



**UNIVERSITY OF NAIROBI
SCHOOL OF COMPUTING AND INFORMATICS**

Research Project

**Assessment of the effect of ICT utilization on performance for children with
learning disabilities in private primary schools in the Nairobi County**

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**Submitted in Partial fulfillment of the Requirements of the Master of Science
Degree in Information Systems**

DECLARATION

This research project being presented is my original work and has not been published or presented for the award of any university degree.

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Date

This research project is submitted as partial fulfillment for the Degree of Master of Science in Information Systems with my approval as the university supervisor

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Date

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ABSTRACT

The inclusion of all children in education regardless of their learning disabilities is essential in the attainment of the millennium development goals. ICT in education has offered particular benefits for children with learning disabilities such as visual presentations, self-paced learning, highly motivating graphics and opportunity to be in control of their own learning. The main aim of this study was to determine what effects utilization of ICT has on performance for children with learning disabilities.

This paper focuses on four aspects on which ICT can be utilized in schools. The aspects are access to information, teaching and learning, communication and interaction and access to administrative procedures. A survey instrument, which was given to teachers, was used to collect qualitative data. Results indicated that these four aspects influenced or had an effect on the performance of children with learning disabilities. The utilization of ICT in teaching and learning was however found to have a greater effect in performance of these children. The regression model developed explained 81.4% of the performance of children with learning disabilities.

In order to increase performance, the school administrators should use the children's monitoring and feedback information to either improve or change the teaching and learning methodology.

Key words: inclusive education, ICT utilization, children with learning disabilities,

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CHAPTER ONE:

INTRODUCTION

1.1 Background of the study

Information and Communication Technologies (ICTs) are reshaping the economic and social landscapes of people's lives (Huggins and Izushi, 2002). Applying ICT to the courseware has become a trend of education among most countries in the world. As ICT becomes more widely used in classrooms and schools, attention is been focused on how ICT can make teaching and learning more effective. The main challenge facing education today, however, is the provision of the best and most effective education to children with learning disabilities (Blackmore et al, 2003). The number of children with special education needs has grown in the past two decades due to increased diversity in communities and better diagnostic tools. According to Organization of Economic Co-operation and Development (OECD), as many as 35% of school-age students need some kind of special support or have been diagnosed as having special educational needs. The utilization of ICT in education and mostly for children with disabilities is currently high on the political agendas of all countries, particularly those who have ratified the United Nations Convention on the Rights of Persons with Disabilities (CRPD, 2006).

Many problems in learning are not due to intrinsic causes such as cognitive ability, perceptual impairment, learning disability, deficiencies in memory and attention or poor motivation. Instead, difficulties are caused or exacerbated by either ineffective or insufficient teaching or inappropriateness of the curriculum content (Westwood, 2003).

Children with special needs all have learning disabilities that make it harder for them to learn or access education than most children of the same age. These children may need extra or different help from that given to other children (Westwood,2003). The introduction of ICT in education and internet therefore play a major part in shaping the knowledge and skills of these children with learning disabilities.

1.2 Problem statement

Children with learning disabilities make up the world's largest and most disadvantaged minority in terms of education. Meanwhile, both governments and educational authorities face the

challenge of meeting the Millennium Development Goals which have set a target of full enrolment and completion of primary school for all children by 2015 (MDG 2000).

Learning requires attention to the unique needs of all students of all abilities, acknowledging that each have different learning styles including students with mild, moderate or severe learning disabilities. The use of technology in education plays a particularly vital role by enabling flexible curriculum development and assisting students with learning disabilities to participate as equals in the learning experience. It also helps to prepare them for life-long learning, recreation and autonomy outside the school environment.

Technology plays a vital role in enabling personalized learning by enabling flexible curriculum development and assisting students with disabilities to participate through the use of accessible ICTs as equals in the learning experience. It is important that the use of technology for learning does not in any way contribute to replicating any form of stigmatization and labeling that may be found elsewhere in society.

Despite the great effect of ICT utilization on performance of children with learning disabilities, there is dearth of empirical evidence on effect of ICT utilization on performance of children with learning disabilities. It is against this backdrop that the study envisions to fill this research gap on the effect of ICT utilization on performance of children with learning disabilities in private primary schools in Kenya.

1.3 Purpose of study

The purpose of this study is to assess the effect of ICT utilization on performance of children with learning disabilities. The utilization of ICT is on the access to information and knowledge, learning and teaching, communication and interaction and access to administrative procedures.

1.4 Objectives of the study

The general objective of the study will be to assess the effect of ICT utilization on performance of children with learning disabilities in private primary schools in Kenya.

The specific objectives are:

- i. To analyze the effect of ICT in supporting access to information and knowledge to enhance the performance of children with learning disabilities

- ii. To study the effect of ICT utilization in supporting learning and teaching to enhance the performance of children with learning disabilities-overall objective?
- iii. To establish the effect of ICT utilization in enhancing supporting personal communication and interaction to enhance the performance of children with learning disabilities
- iv. To investigate the effect of ICT in enabling access to educational administrative procedures to improve the performance of children with learning disabilities

1.5 Research Questions

The study will be guided by the following research questions:

- i. What are the effects of ICT in supporting personal access to information and knowledge to enhance the performance of children with learning disabilities?
- ii. What are the effects of ICT in supporting learning and teaching to enhance the performance of children with learning disabilities?
- iii. What are the effects of ICT in supporting personal communication and interaction to enhance the performance of children with learning disabilities?
- iv. What are the effects of ICT in supporting access to educational administrative procedures to enhance the performance of children with learning disabilities?

1.6 Significance of the study

ICT support aims at making the learning process possible for these children with learning disabilities. The adoption of ICT is therefore a major incentive in the learning process as opposed to the traditional manual education system. Some of the benefits that can be derived from this study include the following:

- 1. The schools will be able to identify the adequate ICT infrastructure that is required to support children with learning disabilities

2. The government will improve the curriculum content by integrating technology in the dissemination of the content especially for children with learning disabilities
3. The teachers will be able to enhance their teaching skills by understanding the appropriate learning theory that they can adopt in teaching children with learning disabilities
4. The learning institutions like universities and colleges can identify the possible ICT skills that teachers require in the dissemination of curriculum content to children with learning disabilities
5. The parents who have children with learning disabilities may become aware of certain technologies, which they can acquire for their children's home use so as to consistently enhance their learning skills.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter will focus on the concept of inclusive education, theories of existing literature related to learning disabilities, the various learning theories, ICT support tools and the conceptual framework developed.

2.1 Inclusive education

In building a truly inclusive society where all people learn together and participate equally, the main focus is providing quality education for all. The United Nations Education for All movement is a global commitment to provide quality basic education for all children, youth and adults. Article 26 of the Universal Declaration of Human Rights, 1948 clearly lays down the foundation for the Education for all movement. It states that:

“Everyone has the right to education and education shall be directed to the full development of human personality and to the strengthening of respect for human rights and fundamental freedom”

Inclusive education seeks to address the diverse learning needs of all children. This was further supported by the Convention on the Rights of the Child, 1989, which stated that children have the right to receive the kind of education that does not discriminate on the basis of disability, ethnicity, religion, language, gender and capabilities (UNESCO, 2007).

