepts, and viewed as a treat or reward when work was satisfactorily completed. According to Condie et al. (2007), learning experiences have changed and teachers' confidence and skill levels have considerably improved in recent years. Eteokleous (2008) argues that computers and ICTs are generally not extensively used in the classrooms of Cypriot primary schools.

Although the research findings portray that teachers are using computers for their individual purposes, technology use in classroom practice is irregular. ICT and its associated pedagogy is being used in a sporadic fashion. Okebukola (2007), cited in Aduwa-Ogiegbaen and Iyamu (2008), argues that technology application is not part of classroom technology in more than 90 percent of Nigerian public schools. It still appears to be the case that in Nigeria the appropriate and effective use of technology is yet to be fully implemented. Recent studies by Amad (2015); Adebisi (2015); Nwagboke and Singh (2015), have all acknowledged poor application of technology use in Nigeria educational sector. This suggests that the chalkboard and textbook and in recent times the wipe board and marker continue to dominate classroom activities in most Nigerian schools. Damkor Matthew, et al. (2015) also argue that little or no ICT facilities are present in many Nigerian schools and this unavailability of ICT in schools inevitably restricts teachers' use of ICTs (Okwudishu 2005). In further research, it is claimed that ICT is yet to attain the required and necessary impact on pedagogical practice generally and practically in the Nigerian educational sector (Damkor Matthew, et al. 2015).

### **2.2.6 Application of Technology and Inclusive Pedagogy**

The application of appropriate DT within the mainstream educational context holds the potential to improve the entire academic environment, however, constructing an effective learning environment using technology is a challenge, and a hurdle (Wepner, Tao, & Ziomek, 2006; Gorder, 2008). Cuban (2011) argues that applying digital technology in contemporary practice is not only challenging and complex, however also 'messy' due to the interplay of complex variables. It is necessary for the teachers to convey the ability to understand how and why to use technology in meaningful ways if we are to achieve inclusive pedagogy (Wepner, Tao, & Ziomek, 2006). In a further argument, despite the hurdles of using digital technologies in pedagogy, the necessity of using digital technologies in teaching and learning should not be misconstrued (Skolverket, 2016a). It is argued that it is the responsibility of the schools to ensure that all children demonstrate an ability to use modern technology as a tool in the search of knowledge, communication, learning, and creativity. Moreover, the effective and appropriate use of technology in pedagogy holds the potential to support learning in a better way, and in a more efficient and creative manner (European Commission's Digital Agenda for Europe, 7, 2015).

From the literature on technology, it is argued that the incorporation of ICT into teaching and learning requires educators to be committed and in possession of the technological skills to enhance its appropriateness and effectiveness (Almadhour 2010). It is necessary to select and apply the right technological tools in order to enable creative and innovative pedagogy in line with emerging research. Almadhour (2010) argues that teachers appreciate the need for professional development in this area, however frequently there are challenges in finding the time to achieve this skills development. This argument is revealed by Plumb and Kautz (2015) who report that educators require the necessary time if they are to learn to use new technologies. Fenty and McKendry Anderson (2014); Ihmeideh (2009, 2010); Li (2006) and Wood et al. (2008) also argue that an absence of 'adequate time' can become a barrier to technology integration for teachers. Wood et al. (2008) emphasise that the daily schedule of an educator is 'busy' and finding time to prepare for and integrate ICT into this daily schedule is a 'difficult task'. An overloaded curriculum is also reported as a further reason why educators may lack the time to integrate technology within classroom practice (Li, 2006).

A primary goal of a school's technology integration is to ensure that there is the provision of a universal learning environment with effective and appropriate support for teaching and learning (Almekhlafi and Almeqdadi 2010). It is, therefore, crucial to select the right technology tools to meet the needs of children with special educational needs in order to facilitate their academic achievement and meet their learning needs (Adebisi et al., 2015). It is argued that the provision of instructional guides for classroom teachers can help in enhancing the application of assistive technology tools in supporting children with learning disabilities within and outside the school setting (Adebisi et al., 2015). ICT holds the potential to provide quality pedagogical processes that increase learners' creative and intellectual skills (Adebisi et al. 2015). In keeping with the fundamental ingredients of inclusive pedagogy, it is argued that there is a need for the teaching team to identify, introduce, and effectively integrate suitable compensatory or assistive technology devices in order to enhance an individual student's learning goals (Loreman, 2017 and Adebisi et al. 2015). However, without effective pedagogy, it is more challenging to have an operative method of education,

and without purposeful and effective inclusive pedagogy, the basis of meaningful inclusion is in jeopardy.

### **2.2.7 Effective Use of Technological Tools in The Inclusive Classroom**

The use of technologies in the classroom demands teachers to be knowledgeable and competent to enhance their effective and appropriate use. It is not just the integration of these technologies into pedagogical practice, but also the alignment of their use with student learning goals that engage learners in the pursuit of enhanced learning and academic progress (Ogiegbean 2009, and Kim et al., 2013). This means that technology should be used as part of a creative approach that enhances the existing broader pedagogy if technology application to teaching and learning is to be successful (Ingleby, 2016). If educators are yet to efficiently integrate technologies in supporting students with SEN, this is possibly because there is ambiguity over the application of technology in content areas and instructional delivery (Williamson-Henriques 2013; Levin & Wadmany 2008). As the availability of new technology becomes less problematic and discussion of its role in pedagogy continues to become part of mainstream global discourse in education, Gorder (2008) and Beckett et al. (2003) argue that debates on technology integration in both mainstream and special education are no longer about availability yet more about teachers' effective use of technology.

Accordingly, educators may have a perception that suggests AT, Information and Communication Technology, and web educational packages designed for general instruction ought to be collectively understood as AT. However, many educational practitioners may not use technology in their teaching if they do not have a positive attitude towards the use of such technological tools (Nwagboke & Singh 2015). This suggests that even the possession of basic ICT skills does not mean that staff will be automatically prepared towards applying technology effectively in teaching (Onwuagboke & Singh, 2015). Therefore, as a result of the inadequate knowledge of teachers about how to integrate technology, its general application and its availability has resulted in DT not being fully adopted and utilised to benefit a variety of students in general. This can result in denying the learners equality of opportunities in developing their learning potential.

The evidence from the research on technology and pedagogy reveals some of the challenges that confront practitioners in meeting the needs of learners with learning disabilities. It is argued that it is vital to select the right technology and evaluate its efficiency and effectiveness (Adebisi et al., 2015; Liman et al. 2015). Adebisi et al, (2015), Liman et al. (2015), Gronlund et al. (2010); Singal (2008); Chitiyo (2007); and Ellsworth and Zhang (2007) argue that the ineffective and inefficient use of technologies has been identified as one of the major obstacles that hinder inclusive education, particularly in Nigeria and other African countries. Many teachers in developing countries are still nervous about the integration of ICT in schools due to the inadequate training they experience (Oralbekova, 2016) and in consequence, the integration of technology in delivering classroom instruction may be 'difficult and demanding' in many schools in developing countries (Cifuentes, Maxwell, & Bulu, 2011; Joshi, Pan, Murakami, & Narayanan, 2010; and Wachira & Keengwe, 2011).

Technology integration goes beyond the mere use of any particular technology (Cuban 2011). The evidence of the research of Cuban (2001) in California reveals that the majority of teachers' employ technology to sustain existing patterns of teaching rather than to innovate. A recent study also reveals that technology ought to be used in ways that enhance the wider pedagogy that is occurring, if teaching and learning with technology is to become effective (Ingleby 2016). There ought to be a purpose for applying technology to pedagogy in order to achieve deep learning (Yelland Kilderry 2010). Cuban's (2001) research is developed by Blin & Munro (2008); Eynon (2008); and Roberts (2003). It is argued that the application of technology to pedagogy may simply replicate or supplement traditional pedagogical practices as opposed to transforming learning. Correspondingly, technologies may be used for administrative purposes and tasks instead of supporting tools for pedagogical practice (Skolverket 2013b; Skolverket, 2016a).

### **2.2.8 Teacher Perceptions On Technology Application to Pedagogy**

The role of educational practitioners in upholding the tenets of inclusive classroom practice is discussed by de Anna et al. (2015) and in delivering the goals of inclusive education, schools require suitable and effective educational strategies in their pedagogical processes (Mokelle, 2014). I have argued that technology application has the potential to enhance the performance of the educators as they work with their

students and this is supported by published research in this area (Ertmer & Ottenbreit-Leftwich, 2010). With regards to technology integration, it is imperative to reflect on the practitioner's understanding of how technologies and specific learning disabilities influence the learners' performance in education (Damore & Murray, 2009). The presence of digital technology has the potential to empower the teachers as they work with learners with complex needs (Cook et al. 2002). Inclusion is beyond just integrating learners with special educational needs in mainstream educational settings as inclusive education involves the restructure and redesign of the educational curriculum (Damore and Murray, 2009; Della, 2016).

Considering the growing pressure on applying technology to pedagogical practice, teachers may be compelled to resort to ill-thought action plans that result in the introduction of technology rather than the integration of technology into the schools' teaching and learning process (Michaelides, 2011). Under these circumstances, technology can become an 'end' to pedagogy as opposed to being a 'means' (Plomp et al. 2007; Semenov 2005; Wiske et al. 2005). Michaelides (2011) argues that teachers' perceptions on the use of ICT for pedagogy are complex and that ICT may be viewed as being useful for tasks that are not related to pedagogy. This links to the finding that ICT in schools is often used for administrative purposes and tasks rather than being a supporting tool for pedagogical practice (Thullberg & Millstam, 2010; Skolinspektionen, 2012; Skolverket, 2013b; Skolverket, 2016a). Generally, there appears to be inconsistency in the application of technology to pedagogy (Michaelides 2011). In the work of Michaelides (2011), the practitioners expressed uncertainty on how to integrate ICT in their practice and it is revealed that there are a number of factors and related challenges surrounding the application of ICT in schools. Among these factors are the lack of time and the absence of infrastructures that develops technical support (Michaelides, 2011).

Furthermore, teachers' personal and affective characteristics are also contributory factors that influence the application of technology to pedagogy (Almekhlafi and Almeqdad, 2010). This suggests that the practitioners' beliefs about pedagogy influence technology utilisation within schools (Almekhlafi & Almeqdad 2010). It is also argued that teachers possess complex views on their abilities and competencies to integrate technology successfully in their classroom practice (Almekhlafi and Almeqdad 2010). This research links to work that has been done in New Zealand in

exploring secondary school technology teachers' perspectives on integrating ICT in a technology classroom. The study identifies that New Zealand secondary school technology teachers apply various ICT tools in differing ways, and this occurs as a result of the practitioners' perspectives on ICT and their professional experiences of using ICT in teaching and learning (Almadhour 2010). To employ ICT effectively in pedagogy, teachers ought to be trained on how to use particular educational technologies. There is also a need to critically assess teachers' pedagogical approaches to maximise the use of ICT in their learning spaces (Okoli & Wagbara, 2016; Akasi & Nwabufo, 2016). The teachers' ability to know how, when, and under what circumstances they are to apply technology appropriately in their pedagogy makes technology much more valuable (Wordu et al. 2021).

Pedagogy comprises particular knowledge and skills as well as effective overall teaching practices (Wordu et al. 2021). Teachers' 'own pedagogical beliefs' (personal preferences) and 'values' are important elements that shape their use of technology in their learning spaces. The use of ICT in education is influenced by complex variables. It is argued that digital technologies are able to transform education at all levels as long as thought is given to pedagogical techniques and professional development in this area, to promote a type of pedagogy that meets the needs of all learners (Mwangi, 2014). In view of my own pedagogical experiences, I consider that if teachers are to achieve an effective application of ICT in pedagogy, there is a need to reflect on 'better ways' of teaching in order to develop a richer and effective inclusive pedagogy that sustains inclusive educational best practice. This leads on to the next theme of the literature, which is a critical review of the development of SEN and the subthemes that are associated with the professional practice of using technology to enable this form of pedagogy.

### **2.3 The Development of Special Educational Needs (SEN)**

Special Educational Needs is a classification that refers to children who have learning difficulties that can make learning more challenging than for the majority of similar children of the same age (European Agency, 2010; Dupoux et al. 2006). SEN is also understood to be children with disabilities who are unable to learn because of challenges that result in the children deviating from the norm (Oladejo and Oladejo 2011). Osakwe (2010), refers to special education as that type of education with

specially designed instructions to meet the unique needs of people with disabilities. Disabilities manifest themselves in many different forms and severities. To help in discerning who requires technology assisted learning, teachers need to understand the specific difficulties of the learners and the breadth of technologies that are available to support core functioning (Edyburn, 2020). Schools have a special responsibility and a vital role to play in this regard (Hammond and Ingalls 2003; DFE 2015). SEN practice demands and requires that teaching should be tailored to individual circumstances and needs. And SEN practice emphasises that account should be taken by practitioners of the varying circumstances and needs of particular learners (Skolverket, 2011a; Skolverket, 2011b; Hammond & Ingalls 2003). If a student is in need of special support, the learner deserves to be provided with this support as deemed appropriate (Wiles and Bondi, 2011). These children are entitled to special educational provision. This consideration makes Assistive Technology a vital element and tool for inclusive pedagogy in meeting the needs of all learners.

It can be argued that individuals with special educational needs appear to lack equal access to public and basic resources and that this ranges from the right to education, the right to employment, and to the right to opportunities for social integration. These groups of people are often trapped in vicious circles of segregation so that they experience negative attitudes from society, and very often poor health care systems and above all inadequate legal support systems. This can mean that equal opportunities for good education are little other than a fantasy, especially in developing countries like Nigeria. Accordingly, education has featured as one of the top priority areas in the sustainable development goals of UNESCO. It is and has been the objective of UNESCO, (the United Nations' Specialised Agency for Education) to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Therefore, it is argued that education has a vital role to play with 21<sup>st</sup> century challenges and aspirations (alongside fostering 'peaceful living together'; 'the right types of values and skills'; and 'sustainable and inclusive development'). Perhaps, education ought to contribute to a new vision of sustainable global development (SGD) (UNESCO, 2015)? I argue that supporting 21<sup>st</sup> century skill development necessitates changes in teaching practices to encourage contemporary learning outcomes and to enhance the effective inclusion of learners with learning disabilities.



Technology integration has been viewed as a catalyst for supporting the shifting pedagogies that are necessary to enhance the expected change, as well as maintaining deep learning. This literature review explores the perceptions that exist in educational practitioners towards the inclusion of students with special educational needs. The chapter also examines the current practice occurring in the application of new technologies to pedagogy within the academic literature. It is argued that the educators' perceptions of technology may influence their behaviour towards their students (Hammond & Ingalls, 2003). This section of the literature review presents related literature on SEN from a global perspective and from the Nigerian context in particular in order to provide a balanced view of the existing literature. The chapter content identifies areas of convergence and divergence in SEN practice in order to provide an informed argument about SEN practice in Nigeria.

### **2.3.1 Technology Integration as a Process of Change in Inclusive Pedagogy**

It has been emphasised that technology in recent times has the potential to provide access to information, the ability to communicate, and opportunities to collaborate thereby maintaining universal learning opportunities (Swallow, 2017). As a result, preparing students to become active and effective contributors in this knowledge-based, connected world demands a fundamental change in pedagogical practices (Fullan & Langworthy, 2014). Teachers' perceptions and involvement are pivotal to the success of inclusive practice, as their roles are critical to the process of including students with disabilities in regular classroom settings (Adebisi et al. 2014).

Recent policies have encouraged the inclusion of pupils with additional needs in mainstream education both in the UK and in other parts of the world and this is linked to legislation that is designed to support the educational needs of all children and people with disabilities (Pirrie et al. 2006; Lindsay 2007; Mittler 2000; and Adebisi et al. 2014). The objective of Special Educational Needs and Disability (SEND) is to ensure that the needs of children and young people with Special Educational Needs (SEN) are addressed, evaluated and met. The SEND system aims to make sure that children and young people with special educational needs (SEN) are identified, assessed and supported (Kristensen et al., 2006). Reforms to this system started in the United Kingdom in 2014 when the new Children and Families Act 2014 was passed

(Gov.Uk, 2014). This Act has changed the ways in which the needs of children and young people with SEN are addressed, evaluated, and met. The document also states that teachers are responsible and accountable for the progress and development of children in their classroom. This was earlier proposed in the 2011 Support and Aspiration Green Paper. On the basis of the Lamb Inquiry 2009 (Lamb, Frod and Orton, 2012) and The Green Paper (2011) as well as the OFSTED findings (2010), the aim and objectives are to establish a comprehensive system which applies resources in order to develop special educational needs. The basic purpose is determining and paving ways on how to share knowledge and spread the most successful practice of the systems that function well. According to The British Dyslexia Association (ND), at present, it is established by the law that children or young people are considered to have a learning problem, such as dyslexia, if they have:

- *‘A significantly greater difficulty in learning than the majority of others of the same age’*, (as per The Children and Families Act 2014)’.
- *‘Support for learning difficulties may be required when children and young people learn at a slower pace than their peers, even with appropriate variation’* (SEND Code of Practice 2015; British Dyslexia Association ND)’.
- *‘Specific learning difficulties (SpLD), affect one or more specific aspects of learning. This encompasses a range of conditions such as dyslexia, dyscalculia and dyspraxia’*, (SEND Code of Practice, 2015; Cowen, 2010)’.

### **2.3.2 Practice in Special Educational Needs and Disability (SEND) Provision and Children’s Outcomes**

According to Goodley and Runswick-Cole (2011), the concepts of SEN and an individual deficit model still appear to dictate policy and practice, regardless of the attempts that have been made to improve diversity within educational practice. The Equality Act 2010 sets out the legal obligations that schools, early years providers, post-16 institutions, local authorities and others have towards disabled children and young people. It has been found that issues are frequently raised by teachers regarding identifying an individual’s needs. This often comes as evidence of the application of a medical model approach to disability by teachers. Moreover, many documents presented by the UK government, such as the SEN Code of Practice

(Riddell et al., 2010; Goodley and Runswick-Cole 2011) tend to conflate disability with 'learning difficulties' like dyslexia and use SEN as a comprehensive term to encompass virtually all the needs of a child irrespective of their physical, educational and emotional well-being.

Dyslexia, usually called 'reading disorder', is characterised by difficulties with reading regardless of 'normal' intelligence (Reid, 2009). A child with dyslexia is prone to learning difficulties that make it more problematic for the child to learn than other non-dyslexic children. There are many children who have SEN of some kind throughout their education. Rix et al. (2013) suggest that educational practitioners need to be aware of their core responsibility for all the children that they teach, including those with special educational needs and disability. This recommendation by Rix et al. (2013) is echoed by the DFE (2015) paper that states that teachers are responsible and accountable for the advancement and progress of learners in their class. In this respect, the perceptions and ability of the teacher to identify the support needs of the learner, and apply technology to meet the needs of all learners is a milestone in enabling education for all (EFA). Nonetheless, with the early identification of needs and the application of good levels of support by practitioners, most children will overcome the obstacles that their disabilities present (Reid, 2009, Adebisi et al. 2014). There are only a few children who will need additional support for some or all of their time in school, however in a country like Nigeria that has a much inferior infrastructure to the UK, the implications are highly significant, as many more children require support and assistance.

It is argued that children progress at diverse rates and learn well if their differentiated needs are taken into consideration (Woodfine, Nunes and Wright 2008). This approach to pedagogy needs to take into consideration, aligning the methods of assessment with the teaching and learning outcomes. In this regard, it can be argued that where technology is required in either the teaching or assessment of learners, the technology use requires alignment to the learning objectives, hence the call for the grounding of technology use within pedagogy (Kirkwood and Price 2014). Furthermore, it is argued that such approaches to pedagogy ought to be considered alongside the principal objectives of the learning that is taking place (Westwood 2011). To deliver the curriculum in this way, it is important to first explicitly state the learning outcomes. Clear statements associated with learning outcomes and the approach of

Westwood (2011) are vitally important if compliance with SENDA is to be met since the legislation draws attention to the processes of teaching.

The term Special Educational Needs (SEN) and Inclusion is internationally recognised, with the underlying practices and meanings varying from region to region (Loreman, 2017; European Agency, 2010; Oluremi, 2014). It is also argued that although some educational practice may appear to have embraced inclusion, in reality there is no overwhelming sense of transformative practice (Loreman, 2017). Globally, the concept of Inclusive Education (IE) is reflected in many educational policies of various countries and significant resources have been invested into making schools more inclusive (Belo, 2014; Deppeler, Loreman, and Smith 2015). From the international perspective and practice, inclusion is perceived as a reform that supports and welcomes diversity amongst all learners (UNESCO, 2001 cited in Adetoro 2014). In this regard, inclusion proffers that the needs of all students should be met within the mainstream schools (Reid 2013). Inclusive Education entails transforming educational structures in ways that accommodate the needs of children with special needs (Kochoung, 2010). This goes beyond a mere placement of learners with disabilities into an existing system, and is more akin to making reasonable adjustments to the system in order to incorporate the diverse needs of children with SEN. Accordingly, inclusive education necessitates keeping special needs students in general education classrooms as well as providing all of the necessary support services required (Wiles and Bondi, 2011).

Disability is assumed to be dependent on the cultural values and beliefs of the societal context; in other words, a problem is likely to emerge if no value at all is given to certain learning disabilities, or if there is a misconception of what special education is (Oladejo and Oladejo, 2011; Hammond et al 2011). The way a society construes or understands the term learning difficulties/disabilities reflects the status assigned to it, as well as shaping the type of provision maintained (Ajoku-Christopher 2012). In other words, if status is not assigned to a learning difficulty in a particular context, it ultimately lacks credence in that context (Wilson 2002). It is evidenced in the literature that cultural perceptions of disability play a vital role in the lack of support and awareness that is evident with certain Learning Disabilities (LD) like dyslexia awareness in Nigeria (Agu, 2013; Oladejo and Oladejo, 2011). This, therefore, reveals that the perception of the

society as well as that of the teacher and the knowledge of appropriate technology to support the specific disability/needs of a learner is indisputably vital for inclusive classroom practice that meets the needs of all learners.

Special education still appears to remain a grey area in the Nigerian educational context especially in the area of Specific Learning Difficulties (SpLD), for example the awareness and recognition of Dyslexia and other related SpLD difficulties (Ajoku-Christopher 2012). According to the British Dyslexia Association (ND), Specific Learning Difficulties have been described as difficulties that affect the way that information is perceived and processed by learners. This is often recognised as a form of neurodevelopmental syndrome and often runs in families (Deponio 2005; SEND Code of Practice, 2014; International Dyslexia Association, 2002). Thus, SpLD is an umbrella term that is used to refer to a range of frequently co-occurring difficulties such as; Dyslexia, Dyspraxia / DCD, Dyscalculia, A.D.D / A.D.H.D (International Dyslexia Association, 2002).

The SpLD awareness in the Nigerian educational system is still at a relatively low level (Delibe, 2017; Agu, 2013; Ajoku-Christopher 2012). As a result of poor awareness, some teachers in the Nigerian schools are still unprepared in terms of identifying non-physical learning disabilities (Eskay et al. 2014). It is argued that policy relating to Specific Learning Difficulty (SpLD) or dyslexia support in the Nigerian schools is far from robust (Ajoku-Christopher 2012; Lang &Upah, 2008). This has been attributed to a lack of government commitment and involvement on issues of SEN. Currently, students with special educational needs are yet to be fully integrated into regular classroom settings with adequate support (Oluremi, 2015). In consequence, it is argued that the needs of children with SEN will not be actualised and as a result, those learners who struggle with learning disabilities may continue to be disadvantaged or worse still, segregated and stigmatised by an educational system that does not fully include them or take into account their learning needs (Eskay et al. 2012). Therefore, this situation calls for the attention of the authorities involved. Until this happens, inclusion in this respect is unlikely to happen within Nigerian schools (Agu, 2013; Eskay et al. 2012). The contemporary situation in Nigeria prompts questions as to how inclusive the present practice of inclusion using assistive technology is within the Nigerian schools. However, one vital question in this regard that deserves deep

reflection, if SpLD is not recognised in the educational system, is to consider how effective and appropriate is the use of learning technologies in meeting the needs of these children with SEN?

### **2.3.3 Special Education Provision in Nigeria**

Nigeria, like many other countries around the world, has over the years sought to improve its education system by introducing reforms and initiating policies and plans based on the education needs of the country, hence the development of Universal Basic Education (UBE). The ideology of UBE is to give a solid foundation for life-long learning through the inculcation of appropriate teaching and learning approaches, self-awareness, citizenship and life skills (FGN 2003). In this regard, it can be established that beyond increasing access to education, ensuring quality of education is also a vital goal of the UBE programme in the Nigeria education system. This conforms with the Dakar Framework for Action (UNESCO, 2000). However, Education for all (EFA) emphasises that quality is at the heart of education, and this is a fundamental determinant of enrolment, retention, and academic achievement.

Information and Communication Technology (ICT) in education has been continuously linked to higher efficiency, higher productivity, and higher educational outcomes, including the quality of cognitive, creative and innovative thinking (Kirkwood Price, 2014). Nigeria launched its Universal Basic Education programme in 1999 and developed a series of subsequent ICT policies from 2001 (Adeosun, 2010). One of the objectives of these policies has been to focus on integrating ICT into the mainstream of education and training, including 'basic' or 'initial education'. Accordingly, a major rationale for the policies is that they become the catalysts for educational change (Olaore 2014). The Federal Republic of Nigeria's National Policy on Education also records that Nigeria will apply certain strategies for achieving each of the EFA goals (NPE 2013). This policy acknowledges that the use of Information and Communication Technologies (ICT) such as; computer-based systems should be aimed at enhancing and improving access to learning (Nigeria EFA Review Report, 2000-2014). This initiative has been evolving and it has gained immense support and funding through a number of private and donor-funded initiatives. Although there is the need to ensure effective and sustained use of ICT in mainstream formal education (Belo, 2014; Olaore, 2014), the initiative is still at a level of 'infancy' in terms of implementation.

Undoubtedly, some countries have made considerable progress in integrating networked ICT into education and made it possible for education practitioners and learners to utilise ICT within their pedagogical practice. On the contrary, Nigeria appears to know little about the impact and effectiveness of ICT in education (Oladejo, 2011). In this respect, this study is more interested in exploring the current application of technology to pedagogical practice in the Nigerian schools, and therefore, to understand, identify and establish how practitioners perceive their pedagogy with technology, and how effective technologies are being used to promote inclusive practice.

In theory, the Nigerian government appears to have good intentions for the educational sector and to have initiated promising educational policies, but it is generally believed that the educational system has 'failed' to achieve these intended objectives as a result of an inability to enforce these policies (Domike and Odey 2014). This lack of implementation has also resulted in a dearth of positive changes in the area of special educational needs in Nigeria. Special education programmes have been established in a number of countries in the world, however, their implementation has been referred to as being akin to 'a Herculean task' (Cifuentes, Maxwell, & Bulu, 2011; Wachira & Keengwe, 2011). Although in recent times, special education programmes appear to have made some progress in Nigeria (Eskay et al., 2012, NPE, 2013), this progress does not exempt the Nigerian educational system from the general implementation drawbacks that have characterised the educational policies of developing countries. Thus, the entire system is fraught with a myriad of challenging factors ranging from inadequate infrastructure, poor planning, teachers' perceptions of pedagogy and the poor utilisation of technologies like assistive technologies in supporting children with learning disabilities (Adebisi, 2015 ; Ahmad, 2015; Domike and Odey, 2014; Akanbi & Akanbi, 2012; Yusuf, 2012, Ajoku-Christopher, 2012).

Nigeria had an estimated population of about 187,000,000 in 2017 according to the United Nations data (UNdata 2017). Oladejo (2011) argues that children and young people with disabilities number in the region of about 2.4 million students in Nigerian schools. In relation to this, the World Health Organisation (WHO) estimated that approximately 19 million Nigerians are disabled. However, this is regarded as an

imprecise estimate since there is an absence of completely reliable statistical data about numbers of disabled people within Nigeria (Lang and Upah 2008). Therefore, without accurate and reliable data on the number of disabled people in Nigeria, it is problematic for the Nigerian Government to effectively plan and implement any form of service provision for disabled people (Oladejo and Oladejo, 2011). Additionally, in the absence of reliable data, it is also impossible to hold the respective Nigerian areas to accountability for the services that they claim to provide for the education of children with disabilities. This suggests that the democratic obligations of states and local government are significantly compromised (Lang & Upah 2008).

Certainly, the government of Nigeria seems to be lacking the necessary legal mandate that can respond to the objectives of the Nigerian policy on Education NPE (2004; 2008; 2013) regarding people with exceptional educational needs (learning disabilities). This absence of a legal mandate often results in civil rights violations and lack of adequate advancement in the area of special needs in Nigeria (Osokoya, 2012). In addition, it is daunting for the Federal, State and Local governments to adequately provide and fund special education programmes. Indeed, the availability of funds would sustain the provision of helpful support like in-service training for educational practitioners and establishing conducive classroom infrastructures including buildings that are at least able to accommodate learners with SEN (Eskay, 2012; Oladejo, 2011; Domike and Odey, 2014; Olaore 2014). Ajuwon (2008) argues that the absence of legal obligations to enforce special education programmes perpetuates negative societal perceptions of these learners. Against this backdrop, it is 'problematic' to foresee how a rights based approach to disability that effectively facilitates and promotes the social inclusion of disabled people in Nigeria can be achieved. It can be argued that the status quo of special education programmes in Nigeria may be viewed as one step forward and two steps backwards. Although special education has made some progress in many developed countries like the United Kingdom and the United States of America, conversely, special education programmes have recorded little recognition in many parts of Nigeria, particularly in the urban areas like Lagos (Abang, 1995 cited in Eskay 2012).

It is accepted in general that different cultural beliefs, ethnic diversity, and divisive politics influence the unequal representation and treatment of learners with disabilities



in Nigeria (John, 2015; Obiakor, 1998; Bennet 2006). Many Nigerians appear to have little or no enthusiasm in educating children with disabilities and this has resulted in division among policy-makers in the Nigerian educational system (Muuya, 2002). It is argued that the political and cultural issues that mitigate against transforming special education have culminated in the stagnancy and stigmatisation of special education in Nigeria (Eskay, 2012).

As argued previously, although special education provision in Nigeria has developed, a legal mandate for it is lacking so this form of education could be termed 'work in progress' (Olufunke and Oluremi, 2014). It can be argued that there is no efficient and functional law or code of practice guiding the education of children with SEN in Nigeria compared to the global standard of practice that exists in countries like the United Kingdom (with the presence of SEND codes of practice, and legislation like The 2014 Children and Families Act). The only substantial special education mandate in Nigeria comes from the NPE (National Policy on Education) 2004. It is unfortunate that despite the attempts that have been made to reform educational policies, the educational needs of individuals with disabilities are not being met (Adebisi, 2014; Eskay, 2013). Nevertheless, it is expected that Nigeria will join other progressive initiatives from other nations to advocate for and advance the rights of learners with disabilities and enhance the integration of learners with SEN in mainstream education (Eskay, 2001; Mukuria & Obiakor, 2004).

To join other progressive countries in recognizing, protecting, and maintaining the rights of learners with SEN, it is imperative that Nigeria begins to shift its pedagogical practice to meet the 21st century global expectations, by putting away the old tradition of teaching approaches, together with their negative perceptions on learners with disabilities. Consequently, a shift in approaches such as integrating new technologies like 'ATs' (Assistive Technologies) and effective use of 'TAs' (Teaching Assistants), is necessary. It is pertinent that the Nigerian government reviews its current pedagogical practice and integrates modern technologies to pedagogical practice. However, the mere integration of technologies to classroom practice may not be sufficient in addressing and meeting the needs of SEN learners (Kim et al. 2013). It is argued by Loreman (2017) and Ingleby (2016) that technologies ought to be applied purposively and in a creative way if we are to promote effective and inclusive pedagogy. The

effective inclusion of the learners into mainstream education is beneficial because this enables the learners to maximize their potential (Eskay, 2001; Mukuria & Obiakor, 2004; Obiakor, 2004).

Furthermore, how to educate children with SEN is considered to be one of the most interesting issues in education today (Abua, 2016). How practitioners conceptualise and perceive their pedagogical practices using new technology with learners who have SEN needs is a fascinating area of study. This research seeks to understand the extent to which the technologies are being utilised within pedagogy alongside considering the extent to which children with SEN are being integrated and supported in mainstream schools. The research also aims to make new contributions to knowledge by promoting the relevance of applying technology in pedagogy in promoting inclusive and equitable quality education and lifelong learning opportunities for all.

#### **2.3.4 Technology Use and Inclusion**

The Salamanca Framework for Action (1994) states that the fundamental principle of inclusive education calls for all children to learn together, wherever possible despite any potential difficulties or differences that confront the learners. It is argued that the essence of inclusive pedagogy is to ensure the equal participation of all learners irrespective of their diverse abilities (Loreman, 2017; Oluremi, 2015). This notion has been acknowledged by the literature, as Inclusive Education (IE) is portrayed as educating all learners including those with special needs in mainstream schools, and ensuring that appropriate support services are provided (Bondi 2011; Reid 2013). However, inclusive schools need to identify and respond to the diverse needs of their learners. This involves ensuring quality education for all through which appropriate curricula, organizational arrangements, teaching strategies, resource use, and partnerships with their communities are ensured (UNESCO, 1994).

Inclusive education ought to be viewed as a system that assimilates the needs of diverse learners and adapts itself to meet these needs, thereby ensuring that all stakeholders in the system conform to diversity, and see this as a challenge rather than a problem (Oluremi, 2015). Oluremi (2015) argues that the goal of inclusive education is to introduce measures that will benefit the learner significantly in the learning environment. It can be argued that the nature of students with special

educational needs precludes access to learning conditions, and it is therefore imperative to design alternative strategies for assisting students with special educational needs in their learning environments. One such strategy that exists is to apply technology within inclusive pedagogy and this teaching strategy aims to aid inclusion and modify the learners' experiences (Mokelle, 2014; Nkwoagba, 2011; Loreman, 2017). In this study, inclusive pedagogy is understood as being the means whereby the totality of pedagogy promotes the learners' engagement with the learning process. In consequence, teaching inclusively is central to this approach. Similarly, inclusion entails an educational arrangement that brings both students with special educational needs and regular students together under one learning environment (Oluremi, 2015; Loreman, 2017). This view is consistent with the views of other academics who have written about this area (Wiles & Bondi 2011; Reid 2013) and reveals that inclusive education entails educating all learners including those with special needs in a mainstream school, and giving them the appropriate support services needed rather than integrating them together without support.

Accordingly, it is argued that inclusive pedagogy requires the judicious utilisation of technology. This suggests that without purposeful and effective inclusive pedagogy, achieving meaningful inclusion will be questionable (Loreman, 2017). I argue that ICT may be integrated as a learning instrument in order to try to include students with special needs, however, if we are to achieve this, teaching should be adapted to students' needs and pedagogy ought to be aligned with technology (Kirkwood, and Price 2013). Though the perception of what inclusion is differs according to context, inclusive pedagogy may be seen in didactic terms and this perception may lead to social and physical exclusion (Josjo, 2012). Josjo (2012) argues that the teaching that takes place in 'regular' classrooms is infrequently adapted to all the needs of all the students. In order to make the use of ICT more inclusive, teachers need knowledge, awareness, equipment and time to ensure the realisation of these goals of inclusion (Josjo 2012; Michealide 2011; Oluremi, 2015). Although, this goal is yet to be achieved irrespective of the renewed campaign for inclusive education, there are indications that students with disabilities are found to be trapped in a vicious cycle of segregation and discrimination during their educational trajectory (Ahmad 2015). Perhaps, children with SEN are not well integrated in mainstream schools in Nigeria (Oluremi, 2015)? Although, inclusive education has remained a constantly evolving process of change

that makes education learner-friendly and welcoming to all learners, ICT has not always been considered as a key means for promoting inclusive practice (Della, 2016a).

Inclusive education is however, fundamental to the building of an inclusive socio-economic and political society. Consequently, as the world transits from the millennium goals to sustainable development goals post-2015 (Sachs 2012), it is essential that countries like Nigeria intensify practical efforts towards the development and realisation of quality inclusive education (Uchem and Asogwa 2014). There is no doubt that the ICT technologies generally wield a positive impact on the realisation of inclusive practice and on the academic achievement of children and young people. Technology is viewed as a tool that successfully supports the academic success of students with learning disabilities and this also helps the students to attain certain competencies, hence facilitate active engagement in the classroom (Rabah, 2015).

The constantly evolving area of ICT in education, especially using the internet, has necessitated a review of the strategies that exist in integrating ICT with classroom learning (Saverinus 2008). According to Owen (2014), the challenge for teachers facing 21st century learners is ever more daunting as these learners can be more disengaged and non-receptive than previous learners within traditional classroom settings. The argument runs that classroom learning is no longer about 'pens and paper' as students expect to be 'plugged in' to ICT and study in an engaging, collaborative manner. Learners have shown a growing desire for easy access to ICT devices such as iPods, notebooks, palmtops, laptops, and the Internet, among other facilitating gadgets. Consequently, evidence from research on technology usage in Nigerian schools has identified that the majority of Nigerian teachers are not well equipped to provide technology-supported learning opportunities for their students (Kalu and Ekwueme 2007; Yusuf 2005; Ololube 2006). It is, therefore, questionable that Nigerian schools are adequately enabled or equipped to match this required standard for 21st century learning environment. Certainly, it can be inferred that there is a poor state of technology utilisation in schools in Nigeria as a direct consequence of a myriad of factors ranging from an insufficient technology infrastructure, poor or non-existent Internet connectivity, lack of technical support, poor electricity supply, and lack of experience on the part of teachers on how to use the new technologies

(where they exist), as well as teachers' awareness of what technologies to use (Olakulehin 2007; Ureigbo, Oroke & Ekruyota 2007; Adebisi 2015; Olufunke and Oluremi 2014; Eskay 2013).

Recent research by Ingleby (2016) and Price & Kirkwood (2014) reveals that much educational technology is not being utilised in ways that improve deep learning processes. There can be an absence of transformative education. Technology use in pedagogical contexts ought to facilitate the teaching and learning process, hence integrating ICT tools is becoming a 'sine qua non' in pedagogical practice and it has been considered by many as a powerful and flexible tool for learning (Rabab 2015, Loreman, 2017). ICTs are needed and desired to not only aid and support students to learn better to meet globalisation challenges, but also to attain quality inclusive education whilst improving the country's economic situation (Rabab 2015). Furthermore, assistive technology has been argued as a fundamental tool in the promotion of special education, because meeting the needs of students with learning disabilities has made it a necessity that classroom instruction be tailored towards the needs of the learners, and assistive technology can accord such opportunities (Duhaney & Duhaney 2000). In this consideration, assistive technology enhances better opportunities for children with SEN to be integrated in inclusive settings.

The integration of technology in pedagogical contexts can empower, prepare, and create opportunities for students with learning disabilities to achieve their potential. Emma (2011) argues that technology can be used to enable inclusive education and Lewis (1998, cited in Liman 2015) considers that the use of technology holds the potential to be enabling for students with learning disabilities. Mishra and Koehler (2009) also argue that despite the presence of the term 'educational technology', the technologies teachers usually use in education are not purposefully designed for education. In other words, it is assumed that the mere presence of technology is educational. This has an impact on how children with learning disabilities have benefited (or otherwise) from the use of AT in schools, homes and community settings (Alper and Raharinirina 2006). Ajoku-Christopher (2012) identifies that teachers in many developing countries appear to be completely unprepared for integrating technology into their learning spaces. The teachers seem to be lacking in awareness of current and appropriate technologies in supporting a pedagogical practice that will

make their classrooms inclusive (Ajoku-Christopher, 2012). In addition, practitioners in Nigeria reveal an inability to select appropriate technologies to meet the specific needs of learners with learning disabilities (Adebisi et al., 2015, Ajoku-Christopher, 2012). Teachers also appear to show a lack of competence and preparedness to use these technologies even when they are available (Oralbekovaa, 2016). As a result of these challenges, the needs of all learners in an inclusive classroom are jeopardised or compromised, especially in supporting learners with specific learning difficulties. This further culminates in inadequate student engagement which is linked to students' academic achievement.

Research by Oralbekovaa et al. (2016) conducted in Kazakhstan reveals the problematics of using ICT to promote high-quality education in an inclusive environment. The study identified that many children with disabilities in the Republic of Kazakhstan encounter challenges ranging from physiological difficulties to learning difficulties. The authors argue that computer technologies are of particular importance for children with disabilities. By using information and computer technologies, these children are able to not only communicate and move around but also to experience a fully engaged form of inclusive pedagogy. Unfortunately, as a result of the inadequate training of teachers on the use of new technologies, there is a discernible tension across developing countries on the use of information and communication technologies (ICT) in the context of inclusive education. It is argued, therefore, that what matters is not the use of new technologies, but how this contributes to the development of knowledge and transformation of learning.

### **2.3.5 Teachers Perceptions on the Use of Digital Technology and Inclusion**

Teachers' perceptions remain pivotal to the success of their inclusive practice, as their roles are critical to the process of including students with disabilities in regular classroom settings. Going by the notion that educators' perceptions may influence their behaviour towards SEN children (Hammond & Ingalls, 2003), it is imperative to examine the perceptions of educational practitioners towards the inclusion of students with special educational needs, and the current practice in the use of new technologies for inclusive pedagogy. A recent study has established that a complex range of personal, social and professional factors influence the application of technology to pedagogy (Ingleby 2016). These factors are influential elements to the success of

inclusive teaching programmes, and as a result, how practitioners conceptualise the inclusion of children with disabilities has significant bearing and necessitates a level of support being offered to the affected learners. This suggests that if educators hold negative perceptions towards the inclusion of SEN students, the necessary support needed may be in jeopardy (Van Reusen et al., 2001; Cawley, Hayden, Cade, & Baker-Kroczyński, 2002).

Teachers' perceived views on inclusion are a reflection of inclusion's success or failure. If teachers are more receptive towards inclusion, then student achievement, socialization, skill acquisition, and access to education can potentially increase for students with disabilities. Consequently, the emerging literature recognises that the training and skills required to teach and support students with SEN are essential in the implementation of inclusive education practice (Andrews and Frankel 2010). Despite all the concerted efforts made to improve the status of inclusion globally, many countries across the world are still making efforts to enact international standards on inclusive education and education for all in their countries. This challenge is significant in countries like Nigeria (Eskay, 2012; 2013).

Uyouko & Wong (2015) have explored the cultural perceptions of Nigerian teachers about the use of ICT in Nigerian schools. The study reveals that the participants have doubts about the undesirable impact of ICT on teachers and their society. Despite the positive views of the participants on the current and future use of ICT for classroom instructions in Nigerian schools, they thought that there was a lack of suitable software for appropriate education in terms of traditions and culture. The participants also expressed concerns about the type of technology and software that is available. In their view, the authorities need to provide adequate teacher training in ICT skills in order to ensure effective integration of ICT in classroom practice and to facilitate positive teaching and learning in the Nigerian schools. The participants also cited a lack of basic infrastructure and the skills needed to implement ICT as problematic. Thus, it was important to put in place the necessary facilities in schools to sustain teachers' competence and improve confidence levels in the use of ICT. Furthermore, the participants expressed concern over the cultural controversies in the Nigerian context.

