USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING LEARNERS WITH DYSLEXIA IN AN INCLUSIVE PRIMARY SCHOOL

A CASE STUDY OF KYAMBOGO- PRIMARY SCHOOL

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DECLARATION

I MUSIMAMI IDD MUBARAK declare that this research report entitled Use of Information and Communication Technologies in Teaching Learners with Dyslexia is my original work and it has never been submitted to any University or any other Institution for any award. All sources I have consulted are duly acknowledged.

Signature:_____ Date:_____

APPROVAL

This is to certify that this research report entitled *Use of Information and Communication Technologies in Teaching Learners with Dyslexia* was done under our supervision and submitted for examination with our approval.

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DEDICATION

I dedicate this dissertation to Hajj. Kiwanuka K. Nasser, Dr. Vickie Mitchell, Dr. Edward Polloway, Dr. Njuki Eria Paul for all the contributions to my studies.

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Special thanks go to the almighty God for the protection, provision and for the wisdom, knowledge and the strength He gave me when I needed it most.

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May the almighty God bless you all.

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ABSTRACT

The purpose of the study was to investigate the use of information and communication technologies in the teaching of learners with dyslexia in inclusive primary schools in Kampala Uganda. The objectives of the study were; to explore ICT tools used by teachers in the teaching of learners with dyslexia in Kyambogo Primary School, to examine the challenges faced by teachers in using ICT in teaching of learners with dyslexia in Kyambogo Primary School and to explore the experiences of children with dyslexia in using ICT in Kyambogo Primary School. A qualitative case study research design was used. The researcher interviewed six (6) participants in this qualitative study. These participants were involved because of the nature of the study on disability.

According to the study results, ICT was used to facilitate the reading, writing and illustration to children with dyslexia. The second objective of the study was about identifying the challenges faced by teachers in educating learners with dyslexia. From the study results, Teachers faced a number of challenges in teaching children with dyslexia ranging from lack of specialized training/ skills using ICT, financial constraints and inadequate ICT material. The objective here was to identify the Experiences of children with dyslexia in using ICT during learning. The results highly pointed out stigma and discrimination as one of the experiences that children with dyslexia face in utilizing ICT. This was in form of labeling, discrimination and isolation of these children. It is evident that children with dyslexia faced stigma and discrimination in form of labeling, discrimination and isolation of these children which makes their lives very hard.

The study recommends that the government should increase funding for ICT in primary schools to include the needs and the requirements of children with dyslexia to enable their learning. This can be in form of IPADS, laptops, smart phones and many more. There is also need for specialized rooms for children with dyslexia at Kyambogo Primary School and this calls for increased funding from government and its partners. On this same note, the government is called upon to provide ICT devices to both teachers and learners with disabilities in primary schools all over Uganda.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter provides background information on the topic in form of background, problem statement, purpose of the study, objectives, and research questions. It also presented significance of the study, delimitations and definition of terms.

1.1 Background to the study

Teaching children with dyslexia in a poorly resourced school is a challenge. The problem worsens in school environments that lack resources. Schools that are in developing countries like Uganda are the ones usually seriously affected. As such, the issue of poor school conditions and facilities poses a serious challenge in the teaching and learning of children with dyslexia. This has attempted schools to adopt ICT in order to use information technology to enable these learners get the required information for effective learning. Therefore, many schools in Uganda have tried to utilize ICT in all ways possible but few studies have been conducted on this issue. This current study sought to investigate the use of information and communication technologies in teaching learners with dyslexia in inclusive primary schools in Uganda.

ICT is a general term which refers to all kinds of technologies that enable users to access and manipulate information. Examples include computers, phones, tablets (Lemperou, Chostelidou & Riva, 2011:410). In the recent past, there has been lots of emphasis on educating all children and ensuring quality education for all. Education should develop practices needed to optimize learning

and ensure the transfer of knowledge and skills. This fact has reinforced the use of ICT as a means of overcoming barriers to learning (Dillon, 2004).

Dyslexia is a specific learning difficulty that mainly affects the development of literacy and language related skills (Tarles, 2009). It is likely to be present at birth and to be life-long in its effects. It is characterized by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual's other cognitive abilities. It tends to be resistant to conventional teaching methods, but its effect can be mitigated by appropriately specific intervention, including the application of information technology and supportive counseling (British Dyslexia Association, 2007).

According to Dillon, (2004), dyslexia is the most frequent specific learning difficulty and itcomplicates all activities dependent on reading performance, consequently it has an essential impact on the child’s success at school. The difficulty affects the basic variables of reading performance – speed, correctness, reading technique and comprehension (Scarborough, 1990:1728). Moreover, it causes difficulties with orientation in the text (repetition of the beginning of words, skipping of lines etc.) and text reproduction. Incorrect reading or even mangling of words result in the so-called specific errors including static inversions (e.g. confusing letters of similar shapes such as b-d-p, a-e, m-n,l-k-h etc.), kinetic inversions (e.g. mixing of syllables), skipping or adding of extra syllables, words or sentences, inappropriate use of diacritics or guessing of word endings. However, the occurrence of specific errors is highly language specific both in terms of frequency and the presence of the various types (e.g. diacritics, specific pronunciation errors etc.). A specific error which inevitably occurs in all languages is the confusion of letters of similar shapes (Dillon, 2004).

Dyslexia is a disorder that manifests itself through the difficulty children experience to learn reading despite the child's intelligence, socio-economic and cultural background (Wajuihian & Naidoo, 2010:58). The term dyslexia comes from the ancient Greek word, 'dys' which means 'difficulty' and 'lexis' means 'words' (Lemperou, Chostelidou & Griva, 2011:410). Therefore, dyslexia simply means difficulty with written words (Wajuihian & Naidoo 2010:58). Dyslexia is a generic term that describes children with reading and writing difficulties in spite of other intellectual domains in the educational system (Castle, 2012:49).

Technology plays a crucial role in everyday life. It is used to complete work in a job, to make purchases on the internet, and to network with friends and colleagues through social media, such as Facebook, Zoom meetings. Information and Communication Technologies (ICT) have been widely studied in a large number of fields as well as being a subject of study in its own right (Becky, 2007). One of several fields that gathered cumulative data regarding the use of technology in practices is the field of education. Stevens (2004) pointed out that, the effect of ICT in education has been studied since the beginning of the 1970s, where educators started to become increasingly convinced that ICTs could support students in formal education (Wajuihiam & Naidoo, 2010).

According to Wajuihian & Naidoo (2010), dyslexia refers to the difficulties that children experience in reading and writing of ordinary words. Children with dyslexia are capable of achieving in other academic areas such as mathematics and those involving practical skills. Several intervention methods are now implemented as educational practices; however more studies are needed in order to determine which interventions work best. Tarles, (2009) identified that Information and Communication Technology can be very useful in the learning of children with dyslexia and this has been used worldwide. Dyslexia has also been studied world over, on African continent and Uganda in particular.

Globally, ICT has been used in the teaching and learning of children with dyslexia. For example in United Kingdom (UK), it is estimated that 1 in every 10 to 20 people has some degree of dyslexia (Harkland, 2015). In the same vein, Dalton, (2017), it is estimated that 1.2 million children in the UK who have dyslexia, so it is vitally important that our teachers understand how to support pupils with the dyslexia. For those pupils with dyslexia, the task of processing sounds to symbols and symbols to words can be difficult and this can seriously affect the student's learning and performance. However, with the right support from their teachers and systems in place, simple changes can make a big difference, Storey (2013**)** believed that teachers should have a higher quality of training in dyslexia and there should be more measures in schools to build confidence, good access to ICT and an understanding/sympathetic school environment.

In Africa, ICT is being used as a tool for improving the quality of life by improved efficiency and enhanced effectiveness. For example in Nigeria, different types of ICT tools assist the people with disabilities by providing them with learning opportunities, capabilities and also increase potential of individuals with disabilities in different walks of life. ICT makes them capable by providing the ability to access knowledge with the help of suitable digital media. ICT is playing very important role in communicating with peers, thereby promoting collaborative and social learning environment. ICT also helps students with disabilities in reading, writing, auditory impairments and vision impairment (Odekayo, 2012).

In East Africa, Kenya has the highest growth level in ICT essentials and it has highly been utilized in the teaching and learning of children with dyslexia. According to Onyango, (2010), ICT has been effective in Kenya in delivering instruction to the students with disabilities. It has become

possible due to the ICT devices like computers and tablets for learners with dyslexia to communicate their ideas to the teachers.

The Ugandan ICT policy 2014 has been established showing the importance of ICT in various areas of national development including education, the use of ICT in teaching learners with dyslexia is very minimal at the primary school level (Kemigisha, 2015). According to Eremu, (2005), Uganda had only 106 of its 13,353 primary and 2,070 secondary schools connected to the Internet. Uconnect and SchoolNet Uganda, two major Non-Governmental Organisations (NGOs) involved in providing ICT for schools, led the initiative to implement the use of technology in Ugandan schools. Connectivity is much more prevalent in urban than rural schools, basically because access to ICT infrastructure for schools mirrors the national rural-urban divide.

The more specific factors constraining connectivity in rural areas are the overall poor communications infrastructure, low electricity coverage, and high capital costs involved in setting up a computer laboratory. No doubt this has changed since 2009, and will continue to change, as access to electricity and connectivity improves. Although many schools have computers as a result of initiatives with NGOs, religious organizations, and international donors, few are connected to the Internet. Those that are in place are typically used for teaching basic computer skills and administrative purposes (Kemigisha, 2015).

The Ministry of Education and Sports has become much more proactive over the last two years as a result of the recent policy emphasis on ICT. For example, in its Review for 2005-2006, the ministry listed the following achievements; over 300 teachers have been trained, three generators and 300 computers have been provided to NEPAD e-schools, software and upgrades have been procured for 6,000 desktop computers already in schools. In addition, preferential rate agreements

with Uganda Telecom for voice and data connectivity have been secured; work has started on introducing ICT into the teaching and learning process in primary and secondary schools. Schools have also been trying to adopt ICT essentials in the teaching of learners mostly those having disabilities like dyslexia (Eremu, 2005).

According to the 2014 Population and Housing Census, many children with dyslexia have continued to experience discrimination, poor performance and drop out of school. According to Muhanguzi, (2007), the dropout rate of pupils with dyslexia from schools in Northern Uganda is high where 7 out of 10 drop out before finishing primary level. This puts the lives of these children at risk of lack of skills in the future which can lead to unemployment. On the other hand, there is limited information on the availability of communication technologies required for children with dyslexia to reduce on their dropout rate in primary schools. This was the research gap that this study seeks to fulfill. Therefore, this current study sought to investigate the use ICT as a pedagogical aid in teaching learners with dyslexia in inclusive primary schools in Uganda.

According to Eremu, (2005), ICT equipment like smart phones, tablets and laptops assist children with dyslexia in a number of ways like recording notes, recording answers during examinations among others. Odekayo (2012) indicated that scanning pens used by learners with dyslexia can sound the written material whereas spelling checkers can help in spelling for a child with dyslexia. Therefore, ICT essentials can be used to enhance the learning of children with dyslexia. The basis of this study was to explore the use of information and communication technologies in the teaching of learners with dyslexia in an inclusive learning environment.

1.2 Statement of the problem

Mugisha, (2015) reports that many children with dyslexia have continued to experience discrimination, poor performance and drop out of school. The situation in most of the primary schools in Uganda excludes a lot of pupils with disabilities like dyslexia from accessing education. This is because these children have difficulties in reading and writing. With the absence of ICT devices, these children are excluded from the main stream education. Wells, (2017) reports that children with dyslexia are mandated to enjoy all rights. They have, like everyone else, rights and talent which nature has bestowed upon them. According to Eremu, (2005), ICT equipment like smart phones, tablets and laptops assist children with dyslexia in a number of ways like recording notes, recording answers during examinations among others. Odekayo (2012) indicated that scanning pens used by learners with dyslexia can sound the written material whereas spelling checkers can help in spelling for a child with dyslexia. Therefore, ICT essentials can be used to enhance the learning of children with dyslexia.