This principle of inclusive education was adopted at the 1994 World Conference on “Special Needs Education: Access and Quality” in Salamanca, Spain. This Conference had brought together educational specialists, international organizations and governments to discuss and enhance the objective of ‘Education for All’ by considering the basic policy shifts that are required to advance the approach of inclusive education. The policy shifts discussed included enabling schools to serve all children, including those with special educational needs. The Conference adopted the Salamanca Statement on Principles, Policy, and Practice in Special Needs Education and a Framework for Action. The Statement reiterated the several United Nations declarations that culminated in the 1993 United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities, which urges States to ensure that the

education of persons with disabilities is an integral part of the education system (UNESCO 1994). The Salamanca statement embodies the purpose of this study as it builds a framework of inclusion in education, which provides the impetus to use all means possible to ensure all people have access to education, particularly those with special needs.

The educational requirements of people with special needs are extremely varied. As with all other members of society, people with disabilities must acquire the knowledge and skills required for the community in which they live. However, they face additional demands caused by functional limitations that affect their ability as learners to access standard educational methods of instruction. These limitations often prevent educational development and achievement. In this context, the application of ICT is essential as it plays a pivotal role in supporting high quality education for learners with disabilities. The benefits of ICT usage in the teaching and learning process are based on the potential it offers for alternative means of communication, providing access to educational resources in a more convenient way and enhancing learning incentive. By conquering barriers of space and time, supplementing fundamental human functioning, and supporting the development of critical skills, these technologies contribute to the increased effectiveness of educational processes by enabling children with disabilities to actively participate in meaningful learning experiences (UNESCO 1994).

2.2 Learning Disabilities

Researchers have given different definitions to learning disability relative to their contexts. Wender (1981) defines learning disability as a group of biologically based disorders in development that significantly affects school performance. According to Crealock and Kronick (1993) learning disability contains three essential elements: a discrepancy clause, an exclusion clause, and an etiology clause. The discrepancy clause highlights the significant disparity between aspects of specific functioning and general ability; the exclusion clause reveals that the disparity is not primarily due to intellectual, physical, emotional, or environmental problems; and the etiology describes the causal factors that include genetic, biochemical, or neurological factors.

The National Joint Committee on Learning Disabilities (NJCLD,2009) defined learning disability as:

“A heterogeneous group of disorders that manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to central nervous system”

Even though a learning disability may occur concurrently with other disabling conditions or environmental influences, it is not the direct result of those conditions or influences. These definitions highlight a common thread of the difficulties that people with learning disabilities experience in acquiring knowledge because of their pre-dispositions. Reid and Valle (2004) offer that Learning disability theory is founded on a medical model that disability is perceived as an individual deficit that is biological in origin.

Learning disability is therefore not related to a child's intelligence and does not indicate the level of intelligence of a child. Learning disabilities are innate problems that affect the brain's ability to receive process, analyze and store information (Sulaiman, Baki and Rahman, 2011).

2.3 Types of Learning Disabilities

The main learning disabilities that will be focused in this study are dyslexia, dysphasia, dyscalculia, dysgraphia and dyspraxia:

2.3.1 Dyslexia

Dyslexia is a specific reading disability characterized by difficulties in decoding single word, reflecting insufficient phonological processing. According to Velluntino, Fletcher and Snowling (2004), reading is the process of extracting and constructing meaning from written text for some purpose. Skilled reading entails on-line comprehension of meaning from text and process depends on adequate development of two component processes: word identification and language comprehension.

Dyslexia occurs when individual's word identification and language comprehension are significantly below the level that would be predicted from the individual's level of intellectual

ability, assuming other disabling conditions or environmental influences have been ruled out (Brown, Aylward & Keogh, 1996 and Gasparini & Culen, 2012).

2.3.2 Dysphasia

Dysphasia is a language and communication learning disability that involves the inability to either understand or produce spoken language. Language is considered an output activity because it requires organizing thoughts in the brain and calling upon the right words to verbally explain something or communicate with someone else. Signs of a language-based learning disorder involve problems with verbal language skills, such as the ability to retell a story and the fluency of speech, as well as the inability to understand the meaning of words, parts of speech, and directions (Kenyon 2003).

2.3.3 Dyscalculia

Dyscalculia is a learning disability that manifests in difficulty in solving arithmetic problems and understanding concepts in math, despite instruction, good intelligence, and sound sensory functioning. The extent of the disability vary greatly depending on the child's other strengths and weaknesses. According to Brown, Aylward & Keogh (1994), dyscalculia is a specific learning disability in mathematics, where an individual's math skills (e.g. acquisition of number facts, written calculations and mathematical/logical reasoning) are below the level that would be predicted from the individual's level of intellectual ability, assuming other disabling conditions or environmental influences have been ruled out. Kenyon (2003) asserts that the child may also be confused with math operations, especially multi-step processes; and experience difficulties in language processing that may affect the ability to complete math problem solving.

2.3.4 Dysgraphia

Dysgraphia is a form of a learning disability where a person finds it difficult to form letters or writes within a defined space. Brown et.al (1996) describes dysgraphia as a specific learning disorder where an individual's written language skills (e.g. spelling, application of grammar, punctuation, usage skills, organization of thought in writing) are significantly below the level that would be predicted from the individual's level of intellectual ability, assuming other

disabling conditions or environmental influences have been ruled out. Kenyon (2003) defines dysgraphia as a neurological disorder that is characterized by writing disabilities and difficulty with the mechanics of writing. The symptoms associated with dysgraphia include disorganization in writing, trouble getting good ideas down on paper, lacks a clear purpose for writing, and difficulty with physical activities.

2.3.5 Dyspraxia

Dyspraxia refers to a learning disability associated with difficulty in motor coordination. It refers to problems with movement and coordination whether it is with fine motor skills or gross motor skills. A motor disability is sometimes referred to as an “output” activity meaning that it relates to the output of information from the brain. In order to run, jump, write, or cut something, the brain must be able to communicate with the necessary limbs to complete the action. Signs and detection of this condition on a child include problems with physical abilities that require hand-eye coordination, like holding a pencil or buttoning a shirt (Kenyon 2003).

2.4 Learning Theories

A learning theory is a researched concept that describes the observable phenomenon about how people learn. There are several theories of learning but this study will discuss three: behaviorism, cognitivism and constructivism.

2.4.1 Behaviorism

This theory seeks to examine the observable behavior of men and animals in reaction to a certain stimulus. The originator of this theory, J.B. Watson, focused more on the observable behavior and discovered that learning is as a result of response to a stimulus. The learned behavior is reinforced until it becomes a habit. The emphasis on this learning theory is on the outcomes as opposed to the outward signs that any processing is taking place (Cooper, 2011).

Several experiments have been done with animals to demonstrate the effects of repeated actions in learning or conditioning: the Pavlov’s experiment with dogs who appropriately responded to the stimulus of a bell; Thondike observed how cats learned to escape from puzzle boxes, where a

positive result led to a repeated behavior while a negative result led to a gradually weakened behavior (Cooper, 2011).

2.4.2 Cognitivism

This theory indicates that people learn by adding new facts and experiences to their already stored knowledge. Learning takes place as a result of a continuous buildup of the new ideas and experiments. The essential factors of this learning process are collaborative learning and active participation. Cognitivism is mainly involved in the internal processes of learning unlike behaviorism, which relies on the outcomes or results to quantify how people learn.

The role of the teacher is viewed as that of a facilitator who ensures that the information is consolidated before exploring more on the topic. One of the cognitivist approaches to teaching is the problem based learning, where children work in a group and actively solve a specific problem that is set by the teacher. The teacher's role in the learning process is mainly to guide the children towards getting a solution (Cooper, 2011).