I argue that the Nigerian government and education administrators appear to have failed in providing the necessary resources to facilitate the implementation of inclusive practice in most schools in Nigeria (Eskay, 2013). Consequently, there are still no indications of efforts to improve these shortcomings (Eskay, 2013; Olaore 2014). It is also argued that the Nigerian educational system is challenging (Eskay, 2013, Olaore, 2014). To ensure that the educational needs of all learners are met, certain measures and additional adaptations, assistance or specialist support are required. In this respect, the challenges learners with learning disabilities encounter in their education can only be minimised or eliminated through the effective implementation of Inclusive practice and the judicious use of new technologies like assistive technology (Liman 2015).

Special education programmes and policies have been established in most countries, as previously noted, their implementation has remained 'a Herculean task' (Cifuentes, Maxwell, & Bulu, 2011; Wachira & Keengwe 2011). There is an indication that Nigeria is expected to gear up initiatives to advocate for, and advance the rights of children/students with disabilities and enhance the integration of learners with SEN in mainstream education (Eskay, 2001; Mukuria & Obiakor, 2004). Given this notion, it is imperative that Nigeria begins to shift its pedagogic practice to meet the 21st-century global expectations. Although Nigeria appears to be making progress in her educational services, but the more things change the more they remain the same. Thus, a shift in approaches such as integrating digital technologies in effective ways, becomes ever more pertinent.

Effective pedagogy includes teaching strategies with ICT tools that are used to support and encourage learners' engagement and achievement, and the recognition of diversity among learners. This helps in developing improved pedagogical practice, formulation of policies, and training educational practitioners (Tseng 2019), hence the need for sustainable Continuing Professional Development (CPD). The literature reveals that the TPACK model is helpful in considering how teachers can apply technology effectively to their pedagogy (Tseng 2019). This model of pedagogy is useful in considering teachers' professional development, as many teachers in schools reveal that a lack of transformative continuing professional development constitutes a challenge for their professional practice in applying technology to their pedagogy (Ingleby 2019). The literature also reveals that the training teachers receive is centred



more on learning to use technology, as opposed to learning how to use technology for pedagogy (Ingleby 2016; 2019). This point helps in introducing the next section of the chapter which explores teachers' CPD needs in respect of TEL.

## **2..4 Professional Development Need of Teachers in Technology Use in Pedagogy**

The research of Adebisi et al. (2015) reveals that a lot of regular classroom teachers, special educators, and other related professionals in the field of special education are yet to adjust to the advent of both high-tech devices like computers and low-tech, manually operated devices that can deliver and facilitate learning. Suffice to say the use of technologies in the classroom demands that teachers are knowledgeable and competent in order to enhance its effective and appropriate use. This means that there is a need for teachers to be kept up to date and at pace with technology as it evolves, which can usually, in many case be achieved through Continuing Professional Development (CPD) programmes in their various forms. This standpoint is further strengthened by the arguments of Gorder (2008) and Beckett et al. (2003) who contend that debates on technology integration in both mainstream and special education are no longer about availability but more about teachers' effective use of the technology. In this regard, the aim of this section of chapter two is to review related literature and discuss issues that are linked to teachers' professional development or training on technology application in pedagogy.

### **2.4.1 Teachers' Professional Development for Teaching and Learning**

To improve the quality of teaching and sustain an improved quality of education, teachers' professional development is important. Teachers' professional development has been highlighted in much educational research as being in need of improvement (Guskey & Huberman 1995; Baines 1999; Guskey 2000: 245; Mouza 2005). This is also evident in the previous and ongoing reforms of the educational systems of many countries. The need for teachers' professional development is highlighted by most educational stakeholders as being an essential prerequisite for educational development. The bold emphasis that is placed on professional development is based on the widely acknowledged fact that the improvement of schools is first and foremost associated with teachers' involvement, if the improved practice is to be achieved (Adebisi et al. 2014). Teachers are and will remain at the centre of the educational

system, and thus, their professional development remains of discernible importance in the pursuit of educational upgrading (Adey et al. 2004; Siddiqui 2004). Furthermore, most of the factors that correlate with effective school outcomes have direct implications for teachers, and indirect ones for teacher learning and continuing professional development (Bolam & McMahon, 2004). It is argued that noticeable improvement in education is often linked to thoughtful, well designed, and well-supported teachers' professional development (Guskey 2000).

It can be argued that teachers' expertise and experiences are not just a school's greatest asset (Day, 1999), yet also a main resource, denoting in this way that their training and development ought to be seen as a significant priority (Earley and Bubb 2004). It is worth noting that 'long gone' are the days when initial training and the induction of the teacher were seen as a total of final preparation for a career in teaching (Earley and Bubb 2004). After all, one of the hallmarks of being identified as a professional is the continuous development of a career. In this regard, educators will only be able to fulfill their educational purposes if they are both well prepared for the profession and are able to maintain and improve upon their contributions to learner development through career-long learning (Day, 1999). Based on these arguments, it is vital for teachers to be well qualified, highly motivated, knowledgeable and skillful, not just at a particular point in time but throughout their career (Day & Sachs, 2004).

#### **2.4.2 Relevance of Teachers' CPD**

The relevance of CPD in teaching highlights its importance in professionalisation and in contributing to the needs of not just the teachers but also the students and the schools. The focal objective of teachers' CPD is to enhance their capacity and skills and thus equip them in order to ensure that the learners' needs are met irrespective of varied abilities. The prime priority of teachers' CPD is to enhance professionalism in teaching. Professional development in teaching enhances teachers' professional status and makes educators feel like part of a growing profession that incorporates new knowledge into its practice (Guga, 2006; DfES, 2005; Avalos, 2000). It is argued that teachers' participation in CPD should enable them to act collegially in order to maintain and improve the standards of their profession (Mulkeen, 2007; Erskine, 1988). It is expected that engaging teachers in CPD will be valuable in sustaining their relevance, and to cope with emergent curricular changes by bestowing the teachers

with relevant skills for instructional delivery, update their knowledge and expose them to new methods and materials to meet the demands of modern realities of the job (Garuba, 2007; Avalos, 2000). This suggests that CPD is aimed at meeting the professional needs of teachers in order to enhance their career prospects and support them in preparing for future challenges.

Studies have shown that active participation in CPD activities does contribute towards improving the quality of teachers' pedagogy (Hardman et al., 2011; Barber & Moorshed, 2007; Solomon, 2007, Jatto, 2005; Day, 1999). Swann et al. (2010), argue that access to CPD is an important vehicle for challenging and supporting teachers in reflecting, generating, and extending a body of professional knowledge.

CPD activities can enable the teacher to develop reflective classroom practice as a component of a lifelong learning process (Brown et al., 2001; Day, 1999; Hargreaves and Fullan, 1992). CPD implies conscious efforts of learning from experience and reflective thinking, as a form of strategy for the growth and development of the teacher. Avalos (2000) suggests that the continuum of teacher education should help them collaborate amongst themselves, think about their teaching and reflect on the learning process and sociocultural demands of their job. Hence, if teachers are enabled to reflect on their teaching practice, they can in turn develop and improve as professionals. It can be argued that effective CPD holds the potential to improve retention and recruitment and serves as a form of motivation to teachers.

Professional development programmes tend to focus on bringing about change in classroom practices, teachers' attitudes and beliefs, and also on the students' achievements. Successful CPD programmes not only target improving teachers' pedagogical skills, as they are also geared towards manifesting significant effects on students' academic achievement (Day, 1999). Learners' achievements and improvements in learning can be viewed as important determinants of the impact or effectiveness of teachers' CPD. Furthermore, Brown et al. (2001) reiterate that the in-service training experiences of teachers has a significant influence on students' achievement. It is important to note, however, that this is only effective if the teachers' professional development is aligned towards meeting students' needs. Therefore, the planning of CPD should incorporate the needs of the teachers, the students, and the schools.

CPD should be of immense importance to schools. In view of the fact that teachers are frequently considered to be an asset to the schools, their professional development is imperative in determining the standard and quality of the schools. Indeed, Day (1999) argues that those schools that are rated well in respect of standards and performance are usually perceived as being those schools that have shown greater commitment to building effective teacher-teacher, and teacher-student connections. These connections can thrive most where teachers themselves are routinely engaged in continuous professional development. I argue that there can only be a substantial improvement in the quality of education in schools if the quality of the teachers is of a high standard. Many of the educational reforms in many countries around the world today place an emphasis on improving the quality of the teacher and enhancing professionalism to raise the standard of achievement in schools (FME, 2011; DfE, 2010). In a further observation, studies indicate that school reforms and policies have also adopted the culture of CPD for their teaching staff as this is seen as the core of school improvement (Barber and Mourshed, 2007; Brown et al., 2001).

#### **2.4.3 The Concept of Continuing Professional Development**

The continuous demand for improvement, reform, and development of educational quality and standards is a sustainable quest, and, at the centre of this quest are the teachers (Andey, 2004). In view of this, research on CPD has attracted increasing interest (Avalos, 2011; Kennedy, 2005). CPD has become a widely used phrase for on-going education and it builds upon the initial training of professionals. Various terminologies and interpretations are being used in different contexts to describe CPD, for example; capacity building, staff development, professional learning, continuing education and In-service training. Furthermore, CPD involves all formal and informal learning that empowers individuals to improve and develop their own practice (Bubb and Early, 2007).

Consequently, the varied notion of professional development blurs clear understandings of what professional development is, for example, teachers' development refers to the process whereby a teacher's professionalism may be considered to be enhanced (Evans, 2002). Likewise, a teacher's development is viewed as teachers learning so that they are able to change as professionals (Bell and Gilbert, 1994). Bell and Gilbert (1994) argue that during the learning process, teachers

develop their beliefs, ideas and classroom practice related to their feelings in an attempt to change. However, other authors argue that teachers' professional growth is dependent on testing and refining, and engaging in sustained reflection (Evans, 2002; Day, 1999). It is also argued that professional development entails all activities that are engaged in by teachers which enhance their knowledge and skills and enable them to consider their attitudes and approaches with a view to improving the quality of teaching and learning processes (Bolam 1993). I argue that CPD should focus on professional training via short courses and workshops, and professional education (including long courses, and professional support). Examples of professional education include mentoring and coaching which is broader than in-service training. The CPD of teachers comes in various forms and it manifests itself in orientating teachers to the curriculum, upgrading qualification levels, alongside developing subject areas (for example, 'STAN' [Science Teachers' Association of Nigeria] Adagiri, 2014).

In considering the emerging definition of professional development/CPD, it can be argued that CPD relates to the development of individuals, groups and the workplace or institution. Moreover, it is important to develop professional skills, knowledge, and understanding. There is a reflective nature to CPD and in a school context, CPD is linked to teachers' professional development, quality, and also the effectiveness of the school.

In this study, CPD is viewed as any activity or programme that enhances a teacher's attitudes, knowledge, skills, and understanding, and this improves their professional effectiveness in using new technology within inclusive pedagogy. This will impact on students' learning and achievement particularly those with SEN. It is important to acknowledge that the modes of training and professional development may vary from country to country. Therefore, contextual factors appear to influence teachers' professional development and effective CPD leadership.

The evolving nature of technology has made its use in pedagogy not just a mere essential tool in teachers' pedagogical practice yet also an opener of opportunities for the professional development of the teacher (Kirschner & Selinger, 2005). Through applications of ICT and especially communications, professional development can be improved (Davis, 1997; BECTA 2004). More so, this can in turn motivate and support

teachers to utilise new technologies from working with these technologies as part of their professional development process (BECTA 2004; Wiske et al. 2005). ICT, in the context of professional development, can be used to encourage teachers to adopt new ways of thinking and working as part of professional learning communities, by linking and networking various educational establishments, and by bringing professionals together across a range of areas (Kirschner & Selinger, 2005).

However, it has been emphasised that teachers may not be ready to integrate technology and that they may not possess adequate knowledge and skills to utilise technology to support the curriculum (Al-Awidi & Aldhafeeri, 2017). This is largely as a result of lack of competence with or knowledge about new technology (Buabeng-Andoh 2012). Ingleby (2016) reveals that a range of personal, social, and professional factors influence educators' pedagogy with technology and it is argued that there ought to be a pedagogical philosophy behind ICT use, and that technology must be used in creative ways if it is to produce a sense of transformative learning (Ingleby, 2016; Loreman, 2017). It is worth noting that achieving this goal entails constantly updating the skills and knowledge of the teachers, support staff, and other educators, in order to enhance effective integration of technology into pedagogical practice (Chikasanda et al. 2012). Therefore, teachers should be given equal opportunities to attend regular seminars, workshops, and service training to enable them to acquire more skills and competence in their job roles (Olufunmilayo, 2011). This need for up-to-date competent teachers who apply technology to pedagogy can appear to be a pedagogical challenge (Buabeng-Andoh 2012). It is argued that teachers must be empowered to use ICT in their classroom practice not only to develop the ability to promote 21st-century skills into their pedagogical practice, but also to equip them for Sustainable Development Goals (SDG) with regards to education. As a result, the ability of both teachers and pupils to put these skills into daily life is maximised (Selwyn & Facer, 2007, Olufunmilayo, 2011).

With the occurrence of ongoing technology integration trends, teachers are expected to play new roles as part of the reform of the education system (Adebisi, et al. 2014). Hence, it is argued that teachers' professional development ought to provide opportunities for teachers to explore new roles, develop new instructional techniques, refine their practice, and broaden themselves both as educators and as individuals

(Olufunmilayo, 2011). In this regard, the mere integration of technology into current working practices does not adequately recognise the need to review, revise and often reconceptualise current practice in teaching and learning in order to deploy technology effectively (Kim et al. 2013). Although the research of Cuban (2001) and Tearle (2002) reveals that teachers may need to develop their skills in using ICT, the critical point is that they need to be enabled to completely rethink the boundaries of applying technology to pedagogy.

The professional development of teachers remains a key factor in the successful integration and application of technology to classroom practices. This perhaps necessitates ICT related training for all categories of teachers irrespective of the teacher's experience (Bauer & Kenton, 2005; Franklin, 2007; Wozney et al., 2006) This training holds the capacity to boost their competence, and this influences teachers' attitude towards technology integration in the classroom (Hew & Brush, 2007; Keengwe and Onchwari, 2008). Furthermore, ICT- related CPD prepares teachers for the task of reorganising classroom activities involving the use of technology. It is argued that new technology tools are significant for student learning (Plair 2008). Muller et al. (2008) argue that technology focused CPD is vital if there is to be the successful integration of technology in the classroom. In their study of 400 pre-tertiary teachers, it became evident that CPD is among one of the greatest determinants of successful ICT integration within classroom practice.

In order to be ready to integrate technology in pedagogy, teachers need to be provided with a solid foundation of knowledge and skills to utilise new technology and develop new understandings, new approaches, new roles, new forms of professional development, and new attitudes about technology integration (Ruggiero & Mong, 2015; Sabzian & Gilakjani, 2013; Olufunmilayo, 2011). Since, technological advancement has necessitated new ways of doing things (Ahmed 2006), the successful implementation of new technology into the curriculum relies heavily on teachers' readiness and willingness to adopt technology (Singh & Chan 2014; Summaka, Baglibel, & Samancioglu 2010). Teachers can integrate new technology to supplement and support the curriculum, facilitate teachers' work, and encourage student-centered learning (Ertmer et al. 2012). To meet the new demands, teachers need to know more than core subjects. They need to acquire all the technical and pedagogical skills that enable them to integrate digital technology effectively and

efficiently into the school curriculum (Ahmed 2006). Professional development in the use of ICT for teaching and learning is recognised as having a key role to play in the process of enabling and supporting teachers' use of ICT for teaching and learning (Reinen & Plomp, 1993; Williams et al., 2000; Pettenati et al., 2001; Teacher Training Agency, 2002).

Accordingly, introducing digital technology to pedagogical practice has changed the ways in which teaching and learning take place and how teachers implement the curriculum (Sessoms 2008; Koo 2008)). However, the overarching goal of the effective integration of assistive technology in the inclusive classroom is to redefine the way teachers teach, and the way learners learn in order to ensure that the needs of all learners are met. This implies a continuous improvement in teaching processes and technological resources so that the classroom teacher can facilitate learning, and ultimately improve learners' achievements (Puentedura, 2006). However, it can be argued that the emphasis has been traditionally placed on sustaining efforts to upgrade and update teachers to enhance effective teaching and learning processes is a complex and challenging process (Ingleby 2016).

#### **2.4.4 Teacher CPD in Nigeria and England**

The quality of teaching by teachers in Nigeria has been considered as one of the areas which requires urgent attention if the goals of the EFA and other related international campaigns on education are to be achieved (Adagiri, 2014, Olufunmilayo, 2011). Given that teachers play a highly significant role with the work of schools (it could be argued that they are a school's greatest asset), the professional development of educators is a vital aspect of education (Day 1999, Al-Awidi & Aldhafeeri 2017). It is also argued that in Nigeria, unlike a number of other parts of the world, CPD has not achieved the desired attention from both local, and state governments (Olufunmilayo 2011). The system appears to be unable to produce 'well rounded' education practitioners with the knowledge and skills that are ideal for today's schools (Oluremi, 2013). As a result, the quality of teaching in Nigerian schools has been affected. It is in recognition of this that the Federal government has (via the Millennium Development Goals Project) directed the National Teachers' Institute to retrain teachers in Nigeria (Mohammed 2006). However, it appears that different strategies have been adopted towards enhancing CPD in Nigeria and that a confusing variety of institutional



structures have statutory responsibilities for continuing education and the professional development of teachers such as the Universities, the Colleges of Education, the NTI (National Teachers Institute), the Teachers Registration Council of Nigeria (TRCN) and the Universal Basic Education Commission (UBEC) (Adagiri 2014; Mohammad 2006; Oluremi 2013).

Subsequently, an attempt to combat the problem of under-qualified teachers in Nigeria led to the establishment of the Teachers' Registration Council of Nigeria (TRCN) in 1993, having the sole responsibility of determining the standards of knowledge and skills to be attained by individuals seeking to become registered as teachers (TRCN, Decree 31, 1993 cited in Adagiri 2014). The TRCN Decree emphasises the importance of having the compulsory registration of all professional teachers, and this makes the Nigerian Certificate in Education (NCE) the minimum requirement qualification for teachers. There is also mandatory CPD for in-service teachers. However, an inability to provide a variety of general knowledge training and facilities as needed for all the programmes has become a major barrier to effective teacher training and consequently, the full implementation of the UBE project (Oluremi 2013).

Teaching as a profession is perceived as a form of public service which requires expertise, knowledge, and specialised skills which are usually maintained through vigorous and continuous training as outlined in the national policy on education, in Nigeria (TRCN 2008). It is also argued that there is an awakening of attention towards raising the standards of teachers' professional development in many parts of the world (Hennessy 2010). The National Teachers' Institute is fully committed to capacity building for primary and secondary school teachers as demonstrated by the range of retraining programmes. Apart from the upgrading courses (TCII, NCE, and PTP), which the institute has been implementing for many years, the institute has also introduced proficiency Diploma Courses in Early Childhood Education, Guidance and Counselling, School Supervision and Inspection, and the Postgraduate Diploma in Education. Alongside the effective implementation of the Universal Basic Education Curriculum, there is also a strengthening of the capacity of the existing teaching workforce through in-service training and re-training that disseminates innovative practical skills in order to enhance the effectiveness of teachers and thereby enhance the quality of learning (Adagiri 2014; Oluremi 2013). It is argued that one of the

hallmarks that sustain teachers' quality is the ability to provide adequate opportunities for personal growth and professional development (Adagiri 2014). This suggests that the continuing professional development of teachers ought to be a central concern to attaining quality in educational standards (Hennessy 2010).

Moreover, a Teacher Quality Task Team (TQTT) was set up by the Federal Government in Nigeria in 2007 to investigate teacher quality. This 'task team' identified CPD as one of the key elements of teacher quality and effectiveness and pointed to the dearth of training opportunities for teachers. A National Framework for teachers' CPD at all levels of education was introduced in 2007 particularly at primary and secondary levels (Junaid 2009). The objective of the framework includes to update primary and secondary school teachers with improved knowledge of subject matter and pedagogical skills, in order to enhance the quality of teaching in Nigerian schools, and provide a network of learning opportunities for teachers to share best practices (Adagiri 2014, and Oluremi 2013). The main components of CPD that were identified involve school-based teacher support systems, cluster-based teacher networks; and in-service training programmes.

Despite these promising CPD initiatives in the Nigerian schools, its implementation appears daunting as it is argued that the programme is not fully articulated and there is inadequate funding to sustain the initiated programmes (Ekay 2012; Oluremi 2013). According to FME (2005), the Nigerian teachers' preparation in universal basic education is not at all comprehensive. This could be as a result of not paying enough attention to teachers by way of getting them involved in the reforms, and not giving the teachers the required training and support needed to cope with the demands of present-day realities in the classroom.

On the contrary, according to the Green Paper (DfEE 1998), the governments of England and Wales remain committed to giving teachers the necessary training and support to facilitate their roles effectively and to progress in their careers. Hence the need for CPD opportunities is fast becoming mandatory for teachers to progress in their careers across the globe (Hennessy 2010). Whilst CPD has received a high profile attention in England, and various initiatives have been put in place by governments in many developed countries to ensure the effectiveness of their educational reform programmes, the reverse seems to be the case in most developing

and underdeveloped countries (Buabeng-Andoh 2012). Local Education Authorities (LEAs) also play a significant role in the professional development of teachers. In the UK the LEAs provide support for teachers CPD through various means such as the provision of courses, encouraging and facilitating networks and supporting groups, and supplying information about opportunities for professional development (DfEE 2001). A study by Brown et al. (2001) examined the role of the LEA in supporting schools to provide CPD and identify innovative practices that might be adopted by schools and LEAs for further improvements. The study recognised that a professional development culture within schools creates a more supportive and encouraging environment. and this professional development culture aims to provide more opportunities for teachers (Brown et al. 2001).

#### **2.4.5 Sustainable Professional Development for Effective Technology Use**

The effectiveness of CPD is contingent on the type of activity, the specific CPD need and its focus (Adagiri, 2014). This appears to be as a result of the different perceptions and opinions of the practitioners on what they consider as being 'effective' when it comes to CPD activities. In a survey by Menon (2017) on preservice elementary teachers who received professional development in the use TEL tools, it is identified that in general the teachers felt positive, and embraced the use of technology in pedagogy, and that this contrasted with traditional pencil and paper pedagogical activities. The participants revealed that a high degree of hands-on interactivity is achieved when technology is employed in pedagogy.

Menon (2017) reveals that progressing teachers from lower to higher levels of integrating TEL in their teaching necessitates a sustainable effort in providing a type of professional development that goes beyond just a one-time training session. Moreover this finding is also supported by Uslu, 2018; and Keser, Karaoglan Yilmaz, and Yilmaz, 2015. These authors argue that a one-time workshop does not often achieve effective professional development, and it is recommended that long-term training opportunities are provided, for example TEL integrated coaching, as this is more likely to result in sustained professional development.

During complementary research, Keppell, Suddaby, and Hard (2015) reveal that the traditional method of one-time workshops has not been sufficient to transform

teachers' knowledge and competence to the desired levels of technology integration that results in transformed teaching and learning. This lack of training opportunity appears to influence the extent to which inclusive best practice can be achieved using technology. Teachers continually require sustained coaching support and training to achieve inclusive best practice using technology. This research also links to the work of Minshew and Anderson (2016), and Di Blas (2016) who argue that educators require collaborative time, sustained professional development, and different levels of support to improve pedagogical and technological teaching practices. The research of Park, Oliver and Carson (2016) compares self-assessments before and after teachers went through the professional development of adopting TEL with blended learning. The study reveals that teachers require more one-to-one professional development if they are to be effective in applying TEL tools to implement blended learning instruction.

To raise educational standards, the governments in Sub-Saharan Africa are currently emphasising the importance of teachers' professional development. Perhaps CPD remains a vital endeavour that is of discernible importance if there is to be an effective implementation of policy and curricula in supporting sustained teaching and learning practices (Mahammad 2014, Hennessy 2010). In this respect, it is crucial to involve the educators in the process of change, rather than being told what to do (Guskey 2002). It is argued that this style of teacher CPD, where the participants are being told what to do, rather than being involved in the change process is common practice in the Nigerian educational sector (Oluremi 2013). It is, however, argued that it is better for professional development activities to be designed to initiate the changes in teachers' beliefs, knowledge, practice, and perceptions, and that this ought to be the focus of the organisers of CPD (Mahammad 2014). This model of CPD aligns more closely with Kennedy's (2005) 'standards-based model' which is characterised by a tendency of lacking attention to central issues surrounding the purpose of teaching. Also, it can be argued that this model of CPD does not enable a teacher's capacity for a sense of full critical inquiry (Kennedy 2005).

As professional development programmes appear to be essential for the capacity building for teachers' professional growth (Mahammad 2014), it is not just a question of the kind of professional development that matters. Other considerations that are vital include bringing actual changes in the educators' beliefs, knowledge, skills, roles

and pedagogical practice (Mahammad 2014). However, the frequent changes and evolving nature of digital technology that results in newness of technology to the teacher can result in challenges in the design of effective professional development programmes for educators, which in turn influences the effective use of technology in pedagogy (Marklund 2015).

Teachers' roles are considered to be essential in ensuring the successful utilisation of ICT in inclusive education, and this further necessitates education and training/retraining of the teachers to equip them for a successful application of technology to pedagogy. Nonetheless, there is a continuous emphasis being placed on the need to offer enhanced knowledge on the best ways to select and use digital technology tools to achieve the intended goals of technology-enhanced education (Benigno et al. 2007). This reflects the perpetual and on-going concerns that confront educational practitioners desiring to provide an inclusive learning environment.

The expectations and increasing complexity of teaching and learning, including the use of ICT and the diversity of learners' needs, highlights the need for high-quality professional development. Schleicher (2012) indicates that this is necessary to ensure that all teachers are able to meet the needs of diverse student populations, effectively use data to guide reform, engage parents, and become active agents of their own professional growth. The development of teachers beyond their initial education can serve a range of purposes, including the updating of individuals' knowledge of the curriculum in the light of recent advances in the area.

#### **2.4.6 Models of CPD Activities**

In the existing literature, it is recorded that there are different kinds of CPD activities that teachers are engaged with in order to enhance their professional development. According to Avalos (2011); Garuba (2007); and Kennedy (2005), CPD activities can be structured and organised in different ways for different reasons and in different contexts. Eraut (1994) argues that the context through which professional development is acquired is important and that this helps one to understand the nature of the knowledge that is being acquired.

Kennedy's (2005) work explores transformative professional development and its importance. The study provides a framework for analysis by identifying nine key models of continuing professional development. The models are classified in relation to the type of professional knowledge derivable from the CPD and the circumstances in which the models might be adopted. In other words, these CPD models are described in terms of their capacity for supporting professional autonomy and transformative practice. Kennedy (2005) and Eraut (1994) argue that the acquisition of professional knowledge is not confined exclusively within the identified three contexts of the academic, institutional discussion of policy and practice, and the practice itself. The circumstances that each model can be adapted to are; training, award-bearing, deficit, cascade, standards-based, coaching/mentoring, a community of practice, action research, and transformative professional development.

The study further explains that 'transformative' CPD involves a different range of models together with a sense of awareness of the issues of power and can be categorised as a post-structural approach to CPD. Kennedy's (2005) CPD model consists of five questions. These questions are amplified as being: what type of knowledge acquisition does the CPD support, for example, procedural or propositional? Is the principal focus on individual or collective development? To what extent is the CPD used as a form of accountability? What capacity does the CPD allow for supporting professional autonomy? Is the fundamental purpose of the CPD to provide a means of transmission or to facilitate transformative practice?

The 'training' model of CPD appears to be a very dominant form of continuing professional development for teachers and offers support for skills-based views whereby teachers are provided with opportunities to demonstrate their competence by updating their skills (Kelly & McDiarmid, 2002). This model uses experts to deliver training to the teachers who assume a passive role. The training is delivered off-site in most cases and often criticised for lack of connection to classroom contexts. This model of CPD seems less desirable for technology-based CPD if there is to be effective skill acquisition. Day (1999) identifies a principal difficulty in this model as a failure of the training event to connect with the essential moral purpose of the teacher's professionalism. This argument is also developed in the work of Ingleby (2016).

The 'award-bearing' models of CPD are usually offered by accredited conventional institutions that have licences to award qualifications to the educators. This CPD is often offered away from the teacher's school environment. The CPD activities of the award bearing model may include long programmes leading to an 'award' by an institution (for example a teaching certificate) and involve activities that are organised within or outside the school to improve and develop teachers' knowledge and skills (Garuba 2007). In the Nigerian context, this model of CPD exists, and it is offered to the teachers in the form of either a 'sandwich programme' (attended only during school vacations) or during full-time in-service training. Purdon (2003) contends that this award bearing model has the advantage of providing an element of quality assurance and continuity in practice, however this form of CPD suffers from a drawback of skewing more towards something that is more academic than practical.

The deficit model of CPD is known to be famous in correcting teachers' performance and is an example of a performance management strategy (Rhodes & Beneicke 2003) that attempts to remedy a perceived deficiency in the skills of the individual teacher. This model of CPD advocates for the collective responsibility of both the school management and the teacher in remedying any perceived competence concern on the side of the teacher. However, Rhodes & Beneicke (2003) argues that the model can exonerate the management of the organisation as a cause of the problem. It is argued that any model of CPD that exonerates the management/organisation in relation to teachers' competence in technology application to pedagogy is problematic (Ahmad 2015).

The cascade model of CPD involves teachers attending professional training events and sharing knowledge by cascading the information with colleagues. This model is more appropriate when there are limited resources to train all teachers and this model of CPD is, therefore, not always ideal (Eraut 1994). In the Nigerian context, the most commonly used models that exemplify this form of CPD are the workshop model and the school-based teacher professional support model. The workshop model involves an approach in which practitioners gather in a particular venue where they are enabled by experts to develop and subsequently disseminate skills to other educators. The workshop may be short or long-term. The nature of skills and processes to be acquired also varies. This is the most common form of CPD model in Nigeria, and the school-

based teacher professional support and mentoring model is an alternative strategy for the in-service training of teachers. Here, pupils, teachers, supervisors, and facilitators are involved collaboratively in carrying out a series of classroom/school-based activities that will help the teacher to improve. The teacher gets professional support from facilitators and supervisors who serve as mentors. Activities may include direct classroom support by the facilitators and supervisors; staff meetings within the school; and input from head-teachers, the participating teachers alongside teacher-educators or mentors.

On reflecting on the above CPD models identified by Kennedy (2005), in this study, the context of CPD that will be considered includes; workshops, seminars, mentoring, collaborative activities, higher education courses or programmes, and conferences. These forms of CPD are often the common CPD approaches adopted in Nigeria as revealed in the study of Adagiri (2014); and Oluremi (2013). Workshops entail non-award bearing training that is often interactive and participatory activities that involve a group of people either in small or large groups participating in the learning process. Workshops are often coordinated by resource persons from within or outside the school and are aimed at stimulating teachers' knowledge, skills and innovations in teaching or their practice (Garuba, 2007; Villegas–Remiers, 2003).

In the mentoring model of CPD, more experienced teachers or veteran teachers are engaged as professional guardians or mentors to the younger or new teacher (mentee/ protégé) and this is often a school based form of CPD (Bolam 1993). It has been acknowledged that mentoring yields significant benefits for mentees, mentors and the school system (Bush and Middlewood 2005). Additionally, it is also argued that mentoring CPD approaches enable the mentees to acquire new knowledge and gain confidence in their new role, and for the mentors, this encourages reflection and the development of learning partnerships. This can help in the development of a culture of collegiality. It is also argued that knowledge is shared through mentoring between mentees and mentors, which upholds effective teaching and learning (Garuba 2007).

Collaborative activities involve promoting interaction amongst teachers and other related professionals for the purpose of professional development, which sustains positive outcomes such as; school partnerships, teacher-to-teacher collaboration, and coaching, joint preparation of materials, lesson planning, and team building. In



England this is recognised as an important type of professional development in schools. School partnerships can facilitate the sharing of innovative practice and the provision of professional support within a self-sustaining system, which leads to the development of more strategic approaches to professional development planning and opportunities (Cordingley et al. 2003). Collaboration between teachers is necessary if they are to develop the ability to tackle challenges in the context of their working life in school and become more fully engaged in working on pupils' learning and participation (Davis and Howes 2007; Avalos 2000). It is also argued that to achieve educational reform, more efforts are required if the process is to be a sustainable endeavour (Guskey 2002; Huberman & Miles 1984; McLaughlin & Marsh 1978). As many CPD programmes can fail to recognise the various factors that influence professional practice, it is important to consider both the positive and negative factors that are influencing what is happening within the school context (Fullan 1991). To sustain changes in practice, it is perhaps the most challenging aspect of professional development, thus professional development should be a process that motivates teachers to get involved in processes of change so that capacity is developed rather than becoming something that only happens annually (Guskey 2002; Loucks-Horsley et al. 1987; 1998).

'Action research' is a process of investigation, reflection, and action which deliberately aims to improve or make an impact on the quality of the real situation which forms the focus of the investigation. This involves critical awareness and contributes to the existing knowledge of the educational community and it leads to deliberate and planned actions to improve conditions of teaching and learning (Villegas–Remiers 2003). Action research is gaining acceptance in classrooms in many developed countries and is now perceived as a model for teacher professional development (Cordingley et al. 2003; Parke 1997; Elliot 1993). Moreover, it is identified that action research is a valued model of professional development to guide and support teachers (Haggarty and Postlethwaite 2003). Thus, through a reflection in and on the action, teachers are enabled to construct new beliefs, knowledge, and skills to develop a creative practice with ICT in a social context, so that they are prepared for the demands of the 'new century'. However, in order to attain a positive change on teachers' actions in the classroom, the teacher needs to be convinced that the new technologies used as instructional technology (IT) will lead to increased student

learning. This is based on the assumption that teachers' values, beliefs, and knowledge are the main source for their classroom practice and the basis of their professional action (Tresman 2006). Furthermore, Burbank & Kauchack (2003) contend that a collaborative form of action research offers a useful alternative to the passive role of the teacher that may characterise the traditional training models of the teachers' professional development. The action research model of CPD is widely acknowledged as being successful in allowing teachers to ask critical questions about their professional practice.

Conferences are another form of CPD that provide a forum where academics and practitioners often present ideas, discuss research findings and debate relevant issues amongst academics and practitioners. This suggests that conferences avail the opportunity for project discussion by researchers. It can also be a channel to disseminate and generate ideas and developments which will enhance professional practice for networking (Goodall et al. 2005; Garuba 2002). This type of CPD is mostly externally organised in a different venue from the school. Conferences can be regarded as being a means of improving education courses/programmes and they may be regarded as being an important form of CPD that enables the development of skills and knowledge of educational contexts. Conferences may also provide opportunities for developing other forms of managerial, pastoral, or leadership roles for career development and the pursuit of diverse professional roles (Bolam 1993).

#### **2.4.7 Barriers to Teacher Professional Development**

The following factors have been identified as the challenges that confront the Nigerian teachers' quality and their professional development. The challenges range from inadequate funding; lack of resources; and facilities that enhance teaching and learning; poor remuneration; and poor quality of training (Adagiri 2014; Oluremi 2013). It is also argued that these factors have a significant influence on the quality of the trained teachers in the Nigerian schools. As a result, the quality and standard of teachers graduating from the teacher training colleges may be compromised. Studies have shown that many of the Nigeria Certificate in Education (NCE) programmes draw their intakes from secondary school leavers who are below average academically and are unable to gain admission into the Universities (Akinbote 2007; Garuba 2007;

Omoreghie 2006; Dada 2006). This has a detrimental effect on the quality of teachers produced or who are graduating from such NCE programmes thereby lowering the standard of teachers that graduate from the teacher training colleges.

Teachers in Nigeria can lack support regarding adequate resources and innovation in teaching ICT. There may be shortfalls with interactive whiteboards; modern teaching aids; overhead projectors; and internet facilities. A study in the Akwa Ibom state, which is considered to be a relatively educationally advantaged state in Nigeria, revealed that over 90% of the teachers in the primary schools and 80% in the secondary schools had very little knowledge of ICT (Udofia 2007). A major limitation with regards to teachers' CPD in most countries is funding (Pedder & Opfer 2011; Goodall et al. 2005). Funding may include the cost of attendance or participation and travel costs. It is worth noting that although insufficient funding is common in many countries, the extent to which this affects teacher professional development may be different according to cultural contexts (Kennedy and McKay 2011; Gray 2005).

#### **2.4.8 Literature Review Chapter Summary**

This chapter has reflected on the TPACK and SAMR theoretical frameworks that essentially guide the PhD study. These models are presented and then discussed in an attempt to understand how a teacher's knowledge influences their classroom practice on one hand, and how new technology is applied by teachers in their practice to support learners in meeting their learning needs with technology. The chapter has reviewed relevant literature on pedagogical issues, which discuss various perspectives, thoughts and debates around teaching with ICT tools in pedagogy, and the key theme in the published literature is that technologies in pedagogical practice are often used for replicating or supplementing traditional teaching practice. Furthermore, the Assistive Technology (AT) tools used in promoting inclusive pedagogy and the benefits of these tools have been highlighted. The chapter goes on to discuss the wider debates around inclusive education and disability. The content explores different perceptions of SEN in Nigeria and compares the prevailing notions to those that are present in the United Kingdom, and the purpose of this section of the chapter is to point out the similarities and the differences in pedagogical practice in this area. Finally, the chapter reviews key studies on professional development in considering the challenges that are present in developing sustainable professional

development for effective technology use in pedagogy. Through CPD, teachers are potentially equipped to cope with emergent curricular changes by not only bestowing the teachers with relevant skills for instructional delivery, but by also updating their knowledge and exposing them to new methods and materials to meet the demands of modern realities in teaching and learning. It is acknowledged that teachers' continuing professional development plays a significant role in enabling or achieving the expected and desirable change in applying technology to pedagogy (Hennessy 2005). The detailed literature review as the secondary data in the PhD helps to achieve the overall research aim of the thesis, which is to establish an in-depth understanding of how practitioners conceptualise and perceive their current pedagogical practice using technology in sustaining inclusive best practice in selected Nigerian schools. In the next chapter I present the research methodology that has been adopted for this research and explain the rationale behind the methods selected by showing how they provide an effective approach to addressing the research problems and answering the research questions therein.

## **Chapter Three**

### **Research Methodology and Methods**

#### **3.0 Introduction**

This chapter of the thesis discusses the research design and highlights the philosophical beliefs informing the choice of the research methods, and the rationale behind the methods selected by showing how they provide an effective approach to addressing the research problems and answering the research questions therein. The section presents the research philosophy, the research methods, and the research strategy that has been pursued in this study. The research philosophy section outlines the underlying philosophical assumptions that guide the study; the research strategy section encompasses the research methods that are employed in the PhD study to achieve the research aim and objectives. The research methods section presents in detail, the tools employed to implement the research strategy (see Appendix A for the research process diagram).

#### **3.1 The Research Philosophical Perspectives**

In the context of social science research, there are two prevailing research approaches, quantitative and qualitative research methods. Quantitative and qualitative research processes represent two different ways of understanding the world and its phenomena under investigation, often based on the two differing epistemologies underlying the two methods (Wiersma 2000). All research, whether qualitative or quantitative is usually constructed on certain underlying philosophical assumptions on what constitutes the world and how one can best understand this view in respect of the study. This helps in making sense of research, and understanding which research methods are most suitable for a particular research direction. The way that any researcher approaches a PhD study is influenced by the philosophical assumptions that they hold and which form their research paradigm (Bryman 2012). This is made up of ontology (what we believe about the nature of reality) and epistemology which refers to ways of knowing, and this is a central part of any PhD research. The good practice that is associated with a research process (in other words, ethics, and value systems and the processes of inference in reaching conclusions)

becomes a central part of the axiology of the research process and this, in turn, links to what we believe to be true as researchers (Patton 2002). A paradigm, hence leads the researcher to ask certain questions and apply appropriate approaches to the systematic inquiry that is formulated as the methodology. This refers to our understanding of how we should study the world.

### **3.1.1 The Research Paradigm**

Different authors and researchers ascribe different meaning to the concept of a paradigm (Creswell 2009; Livesey, 2011a). In this reflection, a paradigm refers to established assumptions or philosophical frameworks about research that guide how it is conducted in a particular discipline (Mouton 1996; Collis and Hussey 2009). In this sense, a paradigm is potentially an entire system of thinking (Neuman 2011), perhaps involving accepted theories, traditions, approaches, models, a frame of reference, the body of research and methodologies. A paradigm is also often considered as a model or framework for observation and understanding of the world (Creswell, 2007; Babbie, 2011; Rubin & Babbie, 2010; Babbie, 2011).

Philosophical worldviews are important because they inform theories and methodology. However, Bryman (2012) argues that there is no single 'correct' view about social research. Generally, research is often based on the beliefs of the researcher about knowledge within a reality that shapes choices within the research process (Allison and Pomeroy 2000).

A research paradigm encompasses four concepts: axiology; epistemology; ontology; and methodology (Denzin and Lincoln, 2000). Axiology concerns ethics and considers questions like 'how will I be a moral person in the world?' Epistemology concerns how the researcher knows the world and asks 'what is the relationship between the researcher and what is known?' Ontology concerns the nature of reality, while methodology concerns the means of gaining knowledge about the world. In addition, Cohen et al., (2017); ascertain that these philosophical assumptions can be framed around four key questions namely; 1. What is the nature of the social world around us? 2. How do we understand what is believed to exist? 3. What techniques should be adopted? 4. What methods of data collection should be used?

Cohen et al. (2011) note that ontological assumptions give rise to epistemological assumptions, which, in turn, give rise to methodological considerations and result in the strategy and data collection processes. In essence, these philosophical assumptions guide the researcher in the formulation of research questions, as well as enabling researchers to seek the information that is required in answering the research questions (Creswell 2013). Hence my research methodology is informed by my ontological and epistemological position, which governs the construction of my research questions, my research design, and the research methods I utilize in obtaining evidence during this study (Blaikie, 2007).

### **3.1.2 Ontology**

According to Patton (2002), ontology entails whether we believe there is one verifiable reality or whether there exist multiple, socially constructed realities. Ontology can be viewed as the study of reality and existence (Cohen et al., 2015; Thomas, 2009; Gray, 2009; Bryman, 2012, Scotland, 2012). For scientists, ontological questions can be straightforward (Scales 2013) and this assumes that there are clear views about what exists and what does not exist. However, in the social sciences and research in education, these questions and their answers are not necessarily as straightforward. This is because they are concerned with the study of human beings and their actions, their distinct but unpredictable behaviours. Hence, Ormston et al. (2014) posit that ontology is a system of beliefs that reflects an interpretation by an individual about what constitutes a fact, as well as answering the central question of whether social entities should be perceived as objective or subjective (Scotland, 2012).