According to Muhanguzi, (2007), the dropout rate of pupils with dyslexia from schools in central Uganda is 6% with the largest of 71% in Northern Uganda leaving many children to miss out the benefits of education like employment, knowledge, skills and many more. A low rate in the dropout rate in the central region mainly in areas like Kampala can be attributed to factors like low distance to school, accessibility to the schools, increased investment in ICT to enable teaching of children among others. What attempted the researcher to carry out this study was that there was limited information on the availability of communication technologies required for children with dyslexia to reduce on their dropout rate in primary schools. This was the research gap that this study seeks to fulfill.

1.3 Purpose of the study

The purpose of the study was to investigate the use of information and communication technologies in the teaching of learners with dyslexia in an inclusive primary school.

1.4 Research objectives

This study addressed the following objectives:

1. To explore ICT tools used by teachers in the teaching of learners with dyslexia in Kyambogo Primary School.
2. To examine the challenges faced by teachers in using ICT in teaching of learners with dyslexia in Kyambogo Primary School.
3. To explore experiences children with dyslexia in using ICT in Kyambogo Primary School.

1.5 Research questions

The study was guided by the following research questions;

1. What ICT materials do teachers use in the teaching of learners with dyslexia in Kyambogo Primary School?
2. What challenges do teachers encounter in using ICT in the teaching of learners with dyslexia in Kyambogo Primary School?
3. What are the experiences children with dyslexia in using ICT in Kyambogo Primary School?

1.6 Scope of the study

1.6.1 Geographical scope

The study was carried out in one public primary school located near Kyambogo University opposite Kabaka's palace of Banda, Nakawa Division, Kampala Capital City.

1.6.2 Content scope

Generally, the study investigated the use of information and communication technologies in the teaching of learners with dyslexia in one primary school. Specifically, the study found out the ICT tools used by teachers in primary schools in the teaching of learners with dyslexia, identified the challenges teachers in primary schools encounter in using ICT in teaching of learners with dyslexia, explored teachers' opinions regarding the experiences of children with dyslexia in using ICT in primary schools and also came up with possible recommendation to improve the teaching of learners with dyslexia in Kyambogo Primary School.

1.6.3 Time scope

The study was carried out for a period of two years that is 2018 and 2019. Secondary data that was exploited was between 1990 and 2017.

1.7 Significance of the study

The study findings may be useful in the following ways;

The study may help in improving the academic performance of learners with dyslexia since it comes up with recommendations that can help teachers to easily utilize ICT for the betterment of the learning of children with dyslexia.

The result of the study may contribute to the existing pool of literature on the challenges that teachers face in using ICT in the teaching of learners with dyslexia which may be relevant to other researchers and compliment their work.

Teachers may find the study useful since it will make them aware of the possibilities of using ICT in enhancing the teaching and learning of children with dyslexia.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covered the review of the literature on the study. However, it is drawn in line with the objectives of the study. Only published data was used because of its effectiveness.

2.2 Theoretical Perspective

The study was guided by the social model of disability. The social model of disability is a reaction to the dominant medical model of disability which in itself is a functional analysis of the body as machine to be fixed in order to conform with normative values (UK Disability Rights Commission, 2009). The social model of disability identifies systemic barriers, negative attitudes and exclusion by society (purposely or inadvertently) that mean society is the main contributory factor in disabling people. While physical, sensory, intellectual, or psychological variations may cause individual functional limitation or impairments, these do not have to lead to disability unless society fails to take account of and include people regardless of their individual differences. The origins of the approach can be traced to the 1960s; the specific term emerged from the United Kingdom in the 1980s.

In 1975, the UK organization Union of the Physically Impaired against Segregation (UPIAS) claimed: "In our view it is society which disables physically impaired people. Disability is something imposed on top of our impairments by the way we are unnecessarily isolated and excluded from full participation in society (Oliver, 1990). In 1983, the disabled academic Oliver coined the phrase "social model of disability" in reference to these ideological developments (Paley, 2002). Oliver focused on the idea of an individual model (of which the

medical was a part) versus a social model, derived from the distinction originally made between impairment and disability by the UPIAS (Oliver, 1990).

The "social model" was extended and developed by academics and activists in Australia, the UK, US and other countries, and extended to include all people with disabilities, including those who have learning difficulties / learning disabilities / or people with intellectual disabilities, or people with emotional, mental health or behavioral problems (Oliver, 1990). Oliver did not intend the "social model of disability" to be an all-encompassing theory of disability rather a starting point in reframing how society views disability (Oliver, 2008).

A fundamental aspect of the social model concerns equality. The struggle for equality is often compared to the struggles of other socially marginalized groups. Equal rights are said to give empowerment and the "ability" to make decisions and the opportunity to live life to the fullest. A related phrase often used by disability rights campaigners, as with other social activism, is "Nothing About Us Without Us (Charlton, 2000).

The social model was used because it has the following assumptions; the social model of disability focuses on changes required in society. These might be in terms of: attitudes, for example a more positive attitude toward certain mental traits or behaviors, or not underestimating the potential quality of life of those with impairments. This means that the model was useful in identifying the potential of learners with dyslexia in inclusive primary schools. The model also emphasizes social support, for example help dealing with barriers; resources, aids or positive discrimination to overcome them. It also underlies the fact that information, for example using suitable formats (e.g. ICT essentials) to transform information to audio or video (Charlton, 2000).

According to the social model of disability, Information and communication technologies when

accessible and available, can serve as critical enabler that allow persons with disabilities to realize full and effective opportunities to participate, on the basis of equality, in all aspects of society and developrnent- can help persons with disabilities have a greater access to knowledge and independent living (Winnans & Brown, 1992). However, there are a few principles that should be taken into consideration while introducing ICT s. Whether one is considering the respective needs of rich and poor, rural and urban, those with access to the internet and those without (the digital divide), ICT has the power to bring people together but, where persons with disabilities lack access to ICTs, they can also leave people behind. Wi-Fi access is essential, as is access to a stable electrical supply. Technology advances quickly and ICT can quickly become obsolete (and examples provided given in the present module may also quickly become dated).

Therefore, as such, teachers have to identify those children and help them to overcome their problem by simply giving them more reading tasks. For example, the teacher can bring along magazines and distribute them to the children or a teacher can ask them to bring their own reading materials. If there is a library at school, children can also be encouraged to visit the school library to read during their spare time or to borrow books to read at home where they will be assisted by members of the family. They can also be given extracts to copy from the board, and to help them to read unfamiliar words. Copying from the board can also help them to be totally exposed to print. The theory was also be used because of the theory supports adaptation of materials like ICT essentials like tapes, videos, cameras etc. when the information arises that can fit into the learner existing knowledge is added into the learners' cognitive structures. This information adds to extend the learners mind structures or cognitive structures.

2.3 Usage of ICT in the teaching of learners with dyslexia.

In education, ICT refers to the development of information and communication technologies. It includes the adoption of general components of information and communication technologies in learning process. Recently, there has been increased interest and empirical research concerning the use of ICT in the field of education. Various studies have been conducted to improve the benefits of the use ICT in education. A significant amount of research has proven that ICT can have positive effects on learning. Particularly, designed applications can stimulate student's interest. The use of digital technologies is also believed to assist dyslexic learners (Rahman et al. 2012). Multimedia applications not only allow, but also support the bimodal presentation of information via visual and auditory channels. Thus, information processing is accelerated and mnemonic recall is facilitated (Kazakou et al. 2011).

Dyslexia is one of the most common learning disabilities; it is a specific disorder that involves a severe impairment in reading ability, which affects and disrupts a person's language development and functioning (Blustein 2013). Dyslexia can be described as a language-based learning disability, since the severity of reading, writing and spelling deficits vary across different languages and cultures (Elbeheri et al. 2016). It affects relatively about 7–10 % of the population across most languages and cultures (Peterson and Pennington 2012).

According to the Speech-Language Pathology service El Jadida Morocco, over the past three years (2013–2014-2015) 517 new patients with speech and language difficulties have been registered, where 54 patients are dyslexics from years 6 and 13, which represent 10 % of the population of El Jadida city who have dyslexia.

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Recent research (Drigas et al. 2015) (Zikl et al. 2015) (Madeira et al. 2015) agree that ICT is likely to be a useful tool towards users with dyslexia. It can assist and reinforce the learning process, as well as it can create a developmental appropriate learning environment depending on the needs of learners. Some implementations of ICT in education have been conducted to support dyslexic students. For instance, the use of websites as an educational motivators (Johnson and Hegarty 2003), text-based adjustments in synchronous learning activities and browser extension, to help users with dyslexia adapt web content to make it easier to read and more accessible (Woodfine et al. 2008) (Velasco et al. 2015), text editing and adjustment of the visual aspects of the text using specific fonts to the needs of users, permitting them to try different fonts and graphic arrangements and choose the most efficient option so as to improve their reading performance (Zikl et al. 2015) and eBooks reader for Android designed, in an accessible way according to dyslexic user needs (Rello et al. 2012).

Other research, focused on mobile learning and computer game-based as an altar- native learning tool to assist students with special needs (Skiada et al. 2014) (Ismaili and Ibrahimi 2016) (Shaw et al. 2005). According to (Rose et al. 2002) (Kalyviotiand Mikropoulos 2014), virtual environments and virtual reality applications can be used as powerful and sensitive clinical tools for adult and children with neurocognitive and neuropsychological impairments.

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children with neurocognitive and neuropsychological impairment determine an individual's preferred way of learning (Honey and Mumford 1992). There are numerous approaches and models that attempt to clarify and explain the learning styles differences, most of them are based on the assumption that every learner has a dominant or preferred learning style. Thus, researchers agreed that there are many types of learning style models and every student learns differently and possesses a dominant or preferred learning style (Myers-Briggs 2012).

Consider the type of software needed before looking for names of specific software titles. The following describes some of the main categories of software that can be used to support pupils with dyslexia. However, it should be noted that categorisation of software can be done in many different ways. Some software falls into several categories and others into none. The examples provided are merely to give an indication of available software and are by no means intended to be a complete listing of all available titles (Elbeheri et al. 2016).

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Software evaluations, many of which are relevant to special needs, are available via various educational websites such as the NCTE's website, or that of Teachers Evaluating Educational Multimedia (TEEM). Both sites also contain information for teacher on what to look for when evaluating software. (LINK: See the section 'Addresses and Web Links' in The Library) Reinforcement Software - used to reinforce basic skills through repetition and practice. Literacy software can give pupils the opportunity to practice the recognition of sight words, to develop phonological skills, and to help increase their reading comprehension (e.g., Lexia, Numbershark, Starspell 2011, Wordshark, Units of Sound).

Interactive Books - animated books on the computer whichbring stories to life. This category of software links the written word with the spoken word and consequently strengthens word recognition (e.g., Oxford Reading Tree, Spinout Stories, Start-to-Finish series, Wellington Square) (Kazakou et al. 2011)..

Content-free Software - allows user to enter own content. This category of software encompasses many different types which can be used to support pupils with dyslexia including those which can be used for writing and planning/organising (Kazakou et al. 2011).

Word processing programs/ talking word processing programs - provides pupils with the opportunity to express themselves without being concerned with handwriting or the appearance of their work. Talking word processing programs use a multi-sensory approach which allows the pupil to hear as well as see what has been written (e.g., Clicker 4, Texthelp! Type and Talk, Write Outloud) (Kazakou et al. 2011).

Writing Frames - supports pupils through the writing process by providing prompts and sentence starters (e.g., I Can Write 2, Frameworks). Word Prediction - normally runs in conjunction with a word processing program and anticipates the word being typed by producing a word list. It allows pupils to choose from suggested words, thereby enabling them to concentrate on the context of their words rather than become embroiled in spelling issues ((Kazakou et al. 2011).

Word Bank - allows the teacher to input lists of words the pupil has particular difficulty with such as topic words, lists of nouns, verbs, adjectives and adverbs, sentence starters, etc. (e.g., Word Bar, Clicker 4, Textease 2011). Planning and Organising - allows the user to visually organise ideas and information. It can be used for brainstorming, outlining, prewriting, diagramming and concept webbing (e.g., Draft Builder, Kidspiration, Inspiration).

Multimedia Authoring - allows the user to easily and effectively communicate ideas. Most multimedia authoring systems incorporate text, graphics, sound, animation and video to create multimedia projects and presentations (e.g., Buildability, Hyperstudio, Clicker 4, Illuminatus).