2.4.3 Constructivism

Constructivists believe that learners form or create their own knowledge depending on how they perceive the world through their own experiences. Active involvement in the learning process ensures that the learner constructs his own learning. The theory usually involves hands-on problem solving and encouraging the learner to link prior knowledge with new learning. In the constructivism approach, learners participate in learning activities working either with others in a group or on their own (Cooper, 2011).

Jean Piaget's theory of cognitive development can be associated to this learning theory. Piaget believed that acquisition of knowledge is a process of self-construction and that there is an interaction between heredity and environment. According to Piaget, learning is based on the idea of schema or networked concepts for understanding and responding to physical experiences within one's environment. (Cooper, 2011)

2.4.4 Learning theories and Children with learning disabilities

For children with learning disabilities, learning usually takes place at a different pace to that of children without disabilities. The Maturation stages of development that learners go through as described by Jean Piaget indicate that cognitive growth occurs in a series of invariant and interdependent stages. These stages are:

- Sensorimotor Stage: birth to 2 years. The child uses senses and motor abilities to understand the world, beginning with reflexes and ending with complex combinations of sensorimotor skills.
- Pre-operational stage: Ages 2 – 7. The child begins to learn language, is able to do one-step logic problems and continue to be egocentric.
- Concrete operations stage: Ages 7-11. The young learner is now able to think logically and start classifying based on several features and characteristics rather than solely focusing on the visual representation.
- Formal operations: Ages 11-16. At this stage which continues towards adulthood, the learner uses abstractions, theories and relationships without reference to the concrete experiences.

It is unlikely that a child with learning disability will operate at these stages at the same chronological age as a child without disability. The child with learning disabilities will therefore require more time to reach and function at these stages.

Although many teaching methodologies have shifted away from the behaviorist approach, there are many reasons why it remains an important approach to children with learning disabilities. For example, Allor et al. (2010) discovered that intense practice and direct teaching methods on how to read were most effective for children with special education needs. Other learning theories can be adopted along the behaviorist approach. In use of ICT for children with learning disabilities, a constructivist approach would appropriately enhance learning process because computers usually require hands-on experience.

2.5 ICT Tools

The development of ICT in education has led to the use of tools or systems that support learning. The purpose of these support tools is to reduce the mis-match between one's competencies and environmental demands so as to improve the human functioning and achieve the desired learning outcomes (Luckasson & Schalok, 2012). This study will look at ICT tools under four categories: assistive, augmentative, remedial and diagnostic.

2.5.1 Assistive technologies

An Assistive technology device is any item, piece of equipment, or product system that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (Bryant, Seok and Ok, 2012). Assistive technology includes devices ranging from simple (for example adapted spoons and switches) to complex devices (for example computers, augmentative communication systems, environmental control devices, electric wheelchairs).

Bryant et al. (2012) state that helpful technology becomes assistive technology when the technology is being used by a person with a disability to increase, maintain, or improve functional capabilities. The most frequently used assistive technology devices to include wheelchairs, hearing aids, eyeglasses, non-speech touch/picture systems, speech synthesis devices, extra wide doors, handrails, ramps, raised toilets, other-home adaptations, and computers. Assistive technology devices could be viable supports for individuals with learning disabilities throughout the lifespan and across a wide range of intellectual levels.

2.5.2 Augmentative technologies

Augmentative technology is an alternative way to help people with language disorders use expressive language or receptive language. The technology is effective through the use of devices such as computers, hand held devices or low technology such as picture communication systems (Beukelman & Mirenda, 2005). Some of the individuals who make use of these augmentative technologies include individuals with a variety of congenital conditions such as intellectual disability, cerebral palsy and autism..

An augmentative technology aid is any electronic or non-electronic device that is used to transmit or receive messages. These aids range from speech generating devices to communication books.

2.5.3 Remedial technologies

Remedial technologies target areas of neuropsychological functioning involved in learning and basic functioning. The goals of remedial technologies are to bolster specific cognitive capacities that are weak and to teach compensatory strategies. Remedial technology is used primarily with two groups of people: those who have suffered from a traumatic brain injury and those who have learning disabilities (Gaddes&Edgell, 1994). For people with brain injury, remediation typically targets the neuropsychological functions such as attention and concentration; memory; planning; monitoring one's work or behavior; and making adjustments based on feedback.

According to Gaddes & Edgel (1994) , remediation is used to help children and adults cope with learning disabilities. The technologies can be used to treat difficulties with concentration, problem solving, organization, identifying errors, and using feedback effectively are areas that can be treated with remedial technology. Remediation for this group of people is considered helpful but not curative. It is typically practiced by a neuropsychologist. Remediation for individuals with learning disabilities aims to boost a particular area of learning or adaptation, such as in academics or socialization. Although the intervention varies according to the disability and the individual's profile of strengths and weaknesses, the remediator, who can be the teacher, will make use of the person's stronger capacities to strengthen the weaker ones.

2.5.4 Diagnostic technologies

The diagnostic technologies, along with methods for displaying data, have propagated active examination in the evaluation of learning disability which endeavors to improve diagnostic precision and clarify the neurobiological root of learning disorders. Bigler et al.(1998)found outfor individuals with learning disability who utilize computerized tomography, the initial investigations attempted to reveal irregularities or abnormalities of brain morphology. The brain's structural imaging is magnetic resonance imaging, which allows greater specificity in

identifying brain abnormalities. The functional magnetic resonance imaging holds some promise in distinguishing anatomic/function differences in learning disabilities.

Diagnostic technologies like the Electrophysiological and metabolic imaging techniques offer methods by which human brain activity can be studied during cognitive processes. Computerized electrophysiological have also identified a number of brain irregularities in individuals with learning disabilities, though Bigler et al.(1998) argue that no consistent exemplars have emerged.

2.5.5 Barriers to the extent of ICT utilization in learning environment

Although the value of ICT in education cannot be understated, there are challenges and barriers experienced within the processes of adopting these technologies. In order to ensure realistic and holistic solutions for policy makers, the factors that inhibit the full usage of ICT should be identified and understood. According to Scheuermann & Pedro (2009), the barriers are generally divided into three categories: school level, teacher-level and system level:

- School-level barriers: This includes the absence or poor quality of ICT infrastructure (hardware and software), limited access to ICT equipment, lack of experience in ICT projects and poorly maintained computers. On the other hand, a school with high quality ICT resources that are inappropriately organized would also lead to non-optimization of the resources.
- Teacher-level barriers: These include lack of adequate ICT skills and inappropriate teacher training, which affects the motivation and confidence in using ICT.
- System-level barriers: This is the rigid structure of the traditional schooling system including the curriculum content.

2.6 Conceptual Framework

The conceptual framework is based on the aspects which are enabled by utilization of ICT within the school environment. These aspects, which are the independent variables in this study, are: access to information and knowledge; learning and teaching; communication and interaction, and; access to administrative procedures and services. It is the influence of these variables on the performance of children with learning disabilities that this study seeks to investigate. The performance is generally defined in terms of the academic scores.