### **3.1.3 Epistemology**

On the other hand, epistemology probes into the nature of knowledge and truth. Epistemology asks questions like; what are the sources of the knowledge? How reliable are these sources? What can one know? How does one know if something is true? For instance, Schwandt (2001) argues that a paradigm is viewed as a shared world view that represents the beliefs and values in a discipline and guides us to consider how problems are solved (Schwandt 2001). Taking into account that people have a range of beliefs, for example, 'the notion that fairies exist' remains at the level of belief. In this reflection, epistemology probes further to ascertain if a belief is based on valid knowledge (truth), which can be proven by the use of concrete data accessible

to the senses and based on logical inference. Thus, the epistemology here entails, if you say 'fairies exist', what is the source of your evidence that 'fairies exist'? What methods are used to establish the existence of fairies? In other words, the research paradigm helps the researcher to determine the assumptions and beliefs that frame a researcher's view of a research problem; how best the investigator goes about investigating its phenomenon, and the methods adopted to answer the research questions.

Epistemology is the study of the assumptions that are made about the nature of knowing (Richards 2003). Epistemology is a way of having a view of the world and making sense of it (Crotty 1998). This involves creating knowledge and it represents having a certain understanding of what that knowledge as a concept entails for the researcher. The author further expounds that epistemology deals with the nature of knowledge, its possibility, and its scope and legitimacy. In a further argument, epistemology is viewed as involving issues about the question of what is (or should be) regarded as acceptable knowledge in a discipline (Bryman 2008). Epistemology may be viewed as being representative of the assumptions which one makes about the very basis of knowledge, its nature and form; how it can be acquired and how it is communicated to other people (Cohen, Manion & Morrison, 2007).

With epistemology in relation to this study, this PhD research applies photo elicitation in exploring teachers' thoughts and experiences on how they apply digital technology tools in their current pedagogy. The research also reveals how TEL tools are being integrated into pedagogy, alongside analysing why this practice has not led to the transformation of pedagogical practices in respect of enabling effective inclusive learning in Nigeria. The qualitative approach used, particularly via embedding photo elicitation into the research process has enabled a specific focus on the phenomena being studied (Merriam, 1998). The detailed pictures from the participants create the heuristic quality of the research that brings meaning to the phenomena, and reveals new understandings or causal relationships not previously known.

The phenomenon of integrating TEL tools in pedagogy has been studied in depth, as rich detailed insights were derived through interviews based on photo elicitation as a research approach. This has resulted in an in-depth description of the phenomena in relation to the first hand experiences of the research participants in their real-life



contexts. There has been a need for an explanation and understanding of how TEL tools are applied to classroom practice. The design of the research follows the arguments of Yin (2017) and Merriam (2009) where qualitative research can generate holistic perspectives, as data from multiple sources, including the experiences of participants, creates a detailed view of the research focus.

### **3.1.4 Positivism**

Positivism, as an epistemological position, attaches importance to objectivity and evidence in searching for truth and it is argued that the world can be explored in a way that is unaffected by the researcher (Bryman (2012)). Within the positivist tradition, facts are seen as the basis of knowledge and, as a result, an objective and value-free inquiry is conducted (Johnson & Christensen 2014)). In the view of the positivists, meaning and meaningful realities already reside in objects and forces awaiting discovery, and they exist apart from any kind of personal human consciousness (Crotty 1998). This also denotes that when we recognise objects around us, we simply discover meanings that already exist. Furthermore, according to the positivist/objectivist paradigm, the truth is static and it is always objective (Al-Saadi 2014). Within positivism, it is argued that the truth is 'objectified' in the individual being studied and that this objective truth can be 'discovered' if the right methods of conducting this discovery are rightly considered (Ormston et al. 2014). The thinking that characterises the Positivist paradigm is deemed to be value-free, and generates knowledge that is generalisable, and replicable. It is argued that the methodology that arises from positivism is a 'scientific method' (Wellington 2000). A positivist approach claims that it is possible to discover causal relationships existing between the variables that are under investigation, and by discovering these relationships we can identify the forces that underpin them (Bowling 2014). The positivist approach seeks generalisation (Collis and Hussey 2009), and these generalisations are based on natural science laws, which others argue are not applicable to social structures (Henning et al. 2004; Lincoln, 2011; and Babbie 2010). Attempting, for example, to understand the experiences of teachers applying technology in their pedagogical practice, as based on underlying notions of cause and effect, may result in research that is devoid of in-depth intuitive detail. Also, such a process might lose the opportunity to explore the multiplicity of experiences and relationships that individual teachers share with the application of technology. Moreover, it is believed that despite the presence of commonalities of settings and

backgrounds, it is expected that there will be a wide range of perspectives on any aspect of practice because of differing interactions between individuals and their social and contextual environments (Moses and Knutson 2012).

### **3.1.5 Interpretivism and Constructivism**

In contrast to the positivist perspective, a constructivist ontology argues that social phenomena and their meanings are a consequence of the social action that is undertaken by social actors. As a result, the reality of the world is dependent on the perceiver. This is to say, knowledge is to some extent subjective or relative to an individual or group of persons. The goal of the constructionist is to understand and to explain a phenomenon in its contextual setting. According to Bryman (2012), social phenomena are in a state of flux and so they can be revised regularly. Moses and Knutson (2012) contend that in the field of social science, it is not the patterns of nature that are of interest, however what is important are the patterns that are of our own making. It is as a result of the rejection of the notion of positivism and objectivism that the interpretive and social constructionist tradition emerged (Bryman, 2008; Crotty, 1998). These models of research uphold that there are ways of knowing about the world other than direct observation, because our perceptions and interpretations of the world are culturally framed. Knowledge of the world is built on previous 'understanding' which arises from our reflection individually and in groups on lived experiences (Ormston et al. 2014). It is argued by the interpretivist and constructivist researchers that knowledge is developed by exploring and understanding which is hinged and focused on the meaning and interpretations attached to a particular phenomenon and in a particular context. This differs from discovering the underlying forces outside of human agency that somehow shape the social world of the people being studied.

Correspondingly, Schwandt (2007) argues that the interpretive perspective of social action concerns the ability of the investigator to understand the meaning that is given to the actions of the individual, and that this is dependent on the social context as well as to the intent of the individual. Similarly, Walliman (2006) noted that interpretivism is concerned with understanding human conduct or behaviour by placing an emphasis on how people form their beliefs based on social interaction. It could be observed that the positivist proponents reveal that the research itself is independent of the researcher. As a result, data is used to objectively measure reality. This approach often

creates meaning through objectivity uncovered in the collected data (Creswell, 2003). In this way, the positivist tradition seeks explanations and predictions that can be widely applicable to other persons and places. The overarching intent of the positivist is to establish, confirm, or validate causes as well as to develop generalizations that contribute to knowledge (Leedy and Ormrod, 2001). In contrast, in the interpretive paradigm, the interpretivist contends that researchers construct meanings and interpretations rather than finding them outside of themselves, and that their inferences should be based on their research participants. In this tradition, the research process is considered to be largely 'inductive' in nature which entails that the aim is to generate a theory from the data collected rather than use the data to test an already existing theory. This narrative is applicable in this study where individual participants revealed different notions and perceptions about how they construe inclusion and disability, as well as applying digital technology to pedagogy. Participants demonstrated varied views of this phenomenon informed by the context in which they operate; the cultural values they uphold; teachers level of experience and exposure; and their social interactions. These indicate that the perspective and experiences of every participant is unique, and their experiences of reality and truth are, to an extent, different, although individuals collectively each share commonalities to a greater or lesser extent.

I have therefore, aligned my methodological standpoint with the ontological standpoint of the interpretivist/constructionists, which posits that there are ways of knowing about the world other than unmediated observation, for example, through gathering individual perceptions and interpretations of the world. It is argued that people use language to formulate and articulate their thoughts and feelings and therefore teachers reflect in this way on their pedagogical experiences in using digital technology to support inclusive practice. Our everyday knowledge of the world is built on this 'understanding' which arises from our reflection on past events rather than being based on empirically robust lived experiences (Ormston et al. 2014). Having analysed different ontological and epistemological approaches, I consider that interpretivist and constructionist perspectives best suit this research because, this reflects the very nature of this research which is exploratory. This interpretivist paradigm places an importance on understanding meaning within a social context. It is interesting and fascinating to engage with the research participants in qualitative ways as this results in great insights into the construction of real pedagogical practice relating to SEN and TEL. This study

therefore produced an interactive and collaborative research approach, and this has helped in generating creative and rich visual data.

However, interpretivism is not devoid of criticism, given the contention that the interpretivist is subject to bias and because the research findings are less generalizable and not objective, they can be argued to be potentially unreliable. However, Thomas (2009), refutes these criticisms as he argues that interpretivist research generates data that conveys a richness of meaning within social situations. This study has therefore produced some quality research data through the rich data gathering instrument of photo elicitation as the research participants used visual images to express what is important to them in SEN and technological pedagogy and I have immersed myself in this rich data.

### **3.2 The Research Design**

When a research problem and its derived research questions have been identified, and literature review with respect to this problem has also been conducted, a research design must be developed that aims at turning the research questions into a research project (Cohen et al. 2005). It is contended that there is no single blueprint for designing all research, while the strategies that are included are mainly dependent on the researcher's purpose and on the type of research questions that need to be answered (Cohen et al. 2005). Research methodology comprises the key elements of the research process and the methods through which the researcher obtains knowledge about the world under investigation (Creswell, 2007; Edwards & Skinners, 2009; Punch, 1998). This research adopts an interpretive perspective. Based on this premise, the researcher collected data through multiple strategies involving photo interviews, semi-structured interviews, and loosely structured interviews. The researcher has preferred this approach and I am of the view that an interpretive approach to research depends largely upon both the participants' views and the researcher's view of reality. This enables the researcher to infer the significance and importance of social actions and make it understandable and clear for others by suggesting what this specific action entails (Denzin and Lincoln, 2003).

I have acknowledged that the type of methodology that is selected within the research process has an impact on the depth and breadth of the research findings (Mariwilda

Padilla-Díaz 2015). In other words, it is not only the research question(s) and the anticipated results that must guide the decision of selecting an appropriate research approach, it is also vital to consider the acceptability of the methodology within the field to be researched (Denscombe 2017). My research aims to explore teachers' perceptions and experiences on the use of technology in pedagogy. This account is captured through interviews via photo-elicitation in order to gain an in-depth case-centric insight into the experiences of Nigerian school teachers in Imo State and to arrive at a comprehensive finding of the perceptions of these teachers on TEL. In this regard, the researcher has adopted an appropriate research approach that is deemed suitable for collecting the data that is needed to address the research questions. Photo elicitation has made a unique novelty to the research as a rich detailed insight was generated using the research approach.

### **3.3 Phenomenology**

Phenomenology as an approach to social research is generally concerned about peoples' perceptions, attitudes, beliefs, and peoples' feelings and emotions (Descombe, 2017). Phenomenology as a method of inquiry is not limited to an approach to knowing. It is rather an intellectual engagement in interpretations and meaning-making that is used to interpret the lived world of the individual(s) at a conscious level (Bahadur Qutoshi, 2018).

As positivist approaches tend to rely on measurement, statistics, and other things generally associated with the scientific methods, phenomenology is a genuine manner of representing the realities that participants hold in their everyday life experience (Bahadur Qutoshi,2018). This is a research approach that attempts to ascertain a clear knowledge of situations as directly interpreted by other people (Descombe, 2017). The drive of the phenomenological approach is focused on describing experiences. As opposed to just directing their attention to explanations and analysis of experiences in an attempt to discover why they occurred, phenomenologists focus on trying to depict the relevant experiences in ways that reflect the perceived nature of the social world because of a belief in the importance of human agency (Denscombe 2017; Stanley & Wise 1993).

This approach has gained acceptance by researchers for its added ability to provide a description that adequately covers the complexities of the situation. It also offers the benefit of detailed research of a phenomenon in breadth and depth to the researcher. Denscombe (2017) recommends that the description should have elaborate and fair detail, because the social world is hardly 'neat' and phenomenology does not attempt to present life experiences as though they are entirely coherent. Phenomenological research generally relies on in-depth interviews and may not necessarily require technologically sophisticated or expensive equipment for the purposes of data collection and analysis (Denscombe 2017). More so, it is often undertaken in specific settings like schools and hospitals (Denscombe 2017), and it often lends itself to small-scale research where the budget is cost effective as the researcher is the main resource (Denscombe 2017, Ponce, 2014).

Similarly, Creswell (1998) also argues that the best criteria to determine the use of phenomenology are when the Ethics requires a profound understanding of human experiences common to a group of people. Accordingly, the description of the experience of a given situation can often tell an interesting story because phenomenology deals with people and their everyday life. Everyday life and people's experiences can often be generally related. The foregoing notion reinforces the argument that phenomenological research provides the researcher with the opportunity to deal with socially complex phenomena.

I have applied phenomenological approaches as a methodological design in order to perceive the lived experiences of teachers' application of TEL in pedagogy. I have also selected this research approach because phenomenology links to the core concept of understanding the views of my research participants. I am attempting to explore the perceptions and experience about TEL from the research participants' perspectives. This has helped me to become more thoughtful and attentive in understanding social practices in relation to technology and special educational needs. This type of research, like other qualitative researches, uses many methods including interviews, reflections and analysis of the text (Denscombe 2017). The focus is to achieve a more in-depth understanding of phenomena embedded within the research participants' views and perspectives.

### **3.4 Rationale for the Qualitative Approach**

This study set out to generate an understanding of particular social phenomena, from the perceptions of a group of individuals and their interpretations of their world (O’Leary 2014). The approach to this study is informed by the interpretivist ontology. An interpretivist ontology is acknowledged as being a potentially effective model of research that occurs in a natural setting that enables the researcher to develop a level of detail from being highly involved in the actual experiences of the participants (Creswell 2003). It is argued that when social scientists understand, explain and interpret social reality through the eyes of different participants, reliable and rich data may be achieved (Cohen, Manion and Morrison, 2007). In view of the foregoing assumption, the methods in which this research process is pursued relies on the intention of the researcher to gather and present detailed viewpoints of regular education teachers regarding how they apply technology in pedagogy as they interact with special needs students in the inclusive classroom.

Despite the criticisms that surround qualitative approaches, due to their personal nature, the assumption underpinning my qualitative method proposes the existence of multiple interpretations of phenomena within the social world. These phenomena are seen as to an extent as constructions existing in the minds of people albeit influenced by the social environment and the culture in which they find themselves (Crotty, 2003; Guba and Lincoln, 2004; Cohen et al., 2007). In this respect, uncovering these various constructions of reality held by the participants enables an exploration of how the influences on these realities have worked together to create different ideas and practices of enabling inclusion by applying technology to sustain inclusive best practice in Nigeria. As the goal of this research is to present great insights into how regular education practitioners conceptualise their current pedagogical practice using technology in pedagogy, I consider that qualitative methods will yield in-depth understanding and richness of meaning that is associated with subjective understandings of diversity. I also think that qualitative approaches provide opportunities to achieve rich data via Photo Elicitation Interviews (PEI). This PEI as a qualitative research approach enables me to identify and achieve the breadth and the depth of practitioners’ perceptions and experiences in respect of their current pedagogical practice with digital technology use in pedagogy.

The qualitative research builds its approach purely on inductive, rather than a combination of inductive and deductive reasoning. In consequence, the strong relationship between the observer and the data is very different to quantitative research, where the researcher is often placed outside the phenomena being investigated (Leedy and Ormrod 2001).

### **3.5 Research Methodology and Methods**

This section of the chapter presents the methodology and the methods adopted in the study. Methodology is the approach taken in research to identify a solution to a problem from a theoretical perspective using the collection and analysis of data (Remenyi et al., 2003). Saunders et al. (2009) visualise research methodology as being like an 'onion' where layers, representing the different aspects to research, have to be 'peeled away' in order to penetrate the research problem at the centre. Each layer is important in constructing the research methodology. According to Saunders et al. (2009), a research approach can be inductive, deductive, or a mixture of both. An inductive approach is exploratory and it is informally said to be a 'bottom up' approach, whereas a deductive approach is concerned with testing hypotheses and it is informally said to be a 'top down' approach (Research Methods Knowledge Base, 2015). To achieve these research objectives, it became pertinent to elicit stories of participants in their own words based on using a qualitative approach. With this in mind, the research is structured into three stages using an inductive qualitative approach involving PEI, and semi-structured interviews to explore the perceptions and experiences of participants using TEL in their inclusive classrooms.

#### **3.5.1 Qualitative research approach**

Qualitative research involves philosophical assumptions that guide the research data collection and enable the researcher to gain a deeper understanding of the participants' stories in order to explore the meaning of their experiences (Creswell and Plano Clark, 2007). Olsen and Morgan (2004) contend that the choice of data collection methods should be dictated by the nature of the research itself, and how the methods are used (Pratschke 2003). The advantage of qualitative methods, from an interpretivist perspective, is that they are open-ended which allows themes to emerge and in exploring the research, I have utilised an aspect of visual methods via photo-



elicitation in order to place the respondents as co-investigators to an extent of the application of technology within the current pedagogical practice of the Nigerian teachers in the basic education sector. Therefore, the aim of the research is to establish and identify the 'How', the 'What', and the 'Why' of technology application to pedagogy, which aims to understand the underlying influence of this style of practice in greater depth. Adopting this creative and innovative methodological process via PEI has contributed new knowledge to this area, hence the originality of this research is also derived from this research approach. Complex issues associated with pedagogy and technology in teaching and learning have been considered in the emergence of this study.

### **3.5.2 Research Strategy**

Research approaches or strategies are plans of actions for the research (Denscombe, 2014; Bryman, 2008), and this involves the detailed methods of data collection, analysis and interpretation (Trochim and Donnelly, 2007). The selection of the research strategies is based on the nature of the research question, which then entails the researcher's chosen decision on the research design, the research methods, and the data collection and analysis. There are two broad approaches to research involving inductive and deductive research approaches (Trochin 2006). According to Saunders et al. (2009), a research approach can be inductive, deductive, or a mixture of both.

### **3.5.3 Inductive approach**

This study adopts the inductive research approach. An inductive approach is more exploratory and 'open ended', unlike the deductive approach. Trochin and Donnelly (2006) claim that in this approach, the researcher utilises the participants' views to build broader themes, because inductive approaches enable study themes to be connected with the data. Burney (2008) explains that an inductive approach allows specific concepts to be analysed in a general way. It is not required by the researcher to heavily rely on predetermined theory, thus providing more flexibility in the course of the research (Burney 2008).

However, Collins (2010), and Creswell & Clark (2007) argue that deductive research approaches are more concerned with testing hypotheses and subsequently finding relationships between variables. Henn, Weinstein, & Ford (2005) also posit that the

approach begins with a pre-existing theory, and the designing of research around proving or disproving this theory through data collection and testing. Such deductive methods depend upon a pre-existing broad consensus on the framing of the research field, hence, suited to a scientific approach that is often subject to positivist philosophy (Punch 2014). The deductive approach is therefore not pursued in this study.

My research study adopts qualitative inductive processes that are informed by the phenomenological approach. In this approach, the study data collection process includes the use of visual methods involving photo interview/photo elicitation in addition to semi-structured interviews and a follow up Skype interview (loosely structured) interviews to achieve in-depth inquiry. Since smartphones are currently of massive appeal in Nigeria, the research participants were encouraged to use their mobile phones or cameras to capture images that portray their experiences in the use of technology in pedagogy in supporting inclusive practice. This research approach has explored practitioners' perceptions of how they apply digital technology in pedagogy. The study illuminates practitioners' own understandings and experiences about their present pedagogy with technology in Nigerian schools. I have adopted an inductive qualitative research approach as it offers the flexibility to explore the characteristics of a phenomenon about which little has previously been known or explored (Strauss & Corbin, 1998).

In this approach, the researcher explores the 'How and Why' of TEL in pedagogical practice, primarily through speech and text to access what the subjects (research participants) are experiencing and how they make meaning of this experience (Newby 2010). This contemporary phenomenon was investigated within its everyday context by using case-centric sources of evidence (in other words photo-elicitation via semi-structured interviews and follow-up Skype interviews in a loosely structured format). The study through the PEI enabled an in-depth exposition of the research topic by exploring what has happened in an everyday social context. Moreover, the nature of the research questions and the objectives of the study provide a solid base for conducting this qualitative research approach. In this regards, the research explores and illuminates the phenomena under investigation by focusing on 'how' and 'why' types of questions. The choice of the research approach derives justification from the fact that qualitative research is based upon the observations and interpretations of

people's perceptions of experiences (Guba & Lincoln, 1994; Neuman, 2011). A core reason for conducting this study via a qualitative approach and using PEI was to present in-depth understanding and to provide a detailed view of the topic from the perspective of education practitioners who have used or are using new technology in their pedagogy. This has enabled me to gather data that is rich and credible.

### **3.6 Sampling Procedure and Participants Selection**

This section of the chapter presents the sampling procedure followed in the study for selecting the research participants. Justification for the chosen sampling method and procedure is also discussed.

#### **3.6.1 Purposive Sampling**

This study employs a purposive sampling technique for the selection of research participants. Purposive sampling is a research sampling technique commonly used in qualitative research for the selection of research participants (Denscombe 2017). Furthermore, the purposive sample is described as sampling procedures in which specific participants with certain characteristics are selected (Johnson & Christensen 2014). This technique entails identifying and selecting informants or groups of people that are essentially knowledgeable about or experienced with a phenomenon or topic of interest (Cressweell & Plano Clark 2011, Denscombe 2017). Purposive sampling is characterized by the incorporation of specific criteria met by the participants during the selection process (Bernard 2002). However, purposive sampling operates on the principle that the researcher can get the necessary information through focusing on a relatively small number of instances deliberately selected on the basis of their known attributes, and not through random selection. In supporting the choice of this sampling technique, Palinkas et al. (2015) argue that purposive sampling is widely used within the research community in qualitative research for the identification and selection of information-rich cases related to the phenomenon or topic under investigation. **It is worth noting that in this study, the participants were selected just on the basis of their knowledge and experiences of using technology and supporting SEN, age group, area of specialty, school sector and also on the basis of their availability and willingness to participate in the research.**

Nonetheless, Palinkas et al. (2015) argue that the chosen sampling approach selected by the researcher ought to be consistent with the aims and assumptions that conform to the use of either research approach. However, Miles & Huberman (1994) argue that qualitative methods tend to place a primary emphasis on saturation. This implies that the researcher obtains a comprehensive understanding by continuing to sample until no new substantive information is acquired, although this does not seem logically consistent with an inductive approach.

For purposive sampling, the research sample is often selected on the basis of 'relevance' to the issue being investigated. It could also be based on 'knowledge' where participants are selected with regards to privileged knowledge or experience about the topic of study (Merriam, 2016). Purposive sampling is most suited where the researcher already has an insight about the specific people or events and consciously selects participants who are likely to generate the most valuable data. This suggests that the participants are selected with a specific purpose in mind, and that the purpose reflects a given quality or event and their relevance to the topic of investigation. In light of this, the study participants for this research are teachers who have a range of experiences working with children with SEN and apply technology to pedagogy in their practice. Furthermore, purposive sampling, can also be used in order to ensure that a wide cross-section of items or people are included in the sample. Therefore, when used in this way, purposive sampling is a means of enabling a suitable research sample.

### **3.6.2 The Research Sample**

In the research, a sample of 25 participants was initially selected and engaged in PEI interviews (see table 3.1 below for demographic distribution). Subsequently a follow up interview occurred with 10 key participants drawn from the initial 25 research participants' group to gain a deeper insight in technology application for inclusive pedagogy. These 10 key participants were selected purposefully for this stage of the research process because they revealed particularly insightful reflections about their pedagogical practice relating SEN and TEL. The participants provided more reflections on technology application to pedagogy with children with SEN. They also presented detailed reflections about the professional development needs. It was apparent at this stage of the selection and interviewing that a saturation point had been reached due

to the depth and detail of the data that was provided by the research participants (Seidman, 2013) and no new categories had emerged. To enrich the sample and check that no new categories could be exposed, there was reflection on my field notes and an application of the qualitative research concept of crystallisation.

Although quantitative methods place the primary emphasis on 'generalisability', this translates as maintaining that the knowledge gained is representative of the population from which the sample was drawn. However, each methodological approach has different expectations and standards for determining the number of participants required to achieve its aims. In consideration of the sample size of this study, it is recognized that qualitative studies generally depend on precedents for determining the number of participants based on the type of analysis proposed. For clarity, take for example where four to eight participants are interviewed multiple times as in a case of phenomenological study, against 30-40 participants who are interviewed just once or twice in a grounded theory study. This reveals that the level of detail required in each case is different, giving rise to a debate on homogeneity and heterogeneity (Padgett 2008; Guest, Brunce & Jonhson 2007). It is difficult to see any logical reason, however, for any particular number apart from it being a question of practicality.

Purposive sampling, however, is particularly well suited for creating an 'exploratory sample'. This enables the researcher the opportunity to involve the participants to gain quality information and valuable insight into the research topic. Following the above principles, this study, therefore, engaged 25 teachers from the basic education sector in Imo state schools on the principle of the purposive sampling technique. It is therefore justifiable that the chosen sample of the study is suitable for answering the research questions featured in this study. It is posited that the basic principle of quantitative sampling is to produce accurate results without requiring the collection of data from every member of the population (Denscombe 2007; Cohen et al. 2007). However, Newby (2013) argues that if the qualitative sample size is too big, this can lead to too much data being generated, which could also pose challenges and difficulties in analysing the data.

Therefore, as a result of the time constraints to sort through the data, I ensured that a manageable sample size was chosen and as Henning (2004) recommends, participants were chosen who could shed light on the topic being investigated. The

purposive sampling method that was adopted in this study followed the guidance of Merriam (2016) by selecting a sample from which enough detail is likely to be gleaned.

Participants Pseudonym	Gender	Years of Experience	School Sector	Speciality
<b>Frank</b>	M	5 - 10	Private School	Junior Secondary School ICT Teacher
<b>Ify</b>	M	10 - 15	Government School (Public)	Primary School Teacher
<b>Favour</b>	F	5 -10	Government School (Public)	Primary School Teacher
<b>Paul</b>	M	15 - 19	Government School (Public)	Primary School Teacher
<b>Peace</b>	F	10 - 15	Government School (Public)	Primary School Teacher
<b>Lowe</b>	F	5 - 10	Private School	Primary School Teacher/Specialist
<b>Braddy</b>	M	5 - 10	Private School	Junior Secondary Computer Teacher
<b>Joy</b>	F	10 - 15	Private School	Primary School Teacher
<b>Jerry</b>	M	10 - 15	Private School	Primary School Teacher
<b>Judith</b>	F	15 - 19	Government School (Public)	Primary School Teacher
<b>Pamela</b>	F	10 - 15	Private School	Primary School Teacher
<b>Jack</b>	M	15 - 19	Private School	Primary School Teacher
<b>Floss</b>	F	15 - 19	Government School (Public)	Primary School Teacher
<b>Amaraka</b>	M	5 -10	Government School (Public)	Junior Secondary Maths Teacher
<b>Chevonne</b>	F	15 - 19	Government School (Public)	Primary School Teacher

<b>Steph</b>	F	5 - 10	Government School (Public)	Junior Secondary Biology Teacher
<b>Fred</b>	M	10 - 15	Government School (Public)	Primary School Teacher
<b>Patrick</b>	M	5 - 10	Private School	Primary School Teacher
<b>Ndidi</b>	M	15 - 19	Government School (Public)	Primary School Teacher
<b>Kelvin</b>	M	10- 15	Government School (Public)	Junior Secondary English and Literature Teacher
<b>Pascal</b>	M	5 -10	Private School	Primary School Teacher
<b>Chidi</b>	M	10 - 15	Private School	Primary school/Computer Teacher
<b>Helen</b>	F	20+	Special Educator in Integrated Sector	SEN Educator
<b>Jade</b>	M	20+	Special Educator Integrated sector	SEN Educator
<b>Gina</b>	F	15 - 19	Government School (Public)	Primary School Teacher

Table 3.1: Demographic Representation of Participants

### 3.7 Methods of Data Collection

In the research, I have adopted a combination of qualitative data collection strategies in exploring the research questions within the study. Fundamentally, the study employs an augmented approach towards data collection, using more than one type of data source including a reflective journal that I have written during the research process, allowing for a degree of crystallization (Arksey and Knight, 1999). The data collection was completed in two main stages. The first stage of the data collection involved 25 photo-interviews with participants who have a range of experiences working with children with SEN in applying technology to pedagogy in their

professional work. The participants were selected for the research via purposive sampling as discussed earlier. These participants were asked to provide images that capture notable elements of their use of technologies in their pedagogical practice relating to SEN due to their extensive experience working in this area pedagogy. These photos have the ability to reveal both conscious constructions of practice, and they were a starting point for the co-creation of new interpretations of the image (Johnson & Christensen, 2014). The photo elicitation phase became an exploratory phase to gain first hand case-centric accounts from teachers about inclusion/disability and TEL. The photo elicitation research enabled me to identify the participants' core ideas about inclusion/disability and TEL and the emerging themes from the photo interview discussions formed the basis of the subsequent semi-structured interviews with the 25 participants. These interviews explored the views, experiences, beliefs, and knowledge of the research participants on specific matters relating to the use of technologies for inclusive pedagogy.

Given that qualitative research is more concerned with the depth of the research subject matter, the next stage of the data collection process involved a follow-up Skype interview that was more loosely structured as it developed the emerging themes with 10 key participants drawn from the initial 25 research participants cohort to gain a deeper insight and clarity in technology application for inclusive pedagogy. These 10 key informant participants were once again selected purposefully for this stage of the research process because they revealed insightful reflections about their pedagogical practice relating SEN and TEL. These participants also provided more views that correspond to the professional development needs of the teachers. At this stage of the research process, I focused on developing the initial key themes that had been identified during the initial semi-structured interviews in order to gain in-depth insight into how technology is being used for pedagogical practice, with regards to meeting the needs of all learners. It was the intention of the researcher to interview the participants in a face-to-face approach, however, after careful consideration of the risk and cost of traveling to Nigeria to conduct the 10 follow-up interviews, I decided to adopt an online interview approach through Skype.



### **3.7.1 Interviews**

Interviews are considered as being one of the main ways of collecting qualitative data, and face-to-face interviews have long been the dominant interview technique in qualitative research (Punch 2009, and Opdenakker 2006). Punch (2009) argues that interviews provide a very good way of gathering people's perceptions, meanings, and definitions of circumstances and constructions of reality. Interviews are particularly good at generating data that deals with topics in depth and detail (Denscombe 2017), as the researcher gains valuable insights based on the depth of information collected from the key participants. Interviews are also a good way of producing data based on the interviewees' opinions and ideas. The informants have the opportunity to expand their ideas to explain their views and construct with the interviewer what is important to them as crucial factors. The interview also helps to provide a better understanding of other peoples' opinions (Denscombe 2017) and as Jones (1985) argues, in order to understand other peoples' constructions of reality, it is necessary to enable the research participants to reflect in their terms and in depth. This, therefore, captures the rich context that is represented by their subjective interpretations.

According to Denscombe (2017), interviews provide the opportunity to talk about individual opinions and moreover, the ultimate aim of qualitative research is to provide credible research that reflects the researcher's ability to illustrate or describe perceptions of reality (Myers 2000). This qualitative research approach is generally regarded as producing richness in respect of capturing subjective views (Myers 2000). In this PhD, I acknowledge that the essence of completing qualitative research is to discover meaning and understanding, rather than to verify the truth or predict outcomes. Therefore, the aim of adopting a combination of data gathering methods in this research project was to understand the teachers' perceptions of their current pedagogy with technology in supporting children with SEN in greater detail. As Gill et al. (2008) argue, the interviews are supposed to provide a deeper understanding of social phenomena.

### **3.7.2 Semi- structured Interviews.**

The semi-structured interview featured six interview question items covering the objectives of the study (see appendix B). These interview questions were designed beforehand, hence maintaining a substantial level of flexibility to allow additional topics

to be built in to the interview. Drewer (1995) and May (2011) argue that this type of interview is common in small scale studies, because, the researcher has pre-planned questions and themes that hold the ability to prompt and probe in a manner that allows for creativity and flexibility. This data instrument allows the research participants to express themselves relatively freely (Cohen et al. 2011). Semi-structured interviews encourage rich descriptions from participants and this allows rich descriptive data to be generated (Westby et al. 2003), that other approaches, such as questionnaires may not achieve. Semi-structured interviews can enable an understanding of 'why' and 'how' the participant feels the way they do about the technology they are using in their pedagogy. Moreover, these semi-structured interviews can help in reducing any potential researcher bias, by encouraging the research participant's voice to come through (Denzin and Lincoln, 2000).

An advantage of completing a face-to-face interview with the participants is to allow the researcher to pick up on social indications which includes body language and behaviour. Moreover, an effective interpersonal interview atmosphere can be generated by the interviewer, and this can help in encouraging a positive rapport that can put the interviewee at ease during the interview process. This is important especially if personal information is being shared which can be difficult in face-face situations, (Mann and Stewart, 2000; Opdenakker, 2006).

### **3.7.3 Skype Interviews**

The Skype interviews with 10 key participants drawn from the initial 25 research participants' group enabled a deeper insight and clarity into technology application for inclusive pedagogy. These 10 key informative participants were selected purposefully for this stage of the research process and their selection was based on their ability to reveal insightful reflections about their pedagogical practice relating SEN and TEL. These participants also provided more detailed reflections about the professional development needs of the teachers, and at this stage of the research process, I focused on developing the initial key themes that had been identified during the initial photo elicitation interviews. This was to gain in-depth insights into how technology is used in pedagogical practice, with regards to meeting the needs of the learners.

As previously noted, I intended to interview the participants face-to-face, however in view of the practicalities of the research and also due to some of the political turmoil that was occurring in Nigeria, I resorted to online Skype interviews.

### **3.7.4 Visual Data Collection**

This PhD study employed Photo Elicitation Interview (PEI) for visual data collection involving 25 participants who have a range of experiences working with children with SEN and applying technology to pedagogy in inclusive classroom. These participants were asked to provide images that capture notable elements of their use of technologies in their pedagogical practice relating to SEN and TEL. The images that were provided by participants had the purpose of providing both conscious constructions of practice alongside being a starting point for the co-discovery of new interpretations of images (Johnson & Christensen, 2014). Photo elicitation served as an exploratory phase in the research, to gain first hand personal accounts of teachers' views about inclusion/disability and TEL in a way led by them. The photo elicitation research enabled me to identify the participants' core ideas of the images, in order to make sense of the photos and to probe and prompt more information from the participants during the semi-structured interviews. This process also helped in enabling a positive and loosely structured discussion.

Visual data collection is a process of collecting data using visual sources such as photographs, drawing graphics, painting, films and video (Johnson & Christensen, 2014; Arthur et al., 2012). Visual data such as photo images is regarded by some as being one of the richer methods of data collection (Johnson & Christensen, 2014). This research employs visual data collection in order to embellish the practitioners' perceived views on applying technologies to pedagogy and SEN practice. Moreover, the approach has made the research process become more engaging, and it is giving the respondents a creative way of engaging in the research process. Photo interviewing or photo-elicitation is a method of data collection in which researchers show images to the research participants during formal or informal interviews (Arthur et al. 2012; Johnson & Christensen, 2014). In photo-elicitation the research participants are invited to comment on historical images or other images that have been taken by professional photographers and researchers. However, this distinction

remains controversial as some other researchers argue that photo-elicitation involves a method in which photographs are produced by the participant, and are used as a stimulus and guide within the interview (Edmondson et al. 2018).

It is worth noting that, 'auto-photography', 'reflexive photography', 'photo-novella' and 'auto driving' are all variant terms that are used to describe the techniques that are 'driven' by the participants, that is, where participants take or provide the photos. These research processes are characterised by the application of an interview that is centred on the photographs that have been taken by the participants (Heisley and Levy 1991; Noland, 2006; Ziller & Lewis 1981; and Ziller 1990).

### **3.7.5 Photo Elicitation Interviewing in the Study**

As part of the data collection strategy, photo-elicitation was employed to enable the researcher to gain deep insights into the teachers' pedagogical practice as they apply digital technology in enabling inclusive practice in their classrooms. The essence of this phase of the data collection was to gain first hand personal accounts of educational practitioners based on their own current pedagogical experiences. The themes that emerged from these interviews were investigated further in detail through the later Skype semi-structured interviews. A total of 25 photo interviews were conducted initially, following the receipt of consent/approval from the research participants. The pictures/images and the views of the participants as discussed earlier in the study generated key points for discussion during the inquiry. These key points constituted the focus of further interviewing in the second stage of the data collection.

Interestingly, it is the participatory aspect of this form of visual research method that was most helpful as the participants reflected on their images and discussed their meaning in depth and detail. The pictures or the images used in the photo interview became a stimuli that stimulated rich discussions about the research topic (Edmondson 2018; Bignante 2010). It is important to emphasise that these images became a catalyst for generating conversations, thoughts and reflections between the research participants and the researcher. The participants were the analysts of the photographs/images and together we made sense of the pictures by considering the participants' expressions, views and reflections on these images (Ingleby and Currie 2018; Johnson & Christensen, 2014). Johnson & Christensen (2014) argue that visual data (such as images) can become rich forms of data collection because they have

the flexibility to allow for a wider range of interpretation than verbal language and numerical data. Above all, a photo interview has the advantage of stimulating the respondents to express their practical knowledge and experiences through the attribution and association of meanings to the photo.

This way of completing research interviews is found to produce more embodied understandings of people in places (Ross et al., 2009), alongside enabling the collaborative engagement of the research participants within the research process (Trell and Van Hoven, 2010). This suggests that the power of visual data is not to be ignored. Johnson & Christensen (2014) argue that visual data provides 'concrete evidence' as opposed to abstract verbal and numerical data. This supports the arguments of Dempsey & Tucker, (1994) and Haper (2002) who assert that visual data can be used to obtain creative reflections during the research process. The visual data may be used to support alternative interpretations of the phenomenon being investigated. In some cases, the participants are given cameras to collect the initial data themselves. Although, in the case of this study, the researcher asked the participants to provide the images that depict their general perceptions on TEL and SEN, as well as their experience of CPD. The participants used their own smartphones to capture their own images or photographs that are important to them.

The research participants demonstrated active engagement in the research, as they were in absolute control over the decision of what type of photograph to capture (Wuggenig and Mnich, 1994). In visual data collection, the captured photographs generate open communication between the researcher(s) and the research participants (Kolb, 2007). The research participants in a cross-cultural study of American Universities acknowledged that this type of research approach enabled greater levels of reflective thinking than standard research interviews (Douglas (1998). Dempsey & Tucker (1994), Haper (2002), and Johnson & Christensen (2014) support the notion that visual research techniques are able to enhance qualitative research processes significantly.

Kolb (2007) posits that visual research methods involve a number of stages starting with the opening phase, the photo shooting phase, and the moving on to the decoding or analytical phase. These outlined stages were followed in this study within the photo-interviews. At the opening phase, the research participants were asked to take

photographs of a series of topics that are associated with the research focus, which was explained to them. This was completed by considering the arguments of Becker (1974) who posits that photographers ought to be informed of the theories that are guiding the research so that the subsequent images are 'intellectually denser'. In this study, the research participants were given a general overview of the research project, in advance of time, prior to the commencement of the study. Moreover, during the fieldwork stage of the research a further briefing was also given, and this enabled the research participants to consider and contextualise their images as their valuable reflections on the research area were generated.

At the next analytical stage of the research, I explored the participants' subjective values by considering which images were captured and what reflections and meanings the images represented to the research participants. It is, therefore, argued that the photograph is data, and that this results in what is referred to as 'stage three', or the decoding phase of the research process (Oevermann 1993).

The process of analysing the images becomes a combination of inductive and formative actions, which begin prior to the interview in order to provide deep reflective analysis. In this research process, the analysis of the images resulted in an awareness that the images provided great detail about teachers' experiences and perceptions about the use of technology for inclusive classroom practice. As a precaution, Banks (2001) advises social researchers to study images both internally (in terms of the message transmitted to us as a viewer) and externally (via the artefacts we see in the image). Collier and Collier (1986) refer to this process as listening to the visual voice of imagery. However, Pink (2001) argues that researchers should not attempt to translate visual evidence into verbal knowledge and that in contrast, it is important to 'explore the relationship that exists between visual and other knowledge' (Pink, 2001).

### **3.8 Instrument Validation**

This section of the chapter discusses the processes involved in accessing the rigour and credibility of the data collection strategies that have been applied during the PhD research.

### **3.8.1 Pilot Study**

In general a pilot study is a small-scale research study that aims to test the research protocol, the data collection instruments, the participant recruitment strategy, and other research techniques in preparation for the actual larger study (Hassan et al., 2006). The purpose of a pilot study in research is to examine and determine the feasibility of the research design. It is deemed necessary for researchers to pilot their study (Seidman, 2013) and it is argued that this is a crucial aspect of the research process (Majid et al., 2017). I consider that piloting the interview questions was vital in respect of improving the interview protocol and the data collection instruments that were used in the study in respect of reviewing and refining the interview questions.

In this research, five participants were engaged in the pilot study and this helped in developing the research process (Seidman 2013). With the pilot test participants, it was possible to establish whether the interview questions were adequate and appropriate for the research. The reason for conducting a pilot study for this research was to test the appropriateness and suitability of the interview questions as well as the general interview protocol, ahead of the main study. In reflecting on the reactions of the research participants to the interview questions, I was able to identify what needed to be modified and reframed during the interviews. Furthermore, it is helpful for researchers to try out their interview questions with a small number of participants in developing the research process (Seidman 2013). The interview schedule was checked by my Director of Studies who provided a critical review of the interview questions and processes, and pointed out any unclear or ambiguous questions. These corrections were made and I then produced the final draft of the interview questions. In addition, the pilot study provided the means to ensure that all the terms and concepts that were being used were clear enough and well understood by the participants in order to deliver the objectives of the study. The pilot study provided me with the opportunity to reflect on this data collection experience, thus preparing me for the actual study.

### **3.9 Data Analysis**

Data analysis is a process of making sense of the data collected (Merriam 2016), and it involves the coding of raw data (Merriam 2009). It is emphasised that the purpose

of analysing data is to achieve a better and a clear understanding of the data (Denscombe 2014). This is ascertained through a detailed examination of the phenomenon that is being studied (Denscombe 2014; Johnson & Christensen 2014). The data analysis process tends to follow a series of stages (Denscombe 2014). Although, each research approach involves a particular process, in general a researcher aims to portray particular experiences in depth and detail, alongside ensuring that the research process is visible and meaningful to the reader. This suggests that there is a need to give a clear vision of what the situation or phenomenon entails in any research process.