Assessment Software - used to assess pupil attainment and identify learning difficulties. Normally, this type of software consists of a variety of tests to identify pupil's strengths and weaknesses (e.g., Cops, LASS 11-15, Lexia Comprehensive Reading Test,

Superspell Assessment Disc, Studyscan, Quickscan). (LINK: See the section ‘Lists of Tests’ in The Library)

Study Skills - aims to assist pupils in developing the necessary skills needed for efficient study. Most of this type of software is geared towards older pupils (e.g., Help disk! 2.6, Mastering Memory, Timely Reminders, Wordswork).

Other Reading/Writing Tools - There is a variety of other reading /writing tools that can be helpful for those experiencing learning difficulties.

Screen Readers - reads back the text within any other program. It can also be used to read pages downloaded from the Internet, e-mails, text scanned from a book, etc. (e.g., Hal, Jaws, Text help! Screen reader).

OCR (Optical Character Recognition) Programs - used in conjunction with a scanner. It converts text to a digital format which is then displayed on the computer screen (e.g., OmniPage Pro, Recognita Plus, Textbridge Pro).

· Scan/Read Software - allows you to scan pages from any book or document and displays an on-screen version of the printed material which it can then read aloud. The text can be adapted and altered to suit the individual needs of pupils (Kurzweil, Texthelp! Read and Write Gold, WYNN).

Voice Recognition - works by the user manipulating the computer using voice commands. It is often used to facilitate the production of written text as it enables the transfer of speech to text format (e.g., Dragon Dictate, Dragon Naturally Speaking, ViaVoice).

Overview of Hardware

There is also hardware available to support pupils with dyslexia. Portable devices should be considered as some pupils may need to have access to technology in a variety of settings (e.g., mainstream classroom, resource room, home). When selecting portable devices,look for products that are lightweight, durable and have a long battery life. Some of these devices include:

Laptop Computer - A laptop runs the same operating system and software applications as the larger desktop computer but is considerably smaller in size and lighter in weight. Furthermore, a laptop contains a battery, which allows it to be used away from a power supply for a limited time (Rahman et al. 2012).

Portable Word Processors - Though technically not a laptop computer, a portable word processor is sometimes used for simple word processing. Its main use is for entering basic text which can then be printed or, if further editing is required, downloaded by cable into most applications on a standard computer. It is considerably cheaper than a laptop, is much lighter than the average laptop and is more durable (e.g., Alphasmart, Dreamwriter) (Rahman et al. 2012)..

Handheld computers - A personal digital assistant (PDA) or handheld computer is a small mobile hand-held device that provides computing, information storage, and retrieval capabilities. The vast majority of PDAs perform four basic functions: contact management (name and addresses), scheduling (calendar), to do list and note taker. PDAs have been used to cater for pupils with learning difficulties in areas such as note taking, following schedules, and keeping track of homework and assignments (Rahman et al. 2012).

Tape Recorders, handheld spellcheckers, dictionaries and other electronic devices - Such devices range from small handheld items the size of a large pen or marker which perform one or two simple functions to portable items the size of a large calculator which perform several functions. These devices include tape recorders, portable spellcheckers, reading pens, grammar checkers, thesauruses, dictionaries and organisers (e.g., Franklin electronic spellers, Franklin Speaking Dictionary/Thesaurus, Quicktionary Reading Pen) (Rahman et al. 2012)..

Using ICT to support pupils

ICT can be a valuable tool in addressing the educational needs of pupils with learning difficulties. Technology can be used to break down barriers to learning and help pupils with dyslexia compensate for challenges they may experience. ICT can be used to support pupils with dyslexia in the following ways:

- Facilitate individual instruction and learning
- Support literacy and numeracy
- Motivate pupils and raise self-esteem
- Enable pupils to participate more fully in an inclusive environment
- Develop study/independent work strategies and organisational skills

ICT as a Motivational Tool

Learning is not just a cognitive process; it has emotional and social aspects. Research has shown that ICT can play a significant role in increasing self-esteem and motivation levels. Pupils who have learning difficulties can have a poor self-image that may manifest in avoidance behaviour and lack of engagement with their school activities. ICT can be a powerful tool for the remediation

of this problem. It can motivate pupils to undertake tasks that they have not attempted in the past. There is often a 'cycle of failure' where a pupil says “I failed before so I’ll probably fail again this time”. ICT can break this cycle by helping the pupil to succeed (Rahman et al. 2012).

ICT as a Personal Support Tool

One of the biggest benefits and greatest uses of ICT is as a personal support tool that can empower pupils with learning difficulties to achieve greater independence and enable them to take responsibility for their learning. Computer-based learning strategies that focus on the process of learning rather than the content itself can allow pupils to monitor their own learning. These strategies can be especially helpful for older pupils who are taking many subjects and preparing for exams. Below you will find some ways of using ICT as a personal support tool.

· **Presentation** - ICT can enable pupils to produce professional looking work which can help struggling pupils gain confidence. Content free software can encourage pupil creativity by allowing them to present information through the use of text, graphics, sound, animation and video) (Kalyvioti and Mikropoulos 2014).

· **Speed of Work** - Pupils with dyslexia often find that it takes them a great deal of time to complete a piece of work which can result in poor motivation. ICT can assist pupils in completing assignments more quickly which can give them a huge sense of satisfaction in their achievements.

· **Planning** - Pupils can use computers to help organise and manage their workload. Computers can be used to produce timelines, a scheduling matrix, calendars and 'to do' lists.

· **Completing assignments**

- Brainstorming- pupils can use planning and organising software to assist in planning and beginning a project. The results of brainstorming can be printed out and used as the beginnings of a concept map to record and organise further information that is collected.

- Templates- are documents containing a form or structure, not actual content. Templates can simplify the tasks of completing lists, writing reports, reading chapters or other assignments that share similar structures or features. They can be used for book reports, note taking, vocabulary assignments, etc. Wizards in content free programmes like Microsoft Publisher can also be helpful as they provide step-by-step instructions for creating a document) (Kalyviotiand Mikropoulos 2014).

- Writing papers and reports

· Prewriting – use planning and organising software to brainstorm, gather information, develop a plan and make checklists.

· Writing – use writing aids such as talking word processing programs, word prediction and word banks to write a first draft with emphasis placed on just writing down ideas without worrying at this stage about editing and revising.

· Revising and editing – use writing aids to check spelling, grammar, etc. ICT is particularly useful for revising and editing writing, something that pupils often find very tedious to do when writing by hand. Writing aids allow pupils to edit their work immediately and to see the changes and improvements in front of them) (Kalyviotiand Mikropoulos 2014).

· **Reading textbooks / Note taking in class -** scan/read software can be used to scan in pages from a textbook into the computer and have it read aloud. A tape recorder is a low-technology option that can be used to record notes as it can be difficult for pupils to listen and write at the same time. An electronic outline/template can be created using a talking word processor or planning and organising software. Information can then be added as text is read or as notes are given. Pupils can also use a word processing program or spreadsheet to make lists of important vocabulary words that will be encountered and use the list as a study tool) (Kalyviotiand Mikropoulos 2014).

· **Remembering information** – use planning and organising software to synthesise information for pupils who have difficulty seeing the 'big picture'. This type of software is ideal for pupils who think in pictures rather than words and can be used to develop visual aids to define relationships among concepts and to organise information for optimal comprehension)(Kalyviotiand Mikropoulos 2014).

ICT and Dyslexia: Using ICT to assist teachers

ICT can also be used directly by teachers to enhance teaching and support learning. ICT can provide teachers with a powerful tool to reinforce and supplement learning in a meaningful and non-threatening environment, provided that adequate planning is done to integrate ICT use in the classroom. In addition, ICT can also be used as a timesaving, professional productivity tool to assist in the many administrative tasks required of teachers. Below you will find some of the key ways in which ICT can be used to support teachers.

- Individualise teaching and learning materials

- Create own material to meet needs of pupils
- Motivate and engage pupils to learn
- Source of professional development and support
- Provide additional support to pupils in mainstream classroom
- Facilitate program planning and complete administrative tasks (e.g., developing individual learning programs, assessing pupils, weekly planning, recording and storing of data).

Planning for ICT Integration in the Classroom

ICT is most powerful when it is used to supplement teacher instruction and is integrated into the curriculum in a purposeful and meaningful way. When using ICT, it is important that learning does not become fragmented and that pupils can see the relevance of what they are doing in relation to the rest of the curriculum. In order for pupils to gain maximum benefit from computers:

· The teacher/classroom assistant should actively supervise and offer support and encouragement to pupils while they are using the computer and provide related follow-up work in class. It is important to ensure that pupils relate work done on the computers to other contexts and are able to transfer skills learned to other situations.

· If using the Internet, be aware of Internet safety issues and school policy in this regard.

· Consider using content-free software to create tailor-made teaching and learning resources which are directly related to the curriculum, teaching style and pupils' needs

· Teachers also need to carefully plan how ICT will be integrated into day-to-day classroom activities and teaching. Consider how ICT can be used to compliment teaching/learning strategies

commonly used with pupils with dyslexia (e.g., comprehension monitoring, activity-based learning, cooperative learning, memory techniques, practical hands-on approaches, think aloud, story mapping, etc.).

· Graphic organisers can be a useful tool to assist in integrating ICT into the curriculum (an example follows). By carefully examining what is actually being taught and the tasks that pupils are expected to perform, the teacher can more easily identify where ICT can best be used to support learning. If a pupil already has an individual learning program in place, the teacher should examine it to see if ICT can be used to help the pupil achieve the stated goals and objectives.

Example: Integrating ICT in the Curriculum

Task: Write a story called The Spooky Castle

Option 1: Use a talking word processing program /multimedia authoring program with whole class to introduce task and do sample story with whole class. Print off picture prompts and/or word prompts to assist pupils with dyslexia in writing own story. Pupils use talking word processing /word prediction/ word bank programs to complete story.

Option 2: Conduct a class brainstorming session on possible story lines. Use planning and organisation software to construct a story map. Divide class into 3 groups. Each group works on a section of the story using a talking word processing /multimedia authoring program to type and illustrate own section and makes it available to other groups.

Option 3: Pupils with learning difficulties use a talking word processing program that features teacher created writing frames as well as word banks to write their own story.

ICT and Dyslexia: Assisting Parents with ICT Use

More and more parents are interested in how ICT can be used to support their child both at school and at home. In some instances, their child has been provided with laptops for school use and, in some cases, home use. Below you will find some general advice for you to share with parents in regard to using ICT to support pupils with dyslexia.

1. Share with them how you are using ICT to support their child in the classroom.

2. Identify specific tasks that ICT is being used for in the classroom. Try to identify the tasks that parents could possibly work with their children at home using ICT (e.g., letter recognition, word recognition, reading comprehension).

3. Identify the particular pieces of hardware and digital resources (software and web resources) that you are using in your classroom and determine if it would also be appropriate for parents to use the same ICT at home to reinforce learning. Pupils that are using ICT as a personal support tool to complete assignments at school (e.g., laptop equipped with a talking word processor or word prediction), may find it beneficial to use the same tools at home to complete homework.

4. However, parents may want to consider using different software programs at home than used at school to provide sufficient stimulation as pupils may become bored using the same software programs time and time again. You may want to suggest some additional easy-to-use software programs that are geared towards home use which reinforce skills/concepts on which the pupil needs assistance. See for example the Parents Information Network (PIN) website, an independent service that provides evaluations of digital learning resources (software and websites) that are suitable for home use. (LINK: See the section ‘Addresses and Web Links in The Library.)

5. It is also important for parents to bear in mind that the right technology in one setting may be entirely wrong in another. Different types of learning take place at school than at home and parents should not therefore necessarily try to replicate the classroom at home. As pupils with dyslexia can sometimes feel stressed and overwhelmed during the school day, home learning should be more relaxed and ICT use at home should be both enjoyable and motivating. Some software programs that may not seem to have any educational value (e.g., some computer games) can offer children an opportunity to work on problem-solving skills, memorisation and collaboration as well as increasing self- esteem and building confidence (Rose et al. 2002).

6. If ICT is sent home with the pupil, encourage parents to ensure that it is used appropriately and kept in good condition. Have them report any technical problems or difficulties that they are experiencing as soon as possible so that the use of ICT at home does not become a barrier to the pupil's achievement rather than a help (Rose et al. 2002)(.

7. Encourage parents to take an interest in what their child is doing with ICT. Have parents ask their child to demonstrate to them how ICT works and what it is being used for (Rose et al. 2002).