2.6.1 Access to Information & knowledge

Convention on the Rights of People with Disabilities (CPRD) emphasizes that people with disabilities have a right to education without discrimination and on the basis of equal opportunity. This clearly implies that accessible information is vital for education and learning. The barriers presented by inaccessible information potentially impacts on 6.5 billion people with disabilities worldwide (WHO, 2005). Although limited access to information and knowledge impacts on all people, the consequences are more strongly felt by people with learning disabilities, who require information to be provided in accessible and more understandable formats. Access to ICT is no longer considered only a right and entitlement for people with learning disabilities, but that access to ICT is a vehicle towards the societal goals of a knowledge society and growing economy. The concept of accessibility has also extended far beyond just considering accessible web design, but now extends to all areas of daily life.

To ensure equal learning opportunities it is vital that children with learning disabilities in particular can find and access relevant information. Access to information about – as well as for – education is a mechanism that ensures the children with learning disabilities have more solutions to the learning problems that they encounter and this increases the learning opportunities. On the other hand, teachers enhance their teaching skills and knowledge through utilization of the internet services, which gives teachers wide range of information. The Digital Agenda (2010), which endorses the promotion of, take-up and use of the Internet in order to ensure inclusion in the digital society, namely through the extensive use of equipment and digital content and tools in education and learning, by enhancing digital literacy and skills and by improving accessibility for all especially for persons with disabilities.

2.6.2 Learning and Teaching

In relation to the key principles for building an Information Society, the WSIS (2003) recognizes that ICTs should be fostered at all levels of lifelong learning, taking into account the special needs of people with learning disabilities and other disadvantaged or vulnerable groups. According to Tokyo Declaration (2003), teachers act as a gateway to the Information Society, and their skills development and curriculum resources need increased support; this call for improvement in basic and advanced education in science and technology to ensure the availability of competitive ICT services in the future. In utilization of ICT, teachers are able to enhance their presentation of learning content to the children of learning disabilities. On the other hand, the children with learning disabilities are able to reduce errors in their classwork and also acquire new information, knowledge and skills.

2.6.3 Communication and Interaction

Use of accessible ICT enables an equitable learning space through enhancing communication with teachers and fellow students (peers without disabilities), providing access to learning materials and by establishing a venue to complete course work, assignments and examinations.

A concrete reference to accessibility for personal communication and interaction can be found in the CRPD (2006). The CRPD states that the learning of alternative script, augmentative and alternative modes of communication, as well as orientation and mobility skills should be fostered. In utilization of ICT in the education system, there is enhanced communication between the teachers and children with learning disabilities. This enhanced communication is also attributed to the increased motivation of children with learning disabilities.

2.6.4 Access to Educational Administrative Procedures and Services

The educational administrative services include proper keeping of student records and for learning is a continuous monitoring of the students' performance. Assessment of learning involves judging learner's performance against national standards. The assessment for learning is a valuable tool which helps to inform teachers on the development of the best way to promote and provide learning which meets individual learner's needs.

Students' results improve when ongoing academic and behavioral performance data inform instructional decisions. By regularly assessing students' progress in learning and behavior, teachers can identify which students need more help, students who are likely to make good

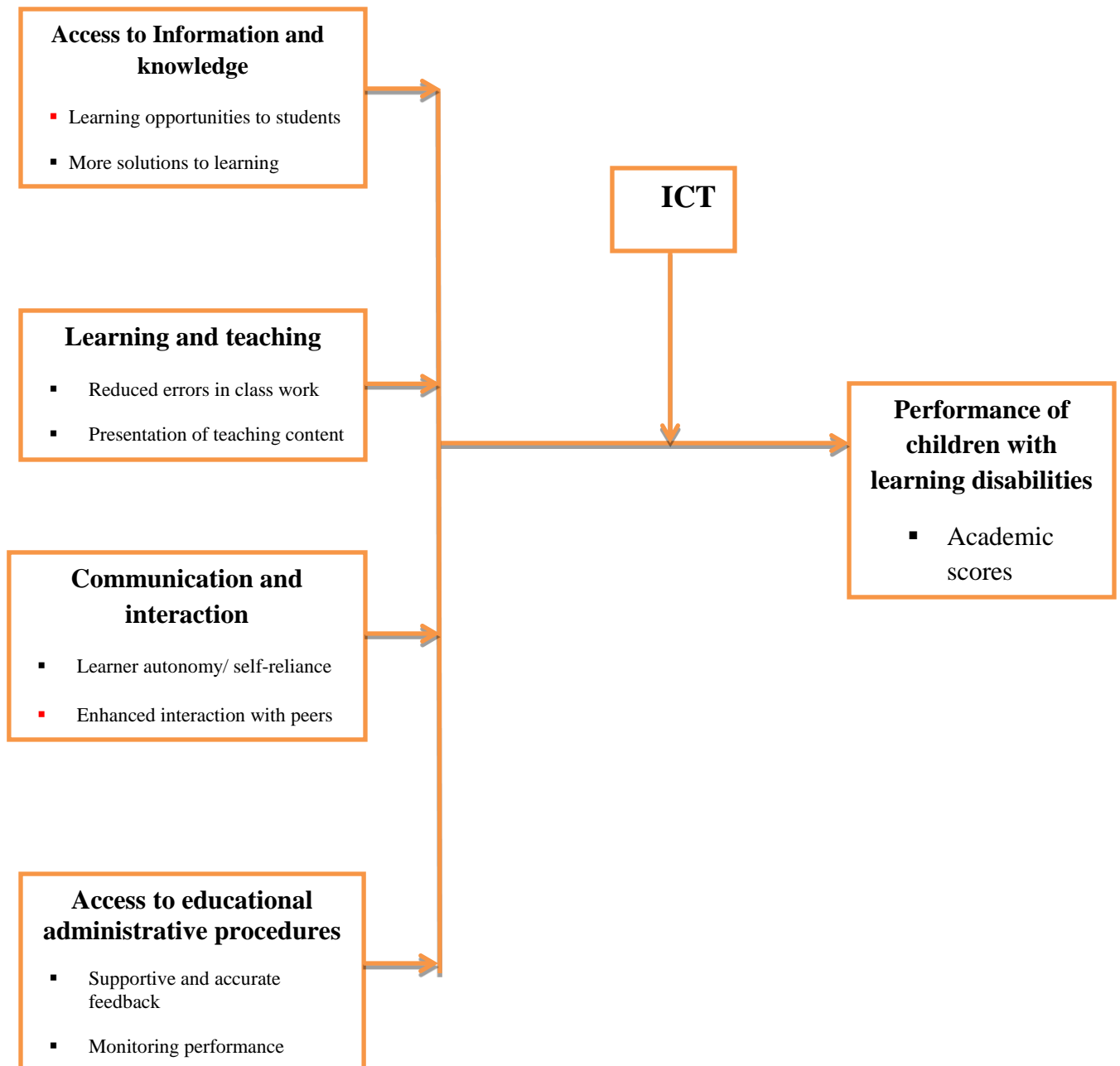
progress without extra help and which students need their learning accelerated. Timely and reliable assessments indicate which students are falling behind in critical skills or which students need their learning accelerated, as well as allow teachers to design instruction that responds to the learning needs.

2.6.5 Conceptual Framework Figure

Independent variables

Dependent variable

Figure 1: Conceptual Framework



CHAPTER THREE:

RESEARCH METHODOLOGY

3.0 Introduction

This section deals with the methodology used by the researcher in carrying out the study. The chapter entails the research design, target population, sample size and sampling procedure, research instruments, instruments validity, instrument reliability, data collection and data analysis techniques that the researcher used.