The process of qualitative data analysis used here consisted of three main phases; reduction, data display, and conclusion-drawing (Miles and Huberman 1994). It is generally regarded as a non-mathematical analytical strategy that includes examining the meaning of individual words and actions (Maykut & Morehouse 1994). This, perhaps depends on the approach or methods the researcher observed or adopts. In this research, I gathered field notes and interview transcripts, and the records of the interview, and visual images were produced by the participants. In accordance with the recommendation of Bryman (2008), this qualitative research data analysis process was based on field notes and transcripts of the interviews.

Within this study, all the data collected was analysed using thematic analysis after manual transcription and coding. The choice of the thematic analytic approach adopted for the analysis of this research was because thematic analysis offers flexibility in interpreting the data (Braun and Clarke, 2013). This process of analysis also allows the researcher to approach large data sets with much ease by sorting them into broad themes. This approach enabled an in-depth understanding of educational practitioners' views about technology use in pedagogy with respect to promoting inclusive pedagogy. By so doing, this allows the data to determine the theme, as is the case for inductive studies. The aim of the research is to explore new ideas, perceptions, and experiences of the practitioners in using technology in developing SEN practice and TEL. The research analysis was completed by comparing the responses of the research participants, through the themes inferred from the interviews. Braun and Clarke (2006) outline that thematic analysis is characterised by having specific themes and that qualitative studies aim to reach saturation of inference, at which time, no new meanings are apparent (Seidman, 2006). In this



study, the codes were generated and analysed in order to establish the key research themes.

### **3.9.1 Thematic Analysis.**

Thematic analysis, according to Braun and Clark (2006) is a method for identifying, analysing, and reporting themes within data. As already noted, in this PhD study, the data analysis approach that informs the research is based upon thematic analysis. Thematic analysis is described as being a means for identifying, analysing and reporting patterns (themes) within a data set (Boyatzis 1998). Thematic analysis involves the search for and identification of common themes that extend across an entire interview or data set (DeSantis & Noel Ugarriza,2000).

Another way of understanding thematic analysis is by viewing this data analysis technique as a means of analysing a data set in rich detail. This type of data analysis for this study is viewed as a helpful form of inductive analysis (Braun and Clarke 2006). This approach is widely applied as a means of data analysis among qualitative researchers, although thematic analysis can be complex. This is because there is no clear consensus about what thematic analysis entails. The rationale for adopting thematic analysis in this research is because of the flexibility it offers, as stated earlier.

This approach, therefore, is a process in which all the data generated in the research is analysed and discussed in rich detail. By use of thematic analysis, the study presented an in-depth understanding of teachers' perceptions and experiences about their current pedagogical practice relating to SEN and TEL, and the associated professional development needs of the teachers. I have adopted this technique because it provides the researcher with the opportunity to elaborate on and discuss the research findings in greater detail. However, it is worth acknowledging that one of the challenges of using this approach during the analysis is that the research participants' responses tend to be complex and this meant that interpreting their experiences was time-consuming.

Regardless of the prevalent use of thematic analysis, this technique has in recent times started to gain 'brand recognition' within research methodologies including interpretive phenomenological analysis (IPA) and grounded theory (Clarke and Braun, 2013). Thematic analysis is fundamentally a technique for identifying and analysing

patterns in a qualitative data set and there appear to be different styles of thematic analysis within academic research (Aronson, 1994, Attride-Stirling, 2001, Boyatzis, 1998, Joffe & Yardley, 2004, Tuckett, 2005; Braun & Clarke, 2006). A number of academics argue that thematic analysis is a key aspect of phenomenological research methods (Guest, MacQueen & Namey, 2012, Joffe, 2011).

Clarke & Braun (2013) refer to thematic analysis as being an analytical technique, rather than a methodology. The authors emphasise the importance of the theoretical flexibility of thematic analysis. Clarke & Braun (2013) highlight that thematic analysis is theoretically flexible as the data analysis technique involves the search for, and examination of patterns in research data. However, patterning across language does not require adherence to any particular overarching theory or framework for understanding human society. This suggests that thematic analysis can be applied within a range of theoretical frameworks. Thematic analysis appeals to a wide range of inquiry and theoretical perspectives. Furthermore, thematic analysis is suited to a wide range of research and it is ideal for interpreting people's experiences and interpretations. Moreover, thematic analysis is also suited to questions that seek the representation and construction of particular phenomena in specific contexts. This technique can be applied to analyse different kinds of data, from primary and secondary sources ranging from transcripts of focus groups and interviews. This form of analysis is also applicable both within the small or large data set, and whereas, grounded theory is used with the intention of developing new theory (or theories) from what the research participants say on the basis of having no preconceived views of the research topic; this was not the case in this PhD research as I already had experience of working in this area of research so I was aware of some of the challenges that the research participants were likely to be experiencing in their pedagogy.

In line with the position of Bryman, (2001), the data analysis commenced as soon as the data had been gathered and transcribed. The analysis of qualitative research transcripts begins when the researcher identifies concepts that are emerging during the research. However, it is vital to note that not all the information generated by the research process is necessarily considered as being useful, therefore, only the data considered pertinent has been used. Braun and Clarke (2006) identified six phases within thematic analysis, and it is noted that the research process should not be viewed

as being in any way a 'linear model'. Rather, the process of data analysis is complex and Braun and Clarke propose six steps that ought to be used in thematic analysis. (1) Familiarisation with the data; this entails the researcher becoming familiar with their data and involves reading and re-reading the data transcripts, and careful listening to interview audio-recorded data in order to note initial analytical observations. It is also argued that qualitative data analysis involves detailed transcription of the interviews, and thorough reading of the interview transcripts (Creswell, 2014; Braun and Clarke, 2006).

The second step of thematic analysis involves coding of the data. Coding the data is described as being the stage of the data analysis which involves generating succinct labels for important features of the data that is of relevance to the (broad) research question which guides the analysis. Coding is also viewed as an analytical process, and the codes capture both the semantic and conceptual reading of the data. The researcher codes every data item and ends this phase by collating all of the codes and the relevant data extracts.

The third step of thematic data analysis involves searching for themes: A theme is a coherent and meaningful pattern in the data relevant to the research question. Searching for themes, however, appears to be more like coding the data in order to identify similarities in the emerging data. This 'searching' is an active process as themes are not hidden in the data waiting to be discovered by the researcher, rather the researcher constructs the themes. The researcher concludes this phase by collating all the coded data relevant to each theme.

The fourth step is reviewing of themes. This involves checking that the themes 'work' in relation to both the coded extracts and the full data-set. The researcher is urged to reflect on whether or not the themes tell a convincing and compelling story about the data, in order to begin to define the nature of each individual theme, and the relationship between the themes. It may be necessary to condense two themes together or to split a theme into two or more themes or to discard the themes altogether and begin the process of theme development once more.

The fifth step is defining and naming the themes. This step requires the researcher to conduct and write a detailed analysis of each theme (the researcher should reflect on

'what story does this theme tell?' and 'how does this theme fit into the overall story about the data?'). This helps in identifying the 'essence' of each theme and constructing a concise, punchy and informative name for each theme.

The sixth step is writing up. Writing is an integral element of the analytical process in the thematic analysis approach and this is often common within qualitative research. Writing-up involves collating and compiling the extracts of data to convey a meaningful, and coherent account of the data in order to contextualise the findings by relating them to existing literature within the research study.

This study adopts Braun and Clarke's (2006) recommendation about the steps that are necessary in analysing qualitative data using a thematic analytical approach. The interviews conducted in this research have been transcribed, and using thematic analysis I drew out common themes in the data gathered. Furthermore, by applying this thematic analysis procedure it was possible to identify categories, patterns (themes), views, ideas, and commonly shared understandings of the phenomena that have been revealed by the research participants. All of these strategies are applied in an attempt to establish the meaning of the phenomenological experiences of Nigerian teachers about the application of technology to pedagogy.

### **3.9.2 The Analysis Procedure**

Upon the completion of the data collection process, the recorded audio data obtained from the interviews was transcribed verbatim. The transcription was completed by leaving a wide margin on the right-hand side of the pages for making notes, and for the writing of codes, using an 'open coding' technique. Open coding is known as a process where the codes are selected according to what the data entails to the researcher (Henning et al. 2004). According to Denscombe (2014), when transcribing an audio recording, the researcher is expected to put informal notes and comments alongside the interviewee's words, and this process is called 'annotation'. This tends to occur with field notes taken during the interview and with notes drafted as soon as the interview is conducted. This includes reflecting on the gestures of the participants, alongside acknowledging uncomfortable silences, outside interferences, and other observations. Moreover, the transcriptions help with detailed searches within the data, enabling comparisons to be made within the data sets (Denscombe 2014).

After the transcription, I read the transcript to form a holistic picture and a clear understanding of the data generated. Subsequently, as the transcripts were read, I was able to summarise each segment and ascribe a code to it. As a researcher, I ensured that the data was coded using as many categories as possible (Newby 2014; Schatzma and Strauss 1997, cited in Maxwell 1996). The related codes were then grouped into categories in order to gain accurate, yet subtle and detailed interpretations of the research study. Afterwards, the codes were grouped together into categories, from which sub-themes were generated. The categories were assigned so as to reflect the purpose of the research study, in order to answer the research question that featured in the study. Hence, I sought to identify and describe patterns and themes that emerged from the participants' viewpoints and then attempted to understand and explain these patterns and themes within the data presentation chapter. As a researcher. I aimed to maintain accurate and detailed interpretations of the research study (Denscombe 2014). I also integrated the themes and concepts into a framework for analysis.

### **3.9.3 Visual Data Analytical approach**

Photographs and words can appear to be more powerful than numbers as a form of data collection. This research adopts Collier and Collier's (1986) reflection on photographic analysis and these individuals were the pioneers of this form of data collection method. The research adopts the recommendations of researchers including Noland (2006) and Thomas (2009) in order to ensure a comprehensive analysis of the visual, verbal, and written data within the research project. The visual data analysis comprises of eight steps. These steps begin during the interviews and involved collaboration, followed by organizing the data, coding of the data, structuring the analysis, detailed analysis, interpretive analysis, creating themes, and then writing up the findings. Thematic analysis has been used to analyse the visual data in this research. The analysis has involved identifying, analysing and reporting patterns that emerged from the data (Harding, 2013; Braun & Clarke, 2006,). Following the recommendation of Collier and Collier (1986) I adopted the following steps in the research process.

Step 1 involves the data analysis which begins during the semi-structured interviews as a collaboration between the participants and the researcher. This results in a

collaborative interaction between the two parties (Collier & Collier, 1986). At this stage of the data analysis, the participants provided images that were important to them about technology application in pedagogy and SEN practice in the Nigerian schools. Both the researcher and the participants collaboratively discussed what the images entailed and meant in relation to technology and pedagogy. This enabled the researcher to gain insights into what the images that were provided by the participants signified. The process also enabled the researcher to progress the research process via semi-structured interviews. This has resulted in the collection of robust and rich data within the research process. The researcher asked the participants to explain in detail the elements of their photos as this represents their experiences and perceptions of using technology for inclusive pedagogy. These explanations during the photo interviews guided the researcher in developing the research's 'big themes' in order to generate a conceptual understanding of the situation that is represented in the participants' photos.

Step 2 of this analysis involves organizing the data. Within the photo interviews the photographs were numbered and labelled and they were then organized or grouped into tables. The photographs from the Government schools, and the Private and Special schools were placed in separate columns. The categories with the photographs that appeared to have similar meanings were placed at the top of the table, and subsequently, other photographs were then grouped according to their meaning and representation.

Step 3 entailed the coding of the data by giving names to the photographs which serve as descriptors, as identified by the research participants. Each photograph was placed into a category or theme. Photographs which did not belong in a particular category were placed in a separate category that was labelled 'miscellaneous'. Labelling, counting, grouping, and comparing of photographs was conducted to identify photographs that reflected the most important research categories. The most commonly photographed themes were allocated to the top of the table that is being used with the research participants and the least photographed themes were placed at the bottom of the table. This gave a clear outline of the experiences and perceptions of the participants about using technology in pedagogy in the Nigerian schools. This is the stage of the research process when the main research themes were subsequently confirmed.

Step 4 of the research process involves a structured analysis of the data whereby counting and comparing of categories took place, alongside a construction of graphs and tables. This was useful in presenting the different categories and their frequency. Using thematic analysis for this study has generated categories/themes. I have considered the visual data by reflecting on the content, meaning, and reasons for why the photographs were taken, and the differences between the various images. In generating meaning from the images, this essentially helps in forming new insights into the research area. Moreover, a picture has a reputation for providing a graphical means of identifying differing world views in order to arrive at shared understandings of an organizational phenomena (Berg & Pooley, 2013).

Step 5 involved the detailed analysis where each category or theme was given a number, labelled and then named, usually using a commonly used word that the participants had used or was applicable for the purpose of the study. Upon counting how many themes emerged from the data and which themes had the most and least number of photographs, I was then able to identify the most and least important themes within each group. This then enabled a narrowing of the broader themes and allowed the common themes to emerge from the research data.

Step 6 involved interpretive analysis in order to understand and make sense of the emerging data. This approach provided insights into how the participants made sense of their worlds so that ideas and meaning could be found and clarified. This in turn enabled the final detailed analysis of teachers' current practice in respect of applying technology to pedagogy and developing SEN practice.

Step 7 involved the refinement of the themes using thematic analysis by looking out for important themes and binding or linking them up to the related overarching theme. The refined themes were then arranged in order of priority starting from the most important to least important. At this stage, common themes emerged and the researcher recorded these themes in greater detail.

Step 8 was about writing up of the identified findings in coherent and readable and understandable ways, through detailing the findings and reflecting on their implications for the study.

### **3.10 Research Good Practice**

Some kind of conception of reliability and validity are considered to be two main key aspects of all kinds of research (Brigitte 2017) and it is vital for researchers to ensure that their study is trustworthy (Kvale, 1996). The rigour of qualitative research does not equate exactly to the concept of reliability, however it is a necessary component of qualitative research quality (Lincoln and Guba 1991). Essentially, in the process of this study, I was much concerned with the rigour and trustworthiness, or credibility, of the study and I ensured that a number of steps were taken to enable these in the research process.

It is argued that it is important to reflect on the validity of the data findings (Creswell & Plano-Clark 2011). Validity serves the purpose of checking on the quality of the research data, in order to ascertain if the research process has measured what is being intended to be measured (Frankfort-Nachmias & Nachmias, 2008). It is expected of researchers to design their research in ways that reduce the threats that are posed to internal and external validity. Creswell, Plano, & Clark (2011) argue that internal validity involves the extent to which a researcher can identify the existence of cause-and-effect relationships among variables. External validity is regarded as being the extent to which a conclusion can be derived when the results apply to a large population. In this study, the threats to external validity included the location of schools selected for the research. The schools are within the same rural community although characteristics differ as there is an appropriate demographic distribution and representation of the sample in this study.

#### **3.10.1 Reliability and Validity**

Both reliability and validity are considered to be two main key aspects of all kinds of research (Brigitte 2017). It is vital for researchers to ensure that the study is valid and reliable (Kvale, 1996). It is also emphasised that the rigour of qualitative research equates to the concepts of reliability and validity, and all are necessary components of quality (Lincoln and Guba 1991). Essentially, in the process of this study, I was much concerned with the rigour and trustworthiness of the study and I ensured that a number of steps were taken to enable the rigour and trustworthiness in the research process.



### **3.10.2 Reliability**

The term rigour in qualitative research commonly refers to its 'dependability' (Lincoln and Guba 1985). Notably, it has been emphasised that in a qualitative study the concept of reliability is less relevant (Stenbacka 2001; Golafshani 2003). Reliability is a term often used in quantitative research to evaluate the quality of a study with the main aim of 'explaining' what is happening, whereas the quality concept in a qualitative study is more to do with providing a transparent and logically reasoned process of 'generating understanding' (Stenbacka, 2001, Cohen et al. 2012). Generally, reliability in research is associated with the issue of whether the research findings are repeatable (Bryman, 2012). The importance of ensuring reliability in qualitative research remains a crucial part of maintaining good practice in a qualitative research process. In this regard, qualitative researchers tend to discuss 'trustworthiness' as a component of the validity and reliability of their research. The term reliability in qualitative research commonly refers to 'dependability' (Lincoln and Guba 1985). Notably, it has been emphasised that in a qualitative study the concept of reliability is less relevant (Stenbacka 2001; Golafshani 2003). Reliability is a term often used in quantitative research to evaluate the quality of a study with the main aim of 'explaining' what is happening, whereas the quality concept in a qualitative study is more to do with 'generating understanding' (Stenbacka, 2001, Cohen et al. 2012). In establishing trustworthiness in this study, the interview guide was tested through the pilot study, ahead of beginning the main data gathering process. For this research, the amount and quality of the data being generated was a key criterion to establish the rigour of the research process. As I have explained previously, all the interviews were recorded and then transcribed. The recordings were all carefully listened to several times to avoid any form of misinterpretation. It is argued that rigour is essentially concerned with the logical processes and methodological choices of the study (Maxwell J. A., 2005; Creswell J. W., 2014).

### **3.10.3 Validity**

Validity is another seemingly controversial concept in research methods, as many researchers argue that the term validity is not applicable to qualitative research. Golafshani (2003) argues that if a qualitative study cannot yield valid results, consequently, everything that is based on a given study cannot be relied on (Patton

2002). However, the constructivist paradigm accepts that the social environment is always, to a greater or lesser degree, in flux and so it would be nonsensical to expect future actions to merely replicate previous ones. Furthermore, it appears that there is no specific method that could guarantee the validity in qualitative research (Creswell, 2014). Nonetheless, the quality of a qualitative study can be judged by how clear and logical the inferences of the study are demonstrated to be, as well as the rigour pursued in devising, utilising and reflecting on the limitations of the methods that are deemed suitable and helpful to address the research question (Cohen et al. 2012).

#### **3.10.4 Language of Communication in the Research**

Nigeria is a diverse society with more than 250 ethnic groups and languages (Eskay et al., 2012), however, English is the dominant and official language of communication. Therefore, the choice of language for this research was carefully considered in order to ensure effective communication during the fieldwork. The teaching workforce is made up of diverse groups of people from different ethnic nationalities, hence it is necessary to use a language that is generally acceptable and understood by all of the participants in the knowledge that language influences how meaning is construed (Van Nes, Abma, Johnson, Deeg, 2010). Reflecting on the work of Van Nes et al., (2010), the language differences of the research participants can have a potential impact on the research process. Van Nes et al., (2010) argue that linguistic differences among ethnic nationalities have consequences, and this is of particular relevance in this research, due to the different dialects that are inherent among the research participants. In consequence, I ensured that in using English during the research process, a helpful uniform approach was adopted during the research interviews.

Moreover, English is an official medium of communication in Nigerian schools and institutions. Although, both the researcher and the research participants are familiar with the local Nigerian languages, I only used the local language informally during the research process, for the purpose of appearing polite and cordial. The application of English during the interviews provided a consistency that has been helpful during the research process.

Qualitative research is considered valid when the distance between the meanings as expressed by the participants and the meaning as interpreted in the researcher is as close as possible (Polkinghorne 2007). It is also essential that the findings of the study are presented in such a way that the readers understand the meanings that are expressed in the findings. In this respect, the local languages and dialects were not considered appropriate in the study as it can be argued that this poses challenges to the interpretation and representation of meanings in addition to creating a need for interlingual translation. This can affect the meaning that the research data presents. It is worth noting that linguistic differences may create extra challenges that might thwart the transfer of meaning and that this in turn may challenge the rigour of this qualitative study.

#### **3.10.4 Trustworthiness**

Trustworthiness has been described in different ways by different researchers. Trustworthiness refers to the quality, authenticity or strength of the research findings. This concept relates to the degree of trust, or confidence, readers have in the research process and data. Yin (1994) argues that trustworthiness is a criterion to judge the quality of the research design. Likewise, Bell (1999) argues that whatever methods are selected as a means of data collection, there should always be a level of critical review in order to evaluate or assess the extent of the rigour and credibility of the study. This argument is also supported by Krench and Crunchfield (1982). It is argued that trustworthiness is an important part of the research process and in this study, the researcher used 'member checking' to ensure the trustworthiness of the research. According to Maykut & Morehouse, (1994), 'member checking' refers to the process of asking the research participants to express their opinion on whether or not the data has been transcribed accurately in respect of representing their experiences. Secondly, it is argued that it is important for researchers to produce a recognizable perception of the reality of a research study. This process has been adopted following the work of Maykut & Morehouse, (1994) who argue that research participants' feedback about the research process is an invaluable component of the research process. The researcher made a copy of the interview transcript available to the participants after transcription for a review and confirmation that the opinions expressed in the transcript represented their true opinions and views as at the time of the interview. The participants were also advised to point out any area of the transcript

that required modification or correction. The participants acknowledged that the interview transcript was a faithful representation of their opinions and views.

### **3.10.5 Triangulation**

Triangulation from an interpretive point of view represents a strategy or principle to also ensure trustworthiness in research (Richardson 2000 cited in Merriam 2016). Commonly used forms of triangulation include data triangulation, and this involves using different sources of data that are gathered from interviews, observations, and focus group discussions. This type of triangulation is viewed as being the most popular form of triangulation (Guion et al. 2011). However, there are other types of triangulation. Triangulation of method involves the use of a combination of research methods and 'environment triangulation' involves different environments (or locations) within the study (Merriam 2016). The key concern of this particular interpretation of triangulation is to explore the environmental factors that can influence the research process. There is also investigator triangulation, and this is enabled through involving the use of different investigators in analyzing the data. These different investigators could consist of fellow researchers/colleagues. The findings from the various investigators are compared for convergence and divergence of evidence. Another type of triangulation is theory triangulation and this involves the use of participants who are professionals drawn from different fields of study. This may also involve using participants in the same field who are drawn from different sectors. It is argued that people from different research fields inevitably have different theoretical perspectives and this can be used to enrich the research process.

In order to facilitate the trustworthiness of this research, the study has adopted data triangulation, in which photo interviewing, loosely-structured interviews, and literature reviews were used to confirm the findings of the research data. The researcher also used triangulation in the sense that different means of data collection were employed to achieve some level of consistency of evidence to ensure that the findings are trustworthy. The researcher has considered those crucial steps and strategies to maintain good practice and trustworthiness within the research process.

### **3.10.6 Member Checks**

'Member checking' as explained previously is another common strategy for maintaining or ensuring rigour and trustworthiness within qualitative research. The researcher has adopted this strategy in confirming the data within this research. In implementing this strategy, all of the research participants were given the opportunity to comment on the transcribed data. To ascertain that the transcribed information 'rings true', the participants were asked to give their views about what was transcribed and then say whether the information was a faithful reflection of their views (Merriam, 2002). In respect of this knowledge, this process has been applied in this study to validate the data of this research. Moreover, the participants were further notified that when the data was interpreted their opinions and comments reflected the 'truth of their responses'.

### **3.10.7 Ethical Considerations**

The importance of ethical considerations while conducting research cannot be over emphasised. As researchers engage in data collection processes, it is important to ensure that there is respect for the research participants and their views (Creswell, 2003). It is, therefore, vital that the researcher complies with the ethical standards and in this research study I have followed the guidance of Teesside University's Research Ethics Committee. In this study, the researcher complied strictly with all the ethical guidelines and standards of research throughout the entire process of this study. Ethical clearance was first sought from the research ethics committee of Teesside University. Permission from the school management regarding the research being conducted at their school was sought. A letter was submitted to the head/principal of schools in order to give an overview of the nature of the study. Moreover, informed consent was obtained from all of the research participants. In this regard, the participants were requested to sign the letters of consent in the event of agreeing to participate in the study. A face-to-face briefing was also held in order to address queries from some participants before the commencement of the actual fieldwork. In this research, the researcher has ensured the participants' rights to privacy, confidentiality, and anonymity were respected and strictly adhered to in the following manner: (1) The participants are not identified in these research findings. 2. Only the researcher and the supervisors have access to the research data. The data

collected was anonymized with pseudonyms used to protect each participant's identity.

The study utilises photo elicitation as a source of primary data collection involving educational practitioners from selected schools in the Imo State, Nigeria. I made sure that research ethical values were carefully adhered to during the research process. Ethics as an important aspect of any research and I considered ethical matters from the very conception of the research idea, and throughout the research process. In this study, written informed consent letters detailing the nature and purpose of the research were disseminated to the various research participants. The participants were allowed to take the letter home so that they had sufficient time to read the letter and provide their consent by signing the consent form and returning the paperwork to the researcher. The reason for allowing the participants to take the letter home was to give sufficient time for any questions that may have arisen from the form or letter. The participants were fully briefed on the nature of the research and the requirement to bring in their own photos depicting their perception of technology application in classroom practice and inclusive education. Also, all of the interviewees were informed that they needed to provide photos revealing their thoughts on SEN practice and the integration of TEL into pedagogy. At the beginning of the interviews, I also obtained verbal consent from the participants to ensure that they were still happy to take part in the research. Due to the nature of the research data, strict codes of confidentiality and anonymity were followed. The school names are not revealed and the participants' names have been changed to pseudonyms. Moreover, each participant's transcripts and audio recordings were erased and destroyed upon completing the PhD research in accordance with the recommendations of the ethics committee.

It is interesting to recall that one of the principles of ethical consideration when using human 'subjects' in this type research is the need to provide feedback. It is an ethical compliance to keep the participants informed about how their data is being used. In adhering to this good practice, a final 'thank you' letter was sent with an attachment that included a summary of the research findings and how the images were used in the study. Moreover, the research at this point deemed it necessary to include the right to withdraw in case any participant objected to the ways in which their data was

processed. I also ensured that each research participant's human rights were completely respected in adhering to the confidentiality of the storage of the research data.

The research was planned and carried out in a manner that fostered good practice and avoided harm to participants, either physical or psychological. Participants' rights to freedom of choice, expression, and access to information was maintained. Respect was considered in terms of their voluntary participation and withdrawal at any time during the study. An example of this is where the participants who were unwilling to capture images for personal reasons were not pressured to do this. The rights of the research community were respected in the following ways: the researcher adhered to high standards of planning, implementation, and reporting the research. I also ensured that I was committed to honest, unbiased and neutral research, and that the research transcripts and images were kept safe and locked away from the public. Pseudonyms were used in place of actual names in the interview transcripts and alongside this, all of the participants were promised feedback on the findings at the end of this study.

### **3.10.8 Crystallization**

Crystallization is a powerful and innovative approach in qualitative research (Ellingson 2009). This form of research reflexivity combines multiple forms of data collection, multiple forms of analysis, and multiple genres of representation and understanding of a research problem to build a rich, open, and coherent account of the phenomena under investigation by using crystallized texts to achieve reflexive validity (Ellingson 2009; Lather 1993). Crystallization is simply a way of incorporating multiple qualitative methods in a research. This approach can be described as being a framework for reaching an understanding of how qualitative methods involve more than one form of inquiry. In a research process, interviews, images and other forms of inquiry hold the potential to combine together to provide the opportunity to gather rich research data. Although some researchers think crystallization is a form of triangulation, Ellingson (2009) argues that crystallization is more than triangulation as it rooted in six key principles of method.

It is worth noting that researchers can triangulate data within a single methodology; however, crystallization not only uses traditional triangulation, as there is the presence

of two or more genres to further strengthen, and contribute to the rigour of the research data. It is acknowledged that crystallization has the benefit of permitting deep, rich, thick descriptions of the data (Ellingson 2011, 2014). Thus, crystallization provides the reader with multiple ways of understanding what is happening during the research process in respect of the breadth and depth of the research data. Crystallisation encourages researchers to embrace an open-minded willingness to appreciate a wide-range of data representation. This research process enables the researcher to have a deeper level of understanding based upon Creswell's (1994) holistic account of qualitative research.

Generally speaking, the concept of crystallization as a framework has two primary types, which are integrated- crystallization and dendritic crystallization (Ellingson, 2009; 2011;2014). I adopted the dendritic crystallization which refers to the continuing and dispersed process of eliciting meaning via multiple forms of analysis, as well as multiple genres of representation in a series of distinct or disparate texts (Ellingson 2014; Stewart, Gapp & Harwood 2017). This approach was chosen because the inquiry process of this research involved both narrative texts and images.

The six principles of crystallization include deep and thick description, paying attention to complexity of interpretation, use of multiple genres or forms of inquiry, significant degrees of reflexivity, alongside a questioning of positivist claims to objectivity, and a singular discoverable truth (Ellingson 2014). I adopted the concept of crystallization in this research process because of the obvious advantages that include the ability to give the researcher a deeper level of understanding (Ellingson 2009) with my photo interviews. The approach also reinforces the same experience in different forms. This is particularly important to my research as I used a variety of inquiry techniques to understand the research problem. This also gives the reader multiple ways of understanding the data by providing deep, rich, thick descriptions.

Crystallization focuses on understanding the research and the researcher's position in order to view the process with an openness that creates room for intimate discoveries (Ellingson, 2011, 2014). As Cohen et al. (2009) contend, researchers should provide an in-depth understanding of their research topics, and crystallization provides yet another way of achieving depth through the compilation of many details, that enhance the thick description of the research findings (Geertz 1973). Flick (2009) argues that



creating trustworthiness and credibility in qualitative research through multiple views is not just about validation, it is more about creating an alternative process that encompasses the deep and rich complexities that ought to be pursued in qualitative research. However, Richardson (2000) applies the metaphor of a crystal as an alternative to a triangle as a basis for research validity and methodological rigor. This metaphorical image was articulated into a crystallization framework that combines different forms of analysis and various genres of representation into a series of related texts to construct a rich, as well as openly partial account of a problem or phenomenon (Ellingson 2014).

Crystallization spans through the qualitative field in the quest to elicit deeper and richer understandings to advance social construction (Denzin & Lincoln 2011; Ellingson 2011, 2014). It is conceptually argued that the notion of importing crystallization requires time, effort, commitment and passion. This suggests that it is not an ontological or epistemological means for the qualitative researchers wanting a quick method of data gathering and analysis. Crystallization is internalized and presented as a way of delving deeply into a research process with the belief that findings become rich, credible and trustworthy (Ellingson 2011, 2014).

In this study, crystallization has enabled a new rich way of data gathering and analysis in my research as the truth presents itself, and the truth is revealed and established through different forms of inquiry. This research incorporated photo-interviewing into its inquiry process with educational practitioners in Nigerian schools. The idea of crystallization in the study has provided me with the ability to delve into generating breadth and depth in the research process in gathering rich responses about the perceptions and experiences of educational practitioners using technology in teaching and learning. It is through the use of photo-interviewing that this breadth and depth of data has been gathered. This research approach contributed to an enabling atmosphere for my research interviews. The framework gave me the opportunity for an extensive and clearer understanding of the research phenomenon that is under investigation. It is emphasised that photo-elicitation provides a common focus for the interviewer and the interviewees (Clark-Ibáñez 2004; Cook & Hess, 2007). The use of participant-produced photographs essentially promotes participative elements towards the research inquiry, and this also decreases power differentials between the interviewers and the interviewees (Cappello, 2005; Packard, 2008; Pink, 2013). In this

research process, when the participants take photos themselves, they are being active participants who can explain their self-produced photographs to the researcher(s) (Cook & Hess, 2007).

### **3.10.9 Reflexivity**

Reflexivity in qualitative research has been conceptualized and defined in different ways (Cutcliffe 2003; Finlay, 2002; Pillow, 2003; Mruck & Mey, 2007). It often refers to the generalised practice in which researchers attempt to make their influence on the research explicit, both to the researcher and to their audience. Reflexivity in qualitative research is more about what changes are brought to the researcher as a result of the study, and how these changes affect the entire research process (Palaganas et al., 2017). Notably, the essence of reflexivity is to give an accurate account of how the research process may have affected, and transformed an individual either, as a researcher, a professional, or a person. As Reay (2007) argues, reflexivity involves giving as full and credible an account of the research process as is possible. Reflexivity illuminates the position of the researcher in relation to the research and in this regard, my research has embraced and promoted the use of a methodology that is not widely used in contemporary social sciences.

This study has incorporated a visual methodological approach interchangeably called 'photo-elicitation' and 'photo-interviewing'. As noted by Douglas Hamper, cited in Rose (2016), photo-elicitation is simply based on the idea of inserting photographs into research processes. This could be an image or different kinds of images. In contrast, Rose (2016) reveals that in many photo-elicitation studies, participants are asked to capture the pictures themselves, and this was the technique adopted for this research process. It was the captured photos of the participants that were discussed during the interviews. I uphold that this method is very well suited to understanding teachers' perceptions and experiences of technology application to pedagogy to promote inclusive practice. The approach has some advantages over traditional qualitative methods such as; using only interviews, observations, focus group interviews, and other qualitative techniques. In this research I have completed 25 semi-structured interviews using photo-interviewing to generate a collective discussion about the perceptions and experiences of education practitioners who are using new digital technology in pedagogy. Their manifest content was analysed and described,

including the comments of the participants. All of the interviews were recorded and transcribed verbatim. Data analysis was based on the transcripts of all interviews, combining rich pictures and a thematic analysis approach.

I acknowledge that the research has both its power and its limitations for social change and development. I saw its importance and influence in conveying ideas from those who have direct experiences of using digital technology to promote inclusion; and those that are in a position to render useful responses on how, why, and the extent to which they use digital technology in their pedagogy to support children with SEN. In the course of this research, I acquired the hands-on experience of developing my critical reasoning, research skills, technical skills and ensuring the credibility of my research process. I realised that I was not only challenged to develop my skills as a researcher, however also empowered to develop my basic virtues and power of reasoning as an individual. This was applied to identify the right frame and flow of interview questions, and make sense of responses from the participants, in order to draw the essential data comprising and supporting the research. Jootun et al. (2009) argue that qualitative research is prone to a degree of subjectivity since the interpretation of the participants' attitudes and collected data may be influenced by the values, beliefs, experience and interests of the researcher.

Whilst the process of transcribing, coding, and analysing qualitative data is often regarded as laborious, (perhaps an almost Herculean task), the data analysis process projected the value of being concise and accurate in identifying categories of representation within the data; and to be always mindful of detaching my own interpretations at these stages of data processing. I gained the experience of understanding how to delineate non-essential data from core fundamental data that represents vital information to the participants, as I listened to the participants' views and narratives of technology use in pedagogy in relation to inclusive practice. The research process provided me with the opportunity to appreciate how the participants can reflect on and define their understanding of inclusive practice and technology use in teaching and learning. Moreover, drawing upon inferences about their experiences of new forms of pedagogy and the influence of professional development in this part of the world, I respected the participants' perceptions of the state and status-quo of current pedagogical practices in Nigeria. The research participants reflected on how they could take pride in their challenges, and struggles to make an impact in their

teaching with technology in promoting inclusive practice in the classroom. During the research process, I came to examine my own experience of resource issues in Nigerian schools. I became more appreciative of the opportunity to explore this phenomenon in greater depth. I aim to establish possible recommendations on how substantial improvements can be made in Nigerian educational pedagogy in order to enable inclusive practice. The research promotes essential social interventions to enact change and improvements towards the perceptions and attitudes of teachers and the general public about children and people with SEN in Africa, and Nigeria in particular. It is correspondingly true that societies influence our perspectives, hence the government and responsible personnel can equip the schools and the society with the required infrastructure, and provide the training that can enable social change.

### **3.11 Summary**

I have presented the ways in which I have used photo interviewing as part of a methodological strategy in this study to convey teachers' perceptions and experiences in applying technology to pedagogy to promote inclusive practice. I have revealed that visual images have allowed me to create holistic and in-depth understandings of the research topic. I have embedded this approach to enable the gathering of high quality data. Of course, the very nature of employing photo interviewing can be difficult, demanding, and time-consuming. One of the challenges I encountered involved analysing the visual data effectively, as there was no explicit and clear format for visual data analysis. Alongside this, and drawing on my practical experience, depending on the nature of the study, photo interviewing may require a different kind of ethical, and methodological approach which also results in practical challenges. Photo interviewing can be enjoyable for both the participants and the researchers. Given the level of involvement of the participants and the collaboration among the participants and the researcher during prior data analysis I contend that visual methods enhance participants' voices and participation in the research process and that this research approach provides the participants with the opportunity to express their views about the social world using images.

## Chapter Four

### Presentation of The Research Findings

#### 4.0 Introduction

This chapter of the thesis is organised into two sections, with the first section presenting demographic data about the participants. The second section of the chapter then presents the findings that have been obtained from the 25 educational practitioners who were selected purposively from the schools within the Imo State of Nigeria that make up my research set. The chapter presents four key research themes that have evolved through constant reflection on the themes that have emerged from the research data. These four themes are all linked to the research questions.

The research questions featured in the study are as follows:

- a) How do teachers perceive and understand the inclusion of children with SEN in their pedagogy?
- b) How do teachers apply digital technology to support children with SEN in their pedagogy?
- c) What are the challenges in integrating technology in pedagogy in the Nigerian schools?
- d) How does the professional development of teachers' influence technology use in promoting inclusive practice?

The four themes derived from the responses to the interview questions (see Appendix D), which are tied to the overarching research question of the study are as follows.

1. Teachers have varied perceptions of what is meant by inclusion and disability.
2. Some teachers lack awareness of how to apply technology to pedagogy effectively.
3. There is a lack of a necessary infrastructure to support the application of technology to SEN pedagogy.
4. Teachers' training needs are not always met.

#### **4.1 Study Presentation Overview**

The presentation and discussion of this research is based on photo elicitation and semi-structured interviews. The research aims to understand and explain teachers' views and experiences in applying digital technology in pedagogy for inclusive practice. The research in this study has elicited in-depth information on current practice in pedagogy as it is, hence presenting 'what is' rather than 'what should be' when technology is applied to pedagogy in educational settings. The presentation and analysis of this study has been completed in accordance with the basic principles of thematic analysis. As noted, this study applied Braun and Clarke's (2006) thematic analysis strategy which provides a flexible and useful research tool for analysing research data (Boyatzis 1998, Ryan and Bernard 2000), and this enables the researcher to create the themes that the researcher wants to discuss (Braun & Clarke 2006). The interviews were conducted in three stages and each stage of the interview has a specific purpose and focus as detailed in the previous chapter.

The study initially generated five emerging themes. However, this was during the early coding of the data which was later narrowed and refined to four key themes following the presentation of the research at an academic conference. Using Braun & Clarke's (2006) approach permits a flexible way of organising, presenting and analysing qualitative research data (Boyatzis 1998, Ryan and Bernard 2000). The Braun and Clarke (2006) analytical strategy allowed me the opportunity to refine the emerging themes from the data in order to enhance consistency and this allowed me to gain clear insights into the research topic. This links to the argument of Creswell (2014), that not all of the information from the data is necessarily pivotal to the research focus, therefore, only the important information was used. The research themes relate in general to the teachers' views and perspectives about digital-technology use in pedagogy in supporting the education of children with SEN. Moreover, the associated challenges impeding teachers' effective use of technology in pedagogy such as; CPD and other factors were all explored.

#### **4.2 The Demographic Representation of the Research Samples.**

The research sample involved 25 education practitioners and this comprised of 13 male teachers and 12 female teachers. The slightly greater number of men in the

research sample was simply because I discovered that men were more willing to be interviewed about the topic than their female counterparts. Moreover, in the context of this study, it appears that men are more confident in applying technology in pedagogy and they were more willing to discuss using technology than the women in the research sample. However, this may not be the case across all pedagogy in this area. The age of the research participants varies from 25 to 60 years, and the research participants evidenced 2 to 20 years teaching experience. This captures a full range of early stage, mid stage, and later stage career teachers. In addition, the research sample also captures the diverse educational sector that the practitioners work in.

Gender	Number	Percentage
<b>Male</b>	13	52%
<b>Female</b>	12	48%
<b>Total</b>	25	100%

Table 4.1: Gender distribution of participants

Age group	Number	Years of experience
<b>25-35</b>	8	5-10
<b>35-45</b>	8	10- 15
<b>45-50</b>	7	15 – 19
<b>50-60</b>	2	20+

Table 4.2: Age distribution of participants

Sector	Number of participants
<b>Government school primary teachers</b>	10
<b>Government school secondary teacher</b>	3
<b>Private school primary teachers</b>	8
<b>Private school secondary teachers</b>	2
<b>General educators of children with SEN</b>	2
Total	25

Table 4.3: School sector distribution of participants

### 4.3 Emerging Themes

The research themes emerged as an outcome of exploring how teachers understood the concept of inclusive education and disability. This part of the interview explored teachers' perceptions and understandings of the inclusion of children with SEN in their pedagogy and this relates to interview questions 1 and 2. The participants' responses that generated this theme suggest different views, perceptions, and interpretations from teachers about inclusion and the different kinds of disability.

#### 4.3.1 Theme 1: Teachers have varied perceptions of what is meant by inclusion and learning disability.

Teachers' knowledge, understanding, and perceived views appear to moderate any successful implementation of any educational programme. The research revealed that the effective implementation of inclusive education is reliant on the way that individual teachers conceptualise inclusive education/pedagogy. Several previous research studies have presented findings which reveal that the conceptualisation of inclusive



practice differs between individual educators (Slee, 2001). For example, a study conducted by Devarakonda (2009) revealed that the concept of inclusive education is vague and difficult to define. It was also revealed that the idea of inclusive education is a potentially vague concept, because there are various misconceptions surrounding inclusion, such as the definition of the term inclusive education, and this can lead to ambiguity (Hornsby 2010). This invariably affects individual teachers' perceptions of the concept of inclusive education, to reveal a variety of views about what inclusion actually is.

This ambiguity surrounding the concept of inclusion and SEN practice is also evident in the responses of the participants in this study. The teachers tend to understand what inclusion means from a number of different perspectives by displaying varying understandings of inclusion and disability. Moreover, the participants demonstrated an awareness of disability from the medicalised idea that disability is a form of 'deficit'. The participants' descriptions of SEN were more associated with the child's/student's physical challenges, behavioural attributes, and cognitive abilities. Furthermore, it is apparent from the findings that many of the participants revealed an understanding of disability from the medical model view of disability with an emphasis being placed on the individual's physical appearance. The research also identifies another interesting aspects where teachers present less awareness of 'invisible' disabilities such as dyslexia; dyspraxia; dyscalculia; ADHD; and dysgraphia.



**Figure 4.1: Image showing teachers' thoughts about inclusive practice and disability.**

In this section of the thesis I will begin with a reflection on the image shown above. During the Photo Elicitation Interview (PEI) in this example, the research participant revealed that inclusive pedagogy in Nigerian schools is not necessarily occurring as there are complexities in respect of what inclusion and disability actually mean to different research participants. In the image, a group of children are present. They almost seem to merge into one, and in this way, the research participant revealed that individual differences are not considered as fully as they ought to be. Different beliefs and cultures affect inclusive practice, and as such, inclusion means many things to different people, and this is expressed in very diverse ways. This appears to make the understanding of the concept of inclusion complex. The image also reveals an old-fashioned view of teaching. It was revealed that the typical classroom arrangements are still like the traditional classroom seating arrangements and this is not a favourable seating arrangement for learners with a disability like dyslexia, as dyslexic learners work and learn better in small groups. The image also reveals an overcrowded classroom with a painted wall used as a blackboard for instructional delivery. In this type of setting all of the students may be viewed in the same way and in consequence the complex needs of children with disabilities, particularly the invisible disabilities are not being met. This reveals that inclusion is not occurring. It was further ascertained that overcrowded classrooms tend to work against the teachers' efforts in meeting the needs of their learners, especially those with complex additional needs. The discussion and reflection on the above image reveals the view that one picture can mean a thousand words (Johnson & Christensen 2014). Effective inclusive practice ought to be based on holistic endeavors to embrace not only the practice of teaching, yet also, an understanding of how students learn in an inclusive and supportive environment (Hunt et al., 2013).