With the integration of ICT in the educational process, methods and practices of teaching and learning differed considerably. It is considered that this integration can increase the effectiveness and efficiency of the educational process, indicating the great importance. Additionally, the flag of ICT increases after studies showing that if you can make a positive contribution to solving the problems associated with teaching students with learning disabilities. This is because ICT pronounce the opportunity for collaborative learning and effective communication and thereby contribute to the development of the educational process (Piliouras, et al, 2011) In order to refer to the procedure that was followed for the integration of ICT in schools we note that first was

joined the lesson of Informatics, and then began the use of various technologies. The integration was done according to various approaches of several sciences such a Pedagogy and Information. In Greece the process began in 1990, when ICT for first time began to be used in the educational process. The main purpose was to be developing new skills of teachers and students (Piliouras et al., 2011, p. 13).

Several research studies (Pea, 1993) have focused on exploring the benefits of ICTs in education process. Specifically, according to Pea (1993) new technologies are changing the way of thinking, as well as the attitudes and the perceptions of both teachers and students. Also Murphy (2003) after his secondary research concludes that ICT stimulate students and motivate them to participate more actively in the education process. This is because ICT destroy the boundaries between school and outside reality of which makes the lessons more interesting. Also, ICT has enabled the student to easily understand the complex concepts through the use of various audio-media instruments. Similarly, Osborne and Hennessy (2003) following an investigation arriving to the conclusion that through ICT in schools are developed new learning environments that enable teachers and students to be more creative. To achieve the above, however, it is important the integration of ICT to be done in an appropriate way (Dede, 1998). It is particularly important to avoid the misuse of new technologies, since in a lot of cases students use computers for other activities not related to their education. Teachers are the ones who will contribute to the proper use of new technologies in schools and therefore their effective training is absolutely necessary.

2.3 Information and Communication Technologies

An exact definition of Information and Communication Technologies (ICT) is fairly complex. This is because the ICT sector refers to activities that are associated with constantly evolving

technologies and therefore unstable. In this sense, the conceptual approach of ICT often becomes obscured a clear demarcation (FEOR Foundation for Economic & Industrial, 2006) the predominant definition of ICT is the one given by the UNESCO (2002). According to UNESCO the concept of ICT is based and determined in accordance with two other words namely "Informatics" and "Information Technology". Specifically, Informatics is a science which makes tool various other sciences by offering the opportunity to develop specialized skills (Piliouras, Simotas, Stamoulisi, Fragaki, &Kartsiotis, 2011) Furthermore, the Information Technology is related to planning, implementation and evaluation to the use and maintenance of information management systems. Information Technology includes hardware and computer software, considering organizational and human factors and industrial, commercial, governmental and political impact of all these (Piliouras, et al, 2011).

On the other hand, information technology is defined "as the set of computer systems and technological applications (artifacts) of the Informatics in society" (Piliouras, et al, 2011) while the Information and Communications Technology (ICT) is defined as "the combination of Information Technology with other associated technologies and in particular that of communication" (Piliouras, et al, 2011). Similarly, according to Blurton (1999) the Information and Communication Technologies is a set of technological tools and resources used to communication through the creation, dissemination, storage and management of information. The ICTs are consisted of three components. The first is the technology, the second is the information conveyed through the technology, while the third is the process of communication and information that takes place with the use of the technology (Rhine, 2006).

On the other hand, according to Hamelink (1997) ICTs are comprised of five components based on the function and especially: 1) capture technologies, 2) storage technologies, 3) processing technologies, 4) communication technologies and 5) display technologies. Today the importance of ICT is growing more and more, as well as knowledge for the modern world also includes the ability to understand and use technology for various reasons (personal and social) (Raptis & Rapti, 2002).

Teaching children with dyslexia in a poorly resourced school is a challenge. The problem worsens in school environments that lack resources. Schools that are in rural areas are the ones usually seriously affected. As such, the issue of poor school conditions and facilities poses a serious challenge in the teaching and learning of children with dyslexia (Rowcliffe, 2002:94).

Teaching methodologies and styles of assessment have strong influence while teaching children with dyslexia. The level of teaching and the quality of learning activities given to the learners have a negative impact on the performance of children with dyslexia. According to Griffiths (2002:3), different methods of assessment should be implemented to accommodate a child's diversity and it should be on a continuous basis. This implies that the potential of children with dyslexia should be assessed in order to determine their strength as well as their weaknesses.

Whereas education is a fundamental human rights issue, all persons have a right to education article 30 of the constitution of the republic of Uganda (1995) and it is the responsibility of the government to ensure that education is equitable and of good quality in accordance with the state standards, in most cases this is not evident to learners with dyslexia in Uganda. Learners with dyslexia have challenges in reading, writing and spelling. Dyslexia and information and communication technology- special education service, explains that the term Information and

Communication Technology (ICT) refers to computers and associated equipment such as printers, software, the internet and World Wide Web, as well as less common technologies like videoconferencing, personal digital materials such as calculators, cameras, mobile phone, smart phones, ipads, television, radio, projector and so on.

ICT can be a valuable tool to support pupils with dyslexia. They can benefit from the visual and auditory nature of ICT. It can be used to develop skills and reinforce learning in a meaningful and non-threatening manner. ICT can also be used as a personal support tool to empower pupils to achieve greater independence and allow for greater participation in a mainstream environment. However, it is important that ICT is not seen as a universal remedy. It is one of many teaching tools and should be used when it can support pupils in a meaningful and purposeful way.

According to the National ICT policy for Uganda (2012), the use of ICTs in education has particularly been mentioned especially with regard to achievement of universal primary education; the policy stipulates clearly that all stakeholders have to play their role in promoting ICTs for development by putting in place mechanisms to address among other things; information and communication infrastructure, access to information and knowledge, building of confidence and security in the use of ICTs, requisite enabling environment and ICT applications in all aspects of life by embracing e-government, e-commerce, e-learning, e-employment, e-environment, e-agriculture and e-health.

In line with the above, the Ministry of Education and Sports is taking steps to co-ordinate ICT development and has allocated resources to support implementation of its ICT strategy. According to Ministry of Education and Sports official records, (2015) all the 21,000 public schools in Uganda practice Inclusive Education by admitting learners with special education needs. The

Uganda's National Development Plan (UNDP), 2010/11-2014/15 indicates that 10% of school-going age children in Uganda have special needs (MoES, 2015). Dyslexia occurs among people of all economic and ethnic backgrounds. Often more than one member of a family has dyslexia. According to the National Institute of Child and Human Development (NICHD), 15% of Americans have major troubles with reading (NICHD, 2013).

According to Dalton, (2008), ICT can motivate learners with dyslexia, to acquire specific skills for reading, spelling, writing, and maths skills, as well as giving more general support in the curriculum. ICT offers a whole toolkit of strategies to help learners with dyslexia, from simple word processors to speech recognition, CD-ROMs and the Internet. Rule (2000:78) asserts that, "If dyslexia was better catered for within all mainstream schools, we could avoid the massive problems of behavioral difficulty, poor self-esteem and under achievement" Becta, (2000) affirms that a range of software now exists to help learners to organize their thoughts, develop their memory skills, expand their creative writing and produce work which reflects their ability.

It pointed out that care must take when choosing suitable software. Learners with dyslexia may access many areas of the curriculum when provided with strategic techniques to help them learn specific skills.

Ideally ICT is very influential on our lives and is a key tool to help learners with dyslexia in learning. It can help in accessing or recording written information. Learners with dyslexia experience challenges in reading, writing, spelling, and accessing the curriculum. Others may face difficulties in learning vocabulary and phonic skills. ICT may in assisting recording and presenting the above skills. Learning may become easier for learners with dyslexia when technology is applied (Dalton, 2008). This may be a result of appropriate speech supported software, selected

hardware, specific programs to support and improve memory skills, planning and use of multimedia learning. ICT as a compensatory tool can help learners with dyslexia to see and hear written text on screen. This may be due to the fact that, it gives room to repeat and review information as and when they need to. Using technology one may try out actions first and make informed choices, practice skills that meet their needs in both pace and content, overcome barriers such as slow writing speed, spelling, record and edit ideas easily using ordinary word processing (Wells, 2008).

Technology can simplify the teaching process, word banks, predictive and planning tools as well as digital recorders and video cameras, demonstrate their knowledge and ability and work more independently among others. Hunter and Murchu (2006) explain that computers provide a multi-sensory environment where sound and images can be used to supplement the written word and calculations. Other items of technology can also be supportive, such as tape recorders or minidisc recorders, a portable spellchecker, digital cameras and scanning pens.

Mpaya, (2007) asserts that ICTs have long been perceived as having the potential to transform education and student learning, especially in developing countries. The underlying belief of many initiatives has been that learning will happen if learners are provided direct access to ICTs. However, despite years of research, there is little evidence of the value of these approaches. The main reason for the lack of success of these highly promoted projects is that they have ignored the teacher. Lots of research studies indicate that the most significant contributor to raising educational results in schools is clear: we need better teachers. The single most important determinant of the educational outcomes for a child within a school is the capacity of his or her teacher, so it is on the teacher that we need to focus our attention.

Ogano (2012) affirms that teachers use movies and music in a classroom to get the rhythm which is important for spelling at the start of reading they also used the computer to train the learners how to read, separate letters and spell words. Use of computer is also emphasized as it seems to be an effective teaching technique to help teachers give support to children with reading and writing difficulties in the classroom. For example, the use of computer programs which help pupils with corrections on spelling and reading instantly.

Singleton (2009), asserts that Computers can be used as part of the instructional process in order to help children learn basic skills and curriculum-related material and also to facilitate reading, writing and the organization of information by means of technologies such as text- to- speech, voice input and planning tools. The principal advantages of Computer Assisted Learning (CAL) for learners with dyslexia are that it enhances motivation, provides individualized instruction, provides immediate informative feedback, creates an active learning environment and can monitor the pupil's performance in real life situation. Behaviorists believe that learning changes behaviour when learners respond to teaching by exhibiting similar responses to the same, or similar, teaching stimuli. In ICT this would be seen as the use of models of programmed learning, where students use software to redress difficulties in reading writing spelling and numeracy (Partnership Development Schools Strategy, 2009).

One of the major advantages of new technologies for students with difficulties in reading and writing is the motivation for learning, attention concentration and easier integration of students with difficulties in the group, learning at a personal pace, but also gradually learning (Detheridge, 1996; cited in Anagnostou 2015; P. 16). According to DSM-IV-TR2, the reading performance of learners with dyslexia as measured by standardized tests is markedly below the expected level

considering the chronological age, intelligence quotient (IQ) and school level specific to the individual's age. The characteristics of reading – both silent and oral – in individuals with dyslexia are marked by distortions, substitutions or omissions in which slowness and errors in comprehension predominate, Cidrim and Madeiro (2017). They further assert that the use of technological tools opens up new possibilities for stimulating the development of reading skills in learners with dyslexia which has a positive effect on the performance of a reader's understanding

2.5 Challenges have been faced by teachers in using ICT in the teaching of learners with reading challenges

Teachers with children with dyslexia experience challenges in mainstream classrooms. Such challenges are not limited to curriculum changes, inclusive education, assessment, planning, overcrowded classes, lack of resources and multi-grade classrooms. A brief outline on how each of these challenges exacerbates the problem is briefly discussed below:

Curriculum is a set of principles or guidelines written with the intention to be used by teachers to develop teaching and learning activities at all levels. Curriculum basically includes all aspects of teaching and learning such as the intended outcomes of learning, learning programmes and methodologies (Pottas, 2005:13). Before 1994, education in South Africa was based on the apartheid regime. The main aim was to segregate all racial groups. In 1994 the new government came into power and it was faced with the task of changing the educational system and to redress the past education inequality. South Africa education is highly influenced by political power. In any county, political regime and administration can either empower teachers as professionals or hinder them from being effective and efficient in the educational sphere (Thakrar, Zinn & Wolfenden, and 2009:7).

Curriculum is not a static set of documents that teachers follow. Teachers have to make choices on the effective use of it so that it meets the needs of the learners. Transition is challenging and fraught with uncertainty. Dyslexic children or teachers move from one setting to another it also has a negative impact in teaching and learning (New Zealand Government, 2008:37). This poses a challenge to the teachers even if they are professionals as they can also be affected by educational challenges in their workplace.