3.1 Research Design

The researcher used descriptive survey that entails examining populations by selecting samples so as to analyze and discover occurrences. The main purpose of this study was aimed at establishing the effect of ICT utilization on performance of children with learning disabilities in private primary schools Kenya. According to Donald and Pamela (1998), a descriptive study is concerned with finding out the what, where and how of a phenomenon.

The researcher obtained information that describes the existing phenomenon and this was achieved by requesting the respondents about their perceptions and opinions towards the effect of ICT utilization on the performance of children with learning disabilities.

The expectation was that the respondents were to fill the questionnaires, which were quantitative and qualitative in nature. The quantitative section was to enable the researcher get quantifiable responses with a view of inferring conclusions. On the other hand, the qualitative section was to enable collection of data which would form the basis of findings and conclusions of the study.

3.2 Target population

Borg and Gall (1989) say that target population refers to all members of a real or hypothetical set of people, events or objects to which the researcher wishes to generalize results of the research. The target population for the study was head teachers and teachers of the private primary schools in Nairobi County.

3.3 Sample size and sampling method

Sampling is the technique or procedure adopted by the researcher in selecting items that are a representative of the entire population (Kothari, 2004). A sample is a finite part of a statistical population whose properties are studied to gain information about the whole population. When dealing with people, it can be defined as a set of respondents selected from a larger population for the purpose of a survey. Orodho and Kombo, (2002) define sampling as the procedure where a researcher uses people, places or things to study. It is a process of selecting a number of individual or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group.

As suggested by Krejcie and Morgan (1970), to select the sample size for the study, the researcher took six private primary schools' head teachers and sixty teachers. The study sample size is supported by Mugenda and Mugenda (2008) who argues that 10% of the target population is representative and economical. All the head teachers in those schools were selected and ten teachers from each of the schools were selected. To sample from the schools, the researcher used the staff registers from the head teachers and applied simple random sampling to pick the selected teachers who were involved in the study. According to Orodho (2005) simple random sampling involves giving each and every item in the population an equal chance of inclusion in the sample.

3.4 Research instruments

The main instrument in the study was the questionnaire. The researcher collected data using questionnaires, which were specifically prepared for head teachers and teachers. Mugenda & Mugenda (1999) cites that the use of questionnaires is a popular method of data collection in education because of the relative cost effectiveness with which they are constructed and administered. The main purpose of the questionnaire was to gather perceptions and opinions of teachers in regard to the effect of ICT utilization on performance of children with learning disabilities. The questionnaire design was on the basis that teachers have the necessary expertise and have continuous interaction with these children that have learning disabilities.

The questionnaire had two sections. Section A sought to establish the profile of the respondents while Section B sought to determine the extent to which the objective of this study affect the performance of children with learning disability. The extent was rated using a likert scale of 1 to

5 where: 1 – no extent; 2- less extent; 3- moderate extent; 4- great extent and; 5 – very great extent. Section B also included an open ended question, which was meant for teachers to express their personal views.

3.5 Instrument validity

Mugenda & Mugenda (1999) notes that validity is the degree to which the results obtained from analysis of the data actually represent the phenomenon under study. Validity is the measurement of the extent to which a questionnaire measures what it claims to measure. This study used content validity. According to Borg and Gall (1989), Content validity is a measure of the degree to which data collected using a particular instrument represents a specific domain of indicators or content of a particular concept. The researcher arrived at content validity through the results and comments of the pilot study which was done in two private primary schools.

The pilot study was conducted to check if the questionnaire was unambiguous and whether it was well understood. The items that failed to measure the intended variables were either modified or discarded completely.

The schools that were used in pilot study were excluded from the main study.

3.6 Reliability of Instruments

The reliability of an instrument is tested in order to find out if it will bring out the required information (Seamus & Hegarty, 1982). A pilot study of two schools was carried to test the reliability of the questionnaire. The aim of the pilot study was to eliminate errors and hence increase the instrument's reliability.

3.7 Data Collection Procedure

The researcher sought for permission from the head teachers in order to carry out the study in the selected private primary schools. A formal letter was presented to the teachers with the aim of getting them to fill the questionnaire. The researcher then administered the valid instruments to the respondents from the selected schools in the Nairobi County. The questionnaires were then picked at the agreed timelines in order to perform data analysis.

3.8 Data Analysis Technique

According to Kombo and Tromp (2006), data analysis involves examining what has been collected in a survey or experiments and making deductions and inferences. The questionnaire contained both qualitative and quantitative data.

Using descriptive analysis coded data was entered into the computer using statistical package for social sciences (SPSS) where it was developed into a data base and analyzed. Findings were presented in tables, and inferential statistics such as the regression models. Both quantitative and qualitative data was generated. Descriptive statistics was used to analyze quantitative data by using mean scores, frequencies and percentages presented in tables, charts and graphs. The qualitative data from open ended questions was thematically presented in narrative form and tables.

3.8.1 Regression Analysis

A multivariate regression model was applied to determine the relative importance of each of the variables with respect to the effect of ICT utilization on performance of children with learning disabilities in private primary schools

The regression model was as follows:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where:

y = Performance of Children with Learning Disabilities

β_0 = Constant Term

β_1 = Beta coefficients

X_1 = Access to Information & knowledge

X_2 = Learning and Teaching

X_3 = Communication and interaction

X_4 = Access to Educational Administrative Procedures and services

ϵ = Constant error

CHAPTER FOUR:

DATA ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents an analysis and interpretation of the collected data with the aim of assessing the effect of ICT utilization on performance of children with learning disabilities in private primary schools. The chapter presents the findings of the study and starts with the profiles of the selected teachers then followed by the descriptive analysis from the data collected.

The researcher developed a questionnaire for private primary teachers so as to enable collection of data for the study. The questionnaires were first administered to eleven teachers selected from two schools that were earmarked for piloting purposes. The questionnaire was then given to fifty eight other teachers in private primary schools in the Nairobi County. The teachers were selected using purposive sampling for piloting purposes so as to establish the validity of the questionnaire as a research instrument. Gall et al (1996) describes purposive sampling as the practice of selecting cases that are likely to be information rich with respect to the purpose of the study.

The aim of the pilot study included the reliability test and mainly involved check for internal consistency. The cronbach's alpha of the instrument was found to be 0.803, which is within the recommendation of Nunnally (1978) who recommends that instruments used in basic research should have reliability of about 0.7 or better.

4.1 Descriptive statistics

The research instrument used in the collection contained two sections. Analysis of these sections is as follows:

4.1.1 Response rate

Table 1: Response Rate

	Head teachers		Teachers	
	Frequency	% response rate	Frequency	% response rate
Non response	1	17%	7	12%
Actual respondents	5	83%	53	88%
Targeted respondents	6	100%	60	100%

In the table above the response rate for teachers were 88.33% and the response rate for head teachers was 83.33%. This was found to be satisfactory for analysis to draw a valid conclusion. This was also consistent with widely held rule of thumb that a sample of 30 respondents and above is adequate for application of statistical tools proposed for this study. This complied with Mugenda and Mugenda (2003) who suggested that for generalization a response rate of 50% is adequate for analysis and reporting, 60% is good and a response rate of 70% and over is excellent. This commendable response rate was actualized after the researcher made personalized calls to explain the importance of participating in the study and visited the respondents to fill in the interview guide.