#### **4.3.1.1 *The participants' perceptions of inclusive practice.***

**Frank** (an ICT teacher from a private school) explains his understanding of what inclusion means to him: *'Just like the word inclusion, inclusion means not being biased as in...non segregation*

*between a boy and a girl, not discriminating against anyone based on religion...that is whether you are a Christian or you are a Muslim everybody comes together to learn under one umbrella.'*

This research participant's response reveals a view of inclusion as an equal opportunity for 'all' irrespective of gender or religion. This idea corresponds with the notion that inclusion or inclusive education can be interpreted as the philosophy and practice for educating children with disabilities in general education settings.

**Ify** (a mainstream school teacher) corroborates this notion of according all children equal opportunity to learn in one setting. The participants' reflections mirror the policy declaration on special needs education (UNESCO, 1994).

*Ify* reflects that: *'I understand that inclusion in education means bringing people with special educational needs and normal children together in the same classroom and being able to tackle their needs together so that you can carry all the children along.'*

In developing this theme further, **Favour** who also works in a mainstream school revealed an awareness of inclusion, although, she acknowledged that full inclusive practice is not yet happening in this school setting:

*'From my own understanding, inclusive education is ideally the integration of all children irrespective of gender, religion, ability and disability. Although in respect of people with severe disabilities NO! NO! NO! we don't admit them here.'*

The reflections from **Ify**, **Frank**, and **Favour** link to the UNESCO (1994) policy document on special needs education, which provides key rights for children with disabilities to be educated. The fact that teachers expressed that certain categories of children are not integrated in mainstream schools in Nigeria, reveals that an understanding of inclusion is evident that is based on a medical model in these school settings. Moreover, this perception is not enabling effective SEN practice.

The teachers also revealed their subjective understandings about what inclusion means to them, in respect of the attempts that are being made to promote inclusive pedagogical practice. **Paul** (a mainstream school teacher) reveals that;

*'The concept of inclusion for me is about bringing together students or people with different abilities or disabilities under one classroom to learn... Yes, you can have children who have different kinds of learning disabilities, for example; the physically handicapped; the blind; the deaf; those with cognitive disabilities; behavioural disorders; autism; and children who are referred to as 'gifted and talented'. There are children who can learn fast and those learners who are slow learners, however, having them taught together is what I understand by inclusion.'*

This research participant reflected that in his experience, some of the children who are classified as SEN children do not necessarily have conventional disabilities. Some are just less privileged, while they may also be exceptional children. It was interesting to identify differing interpretations of inclusion and different terms being used to classify different levels of disability, ranging from physical deformity; for example; the physically handicapped; the blind; the deaf; those with cognitive disabilities; behavioural disorders; autism; and children who are referred to as 'gifted and talented'. There were other categories of SEN based on certain cultural perspectives for example where the children of nomadic farmers are on the list of SEN in Nigeria. However, there was an emphasis placed on 'exceptional children'...like the 'Albinos'.

In **Paul's** reflection, 'Albino' children are viewed as being disabled. **Paul** also reveals that:

*'The Albino child I have in my class is one of the most brilliant students, yet he is still being seen to have problems both in school here and in the wider society... I can't see any other problems, yet some people make fun of him.'*

This research participant highlights that apart from the child's visual difficulties, which are particular to Albinos, there were no other specific difficulties being encountered. Although, this reflection may be considered as a subjective interpretation, it also

reveals that there can be a misconception of various disabilities. The participants revealed varying interpretations.

**Peace** (a mainstream government school teacher) promotes inclusion in the following reflection: *'As an educational practitioner... I try to provide all learners with equal opportunity to learn in the same classroom. So, in my class I have fast learners and slow learners...I try to carry all of them along, although it can be quite challenging but, I don't discriminate based on their disabilities.'*

Here, this research participant demonstrates not just the theoretical understanding of inclusion, yet also a positive attitude that supports children with SEN through mentioning the various pedagogical strategies that are applied to promote inclusive pedagogical practice.

**Lowe** (a private school teacher) reflects on her understanding of inclusion in the following way:

*'Basically inclusive practice reveals a concept that attempts to bring every learner in the same environment together to give them equal opportunity to learn under one umbrella and to maximise their potential. In this type of pedagogical practice teachers develop a strategy to support children with SEN. For example; somebody who is visually impaired cannot be thought about in the same way as somebody who has no visual problems.'*

This research participant demonstrates a positive attitude and an awareness of accommodating and supporting learners with SEN.

**Braddy** (a private school computer science teacher) also views inclusive practice as a process that includes special needs students with the regular students. This was revealed in his reflection below:

*'In my own view, inclusive practice is revealed through the process of including special needs students with the normal students...so it is where people with special needs or disabilities and regular students are together in the same classroom.'*

**Joy** (a primary school teacher) talks about her perceptions of inclusive practice and how useful inclusion is in supporting the education of children and students with SEN. Moreover, **Joy** reveals that the full implementation of inclusion remains a challenge because ‘children with SEN are not well supported even where they are included’.

*‘In my opinion inclusive practice is a good thing... it means that all learners are welcome in schools irrespective of ability and disability; gender; socio-cultural background; and religion. They learn together, participate in all aspect of school life despite their educational needs’. But the problem is that children with disabilities here have little help in place for them because the system does not make enough provision for them.’*



**Figure 4.2: Image depicting the needs of children with SEN not being met due to old-fashioned pedagogical approaches.**

The PEI applied in this study revealed insights into the current practice of inclusion as experienced by the participants. The above image reflects the opinion of the research participants, that teachers still operate old-fashioned pedagogical approaches where traditional teaching methods dominate the way that teaching and

learning takes place. The research participants acknowledged that inclusive practice is not occurring.

**Jerry** (a private school primary teacher) provides the following reflection about the importance of inclusion:

*'I think inclusion is quite useful because children with SEN have more opportunity to spend time learning with their peers with and without disabilities. However, unfortunately many schools and teachers in Nigeria here do not practice full inclusion.'*

The above reflection is another example revealing that inclusive pedagogical practice is yet to be fully adopted, rather what is apparent is 'integration.'



**Figure 4.3: Image revealing the needs of children with SEN are not being met with old-fashioned pedagogical approaches.**

The above image reveals that needs of children with SEN are not being met. The image reveals that didactic pedagogy is the dominant mode of practice and that inclusive pedagogy is dependent upon the environment in which teaching and learning takes place.

**Judith** (a teacher from a government primary school) states that;

*'Inclusive education or practice happens when children with or without disabilities come together to learn. This is to say inclusive education encourages equality. It can go a long way to make a difference given that nobody will be left behind especially in terms of*

*education... But the bad thing is that little or nothing is happening here...I can tell you, not many teachers practice inclusion.'*

This research participant emphasises that most teachers are not well versed on how to initiate effective inclusive practice. It was further identified that the government of Nigeria and the Imo State in particular have done too little to promote the education and support of people with SEN.



**Figure 4.4: An image revealing that the needs of children with SEN are not being met by old-fashioned pedagogical approaches.**

Reflecting on the image above, it is evident that the teachers in the research sample do not think that inclusion in Nigeria is becoming a reality. The above image supports the views of other research participants in revealing challenges in implementing inclusive pedagogy. Although, many teachers attempt to move on from old-fashioned and traditional beliefs about disability in Nigeria, there are a number of factors that are beyond the individual teacher's control. The teachers perceived that the learning environment plays a key role in determining how much information the learners are able to retain and the extent in which the information is processed. For instance; a dyslexic learner who struggles to process information, and learn better with a multisensory approach may not be able to learn well in this type of traditional pedagogical environment. Moreover, learners with ADHD who are characterized with hyperactive forms of behaviour, and difficulties in concentration are likely to be easily distracted or lose focus if the classroom is not engaging enough. The above image



reveals a typical classroom setting, and this was the case in all of the schools involved in this research. The image reveals that mainstream schools do not seem to be welcoming special educational needs children, and teachers appear to be less well prepared than they ought to be because of this inadequate learning environment. A learning environment like this is likely to inhibit learners with disabilities. There is, in other words, a need for pedagogical restructuring and informed policies to achieve a sustainable inclusive pedagogy.

**Pamela** (a teacher from a private school) reflects that;

*'inclusive education helps to combat discriminatory attitudes. And you know when we talk about inclusion you talk about children with SEN who require additional support... Inclusion is good practice, but not the type happening here in Nigeria.'*

There is an indication that teachers conceptually understand what is inclusion, yet seemingly, it appears that it is just knowing what the concept means. Unfortunately, not much inclusive consideration appears to be occurring in a number of examples of current pedagogical practice in Nigeria. However, the research participants reveal that they have a relative understanding what inclusion is at a conceptual level.

**Jack** (a primary school teacher in a private setting) notes that:

*'inclusive practice is letting every child, both disabled and non-disabled, know that their needs will be met, irrespective of whether they are slow learners, or if they have mild or severe disabilities, so that they have the opportunity to attend school and learn, just like they would if their disabilities were not present.'*

**Patrick** (from a private school) reflects that:

*'Inclusion simply means education for both normal children and children with disabilities... I will say, however, that today as in the past a number of parents are still not aware of inclusive education, and in fact, they hardly practice this even though there are schools for the disabled and many of the parents send these children to these schools.'*

**Pascal** (a private school teacher) notes that:

*'Well, the concept of inclusion as far as the education system is concerned is a strategy that is in place in order to help the children to learn as effectively as possible. However, it is complex to realise the agenda because of the variety of interpretations of disability.'*

**Floss** (a government school teacher) elaborates that:

*'Inclusive practice is the integration of special needs students in a mainstream school so that they have educational opportunities just like everyone else. It is good practice if it is fully embraced here in Nigeria...That is the main problem. Although it is more of the integration type of inclusive practice that is mainly practiced here, because, full inclusion is far away from our practice... the support is not there.'*

In developing the theme further, **Chidi** (a private school ICT teacher) notes as follows:

*'I think that the concept of inclusion as far as the education system is concerned is a strategy that is in place in order to help the children to learn as effectively as possible. However, it is complex to realise the agenda because of the variety of interpretations of disability.'*

This research participant views inclusion as a pedagogical strategy that enables effective teaching and learning. This is an interesting reflection that does not just promote including children or young people with SEN in the classroom, however, this goes further by enabling the consideration of the pedagogy that is necessary for all of the learners.

**Amaraka** (a Maths teacher from a government school) notes that:

*'Inclusive education is education for all children... It can enhance students' social interaction. It really helps those with SEN and most parents prefer inclusion to the segregated system of practice. However, the special schools are not always enabling environments either.'*

**Amaraka** makes a key point by acknowledging that social interaction is one of the key aspects of inclusive education. This research participant's reflection also reveals that some parents think that inclusive settings are the best option for the education of children with SEN. However, it was also revealed that most government-run special schools provide a false or misleading impression of reality due to the attitudes that are present about inclusion.

**Chevonne** (a teacher from a government school) reflects that:

*'Some people still regard disabled children as outcasts and as such treat them with contempt...they are yet to be fully integrated in the wider society, in Nigeria especially. In fact, most times they do see these children as not worthy of being included with other mainstream children because of their various disabilities. So they are being treated with little or no respect, and without adequate attention or regard. Children with disabilities go through a lot...our school doesn't practice inclusion in its real sense, that's the main point I want to make.'*

In a further reflection, **Chevonne** reiterates the complexity of enabling inclusive pedagogy:

*'I can recall a few decades ago what things were like, however, there are still some people who regard those with disabilities in the same way as in the past and this is not helping the inclusion agenda and the government could also do more.'*

There is no doubt that many teachers are beginning to show positive attitudes, and understand the need to integrate children with SEN in schools. However, where there is no appropriate and defined measures to do this, teachers in many cases continue to act in limited ways that appear to hamper the aim of providing inclusive education in mainstream schools, and in consequence, effective pedagogy in both mainstream and special schools remains a challenge.

**Pascal** (a private school teacher) also reveals that:

*'cultural perceptions of disability still exist... like in my school we don't admit many children with certain disabilities...I recall they*

*have been labelled as 'imbeciles' when of course they cannot be labelled like this. At present the cultural perceptions of disability do not seem appropriate and my view is that we are only progressing marginally.'*



**Figure 4.5: Image depicting the needs of children with SEN not met with old-fashioned pedagogical approaches.**

Considering the perceptions of the teachers involved in the research sample in this PhD, about the nature of inclusive practice, and the negative attitudes that can be present towards special educational needs learners, there is a need to promote and progress the development of SEN in the Nigerian context. **Steph**, (a government school teacher) reflects that: 'inclusion is only theory here in Nigeria as opposed to actual practice'. As noted previously, actualizing inclusive practice in many schools in Nigeria appears to be a Herculean task. Many people with disabilities are yet to be adequately integrated in schools. The participants also acknowledged that some parents are reluctant to send their disabled children to school. The stigma of having a child with a disability is still present within Nigerian culture. This can mean that children with disabilities can experience discrimination and exclusion in both wider society and in schools. Some families may encounter a number of challenges and this can limit the opportunities for these children with SEN, as some of these children may remain at home or are at best in school with little or no support because they are viewed as being less important in society, or in a worst case scenario 'impossible to educate'.

**Helen**, (a qualified SEN teacher) who has worked in a mainstream school also reveals her views about working with children with SEN:

*'Although what we practice here is an integrated system of education, inclusive practice means full integration and not having the kind of segregated system that we operate in Nigeria. As we have different kinds of learners, it means including children with SEN into regular schools and having them taught in the same place, or placing them in a special school if this is absolutely beneficial for them. But, there ought to be a careful consideration in implementing inclusive practice. This is because inclusive settings are not for all learners due to the diverse needs of the learner.'*

This research participant's response suggests that what is currently being practiced as inclusion in Nigeria is a form of integration. This refers to a situation where both regular children/students and those with SEN share the same school premises. In this type of setting, learners with SEN have their own (building) while the regular students are also kept in a different building. This research participant also noted that another practice is that special schools are often named after the disability. Examples include; schools for the blind, and schools for deaf and dumb. It is also interesting to see how this research participant highlights the importance of establishing, and understanding different kinds of disability.

**Helen** reveals that both the integrated settings and the special schools face complex challenges:

*'Although I understand that educating children with disabilities is complex and challenging, some people in wider society still believe that coming into contact with people with SEN is a health risk! So in my view, implementing inclusive practice is helping to remove the stigma that is associated to people with disabilities.'*

The research participants indicate that negative cultural perceptions of disability are still present and this shows the complexity of the views that are present about SEN. Some of the teachers referred to inappropriate terms in their reflections on learning disabilities in Nigeria, (for example 'slow learners', 'imbeciles', 'outcasts', 'Albinos').

Moreover, there are examples of stigmatizing labels that are being used to refer to people with disabilities. The nouns 'schools for the handicapped', and 'schools for the deaf and dumb' still appear within the discourse about disabilities in Nigeria. It is also worth noting at this point that the terms 'slow and fast learners' are consistently featured in teachers' discussions about their students, and this reveals the teachers' limited awareness of the complexity of disabilities. With education policymakers and educational practitioners not addressing the complexities of various disabilities by way of assigning status to these disabilities, the enabling of appropriate support is difficult to achieve.

**Jade** (another specialist in SEN) gave an insight into the education of children with SEN in Imo State. This research participant revealed that in terms of inclusive practice, implementing the policies and legislation is far from reality. In Nigeria generally, and in the Imo State in particular, people with disabilities appear to be the last to be considered in educational policies and support. It was noted that most teachers and schools choose who they want to include without following the required assessment procedures as a result of the unprecedented challenges that are characterised in the practice of implementing inclusive practice and adequate provision for children with SEN.

*Jade reveals that: 'I don't think they (the government) actually know that Education For All is to avail educational opportunities to every child at least anywhere they can learn best irrespective of their abilities and disabilities. Special education and inclusion, here in Nigeria, is still a 'grey-area'. Some parents are still ignorant of SEN... They don't know what autism is... Many parents do not know that there are special educational needs centres and organisations that support these children... I think actually some parents think that these special schools and centres are very expensive and that they won't be able to afford the tuition fees.'*

#### **4.3.1.2 Teachers attitudes towards and knowledge of disability.**

The way teachers conceptualise inclusive education influences their attitudes towards inclusive pedagogical practice and supporting children with various special educational needs in their classroom. This has important implications for special

education policies and practices in both developed and developing countries. MacMillion (2002) argues that attitudes can be seen as someone's views or thoughts about something, especially as displayed by their behaviours. However, the attitude of teachers mainly depends upon their individual temperament (Googings, Byram & Portland 1995). This attitude entails personal perceptions and feelings, prejudices or biases, preconceived notions, ideas, and opinions about a particular issue. Furthermore, Oskamp (2005) views attitudes as a tendency to respond in a positive or negative manner with respect to a given attitude or objective.

The following reflections reveal the research participants' attitudes about SEN.

**Floss** (a government school teacher), displays her awareness of several kinds of disabilities:

*'We have students who are hearing impaired, visually impaired, and those with behavioural disorders in the school. Autism and dyslexia are among the new categories of disabilities I have heard about in recent times, but we don't admit those students here. And there is this other disability called dyslexia, now, I'm just hearing about it for the first time. Do you see what I mean? It is challenging to provide adequate support if you don't have a good understanding of these disabilities.'*

**Floss**, highlighted several disabilities that she is familiar with, however in her response it is interesting to note that when it comes to terminology on certain disabilities, little awareness was demonstrated by the teachers. The reflections of this research participant reveal much awareness of the physical challenges of some forms of disability. However, to some teachers, disabilities like dyslexia and autism are viewed as a form of 'new terminology'. This reveals how disability is viewed in schools in Nigeria. Moreover, the stereotype and cultural belief within Nigeria is that disabled children are 'children from idols' and this appears to be a factor that works against the adoption and actualisation of inclusive education in Nigeria. It can be argued that the type of disability influences practitioners' attitudes. This challenge links to the training, the skills, and the knowledge of the teachers.

**Chevonne's** reflection supports the views of **Floss** as she acknowledges that:

*'We don't just admit them (children with severe disabilities) in our school... It is difficult to educate children with SEN alongside 'normal' children... There is no way we can cope.'*

Despite some teachers having the empathy to educate children with SEN, it appears that the type of disability in question appears to be a strong factor that influences practitioners' attitudes.

**Pamela** (a teacher from a private school) also reveals that children with SEN are not always integrated into mainstream schools:

*'Here what is common is the presence of physical disabilities... however, we don't integrate children with special needs here, for example the blind, the deaf and dumb. It is only those with mild forms of disability.'*

**'Favour'** (a government school teacher) also mirrors the views of other research participants on this subject:

*'Although in respect of people with severe disabilities NO! NO! NO! we don't admit them here as there is a special school for them... so we don't admit them here... like autistic children you will know that the child has a disability and he or she will be referred to a special school because we don't have adequate support to meet the needs of children with SEN, in fact we don't have much support in place for these children.'*

This research participant appears to display feelings of uncertainty about the education of children with SEN in Nigeria, as she believes that Nigerian schools are not prepared to enhance inclusive learning. Moreover, the research participants reveal that a full understanding of some disabilities such as ADHD and autism is not evident:

**Ndidi** (a teacher from a government school) reflects that: *'At present physical disabilities gets more attention, because you can tell what the*



*problem of the child is, it could be visual impairment, deafness, or a physical challenge. However, with autism, there is less awareness of the needs of these students.'*

**Judith** (a teacher from a government primary school) supports this reflection by revealing that;

*'There are children with various forms of disability...they can be profound or moderate. I would say that if the disability is physically noticeable it is more likely that the learner will get help and adequate support. With other forms of disability, like autism there is less awareness of the needs of the students as it is less physically noticeable.'*

The above reflection reveals some of the challenges that are present in identifying disabilities within mainstream schools. This research finding reveals that teachers are more aware of 'noticeable' disabilities. This is because for some forms of disability (for example dyslexic, dyspraxia, dyscalculia, and ADHD) these children can be left undiagnosed throughout their years in school. They may become vulnerable students who are viewed as 'slow learners'.

**Gina** (a teacher from a government school) makes reference to a lack of education and knowledge as potential factors that influence perceptions of disability in negative ways:

*'There can be a lack of awareness and education on the part of the parents and the wider society, a lack of knowledge on the side of some teachers... you impact what you know, you teach what you know, you fight what you know.'*

This research participant made reference to the lack of education and knowledge as factors influencing teachers' attitudes towards disability. **Gina** acknowledges that the lack of education on the part of the parents and the wider society, has a huge impact on the success of inclusive practice. In complementing the above reflection, it is worth noting that alongside the teachers' knowledge and attitudes, cultural norms and local

interpretations of disabilities were also revealed as another influential factor that dictates the way that children with SEN are being supported. Generally, it was highlighted that traditional beliefs play a major role in shaping views on disabilities. It is revealed that many people in wider Nigerian society consider that those with disabilities are an example of a social stigma. Many children with disabilities face a lot of stigma and discrimination which manifests itself in the language that is used to describe some forms of disabilities.

**Joy** (a primary school teacher) reflects that: *'I know educating children that have a disability is rewarding as I like teaching generally, but it's challenging to do so, especially with the complexities surrounding SEN practice. We are not well equipped...it means that there is limited chance to achieve the goals. So having a child with SEN in the class is okay, but it all depends on the severity of the disability and your knowledge to assist that child adequately. Not everyone beyond the school is supportive of those with disabilities, however, and the children can experience prejudice and discrimination.'*

In a further reflection, **Joy** also notes that there are children with unidentified disabilities:

*'There is no easy way to identify dyslexia definitely...Although I think it is a new disability and I have heard people talk about it...I don't really understand it...We need to raise more awareness about this form of disability or else it will become another area of prejudice.'*

This extract reveals the complex understanding of disabilities within the research participants. There is no doubt that the misinterpretation and misunderstanding of disability culminate in teachers having either negative or positive attitudes, and that this influences the support and provisions for learners with SEN.

**Frank** (an ICT teacher in a private school) reflects that: *'Sure we have children with all sorts of disability... but the question is how do we know of a disability when the disability is not obvious as it means*

*adequate support cannot be provided? Myself, I am not even sure if I know all the learning disabilities.'*

**Ndidi** (a teacher from a government school) also reveals: *'I'm aware of different kinds of disabilities, reading and writing problems and behavioural disorders, they are also apparent in the classrooms here... however these kind of problems might not necessarily be labelled as a disability if there is no procedure in place to help to identify it'.*

Likewise, **Kelvin** (an English Literature teacher from a government school) notes that:

*'The way we understand disability affects the way children are treated and supported in schools. For example, these ones who are physically disabled... it depends on how bad it is... like I have one in my class...he only has a deformity on his leg...whereas the other one has a visual impairment that's all. I can see that academically, they are of good standing, however, our knowledge of how we understand disability in general affects the way we support these children.'*

**Fred** (a government school teacher) adopted a different perspective as he criticised the government on the level of policy implementation relating to SEN and inclusive practice. **Fred** reflects that:

*'Apart from culture, the government have a big share of responsibility. One, the government are in charge of the educational policies not the teachers nor the parents. It is the government that should put policies in place and ensure compliance to the policies.'*

This reflection highlights that there is a disconnect in theory and practice. This suggests that the policy guidelines and legislation do not necessarily meet the needs of the learners with SEN. To establish a policy is one thing, however enforcing compliance to the policy is appears to be a significant challenge.

#### 4.3.2 Theme 2: A number of the research participants lack awareness of how to apply technology to pedagogy effectively.

The second key research theme answers the third research question that elicits teachers' thoughts, perspectives and experiences on pedagogical issues in respect of technology. Teachers were asked to describe their current pedagogical practice to indicate their perceptions on what is the current situation with respect to ICT integration in promoting inclusive pedagogy in the Nigerian schools.



**Figure 4.6: Images revealing teachers' views and the varying use of digital technologies in pedagogy to promote inclusive practice.**

The participants' reflections suggest that teachers often have to rely on traditional 'chalkboard and talk' and in recent times didactic pedagogy. This indicates the current and dominant pedagogical practice that is prevalent in a number of Nigerian schools. The research interviews explored the teachers' confidence in using digital technology, and the extent of technology integration among the research participants. Although, the teachers demonstrated awareness of the importance of applying technology to

pedagogy, it appears to be the case that only a limited number of the teachers and schools have access to appropriate technology to use in their pedagogy. Moreover, how teachers use digital technology depends on their knowledge, and the availability of the required technology.

#### **4.3.2.1 The teachers' thoughts on pedagogy.**

The research participants' responses reveal that the overall use of technology in pedagogy is uneven and quite limited. The participants' reflections reveal variable levels of pedagogy with technology and the teachers reported making, irregular, or no use of the available digital technology in their pedagogy. The findings identified that teachers had less awareness of how to select and apply technology to pedagogy effectively.

**Pamela** (a private school teacher) makes the following reflection about this point:

*'We are gradually moving towards using of technology as a teaching strategy and we have an interactive whiteboard, projectors and things like that are developing. Yes, I use technology sometimes, however this is a limited area for me in general.'*

However, **Pamela** does reveal that technology can be a useful tool in promoting inclusive pedagogy.

*'I discovered that my students who have attention problems are more settled when the teaching is enabled on a technology device...yeah... they tend to recall their thoughts much more readily.'*

**Pamela** thinks that the internet, and other forms of technology are an important way of engaging learners during teaching and learning. **Pamela** also perceives that technology can help children with SEN to remain focus during teaching.

**Floss** (a government school teacher) makes a similar reflection:

*'My classroom environment is enhanced with several visual aids which support learning... I use these cards with pictures and other visual aids as you can see from this picture, this is one of my*

*classroom visual aids, and I use this aid to enhance my students' participation in and understanding of the content, because some learners don't follow learning quickly without these extra visual aids... In terms of technology this is where technology becomes important...it is not only in the school office or ICT room but it has to be made available in all of the classrooms.'*

**Floss**, also reflects on the technological tools she uses in her pedagogy:

*'Yes...I would say that the internet is undoubtedly our greatest technology tool as you can potentially have access to it all the time...You can teach traditionally for the whole year without projectors as they are not readily available here, but you can always access the internet using your own mobile devices...and you can play some YouTube videos for the children which is the interesting part of using technology for me.'*

This reflection highlights the importance of pedagogical experiences, as **Floss** considers the technologies that are being used and the extent to which the technology is used and how technology can help wider pedagogical processes. **Floss's** reflection reveals that teachers' views about pedagogy affect their practice in respect of technology use.

**Favour** (a government school teacher) had less awareness of some of the newer forms of technology:

*'In my view, computers are important. If only we had the computers in the image I have selected for you. However, our computers are outdated, so we resort to using other audio-visual aids. For example I use cards, posters, and other forms of teaching aid in my pedagogy as opposed to using new technologies.'*

**Favour** used this picture to summarise her views on the importance of technology:



**Figure 4.7: Image showing the importance of computing equipment, revealing that digital pedagogical approaches are not fully developed.**

The above visual image with respect to the responses of **Favour**, **Floss**, and **Pamela** indicates that the integration of ICT in mainstream schools is inconsistent and has not developed and progressed to become a major pedagogical approach. The teachers' use of technology and its application to pedagogy appears to be low and restricted. This is supported by other research participants, including **Ify** (a teacher in a mainstream school).

*'We are yet to embrace the use of digital technology as a means of instructional delivery, because our school is not enabled with such technologies and most of the time our ICT teachers are the ones who use technology when teaching ICT as opposed to developing pedagogy for students generally.'*

**Chidi** (a private school teacher) provides the following reflection on technology use and pedagogy:

*'New technologies are really important, and we are making some progress, however in respect of our pedagogy all we have is a computer lab where we take the children and they just complete some basic tasks.'*

This research participant used the following image to exemplify his thoughts on the extent to which technology was being used effectively in pedagogy:



**Figure 4.8: Image showing the extent of technology use in some Nigerian schools.**

The image reveals the extent of technology integration in a number of Nigerian schools. The image also represents the reflections of many of the teachers in that they are yet to use technology as a means of an effective pedagogical approach and that many computer laboratories are simply being used to educate children on how to use technology.

The participant also added that apps like 'WhatsApp' can be used for effective student group discussions.

**Chidi** reflects that: *'I created this WhatsApp group for my students where sometimes, I send the topic for our next lesson beforehand for them to discuss and I identified that this has become an effective way of engaging, enhancing and promoting inclusion because all the students are there, there is no discrimination, and they all interact well'.*



In support of the above reflection, some of the teachers currently apply the use of social media as a technology tool for engaging and enhancing students' learning as well as promoting pedagogical approaches for digital technology use. It is interesting to consider that the teachers are using social media as a technological tool for pedagogy.

**Joy** (a private school teacher) reflects that social media and the internet are typical ways of promoting digital pedagogical approaches:

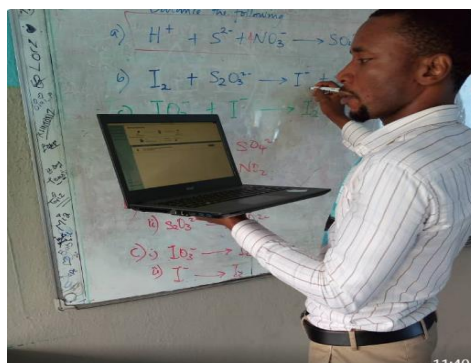
*'The WhatsApp group is what we use now to do some catch up and things like that, and it helps the students a lot to interact together and solve problems together...TEL can enhance learning, it brings them closer. If you want a hands-on approach, then integrate technology into your pedagogy'.*

This reflection reveals the importance of embedding technology into pedagogy. This also links to a number of the reflections of the other research participants in respect of the ideal wish to integrate technology into pedagogy. However, teachers in the research sample who go to the extent of introducing social media platforms such as 'WhatsApp Groups' for their students' online learning interaction are unusual.

**Joy** reveals the importance of being 'a great teacher':

*'I try to be a great teacher so when the desirable is not available what is available has to be used well...We can't just rely on the government, we need to explore other means to ensure that the students learn well...However, there are a number of challenges in using technology for pedagogy particularly in respect of the costs of technology'.*

In a further reflection **Amaraka** (a government school maths teacher) provided this image to summarise his views on pedagogy with technology.



**Figure 4.9: Image showing the extent and how of technology use in some schools.**

**Amaraka** also supports the views of the other research participants through the following reflection:

*'Yes, I would say our dominant practice here is this board and marker... We still write and give the students notes to copy from the blackboard or whiteboard...With regards to technology, we do use technology, (like I use my laptop and smart phone) to make my lessons more engaging, depending on the topic that I'm teaching...However, the school does not have consistent technology use for daily instructional delivery. Although we are in modern era, and I like the idea of technology use for pedagogy, it is not always accessible here when you need it.'*

This research participant also maintains that he uses the internet and his computer at his own cost, just to ensure that his teaching will be more engaging and at times 'carries the learners along'. **Amaraka** also acknowledges that projectors and smartboards are not readily available for lesson presentation, although internet is available and this is useful for professional development, which helps him to develop his pedagogy.

In developing this theme further **Jerry** (a private school teacher) reflects on how he applies technology to pedagogy:

*'I have learnt how the use of technology is important in teaching and learning. I would say I've developed a new teaching method through using the internet, and I think it's helping the students as this is a new and different form of pedagogy. The internet goes beyond local levels.'*

This response also links to the importance of developing self-confidence in pedagogy through the processes of developing innovative pedagogical approaches, even if this means moving out of a pedagogical comfort zone. As identified in the data, some of the research participants have developed a keen interest in integrating technology as a pedagogical approach through using their own laptops; smart phones; and iPads; alongside introducing social media platforms.

**Braddy** (a private school computer teacher) also reflects on pedagogy with digital technology in the following way:

*'I use digital technology to interact with the students and to convey information in different ways in order to make the teaching more engaging, and I also teach the students how to use computer. I think that children in general these days are obsessed with technology, and that using technology to teach, motivates them to pay attention during learning which makes it useful for all of the learners.'*

In a follow up interview, **Braddy** elaborated on his views as he reflected that:

*'It's not all about acquiring these technologies, but more about making good and effective use of technology. I must confess that our pedagogy is not well supported, and this affects those with SEN more in terms of having awareness of the new technologies we call assistive technologies. I like electronic tools and a lot of them are really useful, for example electronic dictionaries. They can be very useful for children with reading difficulties. I have heard about audio books but I have not had access to them,*

*however I think that technology can be very useful for children who have reading difficulties.'*



**Figure 4. 10: An image showing the lack of effective use of digital technology; the ICT lab that is used for ICT pedagogy and little else.**

The above image was used to summarise **Braddy's** views on the use of technology for pedagogy. In other words, *'it's not all about acquiring these technologies, but making a good and effective use of them.'* **Braddy**, highlights that the ICT laboratory is used for the computer curriculum, where students learn to use technology as opposed to using technology to learn. It is revealed that unfortunately, in many cases, the teachers use technology for teaching theories about technology in a computer laboratory. Moreover, the computers are often not up-to-date, and the effective use of these technologies appears to be about making the technology available and using technology for the right pedagogical purposes. The research participants reveal that they saw pedagogical benefits in using digital technologies and media tools like 'YouTube' and 'using the internet for teaching', however, teachers reiterated that the development, and availability and effective use of technology in the Nigerian context is underdeveloped.

**Chevonne** (a teacher from a government school) presents her experiences of using technology from a different perspective, as she highlights that:

*'For me it was more about wanting the students to experience learning in a different way...that's my opinion really... I even prefer to use my own iPad or smart phone as it tends to be more reliable than the school equipment. For me, I can't even operate a smartboard if you provide one in my class, unless I receive training on this.'*

This response also highlights the research participant's lack of confidence about using digital technology. Although a number of the research participants are enthusiastic about using technology for pedagogy, other teachers, revealed less interest in incorporating technology into their teaching and learning. The levels of interest in technology can be influenced by highly subjective factors.

**Pascal** (a teacher from a private school) reveals a detailed awareness of the benefits of applying technology to pedagogy. This research participant thinks that 'chalk and book pedagogy' is 'dull':

*'In ICT, you talk about teaching children with projectors, teaching them with laptops, teaching them with palm tops and with these technological gadgets... I would say it can be helpful for the processes of pedagogy and that it can promote inclusion compared to the dull chalk and book pedagogy because we're thinking about processes of pedagogy.'*



**Figure 4.11: Image showing the extent of technology use in some schools.**

The above image shows the participant's excitement at using technology to teach when it is available. This research participant reveals that there is need to embed technology as a teaching approach and that technology can support the education of children with SEN. Rather than keeping with old fashioned traditional teaching of chalk and talk (didactic pedagogy), a new way of thinking about pedagogy can occur:

**Pascal** (a private teacher) reflects that:

*'Again there are many challenges we are facing. It is not just about bringing in this technology, but more about using this technology effectively and the truth is that we are far behind in the race to embrace and integrate technology in pedagogy. We are not operating at the same pace with the developed countries when it comes to TEL, even though technology itself is evolving.'*

In another interesting reflection from **Pascal** it is acknowledged that the use of the technology is the important consideration. This reflection reveals the importance of thought, purpose, and planning when using technology for pedagogy. However, Nigeria is still trailing far behind in the evolution of technology for pedagogy. It appears that other countries are talking about TEL and using assistive technologies in quite dynamic ways, particularly in the education of children and young people with SEN and this is not necessarily the case in Nigeria.

**Kelvin** (a teacher from a private school) who is keen to introduce TEL to pedagogy in SEN makes the following reflection:

*'You often have to bring your own computer in to make the teaching and learning more enjoyable for the children.... So I do bring in my iPad. I downloaded the OTELO {software} in my iPad including all the poems ...I mean all the novels they need for that academic year are all in that app...{in my iPad} everything is in one place... they have their text... so I don't have to carry a bunch of books everywhere... I also advise my students to do same.... But the problem is many of my students cannot afford it.'*

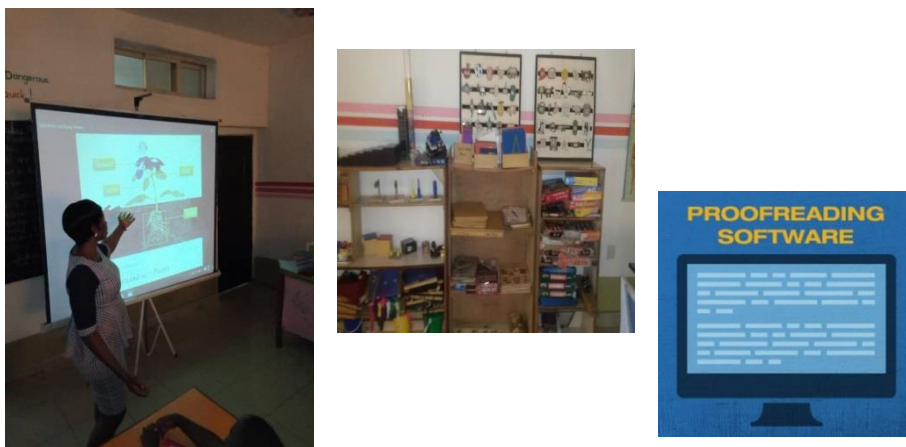
**Kelvin's** response reinforces the finding that some of the teachers do incorporate technological resources like iPads, smart phones, and social media into their pedagogy, however, **Steph** (a government school teacher) reveals that despite the increased awareness of how pedagogy can be improved with technology, the processes of pedagogy have not necessarily changed.

*'For now we still rely on our traditional teaching methods and little has changed... We have been teaching in the same way for years, and we are used to this and all the other students are used to this too...I'm not saying that technology is not good, it's good... but where do you see its innovative application in government owned schools? Technology is good, like my children use their iPad for learning, spelling and writing skills.'*

This reflection is also in line with other findings that have been noted previously. It is revealed that technology use in most of the schools in Nigeria is not well developed, which suggests that technology use in pedagogy may just maintain existing instructional practices that traditionally focus more on transmitting information as opposed to helping the learners to actively construct knowledge. Moreover, a variety of personal and contextual factors affect the teachers use of technology for pedagogy.

**Lowe** (a teacher from a private school) also provided the following reflection which indicates that there are examples where technology is helping with SEN pedagogical processes:

*'My school makes use of projectors though not all the time... They also have a multisensory room for children with SEN, and these technologies and multisensory environments are a very effective tool for promoting inclusion. My school is a good school... we get training opportunities all the time. I have my preference and I focus more on children with SEN, so I use a lot of tools like Apps. I have a text editor, I activate spelling checks, and apply proofreading software and a lot more to help the students. We have a lot of tools in the multisensory room that we use to support children with SEN and those who have reading difficulties. We also use this for children with autism too.'*



**Figure 4.12: Images revealing some of the different technological tools used for pedagogy with SEN in some Nigerian schools.**

This image was provided by one of the research participants to describe how she applies technology to pedagogy to achieve enhanced learning for all and enable students' engagement with pedagogy. This research participant demonstrated a keen awareness of the importance of meeting the needs of children with learning disabilities by using different technologies.

It is also interesting to note this further discussion with **Lowe** as she reflects on her strategies using technology in pedagogy to support SEN.



*'With dyslexia what we do is to be patient with the students and never judge them as it is not that they are unintelligent it is more that they have a learning disability. I work with learners who have difficulties following instructions (behavioural problems)... they also lack concentration and they are easily distracted. The strategy I often adopt is repetition...asking them to repeat the instruction in their own words...Assistive technology can play a really helpful role for these children, I give them an iPad to get them engaged in the learning and as a means of reinforcing good behaviour...So I would say supporting children with SEN is all about knowledge and awareness which is not common with many schools and teachers in Nigeria.'*

The explanation of the participant demonstrates that teachers' experiences and perceptions of TEL are varied, and there was lack of clarity and uncertainty on its application within pedagogy.

Another teacher **Paul** (a private school teacher) provided the following reflection:

*'Here in my school we put the lesson topic on the black board you know we use chalk here, rather than technology. But, we are working on using magnetic boards which I will be excited to get the hang-of. For now I download materials online and I then use my laptop to demonstrate to my class. So basically we make the most use of just boards, chalk and textbooks. Although for me I usually download videos for example ...there was this topic I taught my students then I downloaded the materials online. When I played the videos in the class the students were amazed, there was a great degree of participation and involvement... you see the appreciation level when you bring technology into pedagogy.'*

**Paul's** reflection also supports other teachers' views and this reveals that the main means of their pedagogical practice is chalkboard and talk, instead of TEL. **Paul** appears to be clear about the benefits of integrating TEL in pedagogy, however the challenges of implementing TEL into pedagogy are also revealed.

**Floss** (a teacher from government school) also reveals that the way instructional method is carried out in Nigerian schools has not changed from that of chalkboard and textbooks (didactic pedagogy) over the years.

*'The typical practice we use here is the use of the chalk board and the white board... these are the common forms of pedagogy although the main reason we don't use the projector is the cost of maintenance and because of the unreliability of the electricity supply and the internet. On many occasions we have to rely on other visual aids that are easily accessible.'*

**Peace**, like many of the other research participants reflects that:

*'There is little technology enabled learning unless it is your own technology, like I use my smart phone and computer to play some YouTube videos when I'm teaching an important topic that requires explanation if the students are to comprehend.'*

**Steph** (a teacher from government school) also acknowledged that the extent of technology integration is still 'patchy'. This teacher explained that technology use will be beneficial to teaching and learning, if implemented effectively:

*'In my subject area {science} I wish we did have access to technology all the time... The processes of teaching and learning with technology can be really useful, for example, if we have access to a projector this can help in enabling the learners' understanding.'*

This research participant, like many of the other teachers, viewed technology use in pedagogy as a useful educational teaching approach however its application is referred to as being 'uneven' in Nigerian schools in general.

**Jerry** (a teacher from a private school) provides the following reflection:

*'We tend to mostly apply traditional teaching methods... however, yes, the use of technology can contribute effectively in helping inclusion because if the technology is there, it will enhance the teaching and learning in the classroom and it will also help those*

*ones who struggle with reading difficulties and attention problems, and enable them to pay more attention and to learn... So it is all about having access to these resources and the opportunity to use them effectively.'*

Despite **Jerry** being in a private school that appears to have more resources, it is acknowledged that 'we hardly use technology in the classroom'. **Jack** (a teacher from private school) also reflects that:

*'It is hard to manage some of the children in the classroom, because some find it hard to engage in a number of pedagogical activities. However, with the help of technology I think that when training is provided to the teachers and the learners on how to use technology effectively, we can maximise learning engagement levels both in and outside the school... However, here we have only writing boards and we lack technology as we only have one main technology resource for the whole school.'*

**Jack's** reflection about TEL and SEN mirrors the uncertainty surrounding this type of pedagogy in Nigerian context.

**Ndidi** (a teacher from government school) also reinforces the view that digital technology is a useful resource as it holds the potential to enhance the students' learning experiences.