Mpaya (2007:40), documents that teachers are the ones involved in the process of teaching and learning, consequently they are the ones directly facing challenges brought by curriculum changes. Nonetheless, Pugach (2003:8) also argues that curriculum change is always problematic; it creates problems on the teacher's side, and as such it stimulates anger, confusion and resistance. However, those changes have a negative impact to teaching and learning as both teachers and children are affected (Mpaya, 2007:40).

Curriculum changes are problematic to the teachers once they have mastered the old curriculum. Teachers have to be the masters of the changing curriculum. In this study, the constant change in curriculum also has serious impact on both teachers as well as the children since all have to conform and adapt themselves with those educational changes, especially dyslexic learners.

Farrell (2002:23) states that the first priority when teaching children with dyslexia is to plan a programme which is balanced, relevant and with its aim to meet their long term goals and to prepare the children to be an independent part of the community. As a result, teachers often feel challenged as dyslexic children are sometimes unable to cope with curriculum transformations. Therefore, when the government draws curriculum, teachers have to be consulted input on the

syllabus and teaching methods to be used. Above all teachers should also have a complete say on the selection of text books.

Assessment forms are an integral part of teaching and learning. It mainly focuses on the different aspects of learners such as to address children's needs, progress and to assess their learning outcomes. Nevertheless, the Department of Education (2012:60) defines assessment as a process of collecting, analyzing and interpreting information to assess teachers, parents and other stakeholders in making decisions concerning the progress of the children. However, the duty of the teacher is to record the children's performance. Assessment should be an on-going process which addresses, gathers and interprets the information about the children's performance by using different assessment strategies (Kent, 2012:60).

The assessment can be either formal or informal and has to be integrated as part of the National Education System so that it can raise the standard of effective learning for all learners including dyslexic learners. When the teachers teach they have to assess the potential and skills of the learners. Furthermore, the standardized tests should be administered to check whether learners need special provisions (Griffiths, 2002:3). In this study, assessment is presented as a challenge to the teachers as dyslexic children have to be assessed in such a way that they have to meet their grade level. As such, different assessment methods should be implemented in order to accommodate children's diversity and it should be on a continuous basis. That means the potential and skills of dyslexic children should be assessed in order to check the children's strengths as well as their weaknesses (Griffiths, 2002:3).

Children with dyslexia can be taught well if their classrooms are not overcrowded. For the process of teaching and learning to take place effectively, normal-sized classrooms are imperative. In public primary schools, teaching and learning are not effectively implemented due to overflowing

classrooms. In principle, the teacher-learner ratio in primary schools is supposed to be 1:35. However, in the Vhembe District there are schools with more than 60 to 80 children in one class (Landbrook, 2001:54). This poses challenges to both teachers as well as the children.

The overcrowded classrooms are also problematic to the teachers as they hinder effective classroom delivery. The overcrowded classes make it impossible for the teachers to identify children who cannot read and write. Learners can sometimes hide themselves in class. Therefore, classrooms that are overcrowded become a challenge to the teachers as it is hard for them to individually assist children with learning difficulties and to help the particular child who struggles to perform reading and writing tasks.

Children with dyslexia depend on the availability of resources such as physical resources, technical teaching materials, and financial as well as educational media at school in order to understand the content (Gyorfi, 2010:10). The children are expected to learn in a conducive learning environment where they would be able to participate in the instructional program and achieve high academic performance.

Another challenge is the lack of physical resources. Classrooms and children support materials such as reading books and teaching resources are often inadequate. Most of the children in rural areas are facing challenges of being taught under the tree and in old buildings while others sit on the floor (Sizani, 2012:7). It is difficult for both teachers and children to teach and learn under those conditions. Sizani (2012:7) asserts that poor teaching resources, such as small classrooms, inadequate facilities and poor educational management can disempower the process of teaching and learning. Improper teacher training and inadequate in-service training affect quality provision

of education to dyslexic children. They also lack skills and knowledge on the usage of those resources and strategies that should be used to teach those children to read and write

The manner in which parents involve themselves in the education of their children can have a negative impact or can be a challenge to teachers teaching dyslexic children. They need to know how their children are performing in the classroom. For teaching and learning to occur, it needs collaboration between child's parents and teachers. Parental involvement provides children with a number of benefits. Children with parents who are concerned about their children's performance in school are more likely to succeed in tests and examinations. Such children can also score high marks on tests and they can also read accurately (Smith, 2004:53). Nonetheless, the challenge lies when the parent does not come to school after they have been called. Arias and Campbell (2008:10) point out that parents who are reluctant to take on responsibilities, view teachers as experts in teaching. Teachers are believed to be able to handle children's learning impairment.

The learners' problems need both teachers and parents to discuss the performance of the child and agree on the form of help that they can offer so that the child can progress (Landbrook, 2001:28). The challenge is that the teacher can end up helping a child alone in class without the intervention of the parents. The parents who respond accordingly, support their children in achieving better academic results than being shocked at the end of the year when the child fails to progress to the next grade.

Prior research in inclusive education predominantly focuses on success stories in developed countries in North America and Western Europe (Arnsen and Lundahl, 2006). The general conclusion is that developed countries have made significant progress in inclusive education (e.g., Ferguson, 2008). On the other hand, examination of the status of inclusive education in developing countries in Africa, Asia or Eastern Europe typically focuses on the history and difficulties of

inclusive education (Charema, 2007). Among the long list of barriers to successful implementation of inclusive education such as the limited involvement of the education ministry, limited government support, ineffective policies and legislation, inadequate funding, shortage of specially trained teachers, political instability, and economic crisis, ineffective and inefficient use of assistive technologies is a major obstacle (Ellsworth & Zhang, 2007).

ICT has been used as an Assistive Technology by children with reading problems like those with dyslexia. Assistive Technology is a broad concept, covering virtually anything that might be used to compensate for lack of certain abilities (Reed & Bowser, 2005) ranging from low-tech devices like crutches or a special grip for a pen, to more advanced items like hearing aids and glasses, to high-tech devices such as braillers and computers with specialized software for helping learners with dyslexia to read (WHO, 2009). Despite the positive impact and advancement of AT over years, prior research on the use of ICT in inclusive education is few and limited to developed countries. For example, a Canadian study examines how one can help students with special needs for ICT to smoothly transit from elementary to secondary school (Specht et al., 2007). Similarly, a Norwegian study examines how environmental factors as well as Braille and assistive technologies affect the learning and literacy of 11 severely visually-impaired students (Vik, 2008).

Tlustosova (2006:5) argues that the approach for teaching dyslexic learners should be an individualization process and teachers should focus specifically on that self-need by using differentiation methods to help those individuals. It is also impossible to do group teaching as it is difficult for the teachers to move around in an overcrowded classroom.

For teachers to pursue assessment techniques, they need time to train the children's spelling and vocabulary. Teachers have challenges on working together to help children to read as they are

teaching the subjects content not necessarily literacy. However, teachers are not given formal training on how to assess dyslexic and non-dyslexic in the same classroom at the same time. The different assessment techniques should be employed. It becomes a challenge to the teachers as holistic approach should be used to assess both the strengths and weaknesses in order to minimize dyslexia. Griffith (2002:3) suggests that for teachers to help dyslexic children, they should use standardized tests to inquire if learners require special provision that can raise learners' individual strength and limitations.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presented the research design, area of study, population of the study, sample size, sampling techniques, methods of collecting data, data analysis and ethical consideration.

3.1 Research design

A research design refers to the overall strategy that the researcher chooses to integrate the different components of a study in a coherent and logical way, thereby, ensuring that one can effectively address the research problem (Smith, 2010); it constitutes the blueprint for the collection, measurement, and analysis of data (Creswell, 2003). For this study, a qualitative research approach was undertaken. Qualitative data was used because it can allow the researcher to find out what is happening on the ground (Creswell, 2003). Qualitative research explains in details the perspective, perceptions, attitudes and observations of respondents towards the problem under investigation (Mugenda, 2003). Qualitative research was appropriate for this study due to the nature of the research questions and the focus of the study. The nature of the questions used were open ended in order to enable participants express their views freely.

This study adopted a case study qualitative design. The case that was studied was one Primary School. A case study design is a research approach which studies a certain area where there is problem with the researcher's interest. A case study design was used in order to investigate the problem from a particular small area. In this case, the problem in this primary school could be investigated easily. This primary school was chosen due to its high level of inclusion, availability and of ICT material.

3.2 Research setting

This study was conducted at Kyambogo Kyambogo Primary School. Kyambogo Primary SchoolKyambogo Primary School is a public primary school located near Kyambogo University opposite Kabaka's palace of Banda, Nakawa Division, Kampala Capital City. This primary school was chosen due to its high level of inclusion, availability and usage of ICT material teaching all learners.

3.3 Participants

Study population is the operational definition of target population (Henry, 1990). Researchers are seldom in a position to study the entire target population, which is not always readily accessible. Instead, only part of it respondents who are both eligible for the study. The study involved a total population of sixteen participants and these included primary teachers at Kyambogo Primary School.

The study involved six (6) participants who were selected from a population of 16 teachers in Kyambogo primary school. Teachers were used because they could easily share their experiences in utilizing ICT in teaching learners with dyslexia. Teachers were also used because of their professional. The researcher assumed that teachers had information on the general teaching challenges regardless of those involved in using ICT or in teaching learners with disabilities. Participants were selected using purposive sampling. In summary, 6 teachers were picked out of the 16 teachers at Kyambogo primary school.

3.4 Sampling procedure

Sampling is a procedure followed while selecting participants for a certain study (Kothari, 1999). This study used purposive sampling. Purposive sampling is when a researcher chooses specific people within the population to use for a particular study project based on the characteristics of the

participant (David, 2005). Therefore, purposive sampling was used in selecting the required participants by choosing as per the necessities of the study. Six teachers of primary five and six in Kyambogo Primary School Kyambogo Primary Schoolwere used for this study and were selected purposively. These were selected according to certain characteristics like being a teacher, having learners with dyslexia in class.

3.5 Data collection methods

The process of interviewing involved a semi-structured interview. This is a meeting in which the interviewer does not strictly follow a formalized list of questions. Instead, they will ask more open-ended questions, allowing for a discussion with the interviewee rather than a straightforward question and answer format (Guba and Lincoln, 1999). The nature of the questions used were open ended in order to enable participants express their views freely. Interviewing was used in order to collect the direct views of the participants verbally. The process of interviews conducted on personal basis meaning every participant was met on after making an appointment with him or her. This was useful in making the participants to feel free to share information since privacy was guaranteed.

3.6 Data collection tools

Face to face interviews were used to collect data from six primary teachers using an interview guide. This instrument was used since it was appropriate in seeking for in-depth information from respondents through probing and prompting. The interview guide is a tool that contains key themes or questions that the interview is supposed to focus on. The interview guide helped researchers to stick to the objectives of the research without asking questions that are not in line with the study and ensuring that all key issues about the study are responded to by respondents during interviews (Sarantakos, 2005). The items on the interview guide were developed based on the dimensions

under the independent variable and those under the dependent variable. The items on the interview guide were based on the three research questions of the study.

3.7 Procedure

The researcher developed a research proposal with guidance from my supervisors. After, designed tools for data collection and for this case involved open ended questions. The researcher made a pretest of the tools at the school and collections were made. After the approval by the supervisors, an introduction letter from the Department of Special Needs Studies of Kyambogo University was got. The purpose of the letter was to introduce the researcher to the area of study. After, the researcher proceeded to seek permission from administration of the selected primary schools. After getting approval, the researcher met the targeted participants who gave their responses after being informed on the objectives of the study and accept to participate in the study. Thereafter, schedules for interviews were made. The interviews were held at selected primary because the participants felt that this venue was very convenient to them. By average, one hour and 30 minutes were used to engage each participant in the interview process. A period of two weeks was used in conducting interviews. After data collection, the researcher analyzed the data qualitatively and compiled a report for assessment by internal and external supervisors.

3.8 Data analysis

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data (Mugenda and Mugenda 2003). An essential component of ensuring data integrity is the accurate and appropriate analysis of research findings. Qualitative data was analyzed using thematic method. Thematic analysis involved the presentation of raw verbal responses as recoded from the field. The researcher polished the information to effectively meet the set requirements for the case of academic. Data from the

interviews was arranged in form of themes and presented in form of quotations. Meaning full themes were generated and be discussed study by study. Comparing of studies according to regions was done.