4.1.2 Profile of respondents

Section A of the questionnaire was designed to assess some of the demographic characteristics of the respondents. The characteristics assessed include:

Gender

Table 2: Gender

	Head teachers		Teachers	
	Frequency	% response rate	Frequency	% response rate
Female	2	40%	24	45%
Male	3	60%	29	55%
Total	5	100%	53	100%

This shows that majority of the head teachers were male at 60% while female were 40%. The study further revealed that majority of the teachers were male 55% while female were just 45 %.

Teaching Experience

Table 3: Teaching Experience

	Head teachers		Teachers	
	Frequency	% response rate	Frequency	% response rate
Below 1 year	0	0%	2	4%
2-5 years	0	0%	7	13%
6-10 years	1	20%	21	40%
11-15 years	1	20%	12	22%
16-20 years	3	60%	8	15%
21 years and above	0	0%	3	6%
Total	5	100%	53	100%

The head teachers had experiences as follows, none had an experience of below five years, those who had experience of 6-10 years were 20%, 11-15 years were 20% and 16-20 years were 60%. The results of the findings further indicate that none of the head teachers had an experience of above 21 years and above. This shows that majority of the head teachers at 60% had an experience of 16-20 years.

The teachers had different teaching experience. The results revealed that percentages of respondents with teaching experiences of below 1 year, 2-5 years, 6-10 years, 11-15 years, 16-20 years and above 21 years were 4%, 13%, 40%, 22%, 15%, and 6% respectively. This shows that the majority of the respondents had teaching experience of between 6-10 years.

Academic and Professional Qualification

Table 4: Academic and Professional Qualification

	Head teachers		Teachers	
	Frequency	% response rate	Frequency	% response rate
P.T.E	0	0%	20	38%
Diploma in education	1	20%	21	40%,
B.Ed.	3	60%	6	11%
B.A/B.Sc	0%	0.00%	2	4%
PGDE	1	20%	4	8%
Total	5	100%	53	100%

The study sought to determine the academic and professional qualification of the head teachers. The study established that there was none of the head teachers with B.A/B.Sc. or MA/MSC. The study found that majority of the head teachers held B.Ed. as represented by 60%. Those head teachers with Diploma in education and PGDE were represented by 20% each. From the analysis of the results it shows that majority of the head teachers are well educated and thus ought to understand the use of ICT for children with learning disabilities.

The study also sought to determine the academic and professional qualification of the teachers. The study found out that teachers who held P.T.E, Diploma, B.Ed., B.A/B.Sc. and PGDE were 38%, 40%, 11%, 4% and 8% respectively. This indicate that majority of the teachers at 40% held Diploma in education while none of the teachers held EAACE, K.C.E, and MA/MSC

4.2 Analysis of the respondents opinions

The opinions of the respondents on the effect of ICT utilization on the four variables: access to information; communication and interaction; teaching and learning, and; access to administrative procedures: were analyzed as follows:

4.2.1 Access to Information & knowledge

The measurement scale consisted of four indicators that reflect access to information and knowledge. The respondents were requested to indicate the extent to which they agree with the indicators. The table below shows the descriptive statistics for access to information and knowledge.

Table 5: Access to Information & knowledge

	Mean	Std Dev.
Children with learning disabilities who utilize ICT support have enhanced access to relevant information for and about education	4.880	0.192
Children with learning disabilities who use ICT get more solutions to the learning problems they encountered	3.960	0.230
Children with learning disabilities who utilize ICT enhance their learning opportunities	3.640	0.223
Utilization of ICT like internet has ensured that teachers have access to wide range of information that enhance their teaching skills, knowledge and experiences	4.580	0.259

The study established that teachers agreed to a very great extent that children with learning disabilities who utilize ICT support have enhanced access to relevant information for and about education and that utilization of ICT like internet has ensured that teachers have access to wide range of information that enhance their teaching skills, knowledge and experiences. Each of the factors had a mean score of 4.880 and 4.580 respectively. The respondents agreed to a great extent that Children with learning disabilities who Use ICT get more solutions to the learning

problems they encountered and children with learning disabilities by utilizing ICT enhances their learning opportunities, each had a mean score of 3.960 and 3.640 respectively. The standard deviations are less than one thus indicating that the respondents' opinions were almost the same. The study results deduces that utilization of ICT has enhanced access to information & knowledge thus affecting performance of children with learning disabilities in private primary school in Nairobi county.

4.2.2 Learning and Teaching

The measurement scale consisted of seven indicators that reflect learning and teaching. The respondents were requested to indicate the extent to which they agree with the indicators. The table below shows the descriptive statistics for learning and teaching.

Table 6: Learning and Teaching

	Mean	Std Dev.
ICT is utilized at all levels of learning and teaching, taking into account the special needs of our students with learning disabilities	4.440	0.110
Teachers utilize ICT to develop their teaching skills	4.660	0.165
Teachers present information by using ICT to children with learning disabilities to enhance their performance	2.880	0.208
Children with learning disabilities have reduced errors in school work due to utilization of ICT	3.600	0.232
Children with learning disabilities who utilize ICT are able to acquire new information, knowledge and skills	4.560	0.152
Children with learning disabilities who utilize ICT are motivated to learn	3.400	0.240
Children with learning disabilities who are supported with ICT when learning are more attentive in class -	4.140	0.110

The study results indicated that the respondents to a very great extent agreed that Teachers utilize ICT to develop their skills, and children with learning disabilities by use of ICT help them to acquire new information, knowledge and skills. Each had a mean score of 4.660 and 4.560 respectively. The respondents further agreed to a great extent that Children with learning disabilities who are supported with ICT when learning are more attentive in class and that utilization of ICT has led to reduced errors in school work for children with learning disabilities. Each of the factors had a mean score of 4.140 and 3.600 respectively. The respondents to moderate extent agreed that children with learning disabilities had their motivation enhanced by use of ICT and in order to enhance their performance, teachers present information by using ICT to children with learning disabilities. Each of the factors had a mean score of 3.400 and 2.880 respectively. The standard deviations of less than one imply that there was little disparity in the respondents' opinions. The study results therefore infers that utilization of ICT has enhanced learning and teaching thus affecting performance of children with learning disabilities in private primary school in Nairobi county.

4.2.3 Communication and Interaction

The measurement scale consisted of five indicators that reflect communication and interaction. The respondents were therefore requested to indicate the extent to which they agree with the indicators. The table below shows the descriptive statistics for access to communication and interaction.

Table 7: Communication and Interaction

	Mean	Std Dev.
Utilization of ICT has enhanced how teachers communicate with the children with learning disabilities	4.180	0.217
Children with learning disabilities communicate better with their teachers due to utilization of ICT	3.840	0.202
Children with learning disabilities communicate more with their peers	2.880	0.233

when they utilize ICT		
The autonomy/ independence/self-reliance of children with learning disabilities is enhanced by utilization of ICT	3.760	0.259
Through utilization of ICT, children with learning disabilities participate more actively in class	2.720	0.226

The study established that the respondents to great extent agreed that Utilization of ICT has enhanced: how teachers communicate with children with learning disabilities; how children with learning disabilities communicate with their teachers and; the autonomy/ independence/self-reliance of children with learning disabilities. Each one of these items had a mean score of 4.180, 3.840 and 3.760 respectively. The respondents to a moderate extent agreed that utilization of ICT has enhanced how children with learning disabilities communicate with their peers and that children with learning disabilities participate more actively in class when they utilize ICT. Each of these items had a mean score of 2.880 and 2.720 respectively. The standard deviations of between 0.202 and 0.259 imply that there was little disparity in the respondents' opinions.