*'Using technology in pedagogy is important, as it enhances learning and promotes student engagement and I am in no doubt about this. It is an effective teaching technique as technology assists teachers by giving support to children with particular disabilities, for example, those students who have visual impairments and reading and writing needs.'*

It is interesting to note how this research participant acknowledges the important role that TEL can play in supporting, children with SEN.

#### **4.3.2.2 Brief summary of research theme 2.**

The findings reveal the fascinating views of the research participants on their perceptions of pedagogical practice with respect to digital technology use in pedagogy. Many teachers at all levels demonstrated awareness that technology holds the potential to provide significant benefits in pedagogy, and in the education of children with SEN. There appears, however, to be a lack of awareness of how to apply technology to pedagogy effectively. The educational practitioners revealed the extent of the application of technology to pedagogy, and the research equally reveals that the pedagogical focus on technology use in Nigerian schools is characterised by students merely learning about what ICT is as opposed to developing their learning in general across the curriculum via technology. It is also interesting to note how few private schools have made a change away from not just learning about technology, yet also teaching with technology in comprehensive ways. The teachers referred to the various ways in which they use technology in the classroom. The teachers use PowerPoint presentations; and they use the internet for personal development and for showing videos and other audio visual uses. Whilst some of the research participants acknowledge that technology integration in schools is evolving, other teachers highlighted that the extent of applying technology to pedagogy in most Nigerian schools is uneven and underdeveloped. Some teachers demonstrated negative perceptions regarding technology application in their pedagogical practice in various schools, due to particular contextual, personal, and professional reasons. Overall, the teachers insist that the integration of technology in pedagogy in Nigeria is slow, complex, and not reliable. In general, it appears that the majority of the research participants have many positive things to say about applying technology to pedagogy and they appear to recognise this is an area that is evolving. The teachers also emphasised the importance of the Nigerian governments reforming current pedagogical practice in respect of the use of chalkboards and didactic pedagogy. Few teachers appear to be aware of how to fully apply digital technology to their pedagogy in respect of enhancing SEN and this has emerged as a key research theme.

### **4.3.3 Theme 3: There is a lack of a necessary infrastructure to help support the application of technology to inclusive pedagogy.**

The third theme is linked to research questions 4 and 5 on the potential barriers and challenges towards enabling technology use in pedagogy.

#### **4.3.3.1 Problems with resources.**

This theme reveals that teachers' efforts to effectively and meaningfully integrate digital technology in pedagogy is affected by a number of barriers. The findings reveal that teachers do not have access to the technology that is necessary for effective pedagogy. In the image below, the typical classroom learning spaces may evidence creativity, however these learning spaces do not reveal many supporting resources. The students and the teacher are literally using the walls of the learning space as a resource because there are only few supporting resources available.



**Figure 4.13: This image depicts the lack of necessary infrastructure in many Nigerian schools.**

Although it is apparent that the research participants appear to understand the potential that technology has in enabling inclusive pedagogy in schools it appears that there are inadequate resources to enable this form of learning in the schools that the research participants work in. Therefore, it is a lack of adequate technological resources that is also limiting what the teachers can do in the classroom with regards to the implementation of successful pedagogy with ICT, and consequently this appears

to have a detrimental impact on the quality of teaching and learning. Alongside underdeveloped perceptions of inclusive practice and a lack of innovative use of technology for pedagogy, these problems with the infrastructure come together to produce challenges for successful pedagogy in this area. The following image summarises one of the research participants' views on this theme.



**Figure 4.14: Image revealing a lack of available technology in schools in a traditional teaching space.**

The picture depicts a teaching environment in which didactic pedagogy is the predominant pedagogical method. This reveals a lack of more modern pedagogical methods and an absence of the resources that are necessary in promoting inclusive practice in respect of providing appropriate support for children with SEN. Despite the continued emphasis that is placed on the potential that technology provides for pedagogy, the successful integration of this technology is not evident. Teachers demonstrated various challenges that they encounter in applying technology to pedagogy and it appears that the research participants experience challenges in respect of infrastructure.

**Gina** (a teacher from a government school) reveals that:

*'We have not attained the stage of using projectors for our teaching except for the ICT class where we do use the computer in the computer lab. One of the problems is that there is no regular power supply and lighting in many of the classrooms. There is no socket where you can have the projector in the classroom.'*

In a similar reflection, **Fred** (a government school teacher) also comments on the inadequate levels of technology integration. **Fred** reflects that:

*'We are still where we are. As you can see for yourself, we write on the board and they copy what we put on the board down in their notes. There are lots of times when I resort to dictation to speed things up.'*



**Figure 4.15a: Image reveal current pedagogical practices and a lack of technology use in pedagogy**



**Figure 4.15b: The above images reveal current pedagogical practices and reveal a lack of technology use in pedagogy due to problems with the infrastructure.**

The projector is not readily available for lessons in many of the schools and it was noted that the computers that are available are mostly used for computer classes as opposed to being integrated into all pedagogy. A lack of a consistent power supply appears to be a key factor that mitigates against the use of the technology when it is available.

**Pamela** (a teacher from a private school) reveals that:

*'We lack all these new technologies and also funding is another key constraint and barrier to the quality teaching and the progression of special needs education and inclusive education in Nigeria.'*





**Figure 4:16: The image above depicts the lack of structural accessibility for children with physical disabilities.**

The research participants reveal that frequently students who use wheelchairs do not have easy access to the classrooms and other school building facilities. It was revealed that wheelchairs can often only access the classrooms with help of the teachers or other students. This highlights the finding that there is an underdeveloped inclusive environment in many of the school settings that the research participants work in. I also observed this at first hand in all of the schools I visited.

**Favour** (a government school teacher) expressed her frustration in respect of the scarcity of pedagogical technology due to a lack of funding:

*'We only have a few computers which are used more for computer classes, managerial uses and personal use. We need to have extra funding to enable us to provide the right technologies and offer individual support to children with special needs, however, this is not always available here and the government does not support us effectively. Look at how empty the classroom is! There is nothing to teach them with!'*



**Figure 4.17: The teacher used this image to reveal how the school lacks appropriate instructional materials to provide effective teaching.**

Teaching children with SEN requires special approaches, for example, having a dyslexia friendly classroom that enables inclusive pedagogical practice. However, the above image reveals a lack of an appropriate infrastructure and the absence of technological tools like assistive technology, and teaching aids to promote effective inclusive practice. The image reveals a complete lack of technology use in the classroom. Moreover, the computers that are being used, are mostly used for administrative purposes, for example to type up exam sheets and to print exam papers and official school letters. This point is reinforced by **Frank** (an ICT teacher from a private school).

*'Apart from computers, other digital technologies are lacking in my school. The few computers we have are not always working because some of them are either prone to start-up or booting difficulties or there will be problems with the electricity to power it on. We sometimes end up teaching theory instead of facilitating practical ICT classes because of this.'*

This reflection reveals that the problem of integrating technology into pedagogy is linked to infrastructure.

**Lowe** (a private school teacher) also revealed a lack of technical support in developing SEN pedagogy:

*'There is no adequate support to use these technologies, I don't usually get the support I need technically. On many occasions I don't have access to technology due to technical issues. I'm not an IT teacher, but they expect you to do everything which is frustrating.'*

**Chidi** (a private school teacher) also reveals that there is a lack of specialist support both in the use of technology and supporting SEN children in school.

*'We don't have enough IT specialist teachers to provide adequate support in technology use. We are not talking about SEN children requiring special support, special support is also lacking.'*

It is interesting to note that there is also a problem with human infrastructure resources such as technical and administrative support, and that the participants reveal that this is not usually available. In this context the lack of proper support can become a significant barrier to the ways in which teachers select and utilise digital technologies for pedagogy. It is also apparent that the lack of accessible technical support is likely to lead to teachers to avoid using technological tools because of these complexities.

**Braddy** (A private school computer science teacher) appears to have more experience of using technology and more access to technology, however, this research participant also reinforces the previous reflections of the other research participants.

*'I know IT is my area, but we still have a long way to go and technologies in school have issues with resourcing, therefore their uses are also limited. There is also problem of expertise. Here in my technical role, what has become apparent is how I have been made into a 'Jack of all Trades'.*

**Braddy** revealed that as an IT teacher, he not only teaches computing, as he also completes computer maintenance in the school, alongside training colleagues, and giving technical support when he can. These challenges are all significant factors that have become barriers in enabling the implementation of digital technology in the schools. **Jerry** (a private school primary teacher) reflects that the levels of technology integration are not at all encouraging due to a myriad of challenges. **Jerry** presented the following image as a summary of these views:



**Figure 4.18: Image showing insufficient and unreliable technology resources in schools.**

*'You can see for yourself from that picture there, we don't have enough computers, and also electricity is the major concern alongside some of the computers being outdated. We don't have the money to acquire smart boards so we resort to using the plain wall to project on when we need to, and the level of maintenance is very poor.'*

Many of the teachers revealed that the lack of availability of ICT resources was the main reason given by teachers for not using technology in their pedagogy. Nevertheless, this does not mean that there is an absence of other constraining factors affecting teachers' digital technology use, however it appears that access to

technology is a significant challenge for Nigerian educators in determining the extent of technology use.

**Helen** (a SEN teacher) reinforces the previous reflections:

*'I have been in mainstream education for 10 years before I got transferred to this special school. I would say special schools suffer most as there is no adequate support and facilities in place, apart from this writing board and television that you see here, that's all we have for this category of children with different kinds of need. In most cases we simply improvise with technology to help support SEN children.'*

**Helen** who currently works as an SEN teacher was dissatisfied with her experiences in educating children with SEN because of funding challenges and a lack of resources for SEN pedagogy. Likewise, **Jade** (a SEN teacher) acknowledged that the Nigerian education system is in need of improvement, both structurally and financially.

*'Look at the picture! Oh yes! Our system is as bad as that. My image summarising my experiences as an educator is of an empty room because I do not think that we have been provided with the help and resourcing that is necessary.'*



**Figure 4.19: Image revealing the problems with infrastructure in many of the schools.**

*'You see how empty most of the classrooms are, they barely have any chairs, so we don't talk about technology unless the teachers are able to improvise by themselves...We just moved to this place not long ago. I wish you met us in our old site it was really terrible. It is upsetting that a lot of talent is being jeopardised as a result of this bad practice. Some of the children are exceptional children. I mean very intelligent, like one of my pupils who is deaf but very intelligent. A child like this should be placed in an inclusive setting with appropriate technology and support in place.'*

The responses of **Helen** and **Jade** working with SEN children reveal feelings of frustration in working in the SEN settings without experiencing adequate support. **Peace (a mainstream government school teacher); Pascal (a private school teacher);** and **Steph (A government school teacher)** reinforce these views:

**Peace:** *'Technology makes learning enjoyable these days, but the challenge here is the availability of technology and it is all about lacking the funds we need to put things in place.'*

**Pascal:** *'The truth is... here in Nigeria we are trailing far behind mostly because of the availability of these technologies and infrastructure problems like a strong and steady electricity supply.'*

**Steph:** *'The problem is much is expected from us (teachers) but little is given to us...this includes working with children with SEN. I know I'm not a technology person, however anyone can learn about technology it's just that we don't receive the necessary support.'*

The research participants revealed that the schools lack the required funding to acquire the necessary infrastructure to enable technology use in pedagogy with students with SEN needs.

**Floss (a government school teacher)** notes that: 'in terms of using technology in pedagogy, it's all about access, and knowing how to use the technology'. This research participant acknowledges that there can be complexities surrounding how to apply technology to pedagogy. It is also interesting to hear how this research participant comments on the importance of developing self-confidence in applying

digital resources to pedagogy, however this is only possible if the resources are made available in the learning spaces.

#### **4.3.3.2: Policy Implications.**

**Paul** *'The availability of the technology is below average here ...More so, the schools here are confronted by an absence of adequate facilities and materials that enhance learning, electricity, funding, and specialist support, so using technology can be hard in a situation like this. It is just a shame that all we get is new updates on policies that never work'*

The research participants reflected on the lack of infrastructure in enabling inclusive SEN pedagogy alongside commenting on educational policies and the challenges in implementing effective policies in this area. **Paul** (a mainstream teacher) claims that the teaching staff receive 'updates on policies' however, they 'never work'. This reflection is supported by **Chevonne** (a teacher in a government school):

*'We have got to teach them now which can be quite challenging when you consider having learners with SEN being taught together with normal children without any government consideration on the size of the class.'*

**Fred** (a government school teacher) is also critical of the role of 'successive governments' in Nigeria in respect of this issue:

*'Change without government commitment is a mere dream. For inclusive education here is fraught with a myriad of challenges. Just check the class size and other infrastructure challenges, so how can you achieve effective inclusive practice with that sort of challenge? It is impossible because we are not well equipped all round. Don't get me wrong I'm not saying we are not doing our best, we are however we have not been well supported by successive governments. There are so many challenges going on here in our educational system, and these include large class sizes, and a lack of opportunity for refresher training on the job to keep you up to date. Now we are talking about technology, it is not just the*

*availability of the technology, but how to use it, if the technology is available and the teacher lacks knowledge of how to use it, that doesn't help the purpose of the technology. Here there is no constant power supply and this is a huge challenge for us.'*

It is interesting to hear **Fred's** reflection and his critique of policy approaches in Nigeria. Other research participants are also critical of the governments who have not taken adequate measures in order to develop SEN education effectively, including **Chevonne**:

*'It's the corrupt government, and their nonchalant attitude towards policy implementation, as nothing has changed that much in terms of resourcing, approaches and intervention to support special education in mainstream schools.'*

**Lowe** (a teacher from private school) highlights the challenges for SEN pedagogy that are present for the educational policymakers in Nigeria:

*'Although, in my school we do have a good number of learning facilities and some technologies, there are many challenges in the system overall. In the government schools the case is different, as changes here in the private schools are not comparable to the state schools. Notwithstanding, there are challenges that hinder the policy to promote 'Education For All' in Nigeria. We don't have adequate funding, there is a lack of appropriate facilities/materials, and these issues are really putting our education backwards. The government in general need a reformed approach to improve our educational settings in general. However, things are not getting any better rather it's becoming unbearable.'*

This reflection is supported by other research participants, for example **Judith** (a teacher in a government primary school), who claims that 'the government don't consider SEN fully'. It is apparent that achieving inclusive pedagogical practice is a challenge due to limited funding; a poor infrastructure; the lack of assistive technologies; and ineffective policymaking.



#### **4.3.3: A brief summary of the findings on barriers and challenges to inclusive practice and technology use in pedagogy.**

The research participants have revealed that there is a lack of technological resources for pedagogy with SEN in Nigeria, and that this is a key obstacle in developing pedagogy in this area. These factors relate directly to the lack of physical resources in the schools, as well as to the poor quality of the resources when they are made available. A lack of confidence in using the available technology is also a challenge in realising inclusive pedagogy. In general, all of the research participants agreed that there are myriad of challenges confronting the education of children with SEN both in inclusive classrooms and in special schools. The key barriers teachers mentioned include: infrastructure problems such as the availability of learning materials and funding. Policy implementation; and large class sizes are also problematic. The research participants perceive that the children with SEN may not be adequately supported and the school buildings can have difficulties in respect of access. The research participants also revealed that their classes are too large and all of these factors contribute to undermine the effective implementation of inclusive pedagogy with TEL.

#### **4.3.4 Theme 4: Teachers' training needs are not always met.**

During the research interviews, I wanted to understand if the professional development opportunities that were provided to the research participants were useful and practical in helping the teachers to use technology and integrate it into their pedagogy. However, the research participants revealed that their training needs are not always met. In general, the teachers' view professional development opportunities as a potential opportunity for personal development to apply technology effectively in pedagogy, however, this is not being enabled in the Nigerian context. Moreover, those research participants who are based in the state school sector were of the view that they hardly get any CPD opportunities, and that when they are available, the training is not actually tailored to their needs, which can be discouraging as the professional development does not appear to focus on the teachers' needs to develop technology enabled pedagogy. In consequence, CPD appears to be underdeveloped in many Nigerian schools and 'the cascade model' of CPD tends to be evident, especially

across the public schools. This seems to be a cheaper alternative to formal professional development and this is a consequence of funding constraints.



**Figure 4.20: Image showing education practitioners engaging in professional development in a Nigerian school.**

The above image was provided by one of the research participants to reveal that teachers are positive in general about learning how to integrate technology into pedagogy. The image reveals an experienced colleague volunteering to share their knowledge about technology with the less experienced members of staff. The teachers discussed the different kinds of training that they are engaged in, and they also emphasized the potential benefits that result from training opportunities. The above picture also depicts one of the common practices of CPD that teachers are exposed to in Nigeria. CPD should not be restricted to workshops and seminars, and sharing collaborative knowledge informally via a cascade form of CPD is less than ideal practice.

**Helen** (a SEN teacher) provided the following reflection about professional development:

*‘Special training is supposed to be given to teachers especially for those who work with children with SEN. The truth is, as a teacher it is necessary to have a kind of knowledge of SEN. Some inclusive schools have children with various needs, they need certain levels of*

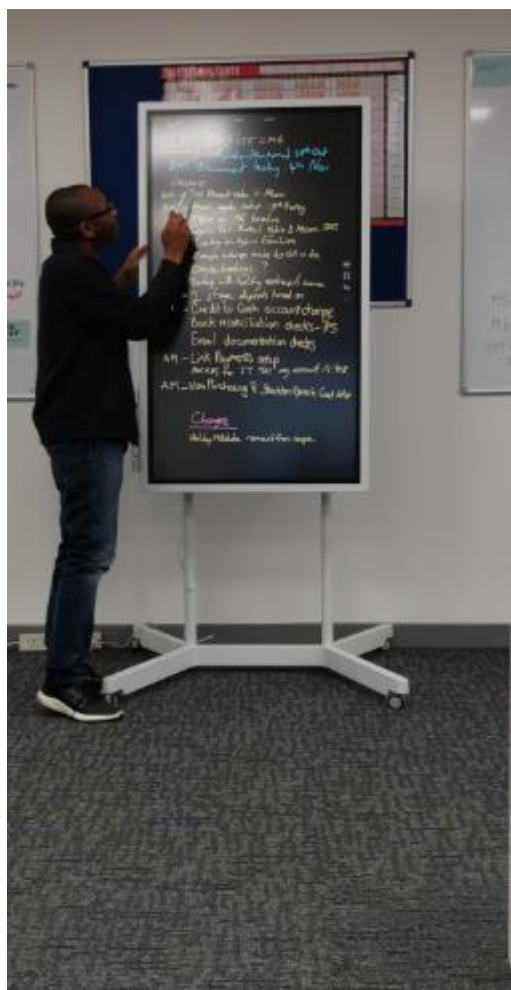
*knowledge to be able to provide adequate support. As a specialist I don't have many problems, because I have my degree in Special Education and I have got years of experience in this area of professional practice. But, to successfully and effectively integrate technology into pedagogy for supporting SEN learner, it requires additional training to enable teachers on the use of new technology.'*

**Helen** has considerable experience in teaching children with SEN, and appears to identify that children with SEN have complex needs and that 'many have invisible disabilities'. This research participant reflected that teachers in mainstream schools require additional training to broaden their knowledge and awareness of SEN in order to be able to support those in their pedagogy effectively. Moreover, to be able to integrate new technology into pedagogy, teachers require additional training to learn and work with technology effectively.

**Chidi** (a private school teacher) provided the following reflection about CPD:

*'I strive to learn more every day because the best you can do is to know more, so I want to say that I am learning. Yes, I am learning, and I am better than yesterday. I have gone through professional development in Electrical Electronics Technology (EET), and computer training. However, not everyone gets these training opportunities and I have this expertise because I am a technical teacher. Actually I do sometimes sign up for myself to get professional development. The seminar I attended recently in Abuja was on digital technology and this provided me with the opportunity to see a new type of smartboard called a 'Flipboard'.'*

**Chidi** acknowledges that the training session was 'a fascinating experience', however opportunities for professional development in respect of pedagogy and SEN in Nigeria appear to be scarce.



**Figure 4.21: A teacher conducting a professional development seminar/workshop in a school in Nigeria.**

One of the research participants used this image to reveal an example of CPD in Nigeria. The image above is a Smart Flip board, a technological tool that offers various features to promote learning. The Smart Flip Board can also enable inclusive pedagogy, because the technology can use different colours for both background and text. As opposed to simply keeping ‘with the old’, new forms of pedagogy are possible. **Floss** (a government school teacher) reflected that:

*‘Learning can be very hard for children with learning disabilities because there are few specialists available to deal with this type of learners, and there is little special training available for the general educators.... We need good knowledge of the potential interventions*

*and approaches that are available out there so that we are not just reliant on ourselves. We need up to date training.'*

This reflection is also supported by **Favour** (a government school teacher):

*'Yes, I only had one training session where we have reflected on the effectiveness of using technology in teaching and learning and although I am not expecting to learn everything, I would have liked to have had more than I received.'*

**Steph** (a government school teacher) also refers to the 'generic training' that does not meet specific needs:

*'It is always a case of a generic workshop and not specific training. The thing is, it is not very often that they arrange these training sessions for us, so we might get no more than two training sessions in one year and none of the training appears to be centred on special educational needs.'*

**Amaraka** (a government school teacher) makes reference to the informal nature of CPD in Nigerian schools:

*'I think that as teachers we should follow the current educational technology trend, and incorporate the use of technologies into pedagogy for the benefit of the learners. As you can see from the images of CPD we have discussed, technology is rapidly developing, so as teachers we are supposed to follow this trend at least for inclusive purposes. We need more training on how to become efficient on the effective use of technology for SEN. We sometimes engage in seminars and workshops however much of this CPD is usually delivered informally.'*

This research participant is aware of how to integrate technology for effective inclusive purposes, however the lack of opportunities for CPD is noted by **Judith** (a government school teacher) and **Joy** (a primary school teacher).

**Judith:** *'Lack of training affects teaching in various ways, because little training appears to have been given in respect of how to embed technology and support the education of children with SEN'*

**Joy:** *'I have never had special training at all in terms of in-service training regarding the promotion of inclusion. They sometimes arrange seminars however they tend to be a kind of old-fashioned talk and there is no actual practice.'*

**Jack** (a teacher in a private primary school) also supported the views of the other research participants by reflecting on the CPD that he has experienced.

*'Yes we do engage in some workshops sometimes, not all the time, and you know the problem is the government. You know, teachers are not really appreciated here so whether they are in government schools or private schools such opportunities are not given for their development. And yet, teachers are supposed to be given up to date training to be able to promote quality teaching that carries every learner along'.*

This reflection is supported by **Jerry** and **Braddy** (private school teachers):

**Jerry:** *'The empowerment of teachers to support children with SEN is lacking. If teachers are given opportunities for in-service training, I think that the inclusion agenda stands the chance to be promoted. Lack of training affects teaching and learning because this problem makes teachers go backwards since they (children with disabilities) are not moving at the same rate as other children. This requires a different approach and strategy which requires a different approach to training.'*

**Braddy:** *'I feel like you've got to keep up to date, not only with what technologies there are out there... but actually with what the students' needs are, and how to make teaching more engaging. From a teaching point of view, it is important to see what's out there and see what you can use to improve your practice. You see the picture we discussed before, that's where I use technology to teach and the other one {picture} is where I help my colleagues to learn how to use some technology tools for teaching and learning.'*



This reveals an interesting reflection on sharing knowledge about pedagogy. A more experienced colleague supports other staff on how to use digital technology for pedagogy. **Braddy** revealed that the current government in Nigeria has made ‘drastic funding cuts’, and this inevitably poses a threat to developing teachers’ CPD. The teachers appear to rely more on ‘knowledge sharing’ that is akin to the cascade model of CPD (Kennedy 2005) for their professional development. Moreover, a form of professional development such as this falls short of a realising transformative agenda for professional development because, the success or failure of this model depends upon the way it is implemented by the trainers (Kennedy 2005). It may be implemented well. It may be implemented less well and this is because the cascade model of CPD depends upon the skills of the trainers. **Ndidi** (a government school teacher); **Jade** (a SEN teacher) and **Fred** (a government school teacher) provide the following reflections on CPD.

**Ndidi:** *‘The challenge here is having the adequate knowledge and availability to make efficient use of these forms of technology. We go for training, however the trainers often just talk about things that cannot be realised without adequate levels of funding.’*

**Jade:** *‘We don’t get regular in-service training; it only comes up once in a while... because the government don’t want to spend money on*

*professional development. This is why our SEN schools are collapsing.'*

**Fred:** *'We don't talk about CPD here. It's for certain people...what we normally get is what's called an update [laughs]. This is where the head thinks that certain teachers need to be sent on a course or training and then they come back to update us.'*

The participants revealed interesting insights into how the system operates in respect of opportunities for professional development. There is the revelation that insufficient funding impacts upon the teachers' capacity building as the schools are subsequently unable to provide effective CPD as a result of these funding constraints.

**Chevonne** (a government school teacher) also confirms the absence of the professional development that is needed to integrate TEL in promoting inclusion:

*'I don't have the training and knowledge about these new forms of technology. It is just the basic training here in government school, Yes I would really expect to learn how to use resources, but the trainers themselves here don't even know much about them. And the training comes once in a while. We don't get updated, that's why we are still where we are. We really need these training sessions, but the opportunities are not there.'*

This reflection is also supported by **Steph; Peace;** and **Gina** (government school teachers).

**Steph:** *'I had one training session last year, it is like a workshop...but it was so generic. Yes, getting updated from time to time is crucial. You get to follow the current trends and appreciate what you're doing. That is why we don't even know much about these new technologies and certain learning disabilities like dyslexia. I'm just hearing it for the first time. You see what I mean.'*

**Peace:** *'The only training I can recall on technology use is the workshop we had about 21<sup>st</sup> century teaching. It was more theory because some of the computers were not in use. It was more of a*



*talk that said that the government should initiate professional development from time to time to create awareness of how things have changed. This isn't enough'.*

**Gina:** *'I think that if there is to be an effective use of technology in our schools here {Nigeria} a lot needs to be done, for example, training to keep teachers up to date. As you know, technology keeps changing all the time, so teachers should keep up-to-date with these technology evolutions through constant and regular CPD, however it is not happening.'*

**Lowé and Pascal** (private school teachers) reveal that although there are opportunities for professional development in their private schools, the opportunities for professional development in Nigeria in general with technology and SEN pedagogy are variable.

**Lowé:** *'In my school we do get some seminars and workshops...the school director often organises training for us once per term. However, you know it is a private school and I know that there are other school settings where professional development is not happening'.*

**Pascal:** *'Everything just depends on the school you are in and how much they want to spend on developing their teachers. You can't compare government owned schools to private schools. I think, I like it here [my new private school setting] because there are opportunities for CPD.'*

#### **4.3.4.1 A summary of the research participants' reflections on professional development.**

In general, it was revealed by the research participants that most classroom teachers do not appear to possess the skills and knowledge to teach or support children with learning disabilities. It appears to be assumed that 'experts who have special training' are educating children/students with SEN effectively and yet 'this is not happening' (**Braddy**). It was also revealed that teaching learners with different kinds of disabilities requires particular teaching approaches and yet this training is not being delivered via

CPD. Moreover, the research participants revealed that many teachers receive little training about ICT. It appears that only those teachers whose subject area is computing are in receipt of in-service training. The teachers in the government schools in particular appear to have few opportunities to engage in professional development. These teachers tend to 'develop themselves through personal funding' (**Gina**). The research participants appear to value the potential of CPD in developing pedagogy with learners with SEN needs, however, learning using technology for inclusive best practice remains 'ideal' as opposed to being a reality within the Nigerian context.

## Chapter Five

### Concluding Discussion of Findings

#### 5.0 Introduction

In the previous chapter I presented thematic analysis of the interviews with the 25 general education practitioners who participated in the research. This section of the study presents the concluding discussions of the research findings by reflecting on the theoretical perspectives that guide this research. In this chapter, the themes identified in the research data are discussed in two main parts in relation to literature and theoretical perspectives that are relevant to the research. In discussing my research findings, I sought for theoretical perspectives that best provide insights into the typical experiences of practitioners on the 'how' of technology use and supporting learners with SEN in pedagogical practice among teachers in the Nigerian schools. In achieving this, I adopted the theoretical viewpoint of Puentedura's (2006) SAMR model and Kennedy's (2005) professional development framework. The SAMR model has provided a complementary insight into the context in which the education practitioners operate, in applying digital technology to pedagogy. Alongside this, the works of Kennedy (2005) and (2015) and TPACK have been employed to assist in analysing the practitioners' experiences on the influence of professional development on the use of technology in inclusive pedagogy. The findings of this study give an insight into the extent to which the schools within the Imo States in Nigeria have aligned technology to inclusive pedagogy. I further discuss the extent of technology integration, and how the teachers' beliefs, knowledge and attitudes influence their use of technology to support the education of children with disabilities in mainstream schools.

#### 5.1 Theoretical Framework

The two main theoretical frameworks adopted for this discussion of the research findings are;

1. Puentedura's Substitution, Augmentation, Modification and Redefinition (SAMR) model. This SAMR model was adopted in the research to discuss and determine the dimension of teachers' technology use in pedagogy, in the Nigerian context.
2. Kennedy's (2005) Model of Continuing Professional Development employed in discussing and analysing the influence of professional development on the use of technology in inclusive pedagogy from teachers' viewpoints.

### **5.1.1 The SAMR Model and its Role in Technology Enabled Learning (TEL)**

In a bid to address the research question of 'how do teachers apply digital technology to support children with SEN in their pedagogy?', this study applies the Substitution-Augmentation-Modification-Redefinition, popularly known as SAMR model to achieve as full an understanding as possible of how teachers use technology in their pedagogy within the Nigerian schools. The discussion of the research findings in respect of the afore stated research question draws on the SAMR model as previously discussed, in an attempt to understand and analyse the 'how' of technology use in pedagogy among the general education school teachers in the Imo State of Nigeria. The application of this model goes further to unravel how digital technology is applied by teachers in their inclusive classroom practice to support all learners within their classroom in attempting to meet their needs. I chose the theory of SAMR because the model has the most relevant components in analysing technology use in pedagogy, as well as having the potential to reveal detailed explanations of the data generated. The theory also enables me to achieve a better description of the research and its visual data.

### **5.1.2 Using SAMR model to analyse how teachers apply technology in pedagogy.**

The general purpose of this research explores the perceptions of educational practitioners about using digital technologies to promote inclusive practice in meeting the needs of learners with special needs. The research aims to establish an in-depth understanding of how practitioners conceptualise and perceive their current pedagogical practice using technology in sustaining inclusive best practice in selected Nigerian schools. As such, the research aims to determine the degree of inclusion of learners with disabilities in general education classrooms in the Imo State of Nigeria.

The purpose of adopting the SAMR model for technology integration in this study is to provide the basis for ascertaining the 'how' of technology use through providing an insight into the manner in which the Nigerian teachers perceive or use digital technology in their pedagogy. This SAMR model provides a structure that helps the researcher to map technology use in the Nigerian classrooms in the research focus. Adopting the theoretical idea of SAMR in this section of research creates a platform to engage in interpretive discussions around how teachers integrate and use the digital technology in their current pedagogy. The theory has ultimately enabled me to understand the dimension of teachers' technology use in pedagogy, and has further created an avenue to view technology debates from various angles, alongside considering the possible implications this has for inclusive pedagogy.

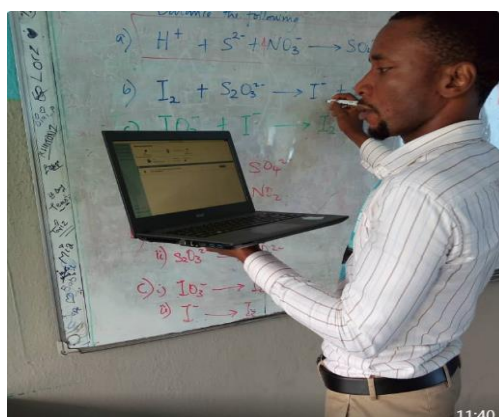
Accordingly, a perceived benefit of the SAMR model is that it offers teachers and educators a common language with which to describe their technology integration and its outcomes (Hamilton et al., 2016; Romrell et al 2014; Nakapan 2016). Another potential benefit of the model relates to the labelling of particular levels or dimensions of the practitioners' technology integration (Romrell et al., 2014, Thornton 2017). It is an ambition of this study to examine how technology is applied to pedagogy in inclusive classroom practices. One of the objectives of this research seeks to understand the 'how' of digital technology use in pedagogy to establish whether its application supports inclusion, and to what extent this has furthered the global campaign for sustainable inclusive practice. The SAMR model also proves useful in helping to understand the purpose of technology use and how teachers use technology in pedagogy (Hamilton et al., 2015, Nakapan 2016).

### **5.1.3 Technology Use in Classroom Practice and SAMR Model**

This study confines its application of the SAMR model to technology use in inclusive pedagogical practice with respect to the scope of the research. Therefore, the model is presented as a tool through which teachers, researchers and educational practitioners may categorize and describe how teachers use technology in their pedagogy (Romrell et al. 2014). The SAMR model is applied in this study to map technology use in Nigerian schools into the SAMR components with the intent to ascertain how technology is used in actual practice when aligned with SAMR model. This mapping and alignment provides the basis for classifying technology use and

presents the case for deeper and a more explicit understanding of the 'how' of technology use among educators in the Nigerian schools, and identifying the position of the Nigerian teacher on the technology integration ladder.

Referring back to this model, as discussed earlier, technology use is broadly categorised into two forms of dichotomy known as 'Enhancement' and 'Transformation' which is subsequently subsumed into the four levels of technology use. For example; at the *Substitution and Augmentation* level, according to the SAMR diagram, this represents 'Enhancement', whilst the *Modification and Redefinition* levels represent 'Transformation'. In a further explanation of the theory, 'Substitution' entails the substitution of technology for part of a task that previously did not include technology, such as the substitution of paper handouts to become transformed into digital handouts. An example is recorded in the photo interview of '**Kelvin**' (private school English literature teacher) that revealed the use of an iPad to download novels which allows him to take his readings directly in the class from the iPad instead of carrying text books into the class. In this way, there is no functional change in using technology. Another typical example of this instance is depicted in the visual analysis of the photo interview of '**Amaraka**' (a Maths teacher from a government school) in which the participant only substitutes technology for his lecture notes, as the image below depicts.



At the *Augmentation* level, technology is directly substituted for traditional pedagogical approaches with the function of the task changing in some way. In other

words, technology seemingly provides a substitute for other learning activities with functional improvements on tasks. An example includes designing a lesson to use videos or PowerPoint presentations, rather than traditional old-fashioned writing with chalk on a board. From the photo interview with **'Kelvin'** **'Pascal'** and **'Lowe'** (private school teachers), the research participants appear to be 'augmenting' the traditional pedagogy with technology in which digital technology is employed in their practice to enhance the students' learning. The photos below depict the teachers illustrating instructional delivery using presentation applications such as PowerPoint. This reveals an indication of varied technology use cases in the Nigerian schools, as suggested by Nakapan (2016), and Romrell (2014). However, while **'Amaraka'** used technology for simple substitution, **'Pascal'** **'Kelvin'** and **'Lowe'** exhibit a different technology use level for augmentation.



On the other hand, the 'Modification' level entails that technology integration brings about the re-design of a task, for example, a science teacher teaching 'the movement of light' via technology potentially changes how learners learn about light by adopting a more interactive learning approach that uses computer simulation and variables that the learners can manipulate. This is in turn an example of learning by doing. Romrell et al., (2014) developed this point further by providing the example of students having to read along simultaneously from a technology device as opposed to relying on the teachers to lead whole class read-aloud lessons. 'Redefinition' is the highest level, which allows teachers and students to do tasks that were previously inconceivable in traditional classrooms, such as using assistive technology when students choose to listen to digital versions of books, as in this example they are bypassing an area of difficulty with reading or reading related challenges. Moreover, if the students focus on

computer screens as highlighted words are read aloud, they can learn unfamiliar words as the teachers use text-to-speech or speech-to-text-software. In this way all learners will be carried along and will enhance the learning participation and engagement of learners with SEN. This is an example of where technology such as ATs are considered useful and benefit the educational development of children with special educational needs and improve learning outcomes.

In view of this PhD research, it can be argued that the level of use of technology in pedagogy in the Nigerian schools is actually far from attaining the modification/redefinition level which is the entry point of the transformative use as outlined in SAMR model. Although, technology is used by many teachers in Nigeria, its application to effective pedagogy is only tangential because in many cases the use is not well aligned to pedagogy, and this makes a minimal contribution to learning. An example from the study reveals the views of teachers like **'Braddy'** (a private school computer science teacher) who reflects that *'it's not all about acquiring these technologies, but making a good and effective use of them.'* **'Braddy'**, highlights that the ICT laboratory is used for the computer curriculum, where students learn to use technology as opposed to using technology to learn. It is revealed that unfortunately, in many cases, the teachers use technology for teaching theories about technology in a computer laboratory. In support of this view, the participants' photo interviews reveal a classroom situation where the children are seated in front of a non-operational computer system that is not even switched on and this is related to a lack of infrastructure because of problems with the electricity supply. The photo below illustrates this situation, and in a number of Nigerian school classrooms the computers are often not up-to-date in many instances.





I argue that in the Nigerian context, technology use is not well aligned to pedagogy, because the application of technology to pedagogy should be about making the technology available and using the available technologies for the right pedagogical purposes. This does not appear to be the case as shown in the photos, hence it is revealing that the transformative element of technology use is lacking in the Nigerian schools.

Achieving the 'Redefinition' level which is at the peak of transformation strata of the SAMR model, entails enabling technology integration in such a way that it creates entirely new tasks that are novel. For example, redefinition is achieved in the case of using technology to enable students' to have new and dynamic learning experiences. Romrell et al. (2014) and Nakapan (2016) acknowledge that learning activities that lie at the modification and redefinition levels of the SAMR framework can transform learning. It is at these higher levels of the SAMR framework that the full potential of learning is realised through technology integration (Hockley 2013). Arguably, there seems to be a huge gap in technology use in the Nigerian schools in this research sample for transformative purposes as outlined in SAMR model. Based on the SAMR model, technology use in pedagogy is designed as a ladder, with substitution at the 'lowest rung' of teacher technology integration. This narrative suggests that there exists a hierarchy to integrate technology in pedagogy. Romrell (2014), claims that teachers integrate technology 'better' when they enact modification and redefinition

which are above the half-way line in the SAMR model, rather than relying on substitution and augmentation. However, the pedagogical practice in Nigeria using technology appears to revolve around just substitution and augmentation (S-A) which is more akin to enhancement as opposed to being transformational. Larkin (2014) recommends that those practitioners who are applying and using technology in their pedagogy should aspire to act on the SAMR model, in order to move beyond substitution and work to achieve redefinition. This in turn suggests that teachers apply technology in a more transformative way rather than merely replicating already existing pedagogy (in other words simply introducing technology for substituting purposes). However, this journey from S-A to M-R level could be achieved by a well targeted policy that aims to improve teachers' capacity building by way of CPD.

As this research seeks an in-depth understanding of how teachers apply digital technology in their pedagogy, applying the SAMR model has helped to understand the levels or dimensions of technology use in pedagogy in the Nigerian schools. To this end, the model helps to highlight common and current modes of technology integration in general education in Nigeria. This affords the researcher a common vocabulary about the use of technology integration in their classroom practices. This may then offer teachers and educators an opportunity for a more thoughtful or purposeful use of technology in teaching and learning. However, it can be argued that the lack of clear understanding of the purpose of technology integration, both on the side of the policy makers and the educational stake holders can lead to the inappropriate utilisation of ICT within the schools. Accordingly, when using technology to teach, teachers must be reoriented from teachers being the source of information to teachers being facilitators of learning (Wagner, 2008). To do so, there is a need for teachers to integrate technology into their classrooms and content areas effectively (Mishra & Koehler 2006).

#### **5.1.4 Applying the SAMR model to Recent Research**

Linking these findings to the discourse about the SAMR model presented earlier, the research reveals that a number of the Nigerian educational practitioners need to have effective professional development in this area of professional practice. Based on the principles and theory of SAMR model, it can be argued that technology use in pedagogy in the Nigerian context appears to align within the 'Enhancement' category,

and more specifically at the lower level of this 'Enhancement' classification. It has become evident from the reflections of the research participants that teachers mostly use technology to either substitute or augment their existing practices. For example, although the teachers indicated that they often use the Internet to find information and teaching materials to design activities and produce teaching plans, they also use technology to design PowerPoint presentations and this is more akin to traditional 'chalk and talk' pedagogy. In consequence it can be argued that there is nothing transformative about this way of working. It is acknowledged by the research participants that there are potential benefits in using technological resources, however, it can also be argued that the way teachers use some of these technologies does not deliver effective pedagogy.

Consequently, in a number of cases the teachers' application of technology in their practice is seemingly not well guided. This is revealed in an image provided earlier by '**Amaraka**' where the computer was merely used in place of a textbook, hence substituting a textbook which introduces little or no transformation on the part of the learners or the teacher. This could be why Nakapan (2016) argues that the classroom has still not been completely transformed according to the SAMR model because some activities remain at the Enhancement level while others are already at the Transformation level. This is as expected because instructors take time to become familiar with using technology in the classroom. They need to be confident and at ease with using technology at the Substitution and Augmentation levels (Enhancement) before they progress to the Modification and Redefinition levels (Transformation). It is important not to assume that Redefinition must be achieved for all of the activities or in every context, because contextual, social, professional and infrastructural factors play a role in achieving technology use best practice in pedagogy. For example, it may be impractical to expect a teacher with little or no knowledge, experience and training to apply technology effectively and purposefully. The teachers' technological needs ought to go beyond the mere gathering of computers in a classroom or ICT laboratory without enhancing teachers' technological, pedagogical and content knowledge (TPACK) to apply them in their pedagogy effectively (Mishra & Koehler, 2006). This leaves the depth or quality of teachers CPD opportunities questionable.

However, Nakapan (2016) argues that the most significant role of the SAMR model is to raise an instructor's awareness when technology is incorporated into the classroom. This awareness needs to be considered when planning teachers CPD training, yet this does not seem to happen as the model of CPD in the Nigerian schools appears to be tilted more to learning to use technology than using technology for effective pedagogical process.

It can be argued that the Technological Pedagogical Content Knowledge (TPCK) model (Mishra & Koehler, 2006) centres more on teachers' knowledge, and that this is associated with developing teachers' knowledge related to technology application, and not how it is being used. In contrast, the SAMR model tends to discourage the mere introduction of technology to the educational process without the presence of a transformational agenda. The SAMR model further challenges teachers to differentiate between old and new technology as a means of examining what they can and, perhaps, should do. As a result, the emphasis remains on what types of technology teachers should use to move themselves along the hierarchical continuum of S-A-M-R, so that they are in turn utilizing technology in ways that emphasise shifting pedagogy or practices in order to enhance teaching and learning (Hennessey, Ruthven, & Brindley, 2005; Hughes, 2005; Windschitl & Sahl, 2002).