3.9 Ethical consideration

Academicians long ago were often careful about airing the ethical dilemma they faced in their research and academic work. Ethics are the norms or standards for conduct that distinguish between right and wrong. They help to determine the difference between acceptable and unacceptable behaviors (Golafshani, 2003). For this study, the researcher first sought for consent of the respondents. This was done by designing a consent form for respondents. Respondents participated in the study on their own accord after being informed on the purpose of the study. While conducting the study, the researcher ensured high level of confidentiality while collecting the data and after. The researcher also observed the environment and all intellectual property. All the secondary sources used were acknowledged and referenced.

CHAPTER FOUR

RESEARCH FINDINGS

4.0 Introduction

This chapter presented the data and the interpretation of the findings according to the objectives of the study which included; to examine the tools used by teachers in primary schools in teaching of learners with dyslexia, to explore the challenges teachers in the selected primary school encounter in using ICT in teaching of learners with dyslexia and to identify teachers' experiences of children with dyslexia in using ICT in the selected primary school. It also presents the demographic information of study participants.

4.1 Presentation of findings

4.1.1 Demographic characteristics of the participants

A sample comprised of six participants who were all teachers of primary five and six at the selected primary school. Out of the six participants, two were male and four were female. This means that all participants of different gender were included in the study hence the data collected was balancing.

Teacher A:

This one was a female participant aged 24 years with a diploma, married, residing near the school premises with two years of teaching experience and trained in ICT.

Teacher B:

Teacher B was a male participant, 30 years of age, with a Bachelor's degree in Primary Education from Kyambogo University. The participant was also married, residing from the school quarters with over five years of experience and also taught using ICT.

Teacher C:

This one was a female participant 40 years of age with over 15 years of teaching experience. The participant had a Bachelor's Degree in Education (Primary) from Kyambogo University, married and resided from the school quarters.

Teacher D:

Teacher D was a female participant 27 years of age with a certificate in primary education. The participant was single residing from the school quarters with one year of teaching experience in using ICT.

Teacher E

This was participant number five. He was male participant of 30 yeas married with a certificate in primary education. He had six years of teaching experience with one year in teaching using ICT. This participant resided near the selected primary school.

Teacher F

This was the sixth participant and was female of 28 years and not married. The participant had a Bachelor Degree in Education (Primary) residing from the staff quarters with five years of working experience.

4.1.2 Use of ICT in the teaching of learners with dyslexia Kyambogo Primary School

This was the first objective of the study. The researcher was interested in identifying the ICT tools used by teachers in teaching of learners with dyslexia at Kyambogo Primary School. Participants were asked a variety of questions on this matter. According to the responses given, to a small extent teachers used ICT in the teaching of learners with dyslexia. These included ICT usage in facilitating reading, writing and illustration to children with dyslexia as indicated below thematically;

ICT usage in reading

This was highly practiced by teachers in the teaching of learners with Dyslexia at Kyambogo Primary School. This was mentioned by majority of the teachers in the interviews conducted at the school. One of the teachers was quoted saying; “We use ICT essentials in order to make communication to the learners. We use microphones which are connected to speakers in order to enable learners who have challenges in reading the work on charts” (Teacher B). From the quotation above, it is clear that teachers use ICT essentials like recorded videos on projectors in the teaching of learners with Dyslexia. Using technology can enhance access through text-to speech and other software.

Another participant said that; “We use recorded scripts in audio in order to enable the expression of ideas to the children who have challenges in reading. In this sense, they can get to know the exact information in the work” (Teacher A). From the quotations above, it is clear that teachers use ICT essentials like recorded videos on projectors in the teaching of learners with Dyslexia at Kyambogo Primary School. Using technology support s text access through text-to speech and other assistive software. They also support teaching learners with dyslexia using multimedia

presentations such as videos. This is because videos contain less words that may require reading and normally interpreted either orally or signed or in gestures.

ICT usage in the writing of children

This was another way in which teachers used ICT essentials in facilitating the writing of children with Dyslexia at Kyambogo Primary School. This was mentioned by majority of the teachers in the interviews conducted at the school. One of the participants was quoted saying;

"ICT tools like digital pens and pencils have been very useful in the facilitation of the learning of children with disabilities like those having Dyslexia at this school. Surely, we have quite a big number of children with disabilities. The whole school has more than 60 pupils with different disabilities including those with dyslexia. But ICT has largely facilitated their learning." (Teacher C).

In another interview, one of the participants replied that; "We always use ICT essentials mostly digital screens in order to enable the writing of children with Dyslexia in this school. They have been so useful brother (referring to researcher)." (Teacher A). From the quotations above, it is evident that Teachers utilize ICT tools like digital screens to enable the writing of children with Dyslexia at Kyambogo Primary School. This is an implication that ICT has been utilized to a certain extent in the teaching and learning of children with Dyslexia at Kyambogo Primary School.

ICT usage in illustration

Illustration was another way in which teachers used ICT essentials in facilitating the teaching of children with Dyslexia at Kyambogo Primary School. This was mentioned by majority of the teachers in the interviews conducted at the school. One of the participants was quoted saying; We

use videos uploaded on the projector and flat screens to illustrate for our learners. We do this in order to make their lives very easy and to facilitate their learning. Children with dyslexia have challenges in reading hence it becomes easy for them to grasp the information by watching videos on Screens. (Teacher D).

Another participant said that; “We have children who cannot write but they are not that many. Therefore, we use illustrations on video screens in order to enable them acquire what we teach them. However, their grasping of the information remains slow.” (Teacher F).

From the quotations above, it is evident that Teacher utilize ICT tools like screens to enable the writing of children with Dyslexia at Kyambogo Primary School. This is an implication that ICT has been utilized to a high extent in the teaching and learning of children with Dyslexia at Kyambogo Primary School.

One of the teachers was quoted saying; “We use ICT essentials in order to make communication to the learners. We use microphones which are connected to speakers in order to enable learners who have challenges in reading the work on charts” (Teacher E).“We use recorded scripts in audio in order to enable the expression of ideas to the children who have challenges in reading. In this sense, they can get to know the exact information in the work” (Teacher F).

From the quotations above, it can be seen that Teacher utilized ICT tools like digital screens to enable the writing of children with Dyslexia at Kyambogo Primary School. This is an implication that ICT has been utilized to a certain extent in the teaching and learning of children with Dyslexia at Kyambogo Primary School.

4.1.3 Challenges teachers encounter in using ICT in the teaching of learners with dyslexia in inclusive primary schools

This was the second objective of the study. The researcher was interested in identifying the challenges faced by teachers in educating learners with dyslexia. A number of questions were asked the participants and they gave a variety of responses. After editing of raw data, four themes emerged and these included; lack of information on disability lack of specialized rooms financial constraints and inadequate ICT devices. These themes are explained below;

Lack of information on disability

While asked on some of the challenges they face while using ICT in the teaching of learners with dyslexia, some teachers demonstrated some challenges in comprehending learning disabilities (LDs) as the common disability. From an interview with one of the teachers, she replied; “We have knowledge in special needs education but not specifically dyslexia. Majority of the teachers here have general knowledge in handling disability but we need more training when it comes to learners with learning disabilities” (Teacher E).

From the quotation above, it seems some teachers lack knowledge in teaching learners with dyslexia. Although the children with dyslexia were in their classes with some ICT devices, no formal diagnosis regarding the disability was conveyed to any of the participants. This lack of information was confirmed by specifically asking participants to provide information on this aspect. They expressed themselves in the following manner; majority of teachers do not have specialized skills related to dyslexia but the general knowledge acquired from University is the one we base on plus experience gathered. The following illustrate how some participants had limited knowledge on disability education; “No, we have had only a workshop and trainings on

disability education in general from Cheshire services Uganda but we did not cover dyslexia specifically. But we cannot fail to do our work"

Participants seemed to rely on information from fellow teachers in specialized schools like fellow teachers in Kireka Home for Children with special educational needs, teachers from other general education schools in the area who did not have specialized knowledge on special needs education cater for children with dyslexia.

Lack of Specialized Rooms

Though UPE looks as a good entry point to the learner with special needs in accessing education and especially to those with disabilities, many of the sampled teachers reported that another challenge they face in teaching learners with dyslexia is that the schools do not have enough specialized rooms to cater for the children. One of the participants said that; "We don't have specialized rooms for children with *dyslexia*. The rooms we are having are intended for all children. They don't have enough modifications to facilitate the learning for children with dyslexia"

Another participant said that;

"We try our level best to integrate children with dyslexia in general classes. We do not have specialized classrooms and teachers but we are trying to cope up with the situation as we wait for the Ministry of Education to rectify this issue due to the ever increasing number of children with disabilities. I think the situation might be similar in other schools in this area and nearby district." (Teacher B).

From the above quotations, it seems that the presence of teachers with specialized knowledge in teaching children with dyslexia is low something which has left parents having children with

dyslexia at risk. This might even be one of the factors causing school dropout among children with dyslexia in the area.

Financial constraints

Another challenge Teachers faced in offering services to learners with children with dyslexia was financial constraints. From an interview with one of the teachers who also doubled as a parent of one of the children with dyslexia said that*;* "There is the financial burden associated with getting health, education, and social services; buying or renting equipment to facilitate the teaching of the learners with dyslexia; making accommodations; transportation; and medications and special food. We are not paid considerable salaries to motivate us double our efforts towards learners with dyslexia. This has greatly affected the teaching of children with dyslexia" (Teacher C).

From the quotation above, it is indicated that teachers do not receive considerable salaries to enable them earn a considerable living and also as a motivation to the teaching of learners with special needs like those with dyslexia in Kyambogo Primary School.

Inadequate ICT devices

The results indicated that there was limited presence of these specialized ICT essentials like Smart phones, laptops, tape recorders, scanning pens, Ipads, audio books, audio to text software, text to audio software among others. From interactions with one of the teachers, he said that;

"We don't have specialized materials that are needed in the teaching of children with dyslexia. The government has not yet provided these materials but some of the children we are having who

have *dyslexia* are sponsored by NGOs and others are provided with some of the materials by their parents. Those whose parents cannot afford to buy these specialized materials for use at school like ICT devices have encountered problems in the past years" (Teacher B).

Another participant said that; "My children are in need of tablet phones, Ipads, audio to video equipment and video to audio devices to enable their learning. The government should be providing these children with such devices" (Teacher D).

From the above quotations, it seems that the presence of specialized educational materials like Smart phones, laptops, tape recorders, scanning pens, IPod's, audio books, audio to text software, text to audio software constrain the teachers in offering services to children with dyslexia. To make matters worse, even children who are visually impaired never had white canes and Braille machine papers, children who were physically handicapped never had wheelchairs, crutches and other facilities that they needed at school meaning that the situation do not affect learners with dyslexia only but all those with disabilities hence the need for interventional efforts. This could be one of the factors that was causing school dropout among children with dyslexia. The information above is supported by plate 1 below where Teacher C indicated the missing and available devices to facilitate the teaching of learners with dyslexia.

Plate 1: Missing and available devices to facilitate the teaching of learners with *dyslexia*

ICT device	*How have you used this device in teaching*	*Number of children with devices*
Smart phone		
Laptop		
Television		
Radios		
Tape recorders		
Computers		
Scanning pen		
Ipads		
Tablet phones		
Audio books		
Audio to text sofftware		
Text to audio software		
Others (specify)		

Source: Primary data (2018).

From the above quotations, it seems that the absence of specialized educational materials like Smart phones, laptops, tape recorders, scanning pens, IPod's, audio books, audio to text software, text to audio software constrain the teachers in offering services to children with dyslexia. To make matters worse, even children who are visually impaired never had white canes and Braille material, children with physical disability never had wheelchairs, crutches and other facilities that they needed at school meaning that the situation do not affect learners with dyslexia *only* but all those with other disabilities hence the need for interventional efforts.

4.1.4 Experiences of children with dyslexia in using ICT during learning.

This was the third objective of the study. The researcher was interested in identifying the Experiences of children with dyslexia in using ICT during learning. In summary, four themes were

generated from the data and these included; stigma and discrimination among peers, low self-esteem, peer rejection, and lack of knowledge on ICT tools. These themes are explained below;

Stigma and discrimination by peers

The results of the interviews with the participants highly pointed out stigma and discrimination as one of the experiences that children with dyslexia face in utilizing ICT. This was in form of labeling, discrimination and isolation of these children. From the field experiences, one sampled participants said that;

"Children who do not have disability do not want to associate with those having reading and writing challenges and they are not helpful. For example, some children with dyslexia may fail to command the projector when others know and they cannot help them. This makes them feel bad and inferior." (Teacher F).