The study results therefore infers that ICT support personal communication and interaction to enhance the performance of children with learning disabilities in Kenya.

4.2.4 Access to Educational Administrative Procedures

The measurement scale consisted of five indicators that reflect access to educational and administrative procedures. The respondents were requested to indicate the extent to which they agree with the indicators. The table below shows the descriptive statistics for access to educational and administrative procedures.

Table 8: Access to Educational Administrative Procedures

	Mean	Std Dev.
Utilization of ICT enhances access to educational and administrative procedures	3.990	0.543
Utilization of ICT has it made easy to process students marks	4.040	0.219
Utilization of ICT has ensured proper keeping of students records	4.220	0.211
Monitoring the performance of children with learning disabilities has been enhanced by utilization of ICT	2.630	0.232
Utilization of ICT gives teachers feedback on how to improve performance for children with learning disabilities	2.460	0.152

On use of ICT for access to educational administrative procedures by children with learning disabilities the respondents agreed to a great extent that Utilization of ICT has: ensured proper keeping of students' records; made it easy to process students' marks and; has enhanced access to educational and administrative procedures and services. Each one of these items had a mean score of 4.220, 4.040 and 3.990 respectively. The respondents to a moderate extent and mean score of 2.630 agreed that utilization of ICT has enhanced monitoring the performance of children with learning disabilities.

From the study, findings deduced were that ICT support access to educational and administrative procedures to enhance the performance of children with learning disabilities

4.3 Analysis

The researcher carried out data analysis in order to gain a better understanding of the collected data. The analysis done included correlation, regression and analysis of variance:

4.3.1 Correlation Analysis

Correlation analysis is one of the most widely used and reported statistical methods in summarizing research data (Taylor, 1990). The analysis determines the correlation co-efficient, which indicates whether a relationship exists between two different variables. It indicates how significant or how strong the association is between the variables. The correlation co-efficient or the Pearson's correlation requires both a magnitude and a direction of either positive or negative. A correlation coefficient of zero indicates that no association exists between the measured variables. The closer the coefficient approaches +1 or -1, regardless of the direction, the stronger is the existing association thus indicating a more linear relationship between the two variables.

According to the table below, the correlation co-efficient are between 0.412 and 0.760 therefore indicating that association exists between the variables measured in this study. In addition, the values are positive indicating that as one of the variable increases or decreases, the second variable also increase or decreases in value. Thus there is a positive correlation.

Table 9: Pearson Correlation

	access to information & knowledge	learning and teaching	communication and interaction	access to educational administrative procedures
access to information & knowledge	1.000			
learning and teaching	.760	1.000		
communication and interaction	.746	.434	1.000	
access to educational administrative procedures and services	.634	.412	.469	1.000

4.3.2 Analysis of variance (ANOVA)

ANOVA test is used to determine the impact independent variables have on the dependent variable in a regression analysis. The probability value (p-value) of a statistical hypothesis test is the probability of getting a value of the test statistic as extreme as or more extreme than that observed by chance alone, if the null hypothesis H_0 is true. The p-value is compared with the actual significance level of the test and, if it is smaller, the result is significant. The smaller it is the more convincing is the rejection of the null hypothesis. ANOVA findings in table 4.11 shows that there is correlation between the predictors' variables (access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services) and response variable (Performance of Children with Learning Disabilities) since P- value of 0.00 is less than 0.05

ANOVA

Table 10: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	135.830	4	33.958	102.784	.000(a)
	Residual	29.404	89	.330		
	Total	165.234	93			

Predictors: (Constant), (access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services)

Dependent Variable: Performance of Children with Learning Disabilities.

The above summary of the basic logic of ANOVA is the discussion of the purpose and analysis of the variance. The purpose of the analysis of the variance is to test differences in means (for groups or variables) for statistical significance. The accomplishment is through analyzing the variance, which is by partitioning the total variance into the component that is due to true random error and the components that are due to differences between means. The ANOVA analysis is intended to investigate whether the variation in the independent variables explain the observed variance in the outcome, which in this study is the performance of children with learning disabilities.

The ANOVA results indicate that the independent variables significantly ($F=102.784$, $p=0.001$) explain the variance in the performance of children with learning disabilities. In this context, as have been presented in the table above, the dependent variable is the level of performance whiles the independent or the predictors are: access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services.

4.3.3 Regression coefficients

The regression analysis as a statistic technique is used to investigate the relationships between a dependent variable and the independent variables. The most common analysis are simple and multiple linear regressions. Multiple linear regression was used in this study in order to investigate the relationships between the child's performance and the four independent variables.

Regression Co-efficients

Regression coefficients are used to evaluate the strength of the relationship between the independent and dependent variables. The Beta coefficients as indicated by Chau & Hu (2002) are that they can be used to determine the derived importance of the dependent variable against the independent variables. The constant factor is where the regression line intercepts the y-axis while the error represents the expected random error that will occur. The error is the value of what the dependent variable will assume when all the independent variables have a zero value. The table below shows the values of the beta coefficients:

Table 11: Regression coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.497	.167		2.980	.004
Access to Information & knowledge	.439	.212	.933	4.431	.000
Learning and Teaching	.685	.142	.826	5.526	.000
Communication and interaction	.476	.126	.793	5.895	.000
Access to	.306	.073	.321	4.174	.000

Educational
Administrative
Procedures

Table1: Regression coefficients

A multivariate regression model was applied to determine the relative importance of each of the four variables with respect to the effect of ICT utilization on performance of children with learning disabilities

The established multiple linear regression equation becomes:

$$Y = 0.497 + 0.439X_1 + 0.685X_2 + .476X_3 + 0.306X_4 + 0.1667$$

Where

Constant = 0.497, shows that if access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services were all rated as zero, performance of children with learning disabilities rating would be 0.497

$X_1 = 0.439$, shows that one unit change in access to information & knowledge due to ICT utilization, results in 0.439 units increase in performance of children with learning disabilities

$X_2 = 0.685$, shows that one unit change in learning and teaching due to ICT utilization, results in 0.685units increase in performance of children with learning disabilities

$X_3 = .476$, shows that one unit change in communication and interaction due to ICT utilization, results in .476units increase in performance of children with learning disabilities

$X_4 = 0.306$, shows that one unit change in access to educational administrative procedures and services due to ICT utilization, results in 0.306 units increase performance of children with learning disabilities

Model Summary

The Table below shows the R-squared (R^2) which is the multiple correlation that represents the percentage variance in the dependent variable as explained collectively by all the independent variables. The value of R^2 in the model indicates a measure of the predictive ability of the model.

The F value is used to test the significance of the regression model and it is a function of the R^2 .

Table 12: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
				R Square Change	F Change	df1	df2	Sig. Change	F
.907	.822	.814	.57479	.822	102.78	4	89	.000	
(a)					4				

Predictors: (Constant), access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services

Strength of the model

Analysis in table 2 shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R^2 equals 0.822, that is, access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and services explain 82.2 percent of the effect of ICT utilization on performance of children with learning disabilities in private primary schools leaving only 17.8 percent as unexplained.

Adjusted R^2 is called the coefficient of determination and tells us how Performance of children with learning disabilities varied in relation to access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures

and service. From above, the value of adjusted R^2 is 0.814. This implies that, at a confidence level of 95%, there was a variation of 81.4% in performance of children with learning disabilities performance against the independent variables: access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and service.

