TEACHER COMPETENCY AS A DETERMINANT OF MATHEMATICS ACHIEVEMENT AMONG CLASS SIX LEARNERS WITH DYSCALCULIA IN KIRITIRI DIVISION, MBEERE SOUTH SUB COUNTY, KENYA

BY

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APRIL, 2023

DECLARATION

Declaration by the candidate:

I confirm that this research project is my original work and has not been presented in any other university/institution for certification. The project has been complemented by referenced works duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other works- including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

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DEDICATION

This work is dedicated to my daughter Vanessa Megan, my parents Mr. Amos Njiru Mwangarie and mum ;Hon. Ann lily ,My siblings, my nephew Brian Adams and my niece Quinter Annabel.

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LIST OF ABBREVIATIONS AND ACRONYMS

EBD	-Emotional and Behavioral Disorder.
EFA	-Education for All
FPE	-Free Primary Education
IEP	-Individualized Education Program
IGQ	-Interview Guide for QASOs
KCPE	-Kenya Certificate of Primary Education
KCSE	-Kenya Certificate of Secondary Education
KISE	-Kenya Institute of Special Education
LD	-Learning Disability
MKO	-More Knowledgeable Others
NACOSTI	-National Commission for Science, Technology and Innovation
QASO	-Quality Assurance and Standards Officer
ROK	-Republic of Kenya.
SCDE	-Sub-County Director of Education.
SNE	-Special Needs Education
TSC	-Teachers Service Commission
UNESCO	-United Nations Educational Scientific and Cultural Organization
ZPD	-Zone of Proximal Development

ABSTRACT

Education is one of the fundamental factors that enriches people's understanding of themselves and the world around them. Education is viewed globally as an ingredient of developmental process from both local and international perspective as an instrument for reducing poverty, gender inequality and discrimination owing to any disability form. Previous studies have noted that 10 children in every class of 40 pupils do not acquire mathematical numeracy in the sub-county. Further, among these pupils, those in class six achieved between 15% -18% in Mathematics subject. In this regard, it is expected that for inclusive education; teacher competency is considered a key determinant for mathematics achievement among class six learners with dyscalculia in Kiritiri division, Mbeere South Sub-County, Embu County. The purpose of this study was to establish whether teacher qualification, teacher's ability to use locally available materials, teacher's classroom management skills and teacher's instructional delivery determines mathematics achievement among class six learners with dyscalculia. The study adopted a mixed method research adopting a descriptive survey design. The research was guided by the social developmental theory. The target population consisted of 378 pupils, 97 teachers from 14 primary schools and 1 QASO officer, giving a total of 476. Simple random sampling technique was used to select a sample of 38 pupils, 30 teachers, whereas purposive sampling was used to select the QASO officer. The main tools of data collection were: questionnaires and interviews. Piloting was done in one of the schools in the study area, which was omitted in the final study. Quantitative data realized from questionnaires was tallied, coded and analyzed descriptively (means, frequencies and percentages), with the aid of SPSS software, version 26. The study findings were presented tables and diagrams. Qualitative data from the interview was edited, transcribed, coded and analyzed thematically. The overall study findings showed that 60% of the teachers largely agreed that teacher competency contributed to mathematics achievement among class six pupils with dyscalculia. The study, recommended that, for greater mathematics performance among learners, the use of locally available resourced should be emphasized and teachers be encouraged to continuously enroll for in-service training courses to adequately learn novel approaches, skills and methods to better teach mathematics among learners with dyscalculia.

CHAPTER ONE

INTRODUCTION

1.1. Introduction

This chapter gives the description of; Background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitations and delimitations of the study, assumptions of the study, theoretical framework, conceptual framework and operational definition of terms.