Another participant replied that; "The way some children treat those with dyslexia is not good. They call them fake names like "Abanafu bo' bwongo" (children with weak brains) which make their learning instead very hard" (Teacher E).

From the quotations above, it is evident that children with dyslexia faced stigma and discrimination in form of labeling, discrimination and isolation of these children which makes their lives very hard.

Low self-esteem and lack of knowledge on ICT tools

Low self-esteem was another experience that children with dyslexia faced while utilizing ICT at school. Low self-esteem was identified in a way that these children felt inferior regarding ICT usage hence they saw themselves unable to compete with their counterparts who never had

disabilities. From interviews with Teachers, the following were quoted; “Our children with dyslexia sometimes do not believe that they can do well with ICT as they keep competitive like their fellows. They possess fear amongst themselves” (Teacher C).

From the quotations above, it is evident that school children with disabilities could feel inferior to those who never possessed disabilities in while still in school. Therefore, policy recommendations should start with rehabilitation these children and offering them assistive devices before they are integrated in the education system or empowered in any form.

Peer rejection

This was another challenge that children with dyslexia faced in utilizing ICT at Kyambogo Primary School. The interviews with the participants were worth noting. These participants brought on board unbelievable facts which indicated that the children are highly rejected by their fellows during ICT lessons and when they fail to use the devices available like the flat screens. One of the teachers’ remarkable verbal expressions include the following;

“Every time some children ask others on how to operate some devices, they ignore them instead of showing them how to use them. This annoys me as teacher.” (Teacher C). Another participant said that; some children could not want to sit with children with dyslexia. They do not want to revise and do homework with them” (Teacher C).

From the above quotations, it is evident that these children could suffer because of being rejected by their peers. Therefore, policy recommendations should start with rehabilitation these children before they are integrated in the education system or empowered in any form.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, discussion, conclusion and recommendations in line the objectives of the study which included; to find out the ICT materials teachers at Kyambogo Primary School use in the teaching of learners with dyslexia, to identify the challenges teachers at Kyambogo Primary School encounter in using ICT in teaching of learners with dyslexia and to explore teachers' opinions regarding the experiences of children with dyslexia in using ICT in Kyambogo Primary School.

5.2 Summary of findings

5.2.1 Kind of ICT to teachers at Kyambogo Primary School use in the teaching of learners with dyslexia

It was clear that teachers used some ICT essentials like recorded videos on projectors in the teaching of learners with Dyslexia at Kyambogo Primary School. They also support teaching learners with dyslexia using multimedia presentations such as videos. This is because videos contain less words that may require reading and normally interpreted either orally or signed or in gestures. Learners need to recall from memory but it is also easier for them when they see the letter first. Also the final written text tends to be neater and more legible than a handwritten text. It was further noted that writing process is usually more efficient for learners with dyslexia because they may be able to correct their writing and spelling mistakes.

5.2.2 Challenges teachers in primary schools face in using ICT in the teaching of learners with dyslexia.

This was the second research question. The objective here was to identify the challenges faced by teachers in educating learners with dyslexia. In summary, the major challenges included; lack of information on disability, lack of specialized rooms and lack of assistive devices as discussed below;

Lack of information on disability was a major challenge faced by the teachers in using ICT to the learners. Some teachers demonstrated some challenges in comprehending learning disabilities (LDs) as the common disability. Although the children with dyslexia were in their special classes with some ICT devices, no formal diagnosis regarding the disability was conveyed to any of the participants. This lack of information was confirmed by specifically asking participants to provide information on this aspect. Participants seemed to rely on information from fellow teachers in specialized schools like fellow teachers in Kireka for children with special educational needs, teacher from other general education schools in the area who did not have specialized knowledge on special needs education cater for children with dyslexia.

Lack of specialized rooms was another key challenge faced by the teachers in using ICT to the learners. Though UPE was a good entry point for learners with disabilities in accessing education and especially to those with dyslexia, many of the sampled teachers reported that another challenge they face in teaching learners with dyslexia is that the schools do not have enough specialized rooms to cater for these children. It seems that the presence of teachers with specialized knowledge in teaching children with disabilities is low something which has left parents having children with special needs at risk. This might even be one of the factors causing school dropout among children with special needs in the area.

Inadequate ICT devices was also a key challenge faced by the teachers in using ICT to the learners. The results indicated that there was limited presence of these ICT essentials like Smart phones, laptops, tape recorders, scanning pens, Ipads, audio books, audio to text software, text to audio software among others. It seems that the absence of specialized educational materials like Smart phones, laptops, tape recorders, scanning pens, IPod's, audio books, audio to text software, text to audio software constrain the teachers in offering services to children with dyslexia. To make matters worse, even children who are visually impaired never had white canes and Braille machine papers, children who were physically handicapped never had wheelchairs, crutches and other facilities that they needed at school meaning that the situation do not affect learners with dyslexia only but all those with disabilities hence the need for interventional efforts. The information above is supported by plate 1 below where Teacher C indicated the missing and available devices to facilitate the teaching of learners with dyslexia.

5.2.3 Experiences of children with dyslexia in using ICT at Kyambogo Primary School

This was the third objective of the study. The objective here was to identify the Experiences of children with dyslexia in using ICT during learning.

The results highly pointed out stigma and discrimination as one of the experiences that children with dyslexia face in utilizing ICT. This was in form of labeling, discrimination and isolation of these children. It is evident that children with dyslexia faced stigma and discrimination in form of labeling, discrimination and isolation of these children which makes their lives very hard.

Low self-esteem was another experience that children with dyslexia faced while still utilizing ICT at school. Low self-esteem was identified in a way that these children felt inferior regarding ICT usage hence they saw themselves unable to compete with their counterparts who never had

disabilities. It is evident that school children with disabilities could feel inferior to those who never possessed disabilities in while still in school. Therefore, policy recommendations should start with rehabilitation these children and offering them assistive devices before they are integrated in the education system or empowered in any form.

Peer rejection was another challenge that children with dyslexia faced in utilizing ICT at Kyambogo Primary School. The interviews with the participants were worth noting. These participants brought on board unbelievable facts which indicated that the children are highly rejected by their fellows during ICT lessons and when they fail to use the devices available like the flat screens. It is evident that these children could suffer because of being rejected by their peers. Therefore, policy recommendations should start with rehabilitation these children before they are integrated in the education system or empowered in any form.

5.3 Discussion of findings

5.3.1 Whether teachers at Kyambogo Primary School use ICT in the teaching of learners with dyslexia

It was clear that teachers used ICT essentials like recorded videos on projectors in the teaching of learners with Dyslexia at Kyambogo Primary School. These findings are in agreement with Kraige (2008) which affirms that using technology supports text access through text-to speech and other software. They also support teaching learners with dyslexia using multimedia presentations such as videos. This is because videos contain less words that may require reading and normally interpreted either orally or signed or in gestures. One participant was quoted saying; “We use ICT essentials in order to make communication to the learners. We use microphones which are connected to speakers in order to enable learners who have challenges in reading the work on charts” (Teacher B).

According to Broda, (2006), ICT also allows pupils with reading difficulties to access ‘talking text’ either through talking word processors or pen readers which read text aloud when scanned over a word or sentence.

The study also found out that Teachers utilized ICT tools like digital screens to enable the writing of children with Dyslexia at Kyambogo Primary School. This is an implication that ICT has been utilized to a high extent in the teaching and learning of children with Dyslexia at Kyambogo Primary School. Another participant said that; “We use recorded scripts in audio in order to enable the expression of ideas to the children who have challenges in reading. In this sense, they can get to know the exact information in the work” (Teacher A).

These findings are in agreement with Anagnostou (2015) who said that the available data observes that students with difficulties in writing do not like writing because they have to combine context with syntax, grammar and spelling. What is written on the paper does not typically represent the learners' actual abilities. To use a computer for writing can be helpful because the learner can focus on a small piece of work at a time. Also it may be easier for a learner, who does not recognize the letters correctly, to find the right letter on the keyboard. Learners need to recall from memory but it is also easier for them when they see the letter first. Also the final written text tends to be neater and more legible than a handwritten text. It was further noted that writing process is usually more efficient for learners with dyslexia because they may be able to correct their writing and spelling mistakes.

Recent research (Drigas et al. 2015) (Zikl et al. 2015) (Madeira et al. 2015) agree that ICT is likely to be a useful tool towards users with dyslexia. It can assist and reinforce the learning process, as

well as it can create a developmental appropriate learning environment depending on the needs of learners. Some implementations of ICT in education have been conducted to support dyslexic students. For instance, the use of websites as an educational motivators (Johnson and Hegarty 2003), text-based adjustments in synchronous learning activities and browser extension, to help users with dyslexia adapt web content to make it easier to read and more accessible(Woodfine et al. 2008) (Velasco et al. 2015), text editing and adjustment of the visual aspects of the text using specific fonts to the needs of users, permitting them to try different fonts and graphic arrangements and choose the most efficient option so as to improve their reading performance (Zikl et al. 2015) and eBooks reader for Android designed, in an accessible way according to dyslexic user needs (Rello et al. 2012).

Other research, focused on mobile learning and computer game-based as an altar- native learning tool to assist students with special needs (Skiada et al. 2014). According to (Rose et al. 2002) (Kalyviotiand Mikropoulos 2014), virtual environments and virtual reality applications can be used as powerful and sensitive clinical tools for adult and children with neurocognitive and neuropsychological impairments.

5.3.2 Challenges teachers face in primary schools in using ICT in the teaching of learners with dyslexia.

This was the second research question. The objective here was to identify the challenges faced by teachers in educating learners with dyslexia. In summary, the major challenges included; lack of information on disability, lack of specialized rooms and lack of ICT devices as discussed below;

Lack of information on disability was a major challenge faced by the teachers in using ICT to the learners. Some teachers demonstrated some challenges in comprehending learning disabilities

(LDs) as the common disability. Although the children with dyslexia were in their special classes with some ICT devices, no formal diagnosis regarding the disability was conveyed to any of the participants. This lack of information was confirmed by specifically asking participants to provide information on this aspect. Participants seemed to rely on information from fellow teachers in specialized schools like fellow teachers in Kireka for children with special educational needs, teacher from other general education schools in the area who did not have specialized knowledge on special needs education cater for children with dyslexia. From an interview with one of the teachers, she replied; "We have knowledge in special needs education but not specifically dyslexia. Majority of the teachers here have general knowledge in handling disability but we need more training when it comes to learning with learning impairments" (Teacher E).

These findings are in line with Samantha, (2008) who said that teachers find a challenge of lack of information on disability which limit their performance at work.

Lack of specialized rooms was another key challenge faced by the teachers in using ICT to the learners. Though UPE was a good entry point for children with disabilities in accessing education especially children with dyslexia, many of the sampled teachers reported that another challenge they face in teaching learners with dyslexia is that the schools do not have enough specialized rooms to cater for these children. It seems that the presence of teachers with specialized knowledge in teaching children with disabilities is low something which has left parents having children with special needs at risk. This might even be one of the factors causing school dropout among children with special needs in the area. One of the participants said that; "We don't have specialized rooms for children with *dyslexia*. The rooms we are having are intended for all children. They don't have enough modifications to facilitate the learning if children with *dyslexia"*

Another participant said that;

"We try our level best to integrate children with *dyslexia* in general classes. We do not have specialized classrooms and teachers but we are trying to cope up with the situation as we wait for the Ministry of Education to rectify this issue due to the ever increasing number of children with disabilities. I think the situation might be similar in other schools in this area and nearby district." (Teacher B).

These findings are in agreement with Sizani, (2012) who said that classrooms and children support materials such as reading books and teaching resources are often inadequate. Most of the children in rural areas are facing challenges of being taught under the tree and in old buildings while others sit on the floor. It is difficult for both teachers and children to teach and learn under those conditions. Kraige (2013) also asserts that poor teaching resources, such as small classrooms, inadequate facilities and poor educational management can limit the process of teaching and learning. Improper teacher training and inadequate in-service training affect quality provision of education to dyslexic children. They also lack skills and knowledge on the usage of those resources and strategies that should be used to teach those children to read and write.