### **5.1.5 Teachers' Technology Use and Inclusive Pedagogy**

In the interview questions, the participants were asked to express how they use digital technology in general education and in facilitating the education of children with SEN in inclusive pedagogy. It was revealed that technology is being applied in diverse ways. Some teachers demonstrated using digital technology for teaching preparation and presentation, while the majority of the teachers revealed not employing ICT tools and resources in a support capacity for the education of children with SEN. Other groups of teachers acknowledged that they use ICT for administrative or personal purposes and other communication activities. It was also identified that only a few teachers have access to technology and that they were employing the digital technology to achieve the needs of all learners.

It is evident that technology use in many schools in Nigeria is limited. This is particularly noticeable in the state schools. As a consequence, the effective use of

digital technology in supporting learning in general education appears to fail to deliver on the expected goals of the policies. Although, the research findings reveal that the majority of the teachers in the research sample indicated a limited application of technology in pedagogy, it is worth noting that this revelation does not necessarily suggest an unwillingness to employ technology. Neither does it infer that the teachers are not competent enough to use ICT in their pedagogy because some teachers like **'Braddy'** (a private school computer science teacher); **'Pascal'**, **'Lowe'** and **'Chidi'** (private school teachers); and also **'Kelvin'** (an English Literature teacher from a government school) are already using various technological tools including; smartboards; software, and social media to enable learning. The above research participants among others acknowledged that technology can be a useful tool for pedagogical activities in helping children with SEN to concentrate during teaching. These reflections suggest that technology use avails teachers the opportunity to create engaging teaching experiences. Using technology motivates children to learn. It also appears to help those with SEN in diverse ways; for example, those learners with ADHD needs appear to be more focused when technology is employed during teaching and **'Lowe'** (a private school teacher) noted that:

*'my school makes use of projectors though not all the time... They also have a multisensory room for children with SEN, and these technologies and multisensory environments are a very effective tool for promoting inclusion.'*

However, for the teachers in state schools, it seems a different experience as their practice is more akin to didactic pedagogy. **'Gina'** (a teacher from a government school) reveals that:

*'we have not attained the stage of using projectors for our teaching except for the ICT class where we do use the computer in the computer lab. One of the problems is that there is no regular power supply and lighting in many of the classrooms. There is no socket where you can have the projector in the classroom.'*

More of the participants from the state schools expressed that technology integration in pedagogy seems to be trailing far behind what should be happening, mostly

because of the lack of availability of these technologies and infrastructure problems. Adomi & Kpagban (2010) reveal that in the Nigerian context, technology is not a full part of classroom pedagogy in more than 90% of Nigerian public schools. Perhaps, this is because the technologies that the teachers usually use in education are not purposefully designed for education. The findings of this research reveal that teachers' pedagogical approaches are not straightforward due to several constraining factors which include technology availability and professional development. It is evident from the research findings that the extent of the teachers' application of technology in pedagogy currently appears to be variable, uneven, inconsistent and unreliable. It can be argued that in many cases, the use of technology in schools in Nigeria is generally restricted only to a small range of uses where resources are utilised by few teachers. **'Ify'** (from a public school) reflects that:

*'we are yet to embrace the use of digital technology as a means of instructional delivery, because our school is not enabled with such technologies and most of the time our ICT teachers are the ones who use technology when teaching ICT as opposed to developing pedagogy for students generally.'*

This finding is consistent with many other studies in Nigeria and Ajoku-Christopher (2012) has previously identified that teachers in many developing countries appear to be completely unprepared for integrating technology into their pedagogy. The teachers seem to be lacking awareness of which assistive technologies can develop the pedagogical practices that will make their classrooms inclusive (Ajoku-Christopher, 2012).

Some of the research participants also referred to using their smart phones for pedagogy, for example, **'Peace'** (a government school teacher) reflected that: *'there is little technology enabled learning unless it is your own technology because I use my smart phone and computer to play some YouTube videos when I'm teaching an important topic'*. This indicates that technology use is more teacher-centred than learner-centred (Eynon, 2008). A similar study by Dwyer et al. (2004) conducted in Massachusetts, USA on teachers' use of technology also discovered that teachers used technology most frequently for lesson preparation purposes and less frequently for directing their students to create projects using technology. Alongside this research

by Dwyer et al. (2004), another study conducted by Eteokleou (2008), reveals that teachers were primarily employing computers to support their traditional practices. It is argued that ICTs were being used as 'fancy chalkboards' since their technology use as educational tools in pedagogy was employed only by a small number of teachers.

This PhD research findings further establish that selected teachers in Nigeria are not progressing with ICT integration in their pedagogical practices because the application of ICT to pedagogy does not appear to reveal a transformation in teaching and learning processes. A similar research study in Cyprus by Karagiorgi and Charalambous (2006), discovered that the teachers' levels of ICT integration was developing in their practices as work in progress. In this example, technology application was not demonstrating a transformation of teaching practices too. Based on the findings of this study, I argue that technology use in pedagogy can simply be classified as minimal, and that technology is generally being used for low-end applications that maintain rather than modify existing practices geared towards actualising a transformative agenda for technology use in pedagogy. As such, Nigeria needs to do more in improving levels of technology awareness in order to enhance the impact and effectiveness of the application of technology in education (Oladejo, 2011). Moreover, the technology use in the Nigerian schools confirms the findings of studies by Ingleby (2016) and Price & Kirkwood (2014) that reveal that much educational technology is not being utilised in ways that improve deep learning processes. These limited modes of use of technology in pedagogy can engender an absence of transformative education.

#### **5.1.6 TEL and the Need for Digital Development in Pedagogy in Nigeria.**

To enhance technology use in pedagogy, teachers' understandings about the use of technology is vital (Lehmann & Livingston, 2011). Kirkwood and Price (2014) argue that it is of paramount importance to understand the purpose of technology use and how it is currently applied to pedagogy, if practitioners and the school management are to be helped to develop effectively with respect to technology application in pedagogy. The authors argue that some practitioners are aligned with either teacher-focused views or learner-focused views, and that these perspectives influence the application of technology to pedagogy (Eynon, 2008). A key theme in the literature is that technology in teaching and learning may be used for replicating or supplementing

traditional teaching practice (Blin and Munro, 2008; Eynon, 2008; Roberts, 2003). This assertion is essentially captured in this PhD research as revealed by the teachers who reflected on their various experiences. Nonetheless, this occurrence of using technology to replicate existing practice tends to be devoid of an innovative or transformational impact in pedagogy. Furthermore, in support of the views of Kirkwood & Price (2014) and Lehmann & Livingston, (2011) in respect of teachers' understanding as a vital ingredient for the effective application of technology in pedagogy, this PhD reveals the diversity of interpretations that are present about the application of technology to pedagogy within the research sample. Moreover, having considered the complexity of teachers' understandings of inclusion/disability, and teachers' use of technology in education, it can be asserted that the teachers' perceptions about children with disability and the ways in which teachers view or think about technology is an important precursor to teachers' actual uses of technology (Inserra & Short, 2012; Zuber & Anderson, 2013). In many cases, the complex setting in which this technology integration occurs is often not considered (Hamilton et al. 2016). Thus, Berliner (2002) advocates for the importance of contextual components that could be influential with this type of practice where understandings are divergent.

From the responses gathered in this research, the participants' experience and understanding of TEL is varied. The explanations of the participants demonstrate that teachers' experiences and perceptions of TEL are inconsistent, and there is a lack of clarity in their views which creates uncertainty in respect of technology application within pedagogy. This is perhaps influenced by personal, social and professional factors as posited by Kirkwood and Price (2014) and Ingleby (2016). Through the research findings, there is the indication that these participants struggle to explain what TEL means to them, as they discussed their experiences with TEL in varied ways.

To this end, '**Braddy**' reveals that 'I use digital technology to interact with the students and to convey information in different ways in order to make the teaching more engaging', while '**Pascal**' considers that 'chalk and book pedagogy' is 'dull' as he viewed TEL as 'teaching children with projectors, teaching them with laptops, teaching them with palm tops and other technological gadgets'. Other research participants, including '**Amaraka**' and '**Lowe**' reflect on using technology to 'help the



students learn'. **'Floss'** considers that 'using the internet' is 'a good source for information' that helps her in her teaching. **'Floss'** goes on to reflect that 'you can always access the internet using your own mobile devices for teaching and other personal purposes'. **'Ndidi'**, also reinforces the view that digital technology is a useful resource as it holds the potential to enhance the students' learning experiences by reflecting that 'using technology in pedagogy is important, as *'it enhances learning and promotes students' engagement'*.

The research established that more teachers in the government schools consider that the underpinning pedagogical theory is not changing, even though TEL use is evolving and being used in various forms in various schools. This is revealed by **'Ify'** in the following reflection:

*'We are yet to embrace the use of digital technology as a means of instructional delivery, because our school is not enabled with such technologies and most of the time our ICT teachers are the ones who use technology when teaching ICT as opposed to developing pedagogy for students generally.'*

**'Floss'** supported this view by reflecting that: *'in terms of using technology in pedagogy, it is all about access, and knowing how to use the technology effectively'*. This suggests that technology enhanced pedagogy is beyond many of the teachers who work in the Imo State schools generally, and the government schools in particular as they are unable to practice full technology application in pedagogy. It is noticeable that some countries, contexts, settings, schools, and teachers adapt to this process more effectively than others (Cifuentes et al., 2011; Wachira & Keengwe, 2011). For example, in developing countries like Nigeria particularly; in some areas and schools there may be index characteristics such as problems of information infrastructures that mitigate against successful pedagogy in this area (Akanbi & Akanbi, 2012; Yusuf et al., 2012). Accordingly, irrespective of the increased campaign for technology integration by various governments across the globe, the considerable disparity in the access to ICTs is identifiable especially in teaching and learning around the world (Olakulehin 2007; Michaelides 2011; Damkor et al. 2015). This divergence in the availability and integration of technologies in different countries represents a 'stark digital divide' (Manjulika & Reddy 2002). As this research suggests and as revealed

in many other studies, ICT use in the educational system of developing countries like Nigeria is still an emerging work in progress (Olakulehin 2007; Ogechukwu & Osagwu 2009). This indicates that Nigeria when viewed from a global perspective has continually remained on the wrong side of the digital divide comparatively, when viewed from a global perspective (Aduwa-Ogiegbean & Iyamu 2005). I argue that Nigeria needs to do more in an effort to embed technology as a sustainable means of pedagogical practice, because the number of schools that have embraced the ICT culture and embedded any form of technology application to their pedagogy is significantly low (Onwuagboke & Singh, 2016; Ajadi, 2008). It is evident that the traditional pedagogical practice involving 'chalk and talk', and visual aids has remained the predominant pedagogical practice by teachers in most schools in Nigeria.

According to the views of the research participants, the teachers have little or no awareness of the new ICT resources that are available for pedagogy. Perhaps, teachers' pedagogical practice remains restricted to a small number of resources which mostly represent traditional aids and approaches. For example, when a teacher was asked to describe their usual classroom instructional delivery in order to identify the extent of technology use and their experience using technology, '**Favour**' noted that her classroom is characterised with audio visual aids, designed cards and posters with many other improvisations that are useful in her teaching. However, this research participant is of the view that she ideally would apply this type of pedagogical approach in order to enhance the learning experiences of learners with SEN considering their individual learning capacities, yet the necessary technologies are not often available. '**Floss**' went on to reflect that the dominant pedagogy is a didactic approach which does not necessarily meet the needs of all learners because they have children with additional needs who require different teaching strategies. '**Favour**', '**Floss**', and '**Pamela**' indicate that the integration of ICT in mainstream schools is inconsistent and has not developed and progressed to become a major pedagogical approach. This view confirms the arguments of Olakulehin (2007) and Ogechukwu & Osagwu (2009) who contend that ICT use in the educational system of developing countries like Nigeria is still in an emerging phase.

The findings of this study conform with other studies conducted in Nigeria which similarly demonstrated that the level of ICT integration in pedagogy is still at a low level

(Akuegwu, Ntukidem, Ntukidem, & Jaja, 2011; Modebelu & Azu, 2014; Egomo, Enyi, & Tah, 2012; Bamigboye, Bankole, Ajibye, & George 2013 Onwuagboke, Singh, & Onwuagboke, 2015; Ahmad 2015). All the teachers in this research revealed that limited integration of ICT in pedagogy is connected to a myriad of challenges ranging from the availability of ICT resources to other problems with the infrastructure. This was also reported in the studies of Modebelu & Azu (2014); Onwuagboke (2014); Singh, & Onwuagboke (2016). Many other studies also complement these results, including Okebukola (2007), cited in Aduwa-Ogiegbaen and Iyamu (2008), who argues that technology application is not part of classroom pedagogical practice in more than 90 percent of the Nigerian public schools. Though Nigeria appears to be making progress in her educational reforms, the more things change, the more they appear to remain the same (Eskay, 2001). From the research findings, it still appears currently in Nigeria that appropriate and effective use of technology is yet to be fully implemented. As '**Chidi**' reveals:

*'New technologies are really important, and we are making some progress, however in respect of our pedagogy all we have is a computer lab where we take the children and they just complete some basic tasks.'*

In addition to the above reflection, '**Amaraka**' uses an image to reveal that the application of technology in pedagogy is not consistent and reflects that: *'yes, I would say our dominant practice here is this board and marker... We still write and give the students notes to copy from the blackboard or wipe-board'*. This suggests that the chalkboard and textbook, and in recent times the wipe board and marker continue to dominate classroom activities in most Nigerian schools.

Arguably, the current position of Nigeria which reveals an underdeveloped technology application to pedagogy is not peculiar to Nigeria alone, as revealed by the research of Wozney (2006) who studied the technology application of 764 teachers in Quebec, Canada. The research findings indicate that 59% of teachers were not making regular use of technology, and only about 7% of teachers reported making regular use of technology. Moreover, 39% of the teachers reported that ICT was 'rarely' or 'not at all' integrated in their classroom activities. However, Damkor Matthew, et al. (2015) also argue that little or no ICT facilities are present in most Nigerian schools and the non-

availability of ICT in schools tends to restrict teachers' use of technologies (Okwudishu 2005). Hence, technology use in the classroom is yet to attain the expected level in the Nigerian educational sector (Damkor Matthew, et al. 2015). Therefore, teachers cannot make use of resources that are not within their disposal, and this is the case identified in this research. Moreover, even where the resources are available, the challenges of teachers' technological knowledge of ICT use as a result of lack of CPD opportunity was viewed as a significant drawback to teachers' technology use in pedagogy. This view is also shared by Mishra & Koehler (2006) as they argue that the mere introduction of technology to classroom is not enough because the question of what teachers need to know in order to appropriately incorporate technology into their teaching is even more important for a successful implementation of technology enabled learning. I argue that with these prevailing challenges, sustainable ICT use in education will remain a significant task to achieve in the Nigeria context if the professional development needs of the teachers is not adequately addressed. This suggests that teachers' professional development is important and that an effective and appropriate professional practice relating to technology use could be achieved by a well targeted policy that aims to improve teachers' capacity building by way of CPD. However, although the teachers expressed a willingness to learn about new technologies for teaching and learning, they also lamented the dearth of CPD opportunities in their various practices.

### **5.2.0 The Relevance of Kennedy's Model of Continuing Professional Development to the Research**

This PhD research has considered Kennedy's (2005) nine models of CPD in analysing the education practitioners' PD experiences and perceptions in respect of this aspect of pedagogy. The use of Kennedy's (2005) work enabled me to gain insights into the participants' actual professional development activities in enabling their pedagogical practices. Kennedy (2005) classifies CPD into three broad categories namely; transmission, transitional, and transformative professional development. Each spectrum of professional development has a specific purpose and the three classifications are characterised by varying levels of professional autonomy. For instance, the transmission category of the model entails the function of preparing teachers to implement new reforms and policies. These include the training, award-bearing, and deficit models of CPD. In contrast, the transitional models of CPD support

underlying agendas that are compatible with developing teachers to implement policies and this in theory helps in assisting teachers in contributing to education policies and developing professional practice. Moreover, the transformative model of CPD is considered to promote the highest level of teachers' professional autonomy and capacity building. The work of Kennedy (2005) has led to debates about the strategies that are needed in order to achieve sustainable or transformative CPD. Kennedy (2005) advocates that any model of CPD can be 'transformative' however, this is reliant on the purpose and thought about the professional development if the professional experiences of the educators are transformed in significant ways.

It has become clear, however, that the agenda of incorporating technology in pedagogy has lagged far behind the vision. This could be why Mishra and Koehler (2006), suggest that part of the problem is akin to a tendency to only look at the technology integration and not how it is being used. Therefore, merely introducing technology to pedagogical processes is not sufficient. The question of what teachers need to know in order to appropriately incorporate technology into their teaching is also important, and can be achieved through transformative teacher training and professional development as advocated by the work of (Kennedy 2005; 2015). The oversight of attaching importance to teachers' knowledge and professional development can be attributed to the lack of theoretical grounding for developing or understanding the process of integrating technology in pedagogy effectively (Mishra and Koehler). This suggests that teachers' knowledge, training and professional development are important measures towards achieving appropriate and effective technology application in pedagogy. If more transformative professional development opportunities for educators can be enabled, the poor application of TEL can then be potentially addressed, however as the data of this PhD reveals, the teachers have expressed a willingness to learn about new technologies for teaching and learning, yet there are few actual CPD opportunities for them in the Nigerian context. I therefore, argue that if there are effective professional development opportunities, technology will be applied in a creative way as suggested by Ingleby (2016). Mishra and Koehler (2006) also support this argument as the authors acknowledge that teachers require both the technological and the pedagogical content knowledge in order to use technologies in constructive ways.

The incorporation of a new technology is not the same as adding another module to a course. This often raises fundamental questions about the kind of PD needed for teachers to use technology effectively. Mishra & Koehler (2006) argue that technology training for teachers through 'workshops' is ill-suited to produce the 'deep understanding' that can assist teachers in developing the technological knowledge that will enable the effective use of technology in pedagogy. This shows that using 'workshops' or basic training will not afford the teachers with the opportunity to become effective users of technology for pedagogy (Kennedy 2005, 2015). This prompts the restructuring of professional development experiences for teachers so that they might develop the kind of nuanced understandings to achieve the expectations of incorporating new technology in pedagogy (Kennedy 2005, 2015, Mishra and Koehler 2006). The teachers' knowledge is what makes it challenging or easy for teachers to use technology effectively, therefore, a teacher's knowledge can be enhanced through professional development, which in turn can help to redress some of the problems that both teachers and students face in technology use.

### **5.2.1 Technology Use in Pedagogy and Professional Development: Teachers' Training Needs are not Being Met.**

Teachers are and will always remain at the centre of the educational system. Therefore, their professional development needs remain of massive importance in the pursuit for high level of educational achievement (Adey et al. 2004; Siddiqui 2004). There is no doubt that the introduction of new technologies into aspects of academic practice is believed to have a positive impact for a number of teachers (Ecclesfield & Garnett, 2013). In addition, Olakulehin (2007) argues that the use of ICT is seemingly an opportunity for those who can respond to the new paradigm and a threat to those who cannot. Ogunrin (2011), posits that appropriate and thoughtful staff development programmes can help in developing teachers' skills and in motivating their enthusiasm to achieve quality education. In relation to meeting the needs of all learners, this assertion conveys an implication which suggests that teachers require an immense amount of knowledge, action, and belief in their work, to know how best to support a diverse range of children (Florian & Spratt, 2013; Graham, Berman, & Bellert, 2015). Hence, the key objective of professional development is to improve learners' performance in respect of achieving excellent learning outcomes (Mishra & Koehler 2006). This PhD research reveals that the desirable empowerment teachers required

to support inclusive pedagogy is lacking. There appears to be significant frustration being expressed by the research participants about enabling effective inclusive pedagogy and technology use due to complex issues which can be attributed to personal, social and professional development. This is revealed by '**Jerry**' (private school primary teacher) who acknowledges that:

*'The empowerment of teachers to support children with SEN is lacking. If teachers are given opportunities for in-service training, I think that the inclusion agenda stands the chance to be promoted. Lack of training affects teaching and learning because this problem makes teachers go backwards since they (children with disabilities) are not moving at the same rate as other children. This requires a different approach and strategy which requires a different approach to training.'*

With respect to technology use, I am of the view that the use of technologies in the classroom demands that teachers are knowledgeable and competent in order to enhance its effective and appropriate use. Adebisi et al. (2015) argue that a lot of regular classroom teachers, special educators and other related professionals in the field of special education are yet to adjust to the advent of both high-tech devices like computers and low-tech, manually operated devices that can deliver and facilitate learning. This means that there is a need for teachers to be upskilled, and kept up to date and at pace with technology as it evolves. This can usually, in many cases be achieved through CPD programmes in their various forms such as seminars, meaningful workshops (as opposed to general workshops), research, and conferences. In support of this argument, Bolam (1993), advocates that CPD should focus on professional training in the form of short courses; long courses; and professional support (mentoring and coaching); which is more tailored to individual personal and professional needs than mere in-service training.

Other studies have affirmed that when well-designed and purposeful professional development (PD) programmes are effectively implemented, this may lead to desirable changes in teachers' pedagogical practice and result in improved student learning outcomes (Buczynski and Hansen 2010; Johnson & Fargo 2010; and Santagata, et al., 2010). Day (1999) earlier noted that PD ought to be centred on improving teachers' attitudes and beliefs which in turn enhances a teacher's pedagogical skills towards the

effective use of technology in pedagogy. This argument is also supported by Gorder (2008) and Beckett et al. (2003) who suggest that debates on technology integration in both mainstream and special education are no longer about availability but more about teachers' effective use of the technology.

Ajani (2018) argues for the need for professional development activities to be frequently made available to all education practitioners, however this does not seem to be the case in many of the Nigerian schools as '**Jade**' (specialist in SEN) and '**Fred**' (a government school teacher) acknowledge:

*'We don't get regular in-service training; it only comes up once in a while, because the government don't want to spend money on professional development' (Jade). 'We don't talk about CPD here. It's only for certain people.'* (**Fred**)

'Fred' indicates that the opportunities for CPD are reserved for particular individuals and not for everyone. This appears to depend on the teacher's area of specialty or their role in the school. If this aspect of professional practice is to be developed in the future, Ajani (2018) argues that it is necessary to emphasise the necessity of supporting practitioners in identifying their needs for subsequent professional development. According to Van Driel (2011), a teacher's ability to understand how best students learn, and how they fail to learn as well as their challenges is an incredibly important goal to focus on when we are developing teachers' CPD. This in turn enables the teachers to acquire the appropriate skills that are necessary for effective pedagogical practice so that the students' learning goals can be achieved. This indicates that professional development programmes aimed at the development of teachers including their Pedagogy Content Knowledge (PCK) cannot be limited to supplying teachers with just input that is targeted at equipping the students with mere subject matter expertise. Instead, it is important to establish PD activities that are closely aligned to teachers' pedagogical practice (Van Driel 2011). This suggests that PD should not only be limited to providing teachers with specific input, yet also there ought to be transformative PD opportunities that enable teachers to evolve certain instructional strategies that sustain highly effective pedagogical practice such as the effective application of technology in pedagogy (Van Driel 2011). This PhD research identifies that the current PD provision in the Imo State of Nigeria does not meet the



needs of the education practitioners in enabling effective inclusive pedagogy, and in applying technology to support the education of children and young people with SEN in schools. **'Floss'** (a government school teacher) reveals this with the reflection that:

*'Learning can be very hard for children with learning disabilities because there are few specialists available to deal with these type of learners, and there is little special training available for the general educators.'*

The findings of this PhD study reveal that this challenge is more common for practitioners who are working in the government owned schools. Furthermore, it is revealed that there is a complex interplay affecting the uptake and integration of TEL into pedagogy. Hence, this is why I argue for the importance of emphasising the vital need for effective CPD (Stevenson et al. 2016; Cameron and Woods 2016; Fraser et al. 2007). There is an expectation for educators to evolve their pedagogical practice throughout their careers (Lofthouse and Thomas 2017). According to Djoub (2018), a teacher's training and their CPD at all levels of their career are of incredible importance in developing an effective professional.

In relation to my PhD research findings, I am of the view that in Nigeria generally, and in the Imo State in particular, there are few examples of successful professional development. As the result of this PhD research I am able to reveal that pedagogical professional development in respect of TEL and SEN is not taking place within the Nigerian context. The research participants indicate that their training needs are not being met effectively. In general, the teachers acknowledged little involvement in workshops and seminars and that mentoring was taking place via informal conversations with experienced colleagues. However, the research in this thesis reveals that the teachers view professional development as a potential opportunity for personal development. Unfortunately, this is not being enabled in the Nigerian context in effective ways and although professional development is an essential component of any profession it is not developed effectively at present based on the reflections of the participants in the research sample (Hadley et al. 2015).

The model of CPD mirrored in the Nigerian schools is tied more to the transmission category in the Kennedy (2005) CPD model. The research participants who are based in the state school sector were of the view that they hardly get any CPD opportunities, and that when they are available, the training is not actually tailored to their needs.

This is characteristic of the Training model and Standard-based models of CPD and these forms of CPD can be discouraging because the professional development does not appear to focus on the teachers' needs to develop technology enabled pedagogy alongside supporting learners with SEN. It is Kennedy (2005) who warns that the training model and the standards-based model of CPD tend to render the teachers passive, as they are more focused on standardisation and compliance than meeting teachers' needs fully.

To demonstrate how adrift existing CPD programmes are, and without focus on teachers' training needs, '**Favour**', and '**Steph**' reveal that their training needs are not being well addressed. '**Favour**' (a government school teacher) reflects that:

*'Yes, I only had one training session where we have reflected on the effectiveness of using technology in teaching and learning and although I am not expecting to learn everything I would like more than we are getting.'*

This reflection reveals a lack of satisfaction in PD as '**Favour**' was expecting a kind of CPD that is more tailored towards teachers' needs in respect of TEL and SEN pedagogy. '**Steph**' also refers to the 'generic training' that does not meet specific needs by revealing that: '*yes, it is always a case of a generic workshop and not specific training, however the training opportunities is not very often.*' '**Amaraka**' also makes reference to the informal nature of CPD in the Nigerian schools noting that; 'teachers sometimes engage in seminars and workshops however much of this CPD is usually delivered informally'. The participants' responses mirror the arguments of Kennedy (2005) in which the author claims that the training models of the transmission category used in CPD fail to show significant impact in developing the knowledge required by teachers through their CPD. Accordingly, the findings also support the research of Hughes (2016) that reveals that teachers are frequently not actively involved in the planning of their professional development, and according to Colbert et al. (2008), this results in professional practices that are not sustainable and do not meet the teachers' pedagogical needs. Although, some research participants are aware of how to integrate technology in their pedagogy, the lack of opportunities for CPD presents a huge challenge towards actualising the effective integration of TEL in the Nigerian context.

It is argued by Seldon (2017) that effective leadership is required to support CPD in order to integrate a strategic approach that provides opportunities for pedagogical development at different stages of the of teacher's career (Hadley et al. 2015). The research participants reveal interesting insights into how the system operates in respect of opportunities for professional development. There is the revelation that insufficient funding impacts upon the teachers' capacity-building as the schools are subsequently unable to provide effective CPD as a result of these funding constraints. Consequently, the Cascade model of CPD appears to be the common model of CPD among my research participants when it comes to applying technology to pedagogy. It was evident in the reflections of the research during the photo interviews that CPD needs to be developed if it is to become effective.



The above image reveals an interesting reflection on sharing knowledge about using technology in pedagogy. A more experienced colleague supports other teaching staff on how to use digital technology for pedagogy. **'Braddy'** revealed that the current government in Nigeria has made 'drastic funding cuts', and this invariably poses a threat to developing teachers' CPD. The teachers appear to rely more on 'knowledge sharing' that is akin to the cascade model of CPD (Kennedy 2005) for their professional development.

With reference to the models of CPD that are analysed by Kennedy (2005), the responses of the research participants about their professional experiences on TEL

and supporting inclusive pedagogy reveal that they would ideally like to have more effective CPD. '**Chidi**' reflects that: 'I strive to learn more every day because the best you can do is to know more'. Equally one of the research images provided by '**Braddy**' indicates the enthusiasm that can be present in the teachers in respect of applying technology use in pedagogy. The image (as shown above) reveals an experienced colleague volunteering to share their knowledge about technology with the less experienced members of staff. The image clearly indicates the teachers' enthusiasm about integrating technology in their pedagogy. The teachers discussed the different kinds of training that they are engaged in. They also emphasized the potential benefits that can be derived from training opportunities. It was interesting to identify other common practices of CPD that teachers are exposed to in Nigeria. These forms of CPD can include mentoring and peer-knowledge sharing forms of PD. However, the teachers appear to rely more on 'knowledge sharing' that is akin to the cascade model of CPD (Kennedy 2005) for their professional development. It is worth noting that these forms of professional development may fall short of realising the transformative agenda for professional development because they fall within the transmission and transitional categories of Kennedy's (2005) CPD model. Furthermore, these categories of CPD offer the teacher less capacity for their professional autonomy. However, the success or failure of this model of CPD appears to depend to a large extent upon the way it is implemented by the trainers (Kennedy 2005). It may be implemented well. It may be implemented less well, and this is because the Cascade model of CPD depends upon the skills of the trainers. Moreover, Kennedy (2005) cautions that CPD should not be restricted to workshops and seminars, and this reveals that a cascade form of CPD is less than ideal practice.

Accordingly, Dobbs et al. (2017) advocate the need for a transformed oriented strategy to professional development that could achieve sustainable improvement and initiate institutional change, in order to equip the educators better in respect of their professional skills. Alongside reflecting on the models of PD, it becomes imperative to develop opportunities for at least informal training (Kennedy 2011), perhaps where opportunities for formal PD are limited. The cascade model of PD could become acceptable if CPD is implemented well. However, one of the main barriers to the effective use of TEL in teachers' pedagogical practice is the lack of training opportunities in this area (Cheon et al. 2012, Crow et al. 2010). This can have an

important bearing on how teachers perceive or view the actual technology as opposed to reflecting on how technology can be used in a particular context (Mishra and Koehler 2006).

It is noticeable that the professional development opportunities to assist educators in developing their potential towards adopting technology to support pedagogy is vital. However, this requires ongoing guidance and support (King and Boyatt 2014), in the understanding that teachers' experiences and training significantly influence their attitudes towards SEN practice and applying technology in pedagogy. According to Fullan and Miles (1992), a reform in professional development is essential. This implies that teachers need to be updated with developmental courses such as professional development opportunities that target a broadening of teachers' knowledge and skills on successful approaches of overcoming barriers to learning. Kennedy's (2005) framework has been used to analyse the educational practitioners' PD experiences and their perceptions of pedagogy. The use of this model of CPD has enabled me to gain insights into the participants' existing professional development within selected Nigerian schools and I think that this is an example of new knowledge as this research has not been completed previously within the Nigerian context.

### **5.2.2 Teachers' Perceptions of Disability and Inclusive Practice.**

Inclusive education entails educating all learners including those with special needs in a mainstream school, and giving them the appropriate support services needed (Wiles & Bondi; 2011; Reid 2013); rather than integrating them in pedagogical settings that appear to be a one-size-fit-all setting as seems to be the case in the context of this research. As argued previously, special education in Nigeria appears to have made some progress. Although a legal mandate is apparently lacking, this form of pedagogical practice can only be viewed as an example of 'work in progress' (Olufunke and Oluremi 2014). In theory, the Nigerian government appears to have good intentions for the educational sector and to have initiated promising educational policies, however, it is generally believed that the educational system has 'failed' to achieve these intended objectives, due to the inability to enforce these policies (Domike and Odey 2014). This lack of implementation has also resulted in a dearth of positive and sustainable changes in the area of special educational needs in Nigeria. Special Education programmes have been established in a number of countries in the

world, however, as already noted their implementation has been referred to as being akin to 'a Herculean task' (Cifuentes, Maxwell, & Bulu, 2011; Wachira & Keengwe, 2011). Although in recent times, special education programmes appear to have made some progress in Nigeria (Eskay et al., 2012, NPE, 2013), this progress does not exempt the Nigerian educational system from the general implementation drawbacks that have characterised the educational policies of developing countries.

The research findings in this study reveal how teachers demonstrate varying perceptions and experiences about inclusion and disabilities. The teachers tend to understand what inclusion and disabilities mean from a number of different perspectives by displaying varying understandings of inclusion and disability. Moreover, the participants demonstrated an awareness of disability from the medicalised viewpoint that relates disability to a form of 'deficit'. The participants' descriptions of SEN were more associated with the child's/student's physical challenges, behavioural attributes, and cognitive abilities. Furthermore, it is apparent from the findings that many of the participants revealed an understanding of disability from the medical model view of disability with the implication that the emphasis is placed on the individual's physical appearance. This stance subsumes the unidentifiable physical deficiencies within the normal learner cluster. As a result, this class of SEN learners who are wrongly classed as non-SEN learners are not well supported according to their needs, largely because the teachers failed to class them correctly. In terms of SEN in this research, a key finding suggests that teachers lack awareness of specific learning difficulties. Currently, it appears that there is no clear framework in place on how to identify learners with SEN in general education. The varying perceptions of these teachers are perhaps influenced by what I termed personal, social, levels of experiences, trainings and continuing professional development. This was more noticeable when it comes to terminologies and concepts on certain learning disabilities, as many of the teachers demonstrated little or no awareness of unidentified learning disabilities, while revealing much awareness of the physically identifiable disabilities among some learners. These conceptions are indicated in the reflections of some research participants like; **'Ndidi'**, **'Judith'**, **'Frank'**, **'Joy'**, **'Pamela'**, and **'Kelvin'**.

**'Ndidi'** (a teacher from government school) reflects that:

*'at present physical disabilities get more attention, because you can tell what the problem of the child is, it could be a visual impairment, deafness, or a physical challenge. However, with autism and dyslexia, there is less awareness of the needs of these students.'*

**'Judith'** (a teacher from a government primary school) supports this view as she notes that:

*'There are children with various forms of disability...they can be profound or moderate. I would say that if the disability is physically noticeable it is more likely that the learner will get help and adequate support. With other forms of disability, like autism there is less awareness of the needs of the students as it is less physically noticeable.'*

**'Frank'** (an ICT teacher in a private school) reiterates that:

*'Sure we have children with all sorts of disability... but the question is how do we know of a disability when the disability is not obvious, it means adequate support cannot be provided. Myself, I am not even sure if I know all the learning disabilities.'*

**'Joy'** (a private school teacher) also reinforces this view by revealing that:

*'There is no easy way to identify dyslexia definitely...Although I think it is a new disability and I have heard people talk about it...I don't really understand it...We need to raise more awareness about this form of disability or else it will become another area of prejudice.'*

These reflections are also complemented by **'Kelvin'** (English Literature teacher from a government school):

*'The way we understand disability affects the way children are treated and supported in schools. For example, these ones who are physically disabled... it depends on how bad it is...however, our knowledge of how we understand disability in general affects the way we support these children.'*

The above reflections from the research participants say something about the teachers' theoretical understanding of 'Persons with Special Needs', and these research participants have shown less awareness of unidentified disabilities. The research participants reveal that disabilities like dyslexia and autism are viewed as being akin to 'new terminology' and this reveals the complex understandings of inclusive education and disabilities among educators in Nigeria. In the work of Cagran and Schmidt (2011) it is revealed how the type of special needs of the learner influence teachers' attitudes about inclusion. Such types of special needs include students with physical disabilities, and behavioural and emotional disorders. The findings of this PhD study indicate that teachers expressed a high level of awareness about learners who are physically challenged and also expressed little or no awareness of behavioural or emotional disorders, and failed to class unidentified learning disabilities effectively. It is envisaged that the teachers' perceptions and experiences, the stereotypes and the cultural beliefs within the society that disabled children are 'uneducable' appears to be a strong factor that works against the adoption and actualisation of inclusive education in Nigeria. In view of this, it can be argued that the type of disability influenced practitioners' attitudes towards SEN learners (Oskamp, 2005; Gaad 2004). However, teachers' perceptions, awareness and experience to a large extent moderates their professional practice. The research of Cagran and Schmidt (2011) further identifies that teachers' professional expertise in working with children with special needs is another vital factor that not only determines but also influences teachers' attitudes towards inclusive education.

Children with SEN generally are not well included in the Nigerian schools and where they are included they appear to be not well supported. Adebisi (2015) recorded that many children with SEN in Nigeria are out of school particularly in several rural areas as a result of the non-availability of special schools. Moreover, it is also noted by Adebisi (2015) that many parents and communities and teachers are not fully aware of the full range of factors that are affecting children with SEN. This is as a result of negative perceptions from parents, communities and teachers who can believe that such children cannot be educated or achieve in school.

There also seems to be no well-structured process of assessment in place for identifying children and young people with SEN within the Nigerian context. Neither is



there differentiated instruction or assistive technology in place to promote SEN pedagogy in the schools visited within this study. As '**Jade**' reveals, most teachers and schools choose who they want to include without following a prescribed assessment procedure. Equally, '**Gina**' acknowledges that the lack of education on the part of the parents and the wider society, as well as a lack of knowledge on the side of the teachers has resulted adversely on the success of inclusive practice in the Nigerian schools. In complementing the above reflections, it is worth noting that alongside the teachers' knowledge and attitudes, cultural perceptions and local interpretations of disabilities were also revealed as other challenging factors that influence the way children with SEN are identified and supported in the Nigerian schools. What is apparent is that teachers understand inclusion as 'fairness' and also as a process that needs to occur to benefit not only the child with SEN, but also other learners. This tendency links to the training, the skills, and the knowledge of the teachers about SEN pedagogy.

Consequently, Peer (2009) argues that barriers to education are created if teachers lack the required knowledge, and awareness of the individual differences which characterise the practice of SEN in this area. This involves having the appropriate knowledge and understanding of appropriate teaching strategies such as technology use and intervention to support the children to attain their own independence. In reflecting on this point, '**Lowe**' emphasised the importance of ensuring that the full needs of children with SEN are met as holistically as possible.

In this PhD research, most classroom teachers reported that they do not have the requisite skills and knowledge to work or teach children with learning disabilities. The research participants are of the view that teachers with special skill sets and expertise should be assigned the responsibility to deal with these kind of students with special educational needs. This research finding also aligns with the study of Ellins & Porter (2005), and similarly, the research by Kaufman et al. (2005). These studies argue that teaching students with different kinds of disabilities demands special teaching approaches. Hence, the need for special teacher training is required. However, the views of Eleweke & Rodda, (2002) advocate that adequately trained professionals are essential for educating learners with special needs. Nonetheless, the dearth of such specialist teachers and other support staff such as; teaching assistants, audiologists,

psychologists, speech and language therapists, communication support workers and interpreters also poses a further challenge in many developing countries including Nigeria (Eleweke & Rodda, 2002). This is supported by 'Floss' who reflects that: *'learning can be very hard for children with learning disabilities because there are few specialists'* and in addition, 'Chidi' reflected that *'special support is also lacking in the provision of SEN'*.

In conclusion, most teachers appear to demonstrate a positive attitude towards eliminating barriers in respect of the marginalisation of children with SEN. However, there seems to be no clear direction on how to achieve this aspiration within the Nigerian context. A teacher's pedagogy is thought to be developed through a combination of content, beliefs about learners, knowledge of the curriculum, knowledge of support, resources and context, and their pedagogical knowledge (Hashweh, 2013).

### **5.2.3 SEN Identification Challenge and Technology Use in Pedagogy**

Teachers' knowledge, understanding, and perceived views appear to moderate the successful implementation of most educational programmes (Damore & Murray, 2009). With regards to technology application, it is imperative to reflect on the practitioners' understanding of specific learning difficulties, and how this understanding may influence the way teachers use technology in pedagogy. This study discovered that teachers can lack awareness of some unidentified learning disabilities. This results in some teachers' lacking the ability to assign proper status to certain disabilities. Hence, many children with SEN are therefore wrongly placed, and this in turns affects adequate technology use. According to Ajuwon (2012), the growing number of inclusive schools together with policy provision has placed huge demands on educators, with an expectation of them adapting instructional techniques and curricula to accommodate children with SEN. Consequently, the implementation, progress and management of special needs education in the country still appears to be a challenge. The ability of the teachers to identify the support needs of these learners, and appropriately apply technology to meet the needs of all learners is a milestone in the campaign for enabling 'Education For All' (EFA). Nonetheless, with the early identification of needs and the application of good levels of support by practitioners, most children can still overcome the obstacles that their disabilities

present (Reid, 2009, Adebisi et al. 2014). The problem however, lies in what is socially construed as a disability or a learning difficulty in a given society (Kisanji 1998; Wilson 2002). If what is considered a disability or a learning difficulty is dependent on the cultural values of the particular society, subsequent problems with inclusion can appear (Kisanji 1998). I argue that technology may not be effectively utilised in inclusive pedagogy, if the learners needs or problems are not identified effectively. A societal understanding of the term 'learning difficulties/disabilities' reflects the status assigned to it (Christopher 2012). Arguably, this reflects the way children and young people will be supported in schools.

It is argued that children progress at diverse rates and learn well if their differentiated needs are taken into consideration (Woodfine, Nunes and Wright 2008). This approach to pedagogy needs to take into consideration the profiling of the individual learners and their needs. It is also important to introduce strategies and interventions that promote best practice for educating children with varied needs. In this regard, it can be argued that where technology is required in either the teaching or support of learners in schools, the technology use necessitates alignment to the learning objectives, hence the call for the grounding of technology use within pedagogy (Kirkwood and Price 2014).

#### **5.2.4 Addressing Diversity in Inclusive Pedagogy using Technology Effectively**

The study highlights the need for Nigerian schools and teachers to embrace a flexible teaching approach to support a form of pedagogical practice that promotes equal participation and improved learning. As argued by Loreman (2017), the effective integration of technology is considered useful in inclusive pedagogy. Cuban (2011) also argues that applying digital technology in contemporary practice is not only challenging and complex, however also 'messy' due to the interplay of complex variables. It is necessary for the teachers to possess the ability to understand how and why to use technology in meaningful ways if we are to achieve inclusive pedagogy (Wepner, Tao, & Ziomek, 2006). It is not just the integration of these technologies into pedagogical practice, yet also the alignment of their use with student learning goals in a manner that engages learners in the pursuit of enhanced learning and academic progress (Ogiegbean 2009, and Kim et al., 2013). This means that technology should

be used as part of a creative approach that enhances the existing broader pedagogy in addressing a student's needs. Moreover, embracing the principles of the Universal Design for Learning (UDL) in education while applying technology to pedagogy is a worthwhile consideration. This will not only benefit students with SEN yet also other learners (CAST 2010).