CHAPTER FIVE

DISCUSSION CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents the summary of the data findings on an assessment of the effect of ICT utilization on performance of children with learning disabilities in private primary schools in Kenya, the conclusions and recommendations drawn there to. The chapter is hence structured into summary of findings, conclusions, recommendations and area for further research.

5.1 Summary of findings

The study results deduced that utilization of ICT has enhanced access to information & knowledge thus affecting performance of children with learning disabilities in private primary school in Nairobi County. The results further inferred that utilization of ICT has enhanced learning and teaching thus affecting performance of children with learning disabilities in private primary school in Nairobi County. In addition, the study results showed that ICT supports communication and interaction to enhance the performance of children with learning disabilities in Kenya.

A multivariate regression model was applied to determine the relative importance of each of the four variables with respect to the effect of ICT utilization on performance of children with learning disabilities. The established multiple linear regression equation becomes: $Y = 0.497 + 0.439X_1 + 0.685X_2 + 0.476X_3 + 0.306X_4$

At a confidence level of 95%, there was a variation of 81.4% in performance of children with learning disabilities performance that varied with access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and service.

5.2 Conclusion

The regression model used in this study indicated that 81% of the performance of children with learning disabilities was to a great extent due to utilization of ICT in the four variables identified: access to information & knowledge, learning and teaching, communication and interaction and access to educational administrative procedures and service. Based on this model, the study

established that utilization of ICT in teaching and learning, communication & interaction and access to information had a great influence on the performance of these children with learning disabilities. The use of ICT in administrative procedures including monitoring did not have a significant effect on the performance of children with children with learning disabilities. In a school context, teachers should understand that use of technology in monitoring performance can assist in identifying specific learning problems that children encounter. This would therefore lead to specific solutions that would increase the child's learning, improve teaching and by extension enhance communication and interaction in schools.

5.3 Limitations

The study mainly gathered data from the teachers. As much as more pertinent information would have been gathered from the students, it was practical to do so due to the existing barriers. First, authority been granted from either the teachers or parents to interview school going children of ages between 5-13 years. Second, the time it would have taken the researcher to explain each question to these children with learning disabilities. Third, the children's innate nature where there is minimal co-operation, lacks interest in the subject matter and low concentration levels.

5.4 Recommendation

The study recommends that private primary schools and government should put up mechanism and facilities that can enhance more utilization of ICT as it had great effect on performance of children with learning disabilities.

5.5 Recommendations for further study

First, due to the limited time threshold and inadequate funds to facilitate the research it would be interesting for future researchers to use other instruments to measure the effect of ICT utilization on performance of children with learning disabilities or to employ several instruments at the same time and compare the results.

Second, this project examined the effect of ICT utilization on performance of children with learning disabilities on pupils' performance in private primary schools. It would inform the research community to gather data from other schools like public schools to confirm the study results.

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APPENDIX I: Introductory Letter

Dear respondent,

I am a post-graduate student at the University of Nairobi pursuing a Master of Science degree in Information System.

My study is based on the effect of ICT utilization on performance for children with learning disabilities in schools.

I kindly therefore request you to fill the attached questionnaire in-order for me to carry out the study.

The information provided will be treated with strict confidentiality and it will only be used for the intended purpose of this study. As such, the respondents should not write their names or any other personal identification on the questionnaire.

Your cooperation in this regard will be highly appreciated.

Yours sincerely,

Addy N. Waichigo

Appendix II: Teachers Questionnaire

Section A: Background Information

1. Gender : Male [] Female []

2. Kindly indicate your highest academic and professional qualification

EAACE [] K.C.E [] KCSE [] P.T.E []

Diploma in education [] B.Ed [] M.Ed [] PGDE []

B.A/Bsc [] MA/MSc []

If any other specify

5. Kindly indicate your teaching experience

Below 1 year []

2-5 years []

6-10 years []

11-15 years []

16-20 years []

21 years and above []

SECTION B:

Indicate how you rate the contribution of the listed items to the performance of the children with learning disabilities in your school.

A. Access to Information & knowledge

To what extent do you agree with the following statements on how utilization of ICT has enhanced access to information & knowledge thus affecting performance of children with learning disabilities in your school?

Use a scale of 1 to 5 where:

5 is to a very great extent, 4 to great extent, 3 to moderate extent, 2 to less extent and 1 is to no extent.

	5	4	3	2	1
Children with learning disabilities who utilize ICT support have enhanced access to relevant information for and about education					
Children with learning disabilities who Use ICT get more solutions to the learning problems they encountered					
Children with learning disabilities who utilize ICT enhance their learning opportunities					
Utilization of ICT like internet has ensured that teachers have access to wide range of information that enhance their teaching skills, knowledge and experiences					

According to your own opinion what are the effects of ICT in supporting personal access to information and knowledge in enhancing the performance of children with learning disabilities in schools?

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B. Learning and Teaching

To what extent do you agree with the following statement on how utilization of ICT has enhanced learning and teaching thus affecting performance of children with learning disabilities in your school?

Use a scale of 1 to 5 where

5 is to a very great extent, 4 to great extent, 3 to moderate extent, 2 to less extent and 1 is to no extent.

	5	4	3	2	1
ICT is utilized at all levels of learning and teaching, taking into account the special needs of our students with learning disabilities					
Teachers utilize ICT to develop their teaching skills					
Teachers present information by using ICT to children with learning disabilities to enhance their performance					
Children with learning disabilities have reduced errors in school work due to utilization of ICT					
Children with learning disabilities who utilize ICT are able to acquire new information, knowledge and skills					
Children with learning disabilities who utilize ICT are motivated to learn					
Children with learning disabilities who are supported with ICT when learning are more attentive in class -					

According to your own opinion, how does the use of ICT to support learning and teaching enhance the performance of children with learning disabilities in schools?

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.....

.....

C. Communication and Interaction

To what extent do you agree with the following statement on how utilization of ICT has enhanced communication and interaction? It is postulated that enhanced communication and interaction affects performance of children with learning disabilities in schools

Use a scale of 1 to 5 where

5 is to a very great extent, 4 to great extent, 3 to moderate extent, 2 to less extent and 1 is to no extent.

	5	4	3	2	1
Utilization of ICT has enhanced how teachers communicate with the children with learning disabilities					
Children with learning disabilities communicate better with their teachers due to utilization of ICT					
Children with learning disabilities communicate more with their peers when they utilize ICT					
The autonomy/ independence/self-reliance of children with learning disabilities is enhanced by utilization of ICT					
Through utilization of ICT, children with learning disabilities participate more actively in class					

8: According to your own opinion what are the effects of ICT utilization in supporting communication and interaction to enhance the performance of children with learning disabilities in schools?

.....

D. Access to Educational Administrative Procedures

To what extent do you agree with the following statement on how utilization of ICT has enhanced access to educational administrative procedures thus affecting performance of children with learning disabilities in your school?

Use a scale of 1 to 5 where

5 is to a very great extent, 4 to great extent, 3 to moderate extent, 2 to less extent and 1 is to no extent.

	5	4	3	2	1
Utilization of ICT enhances access to educational and administrative procedures					
Utilization of ICT has it made easy to process students marks					
Utilization of ICT has ensured proper keeping of students records					
Monitoring the performance of children with learning disabilities has been enhanced by utilization of ICT					
Utilization of ICT gives teachers feedback on how to improve performance for children with learning disabilities					

10: According to your own opinion what are the effects of ICT in supporting access to educational administrative procedures to enhance the performance of children with learning disabilities in schools?

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