Inadequate ICT devices was also a key challenge faced by the teachers in using ICT in teaching learners with dyslexia in K primary. The results indicated that there was limited presence of ICT essentials and software like Smart phones, laptops, tape recorders, scanning pens, Ipads, audio books, audio to text software, text to audio software among others. It seems that the absence of ICT materials like Smart phones, laptops, tape recorders, scanning pens, IPod's, audio books,

audio to text software, text to audio software constrain the teachers in teaching children with dyslexia.

The information above is supported by plate 1 below where Teacher C indicated the missing and available devices to facilitate the teaching of learners with dyslexia. From interactions with the one of the teachers, one said that;

"We don't have enough ICT materials that are needed in the teaching of children with *dyslexia*. The government has not yet provided these materials but some of the children we are having who have *dyslexia* are sponsored by NGOs and others are provided with some of the materials by their parents. Those whose parents cannot afford to buy these ICT materials for use at school like recorders have encountered problems in the past years" (Teacher B).

This could be one of the factors that was causing school dropout among children with dyslexia. These findings are in agreement with Musoke, (2009) who said that some specialized materials are inadequate in many primary schools. This leaves the education of people with disabilities in shambles. The teaching of children with disabilities requires substantial care and material equipment. Absence of the required materials can lead to drop out of these children and makes their teaching very hard.

5.3.3 Experiences of children with dyslexia in using ICT at Kyambogo Primary School

This was the third objective of the study. The objective here was to identify the Experiences of children with dyslexia in using ICT during learning.

The results highly pointed out stigma and discrimination as one of the experiences that children with dyslexia face in utilizing ICT. This was in form of labeling, discrimination and isolation of

these children. It is evident that children with dyslexia faced stigma and discrimination in form of labeling, discrimination and isolation of these children which makes their lives very hard. From the field experiences, one sampled participants said that;

“Children who do not have disability do not want to associate with those having reading and writing challenges and they are not helpful. For example, some children with dyslexia may fail to command the projector when others know and they cannot help them. This makes them feel bad and inferior.” (Teacher F).

These findings are in line with Kurt (2017) who said that discrimination means having a fixed image of a group of people for example children with disabilities; this comes from facilitators, teachers, parents, community members among others, whereby children with disabilities are always ignored, leading to failure to access education. Similarly, Nakaweesi (2015) added that education of children with intellectual disability is always a challenge to many facilitators who believe that they cannot cope with regular curriculum and these perpetuate the failure of children with disabilities to access education.

Low self-esteem was another experience that children with dyslexia faced while still utilizing ICT at school. Low self-esteem was identified in a way that these children felt inferior regarding ICT usage hence they saw themselves unable to compete with their counterparts who never had disabilities. It is evident that school children with disabilities could feel inferior to those who never possessed disabilities in while still in school. Therefore, policy recommendations should start with rehabilitation these children and offering them assistive devices before they are integrated in the education system or empowered in any form. These findings are in line with Hallahan et.al (2014) also asserts that Children with disabilities have low self-esteem that hinders them and makes them

feel so low, they cannot do anything and they usually have questions about themselves; how did I get it?, will the disability go away?, will I be recognized as an important person in the community?, will I also be given a chance like other children? Will my siblings like me?

Peer rejection was another challenge that children with dyslexia faced in utilizing ICT at Kyambogo Primary School. The interviews with the participants were worth noting. These participants brought on board unbelievable facts which indicated that the children are highly rejected by their fellows during ICT lessons and when they fail to use the devices available like the flat screens. It is evident that these children could suffer because of being rejected by their peers. Therefore, policy recommendations should start with rehabilitation these children before they are integrated in the education system or empowered in any form. These findings are in line with Kurt (2017) who said that discrimination means having a fixed image of a group of people for example children with disabilities; this comes from facilitators, teachers, parents, community members among others, whereby children with disabilities are always ignored, leading to failure to access education. Similarly, Nakaweesi (2015) added that education of children with intellectual disability is always a challenge to many facilitators who believe that they cannot cope with regular curriculum and these perpetuate the failure of children with disabilities to access education.

5.4 Conclusion

The study concluded that ICT was used to facilitate the reading, writing and illustration to children with dyslexia. Secondly, Teachers faced a number of challenges in teaching children with dyslexia ranging from lack of information on disability, lack of specialized rooms financial constraints and inadequate ICT devices. However, the common experiences that learners with dyslexia face in using ICT included; stigma and discrimination among peers, low self-esteem, peer rejection, and lack of knowledge on ICT tools. Therefore, there is need for concerted efforts in order to improve

the education of learners with dyslexia like teacher training in specialized education, equipping the schools with adequate and appropriate ICT tools, paying the teachers well, counseling children to believe in themselves and sensitizing the ordinary learners on disability issues and how best they can support their colleagues with dyslexia to use ICT tools to learn.

5.4 Recommendations

The study concluded that ICT was used to facilitate the reading, writing and illustration to children with dyslexia. Therefore, the government should increase funding for ICT in primary schools to include the needs and the requirements of children with dyslexia to enable their learning. This can be in form of IPADS, laptops, smart phones and many more.

Secondly, the study concluded that Teachers faced a number of challenges in teaching children with dyslexia ranging from lack of information on disability, lack of specialized rooms financial constraints and inadequate ICT devices. Therefore, teachers are advised to seek more knowledge on disability and this can be in form of enrolling for special needs education at institutions like Kyambogo University. There is also need for specialized rooms / resource rooms for children with dyslexia at Kyambogo Primary School and this calls for increased funding from government and its partners. On this same note, the government is called upon to provide ICT devices to both teachers and learners with disabilities in primary schools all over Uganda. This has been done in Kenya whereby every child joining primary one is given a laptop by Government.

The study also concluded that the common experiences that learners with dyslexia face in using ICT included; stigma and discrimination among peers, low self-esteem, peer rejection, and lack of knowledge on ICT tools. Therefore, there is need for concerted efforts in order to improve the education of learners with dyslexia like teacher training in specialized education, equipping the

school with appropriate and adequate ICT tools, paying the teachers well, counseling children to believe in themselves and construction of resource rooms in inclusive schools.

5.5 Areas for further research

According to what has been discovered in the study, to pacify the situation of ICT usage and learners with dyslexia in primary schools in our nation, the researcher suggests that;

1. A similar study should be conducted for Private schools in Kampala.
2. Another study should be conducted to find out if there is a difference in children with dyslexia between schools in urban areas and in rural areas.

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LIST OF APPENDICES

APPENDIX 1: CONSENT FORM

KYAMBOGO UNIVERSITY

FACULTY OF SPECIAL NEEDS EDUCATION

LETTER OF CONSENT

Dear respondent,

I am **MUSIMAMI IDD MUBARAK,** a final year student pursuing a Master's Degree in Special Needs Education at Kyambogo University. I am conducting a research study entitled "**Use of Information and Communication Technologies in Teaching Learners with dyslexia**

You are among the respondents purposively selected to provide me with appropriate information. The information given will be treated with utmost confidence and used for academic purposes only. Your response will be kept confidential and used purely for academic purposes only. Give a brief statement where necessary.

_____ _____

MusimamiIdd Mubarak **Participant**

Reg. No. 15/15960/GMSN/PE

APPENDIX II: SEMI STRUCTURED INTERVIEWS FOR TEACHERS

1. For how long have you been teaching in this school?

……

2. Are there children with disabilities in this school?

…….

3. How many children with reading and writing difficulties do you have in your class?

……

4. How many children with reading and writing difficulties are there in the school?

……

5. In some schools, reading and writing disability is very common. What is the situation here?

……

6. In which ways has ICT been used in the teaching of learners with reading and writing in inclusive schools?

……

7. Do you have any specialized skills / training in teaching children with reading and writing difficulties?

……

8. Which of the following ICT essentials do you use in teaching children with reading and writing disability (dyslexia)?

ICT device	**How have you used this device in teaching**	**Number of children with devices**
Smart phone		
Laptop		
Television		
Radios		
Tape recorders		
Computers		
Scanning pen		
Ipads		
Tablet phones		
Audio books		
Audio to text sofftware		
Text to audio software		

Others (specify)		

9. What challenges do you find in using ICT in the teaching of learners with reading and writing difficulties in inclusive class?

……

10. In some cases, some teachers do not have the required ICT tools to teach children with reading and writing difficulties. What is the situation here?

……

11. How do children with reading and writing difficulties use ICT tools?

……

12. To what extent do children with reading and writing difficulties use ICT tools?

……

13. What strategies have been used to improve the teaching of learners with dyslexia (difficulties in reading and writing) in this school?

……

14. What other information would you like to share with me?

……

Thank you so much

APPENDIX III: INTERVIEW GUIDE FOR TEACHERS

1. For how long have you been in the teaching service?

   ……

2. For how long have you been in this particular school?

   ……

   Some schools have learners with dyslexia while some do not have. What is the situation at this school?

   ……

3. In many instances, teachers report challenges while teaching learners with difficulties in reading and writing. What are some of the challenges faced by teachers at this school?
   ……..……..
4. A number of ICT materials like desk top computers, laptops, projectors among others are available in some schools for learners with difficulties in reading and writing. What are some of some materials do you have in this school?

   ……..……..……..

5. Which of the following ICT essentials / devices do you use in teaching learners with dyslexia?

ICT devices	**Number of ICT devices**	**How have you used this device in teaching children with dyslexia**
Desk top computers		
Laptop		
Tablet phones		
Smart phones		
Ipads		
Projectors		
Tape recorders		
Redios		
Television set		
Audio books		
Text to audio		
Internet services		

6. What is your opinion on using ICT devices in teaching learners with dyslexia?

   ……..
7. Do your teachers have the ICT skills required for teaching learners with difficulties in reading and writing?

   ……..
8. What challenges do encounter in managing an inclusive school?

   ……..….
9. Do you have any other information that you wish to share with me?

   ……...

** Thank so much**

APPENDIX IV: INTRODUCTORY LETTER

KYAMBOGO UNIVERSITY

P. O. BOX 1, KAMPALA
FACULTY OF SPECIAL NEEDS & REHABILITATION
Tel: 0414-286237/285001/2 Fax: 0414-220464
DEPARTMENT OF SPECIAL NEEDS STUDIES

15th January, 2019

The DEO/DIS/Head teacher/Teacher/Community/Opinion Leader/Church Leader
KAMPALA CAPITAL CITY
AUTHORITY

Dear Sir/Madam,

RE: INTRODUCTION OF RESEARCH STUDENT ON DATA COLLECTION

This is to introduce the bearer Rev/Dr/Sr/Mr/Mrs/Ms. MUSIMAMI IAD MUBARAK
Reg.No: 15/15960/GMSN/PE who is a bonafide student of Kyambogo University in the Faculty of Special Needs and Rehabilitation, Department of Special Needs Studies. As partial fulfillment of the requirement for the award of the Diploma/Degree/Master, he/she is required to undertake a research on the approved area of study.

The purpose of this letter is to request you to allow him/her have access to information from your office, school or area of operation necessary for the study.

Kyambogo University will be grateful for any assistance rendered to the student.

Yours faithfully,

Kyambogo University
25 JAN 2019
Faculty of Special Needs Studies

Dr. Okwaput Stackus
HEAD OF DEPARTMENT

OS/aj

APPENDIX V: ACCEPTANCE LETTER FROM KCCA

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

DIRECTORATE OF EDUCATION & SOCIAL SERVICES

REF: DES/KCCA/201/17

24th October,2019

Mr. Musimami Idd Mubarak
Kyambogo University
P.O. Box 1
KAMPALA

RE: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH

The above subject refers;

Permission is hereby granted to you to carry out research on "Use of Information and Communication Technology in Teaching Learners with Dyslexia in Inclusive Primary Schools"

You are expected to exercise utmost ethical treatment of study subjects, consented participation and that the results of the study will be used for academic purposes only. You are also expected to share the research report with KCCA.

For a better City

Jimmy Amatre
FOR: DIRECTOR EDUCATION AND SOCIAL SERVICES

Copy: All Supervisors Education Services

P.O. Box 7010 Kampala - Uganda
Plot 1-3 Apollo Kaggwa Road