UDL is viewed as a philosophy of education that is intended to provide access to learning and meeting the needs of diverse learners in a common setting (Sokal & Katz, 2015). I argue that one way to achieve a form of universal learning that enhances the equal participation of all learners is by effectively integrating Technology Enabled Learning in pedagogy. According to (CAST 2010), the Universal Design for Learning (UDL) is defined as a set of principles for curriculum development that gives all individuals equal opportunities to learn. UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone, and not a single one-size-fits-all solution. The one-size-fits-all approach seems to be prevalent in Nigerian school settings as revealed from the images presented and the research participants' reflections. Therefore, it is vital to embed a flexible approach that can be customized and adjusted for individual needs (CAST 2010).

The policy and research often place an emphasis on the practitioner's responsibility to ensure that ICT in teaching and learning is effectively utilised in generating new opportunities for all students to learn and achieve (Ahmad 2015). However, this narrative is seemingly adrift from reality given the evidence from this study. A number of the research participants commented on educational policies and the challenges in implementing effective policies in this area. For example; **'Paul'** (a private school teacher) suggests that *'the teaching staff receive updates on policies however, they never work'*. This reflection is also supported by **'Chevonne'** (a teacher from a government school) who states that *'teachers are expected not to discriminate teaching any child based on their disabilities, consequently without any government consideration on the size of the class and required equipment'*. Moreover **'Fred'** comments that *'change without government commitment is a mere dream. The reality is that inclusive education here is fraught with a myriad of challenges'*.

Having identified the way children with SEN are supported in the study setting, and the way technology is applied in pedagogy among education practitioners in the Imo

State of Nigeria, it is evident that there is a gap between policy and practice. This appears to emanate from an inadequate approach by the various Nigerian governments where policy implementation seems to be passed to schools and teachers without its effective direction. This failure appears to culminate in undesirable outcomes that fail to deliver on the goals of the policy.

This finding conforms with the research findings of Price and Kirkwood (2014) in revealing that much use of new technology in education lacks pedagogical grounding, and as a result, additional efforts and interventions are required to align technology use to pedagogy in an attempt to bridge the gap between practice and theory. I argue that most Nigerian schools are typical examples where technology use in pedagogy appears underdeveloped, and practitioners in this area are not fully knowledgeable on how to effectively employ technology enabled learning. I argue that despite all the promising policies on ICT and inclusive education in Nigeria, the application of technology to pedagogy particularly towards enabling an inclusive classroom, its implementation and the expected transformation in pedagogic practice is yet to be actualised, and still remains a significant challenge. Nigeria, continually experiences a lag in its ICT integration in schools. For instance, the policies in general appear vague and moreover teachers training needs are not well considered.

## Chapter Six

### Summary and Conclusions

#### 6.0 Chapter Overview

This chapter of the PhD presents the overall summary and conclusions of the research by providing a recap of the research problems addressed alongside providing a reflection on the purpose, and objectives of the study. The methodological process that informed the study is also summarised. The chapter content then reflects further on the theoretical frameworks featured in the study, followed by a concise summary of the research findings. I reflect on the implications of the study and provide a final account of the contribution that the thesis makes to knowledge in respect of applying technology for inclusive pedagogy in the Nigerian context. Furthermore, this chapter also presents a reflection on the methodological approach of the study by considering its strengths and limitations for the research. Finally, I provide recommendations for improving SEN practice in Nigeria and I then present my concluding remarks in the form of a reflective vignette.

#### 6.1 Summary of the Study

This section presents a summary the various sections of the study with a focus on purpose of the study, the methodological review, the research problem and findings. This PhD research explored the perceptions and experiences of education practitioners on their current pedagogical practice using Digital Technology (DT) for inclusive pedagogy. The study is aimed at ascertaining the level and mode of use of digital technology in inclusive classrooms, that is, how technology is used, and whether or not the technologies are used in didactic or creative forms in pedagogical practice within selected Nigerian schools.

##### 6.1.1 The Research Problem

Despite the endorsement of the United Nation's Convention on the Rights of the Child (UNCRC) and the global campaign leading to the implementation of the United Nation's Convention on the Rights of Persons with Disabilities (UNCRPD) (UNICEF, 2007), children with disability are continually faced with challenges that range from

marginalisation, discrimination and sometimes total exclusion from education (Olufemi, Josiah and Kehinde 2015; Srivastava, Boer and Pijl 2015; Udemé and Olisaemeka 2016). Children with SEN in many African countries in general, and in Nigeria in particular, are not often included in inclusive classrooms. Even where they are integrated, they are not adequately supported. This problem motivates my interest to explore and understand the current status-quo of inclusive practice and how teachers promote the education of children with SEN using technology. Technology use in education is not always aligned to effective pedagogy, hence its application can lack pedagogical grounding (Kirkwood and Price 2014).

### **6.1.2 Purpose of the Study**

The central focus of the research explores the perceptions of educational practitioners about using digital technologies to promote inclusive practice in meeting the needs of learners with special needs. The research also examines and considers the influence that CPD has in teachers' use of technology in pedagogy. The afore mentioned problem motivates my interest to explore and understand the current status-quo of inclusive practice and how teachers promote the education of children with SEN using technology in their pedagogy. That is, to know the how and why of technology use in the current pedagogy in the Nigerian schools.

This study posed the following research questions and has clearly addressed these questions therein.

- e) How do teachers perceive and understand the inclusion of children with SEN in their pedagogy?
- f) How do teachers apply digital technology to support children with SEN in their pedagogy?
- g) What are the challenges in integrating technology in pedagogy in the Nigerian schools?
- h) How does the professional development of teachers Influence technology use in promoting inclusive practice?

### **6.1.3 Research Questions Addressed**

#### **6.1.3.1 Research Question 1 - addressed**

##### ***How do teachers perceive and understand the inclusion of children with SEN in their pedagogy?***

From the participants' views, there appears to be a general lack of awareness of various disabilities. It is evident in this study that cultural perceptions of disability play a vital role in the way disability is construed. This accounts for the reasons for the lack of awareness and teachers' attitudes towards certain learning disabilities in the Imo State of Nigeria. These cultural and historical perceptions of disability are socially constructed and played out in the findings of this research. The findings from the research interviews in particular show that the constructed understanding of disability does not portray invisible disabilities in a positive light, rather what played out was teachers showing more understanding of learners with physical problems. This reveals that the way inclusion is addressed is subject to what is known to exist as a disability. In the case of this research, the evidence presented suggests that inclusion is not fully addressed or implemented in the Nigerian schools, especially with the low level of awareness of specific learning difficulties. The study highlights that with regards to inclusive practices within the general educational sector, invisible disabilities are not being addressed. This, therefore, has jeopardized the education of children with SEN in many cases as their needs are not being met.

Unfortunately, the society and schools find it difficult to identify people with hidden disabilities and, this in itself has created a negative impact on the way inclusion is addressed in the Nigerian schools. This study raises questions as to how inclusive is the current practice using technologies in inclusive pedagogy, if there is no clear understanding of the complex needs of the learners. I argue that teachers can only teach and support what they know. If teachers lack the awareness and knowledge of unidentified disabilities, the necessary support for these learners is unlikely to occur.



### **6.1.3.2 Research Question 2 - addressed**

#### ***How do teachers apply digital technology to support children with SEN in their current pedagogy?***

This research question explores the 'how' of technology use in pedagogy with the view of understanding teachers' experiences and interpretations of technology application to pedagogy for technology enabled learning. The research identified that the way some teachers apply digital technology in their classroom practice was not demonstrating a transformation of their teaching practices. In some cases, the technologies may not be available, or where they are available they are not fit for purpose as some of the technology devices are not operable due to obsolete or non-functional hardware and software systems. In view of the findings of this research, although the teachers indicated that they often use the Internet to find information and teaching materials to design activities and produce teaching plans, they also use technology to design PowerPoint presentations and this is more akin to traditional 'chalk and talk' pedagogy.

I argue that ICT use in pedagogy as evidenced in this research can simply be classified as minimal. Technology appears to be generally used for low-end applications that maintain rather than modify existing practices, and falls short of actualising transformative agenda for technology use in pedagogy. Reflecting on the research theoretical perspective, the SAMR model adopted in the study reveals that technology application to pedagogy in the Nigerian schools is only within the substitution and augmentation levels on the SAMR hierarchy. As a result, the emphasis remains on what type(s) of technology teachers should use to move themselves along the hierarchical continuum of S-A-M-R, rather than being paced on the more important issue of utilizing technology in ways that emphasize shifting pedagogy or practices to enhance teaching and learning. Moreover, merely introducing technology to the educational process is not enough.

Furthermore, it can be argued that the extent of technology use in classroom practice only offers a substitute for existing activities. I am of the view that technology use in the Nigerian schools is not well aligned to pedagogy, because the application of technology to pedagogy should be about making the technology available and using the available technologies for the right pedagogical purposes. Unfortunately, this does

not appear to be the case as shown in the photos provided by the participants and the subsequent discussions therein. It is apparent that the transformative element of technology use is lacking in the Nigerian schools. In my view, technology use in the Nigerian schools confirms the general findings of studies by Ingleby (2016) and Price & Kirkwood (2014) in other cultural contexts that reveal that much educational technology is not being utilised in ways that improve deep learning processes.

### **6.1.3.3 Research Question 3 –addressed**

#### ***What are the challenges in integrating technology in pedagogy in the Nigerian schools?***

The research participants have revealed that there is a lack of technological resources for pedagogy with SEN in Nigeria, and that this is a key obstacle in developing pedagogy in this area. These factors relate directly to the lack of physical resources in the schools, as well as to the poor quality of the resources when they are made available. A lack of confidence in using the available technology is also a challenge in realising inclusive pedagogy. In general, all of the research participants agreed that there are a myriad of challenges confronting the education of children with SEN both in inclusive classrooms and in special schools. The key barriers teachers mentioned include: infrastructure problems such as the availability of learning materials and funding. Policy implementation, and large class sizes are also problematic. The research participants perceive that the children with SEN may not be adequately supported and that the school buildings can have difficulties in respect of access. The research participants also revealed that their class sizes are too large with teacher-to-student ratios of 1:40 in many of the schools. All of these factors combine to undermine the effective application of technology for inclusive pedagogy. Alongside underdeveloped perceptions of inclusive practice and a lack of innovative use of technology for pedagogy, these problems with the infrastructure come together to produce challenges for successful pedagogy in this area. The lack of confidence by teachers in using the available technology is attributed to a lack of CPD opportunities for teachers. As a result, teachers are not kept abreast with the current and new technologies that are necessary to promote effective and successful use of technology in meaningful and transformative ways that support inclusive pedagogy.

#### **6.1.3.4 Research Question 4 –addressed**

##### ***How does the professional development of teachers influence technology use in promoting inclusive practice?***

Addressing this research question revealed that one of the reasons digital technologies are not well incorporated into the classroom effectively, is because of the lack of teachers' experience of, and exposure to the use of new technologies. As mentioned earlier, teachers in this cultural context are not necessarily made aware about the current and new technologies that are necessary to promote the effective and successful use of technology. This results in a general lack of confidence because many classroom teachers do not appear to possess the skills and knowledge required to teach or support children with learning disabilities using technology. In some cases, technologies are provided because of pedagogical needs, yet the teachers are not properly trained on how to use the technology for the purposes for which it is designed. The research participants revealed that their training needs are not always met. This in turn, leads to the technology not being well utilised in ways to assist in achieving the expected goals. This is particularly noticeable in the state schools. Teachers were of the opinion that they hardly get any CPD opportunities. However, even when they are available, the training is not actually tailored to their needs and the purpose of the technology design. The study established that CPD appears to be underdeveloped in many Nigerian schools and that 'the cascade model' of CPD tends to be evident, especially across the public schools. This seems to be a cheaper alternative to formal professional development and this is a consequence of funding constraints. Teachers therefore tend to rely more on 'knowledge sharing' that is akin to the cascade model of CPD (Kennedy 2005) for their professional development.

#### **6.1.4 Methodological Review**

This study has adopted an inductive qualitative research approach that is informed by an interpretive ontology. The study is based within selected primary and junior secondary schools in Imo state of Nigeria. The sample for the study comprises of 25 participants drawn from primary and junior secondary schools in the Imo State of Nigeria. The sampling method in the research is purposive sampling. The research participants were purposively selected based on their varying subject areas of specialization, and range of experiences working with SEN learners. A combination

of qualitative data collection instruments were used to gather the research data. Fundamentally, interviews were conducted in three phases over a period of six months involving photo elicitation, semi-structured interviews, and some follow-up loosely structured Skype interviews. The first stage of the data collection in the research involved collecting initial qualitative data from the 25 research participants using photo elicitation in a semi-structured interview format. The photo elicitation approach serves as an exploratory tool to gain first hand personal accounts of teachers' views about technology use, inclusion and disability, and the associated professional development experience of the research participants. The follow up interviews via Skype in a loosely-structured form occurred with 10 of the research participants with the aim of further exploring the key findings/themes that were identified from the semi-structured data set.

The research also applied the SAMR model to further analyse the findings of the study to gain a breadth and depth of understanding of how technology is applied by teachers in their classroom practices. Using the SAMR model provided a platform to engage in interpretive discussions around how teachers use digital technology in their current pedagogy. This has enabled me to understand the dimension of teachers' technology use in pedagogy, and has further created an avenue to view technology debates from various angles and consider the possible implications this has for inclusive pedagogy.

The qualitative approach via PEI was found to be a constructive process in achieving the research goals. I have embedded this approach because it was suitable in enabling me to achieve high quality data for this PhD. Ultimately, this resulted in me gathering teachers' views through PEI and this has also involved the research participants throughout the research process as fully as possible. They have been empowered through their selection of images representing the application of technology to pedagogy in this area.

## **6.2 Research Findings**

The study identified the following key findings;

1. Teachers have varied perceptions of what is meant by inclusion and disability.
2. Some teachers lack awareness of how to apply technology to pedagogy effectively.

3. There is a lack of a necessary infrastructure to support the application of technology to SEN pedagogy in this cultural context, and
4. Teachers' training needs are not always met.

The research identified teachers' varied perceptions and experiences about inclusion and disability and revealed problems of disability identification in the area of specific learning difficulties. It was also noted that there is a disconnect in theory and practice on teachers' inclusive pedagogic practice and technology use. Another interesting finding of the study reveals that the integration of TEL in Nigerian schools is not well developed. Teachers still maintain the old traditional instructional approach as opposed to technology use. Few teachers who demonstrated awareness of technology use in their pedagogical practice appear to lack awareness of how to apply technology to pedagogy effectively. Another important finding in the research shows that the pedagogical practice in Nigeria using technology appears to revolve around just substitution and augmentation (S-A) on the SAMR model, which is more akin to enhancement as opposed to being transformational. A typical example is where the participant substitutes technology for making written classroom notes. Suffice to say, technology use in the Nigerian schools appears to lack pedagogical grounding.

I argue that the application of technology seems undeveloped due to the lack of availability of technology; the type of technology being used; how teachers use the technology, and a lack of consideration of why technology is being used in wider pedagogy. This research also identifies a complex picture of interconnected factors which are influential in the teachers' use of technology in their pedagogy. This can be attributed to various factors that affect technology use in pedagogy. These factors include a lack of the necessary infrastructure to support the application of technology, and the required training needs of the educational practitioners.

Interestingly, the research identified that disability identification was a challenge to some extent as many of the participants revealed an understanding of disability from the medical model view of disability with the implication that the emphasis is placed on the individual's physical problems. Similarly, the participants' descriptions of SEN were more associated with the learner's physical challenges and behavioural attributes, while paying less attention to cognitive challenges. With respect to SEN, teachers expressed a high level of awareness about learners who are physically

challenged and also expressed little or no awareness about SpLD and failed to class unidentified learning disabilities effectively. This suggests that some teachers lack awareness of 'unidentified learning disabilities'. This culminates in a general lack of the ability to assign the proper status to a number of disabilities by a number of the teachers in the research sample.

### **6.3 Contribution to knowledge**

This research makes an original contribution to knowledge to the body of existing literature on technology application to pedagogy in the Nigerian context, as it generates new knowledge about inclusive best practice in respect of applying digital technology to pedagogy. It is anticipated that the research in this study holds the potential to impact positively on curriculum planning, teaching, and additional learning support for children with SEN in Nigeria.

Although there are various examples of research around ICT and pedagogy, the application of technology to inclusive pedagogy in Nigeria is limited. An extensive literature search has not yielded a match to the title and context of this study. This, together with the rapid advancement of new technologies globally, calls for research in this area of study. This PhD research presents in-depth insight into teachers pedagogical practice using digital technologies. The study therefore, provides recommendations on how to develop technology best practice for effective teaching and learning strategies for managing students' diversity in relation to digital technology use and to consider best inclusive practice.

This study also makes an original contribution to new knowledge as the research adopts the principles within the Substitution Augmentation Modification & Redefinition (SAMR) model to contextualise the research and understand the current practice through participants' reflections on how they integrate digital technology in their pedagogy in Nigeria. The application of the SAMR model not only revealed how technology is applied in pedagogy in the Nigerian schools, yet also provided a benchmark to rank the level and extent of technology application to pedagogy on the S-A-M-R continuum. To my knowledge, this is the first research to adopt the SAMR model to establish the extent of technology application to pedagogy in the Nigerian

schools, and to ascertain the 'how' of technologies in general education in the Nigerian context.

This research also contributes to new knowledge by the novel methodological application of photo elicitation interviews in exploring the perceptions and experiences of educational practitioners about inclusion/disability and how they apply Digital Technology (DT) to enable inclusive pedagogy in the Nigerian schools. The successful application of this research approach in the study has the potential to improve teachers' technological and pedagogical awareness and practices by presenting typical views and experiences of educational practitioners on how technology is applied in pedagogical practice with students who have SEN.

This research also has the novelty of identifying the disconnect in theory and practice on teachers' inclusive pedagogical practice and technology use, and traces root factors not just to infrastructure and policy, however also to teachers' CPD. In addition, the study also identifies a connection between a teacher's CPD style/model and how technology is applied for inclusive pedagogy in the Nigerian schools.

#### **6.4 Implications for Practice**

The findings of this research gave a deep insight about teachers' pedagogical practice using technology for inclusive practice in a specific cultural context. Unfortunately, the research may not be generalised beyond schools and those who participated in this research because, their interpretation and opinions about inclusion and disability cannot be overly generalised. Some teachers appear to have much knowledge and they are using DT in pedagogical practice, whereas other teachers' technological awareness has not developed effectively.

#### **6.5 Strength and Limitations**

The research utilised interview data collection techniques, and was grounded in interpretivist/constructivist beliefs. The research is subjective and based to some extent on the personal interpretations of the researcher. A strength of phase 1 of the data collection is that the researcher engaged practitioners across general education settings who provided profound insights into the research area. However, the findings from the research are limited to a purposive sample (n=25) within the Imo State of

Nigeria. I acknowledge that the sample of the research appears small, however, the researcher's focus was more on breadth and depth of understanding, hence the narratives of teachers on digital technology application and SEN was revealing and insightful. Nonetheless, I acknowledge that this has been a small-scale qualitative approach to the research area.

## **6.6 Conclusion**

Despite the global shift towards enabling education for all, inclusive practice has largely remained far from reality' in Nigeria (Ajuwon, 2012). The evidence from this study suggests that teachers require more than traditional teaching approaches to engage learners, and to support inclusive best practice. It is noticeable that many factors constitute drawbacks that mitigate against achieving a sustainable inclusive pedagogy. In recent times, special education programmes appear to have made some progress in Nigeria with the new government's 'Change' initiatives. However, as the saying goes, the more things change, the more they remain the same. The findings of this research indicate that the application of technology to pedagogy by teachers in their current pedagogical practice is didactic, and devoid of much innovative or transformational agendas in respect of TEL despite the willingness of the research participants. Kim et al. (2013) argue that pedagogy with technology ought to provide 'deep' learning experiences for all learners by considering effective ways to support inclusive learning. Irrespective of the progress of technology application in education, one question that has continually remained present is 'what is the position of Nigeria in the technology landscape in respect of pedagogy?'. Although the Nigerian teachers have demonstrated willingness and enthusiasm to embrace technology culture in supporting inclusive practice, this willingness is impeded by unreciprocated attitudes from the various Nigerian governments. Nigeria like many developing countries in Africa has remained on the other side of digital-divide, and continually trails behind on the technology landscape, particularly in relation to education. It is unfortunate that despite the attempts that have been made to reform educational policies, the educational needs of individuals with disabilities are not being met in Nigeria as opposed to enhancing the integration of learners with SEN in mainstream education.



## 6.7 Recommendations

This PhD research explored the perceptions and experiences of education practitioners on their current pedagogical practice using Digital Technology (DT) for inclusive pedagogy. Several findings emerged from the study and I make the following recommendations for the improvement in practice as well as in respect of areas for further research.

- Teachers' professional development was identified as a vital factor for the effective use of technology in pedagogy, and this need is not always met. I therefore recommend regular CPD training programmes centred on technology use in supporting the needs of learners in inclusive classrooms because teachers can only teach and support what they know. Teachers and educators need to be constantly up-dated with the knowledge and skills of using the emerging technologies for educational purposes in effective ways.
- There is the need to provide teachers with specific training that develops teachers' knowledge and awareness of not just SEN, yet knowledge about specific learning difficulties which means teachers will have better discernment in selecting appropriate technologies to support their pedagogy and SEN children in their classrooms. If teachers lack the awareness and knowledge of unidentified disabilities, the subsequent support for these learners will be absent.
- The participants revealed that there was no formal practical assessment for the identification of children with special educational needs in Nigeria. This has resulted in a lack of intervention for SEN learners. On this premise, I recommend the introduction of a formal process of disability assessment and identification in schools.
- I also recommend that sufficient technicians need to be employed for the maintenance of the technology devices provided to the schools for technology enhanced learning (TEL). Lecture halls, libraries, laboratories, classrooms and venues for teaching and learning in the schools need to be provided with an appropriate infrastructure.

- I finally propose the need for a paradigm shift in the Nigerian schools' instructional designs; and a new consideration of the development of effective CPD in order to achieve sustainable inclusive best practice and sustainable professional development.

### **6.8 Potential Areas for Further Research**

- This study has provided the opportunity for the development of future research agendas. I therefore recommend further research to investigate the application of digital technology to improve learners' engagement and achievements in inclusive classroom.
- I also recommend for further research on teachers' knowledge about effective assistive technologies for children with specific learning difficulties.
- Further research is recommended on evaluating teachers' knowledge in selecting New technologies: Using The SAMR and TPACK Models.

### **6.9 Reflective Vignette**

This concluding vignette reflects on my researcher journey during my PhD. Having to constantly reflect on the enormity of such a large piece of research, I would not claim that completing this PhD was an easy task, for example, developing the visual methods aspect of the research, and unforeseen circumstances that were beyond my control during the time of my PhD research in view of the global pandemic. At the early stage of my research, my PhD study sometimes seemed to be like a 'boulder rolled by Sisyphus to the top of a hill only for it to roll back down again!' Completing this PhD was a hectic academic journey. I acknowledge that research has both its powers and its limitations for social change and development. I saw its importance and influence in conveying ideas from those who have direct experiences of using digital technology to promote inclusion; and those who are in a position to render useful responses on how, why, and the extent to which they use digital technology in their pedagogy to support children with SEN.

This study has taken me on an exploratory journey that has been very enlightening. The research in many ways sheds light on issues around the teachers' perception of inclusion and disabilities, and the current classroom practice using digital technology

in pedagogy. In reflecting on this area, there is a need to improve not just inclusive practice, but also professional development. It is important for schools to develop new and inclusive pedagogical approaches with technology, in the knowledge that technology is a potential enabler of opportunity (Ekin 2015). In addition, technology use is best when it is applied to pedagogy to develop creative thinking (Ingleby 2016).

In the course of this research I have gathered my research data in a unique way which has informed and added a new level of knowledge to my research skill set. I acquired the hands-on experience of developing my critical reasoning, research skills, and ensuring the credibility of my research process. I realised that I was not only challenged to develop my skills as a researcher, but also empowered to develop my basic virtues and power of reasoning as an individual. I have enjoyed being a researcher, as the research has given me the opportunity to actively engage in several academic conferences and seminars where I was privileged to give presentations and talk to people about my research, as well as listening to their comments and suggestions. As the PhD journey progressed, the research became more interesting with the visual methodology approach applied. The research process provided me with the opportunity to appreciate how the participants can reflect and define their understanding of inclusive practice and technology use in pedagogy using images.

The study will serve to impact positively on SEND best practice and policies on SEN in Nigeria. Using the SAMR model in the research analysis holds the potential to make stakeholders in the Nigerian education system aware of how technology can be applied to pedagogy in effective ways with students who have special educational needs. The study also brings to light some associated problems that mitigate against successful technology use in classroom practice. With this awareness, policymakers can be better informed of the state of technology use in pedagogy in the Nigerian schools. It is simply not sufficient to identify high performing countries and to seek to replicate key aspects of their policies and practices without understanding first what our own particular 'problems' are and without understanding why particular solutions might work in particular contexts. I hope that the research in this PHD will contribute to our collaborative efforts to develop inclusive best practice for TEL.

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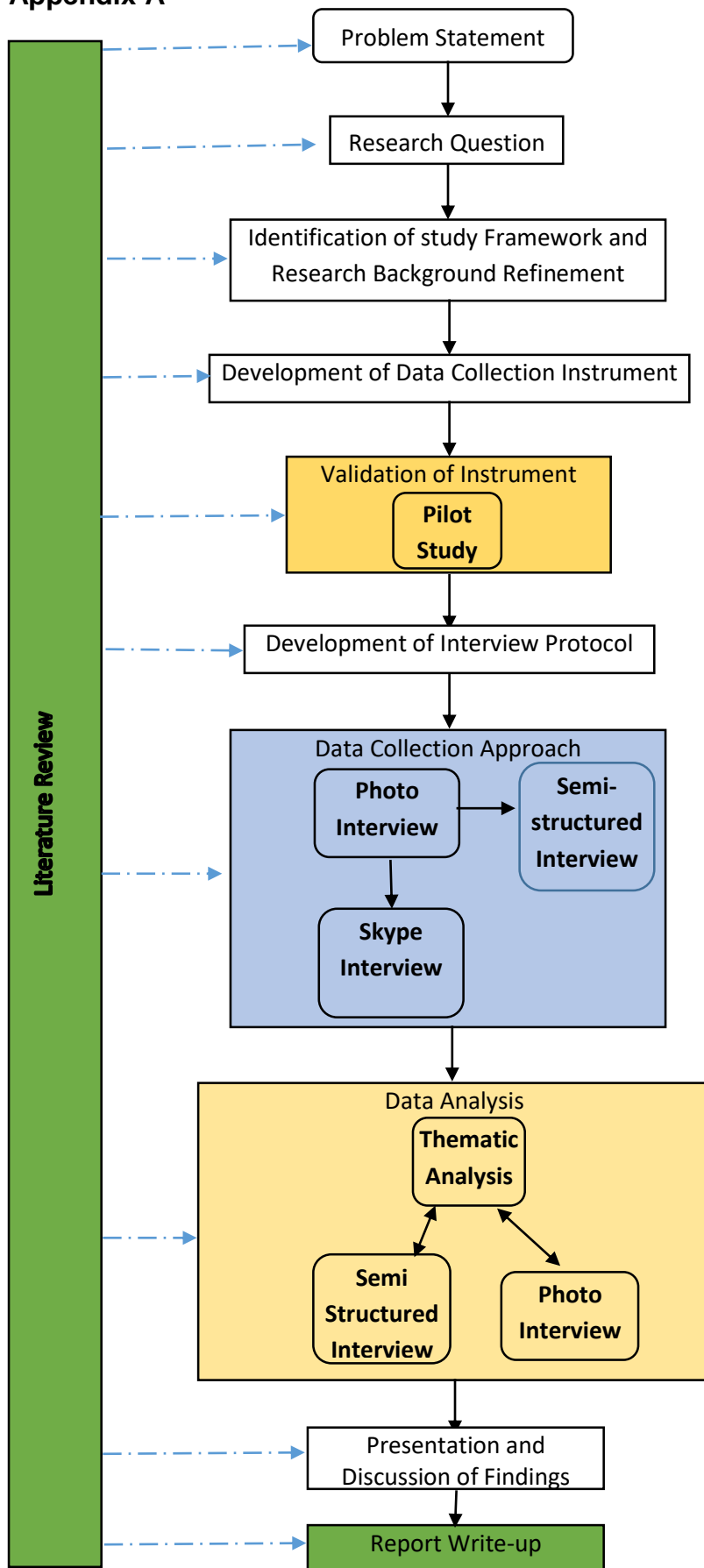
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Appendices

**Appendix A**

**Research Process Diagram**



## **Appendix B**

### **Stage 1 Interview questions- via Photo Elicitation Interview**

Based on your experience, can you demonstrate with images/photos the application of technology in your current pedagogy?

Using photos/images can you discuss the ICT tools that teachers use in teaching and learning? Explain how you use them?

Using photos/images can you explain your views and experiences working with children with SEN?

How would you describe access to digital technology for inclusive pedagogy?

Using photos/images can you share your experiences of educational professional development?

### **Stage 2 The semi structured interview questions discussed in this research were as follows;**

1. In your view how do you conceptualise inclusive practice?
2. Can you share your general knowledge and perceptions towards children with special educational needs and disability?
3. What is the current situation with respect to digital technology integration in your school?
  - b. To what extent do teachers use ICT resources in their classroom to enable inclusive pedagogy?
  - c. How do teachers use ICT; what technologies do you use?
4. Based on your experiences, how would you describe the availability of technology in your school?
5. What factors affect the integration of technology in your pedagogic practice, if any?
6. How would you describe your professional development and training needs for technology use in pedagogy?



## Appendix C

### Categories of Photo Elicitation Interview Images Provided by Research Participants



**Figure 1a:** Images showing teachers' thoughts about inclusive practice and disability. During the Photo Elicitation Interview (PEI) in this example, the research participant revealed that inclusive pedagogy in Nigerian schools is not necessarily occurring as there are complexities in respect of what inclusion and disability actually mean to different research participants. In the image, a group of children are present. They almost seem to merge into one, and in this way, the research participant revealed that individual differences are not considered.



**Figure 1b:** Images revealing that the needs of children with SEN are not being met by old-fashioned pedagogical approaches.





**Figure 1c:** Images from majority of the participants working in government school. The images reveal that technology enabled-learning is not occurring, rather teachers' pedagogic practice is aligned and akin to didactic pedagogy. Teachers *in most cases* tend to simply *improvise with technology to help support SEN*.



**Figure 2a:** Image depicting unsuitable structure for inclusive practice. The images revealed lack of suitable classroom access for learners with SEN.



**Figure 2b** The images revealing that the needs of children with SEN are not being met by old-fashioned pedagogical approaches with little or no consideration to individual learning needs. The images further reveals problem of infrastructure mitigating inclusive practice.



**Figure 3a:** Image revealing the how and different levels of technology use among teachers.



**Figure 3b:** Image revealing the how and extent of technology use among different levels of teachers and schools



**Figure 4:** Some Digital Technology applications that few teachers are aware of, and their use is not consistent because it is not universally available and is restricted to be used by limited numbers of practitioners.



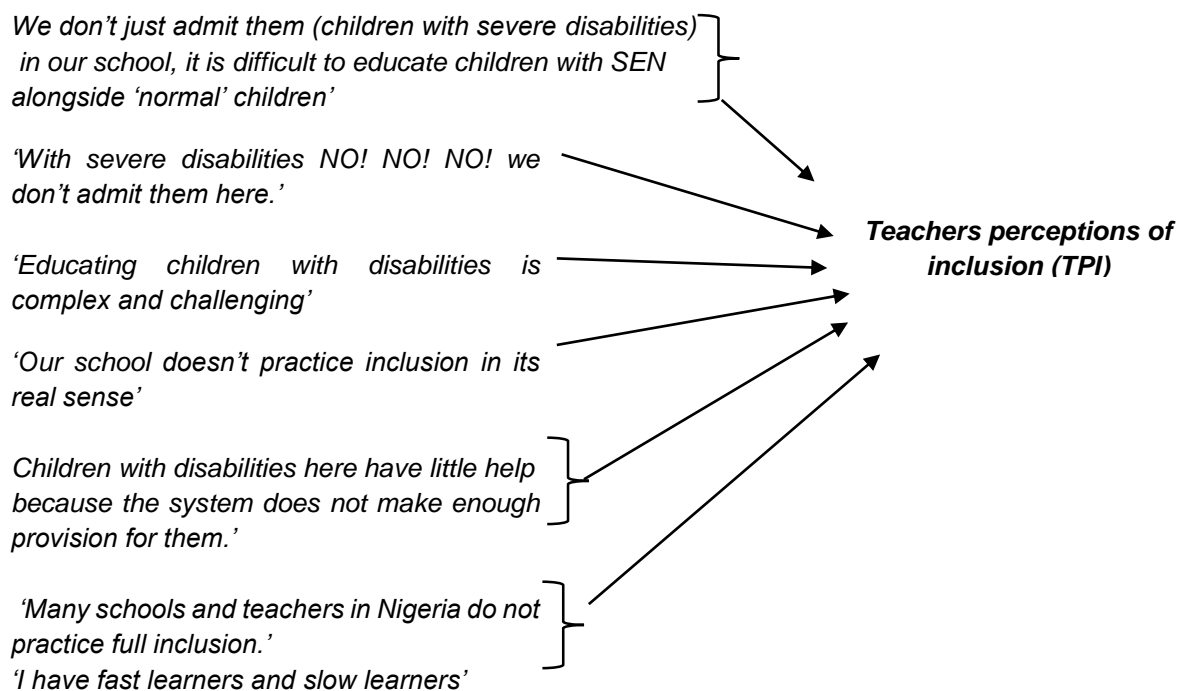
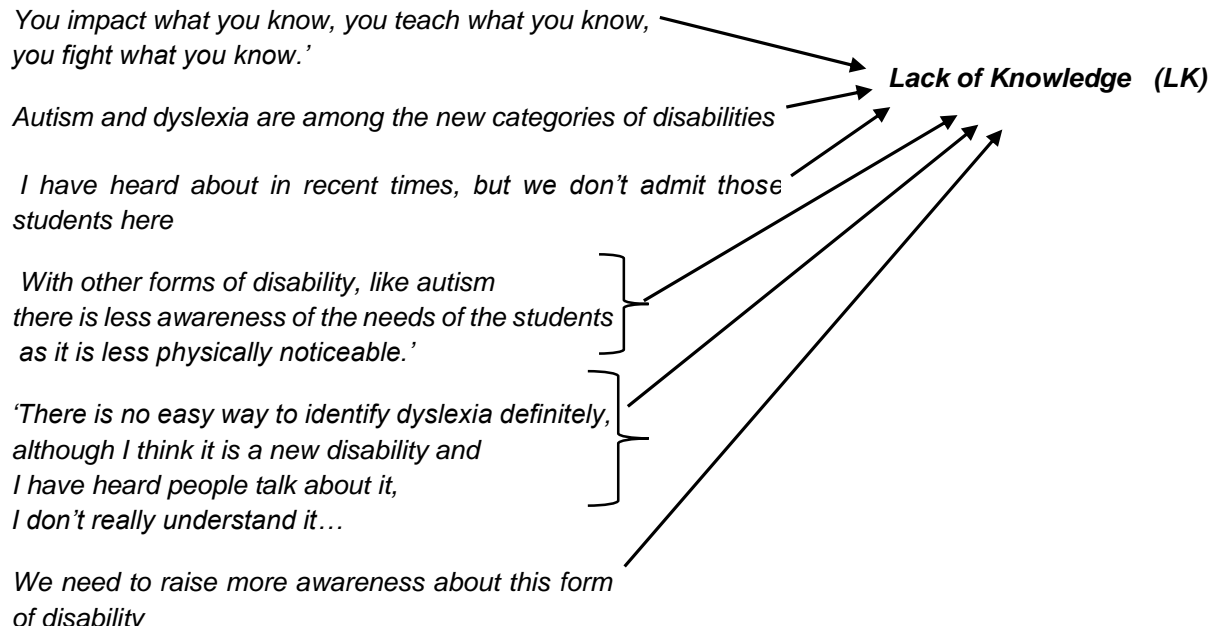
**Figure 5:** The images depicting educational practitioners engaging in professional development in a Nigerian school, where an experienced colleague supports other teaching staff on how to use digital technology for pedagogy. The image further suggests that the Cascade model of CPD is one of the dominant training opportunities available to teachers in the selected schools.

## Appendix D

### EXAMPLE OF RAW DATA

#### DIVIDED INTO SEGMENT

#### CODE



*I use these cards with pictures and other visual aids and other forms of teaching aid in my pedagogy as opposed to using new technologies.'*

*'We are yet to embrace the use of digital technology as a means of instructional delivery, because our school is not enabled with such technologies'*

*"No consistent technology use for daily instructional delivery".  
'For now we still rely on our traditional teaching methods and little as changed'*

**lack of technology use (LTU)**

*Digital technologies are lacking in my school'.*

*'There is no adequate support to use these technologies'*

*'I don't usually get the support I need technically'*

*'We don't have enough IT specialist teachers'*

*'IT is my area, but we still have a long way to go'*

*'There is no adequate support and facilities in place for SEN'*

**Lack of resources**

*We need good knowledge of the potential interventions.*

*'We need up to date training.'*

*'It is always a case of a generic workshop and not specific training'.*

*'We need more training on how to become efficient on the effective use of technology for SEN'.*

*'I can't even operate a smartboard if you provide one in my class'*

**Teacher training need**

*The empowerment of teachers to support children with SEN is lacking'*

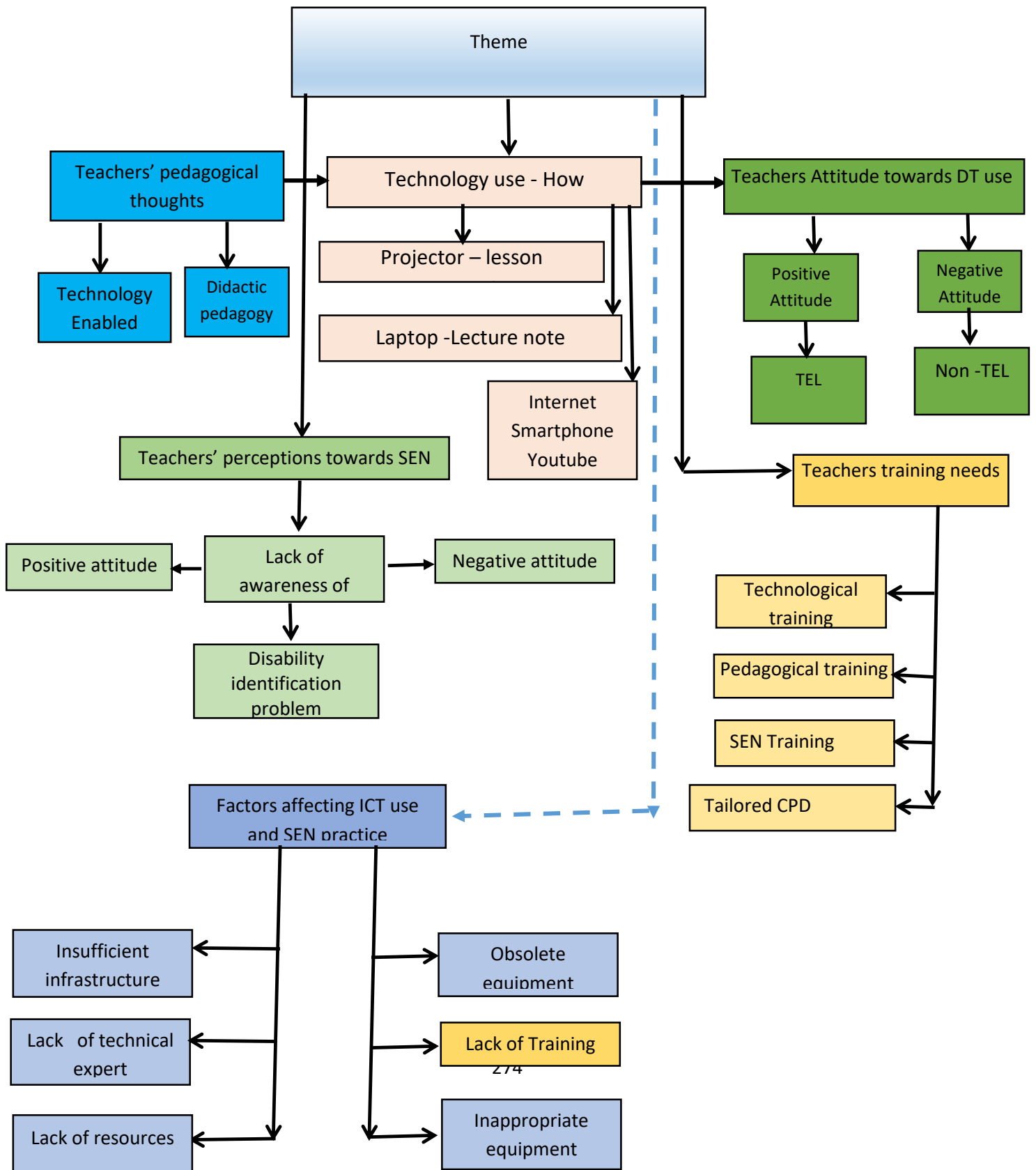
*The challenge here is having the adequate knowledge'*

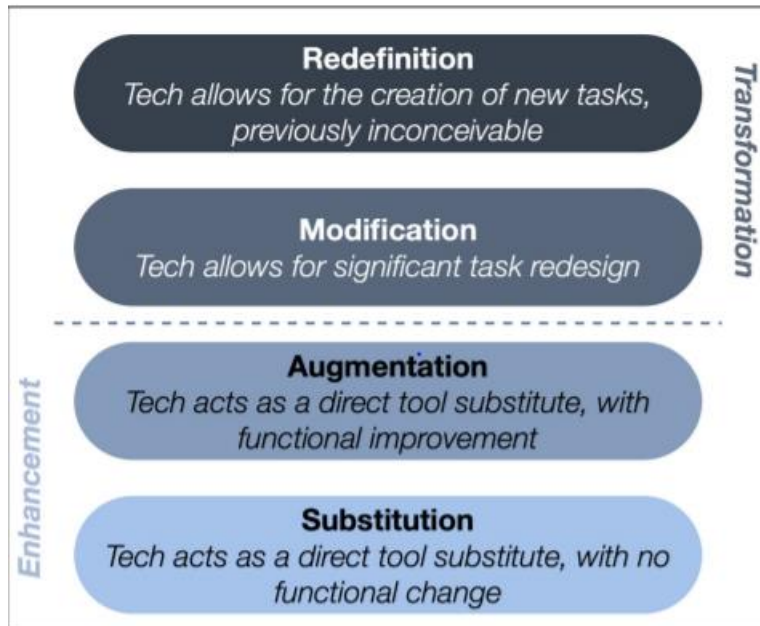
*'We don't get regular in-service training'*

**Lack of training**

## Appendix E

### The qualitative analysis' main themes and coding categories





SAMR Model (Source: Tseng 2019)