1.2. Background of the Study

Education in every sense is one of the fundamental factors of development as it enriches people's understanding of themselves and the world around them (UNESCO, 1994). Education is thus viewed globally as a vital ingredient of the developmental process from both local and international perspective as a powerful instrument for reducing poverty, gender inequality and for laying foundation for sustainable economic growth (ROK, 2005). In this regard, it is hoped that for inclusive education, teacher competency determines Mathematics performance by pupils with dyscalculia in Kiritiri division, Mbeere South Sub-County. Dyscalculia is neurological difficulty in processing information that severely limits a person's ability to calculate given arithmetic (Fretche & Janzen, 2008). In such a scenario, the brain does not process, understand and use any Mathematical information making an individual pupil develop mathematics learning disability. This is noted by primary school teachers and parents whose children fail to acquire basic numeracy skills at lower primary level (Osman, 2001). In a population of 2.6 million in USA in 2011, in every 8 learners, one was diagnosed with Mathematics

learning disability and received remedial education. 25% of students with learning disabilities in Mathematics in the same year in USA dropped out of high school and only 61% of the enrolment completed high school and received a regular diploma (US National Centre for Education Statistics, 2011). Further, according to CIT, dyscalculia affects rural population at 1.57% and 1.49% for urban pupils. Further, prevalence estimates provided by previous empirical studies give a range of between 1.3% and 10.3%, with a mean estimate is about 5–6% among populations (Devine et al., 2013; Keong et al., 2016).

According to a study conducted in Namibia, most schools in the country had an acute shortage of SNE teachers to offer Mathematics remedial classes in 2011. This accounted for inefficient curriculum delivery and follow-up that resulted to poor performance in Mathematics in the year (Aro & Timo, 2011). Less than one in every three children passed Swahili test by 32% and 15% in numeracy according to a study conducted in Kenya by UWEZO in 2011-2012. While Kenya appreciated inclusive education and embraced EFA goals according to Dakar Framework of Action (2000), the main challenge facing its implementation has been ineffective teacher preparation to manage pupils with learning disabilities and inadequate curriculum support materials (UWEZO, 2012). In addition, Kenyan Government has introduced a program called Strengthening Mathematics and Science Education (SMASE) to address learning needs for learners with dyscalculia (Yusta, Muthee & Karugu, 2015). In Mbeere South Sub-County, there are 1512 primary school pupils who have been assessed and were found to be experiencing learning disabilities in Mathematics (SCDE Mbeere South, 2012).

1.3. Statement of the Problem

In response to UNESCO (1994) report and EFA protocol of Dakar Framework for Action 2000, Kenya government embraced inclusive education to cater for persons with learning disabilities. Therefore, an ideal scenario for inclusive learning is for all learners with or without dyscalculia to perform all subjects with equal energy and perceptions. This is the case with most schools in Embu County. However, in Mbeere South Sub-County of Embu County, the number of primary school children experiencing dyscalculia as confirmed by the baseline survey revealed that 10 children in every public school class of 40 pupils had not acquired the basic numeracy skills (SCDE Mbeere South, 2012). The report further indicated that most pupils in class six achieved between 15 % to 18% in Mathematics in Mbeere South schools. This high number of low achievers in Mathematics has been the cause of dismal overall performance position 5/5 by the division perennially, when it was ranked with others in the Sub- County. It was however noted on the same report that teacher competency influenced the variation of mathematics achievement by dyscalculia pupil. Failure to arrest this scenario will facilitate distraction of the achievement of the government's FPE expectations. This in turn, would also subsequently place the division into a precarious bargaining position in terms of sharing the national resources and specifically economic development, considering that Mathematics is an industrial subject, hence the reason to establish whether teacher competency among other factors determines Mathematics achievement among class six learners with dyscalculia. Class six that lies at the middle of the upper primary was the one most affected and thus chosen as the focus of the current study.

1.3.1. Purpose of the Study

The purpose of this study was to establish how teacher's qualification, ability to use locally available materials, classroom management ability and instructional delivery, determined Mathematics achievement among class six learners with dyscalculia in Kiritiri division, Mbeere South Sub-County, Kenya.

1.3.2. Objectives of the Study

The objectives of this study were to;

i. To examine the influence of the teacher qualifications on Mathematics achievement of class six pupils with dyscalculia.
ii. To assess the influence of teacher's use of locally available materials Mathematics achievement for class six pupils with dyscalculia.
iii. To evaluate how teacher's classroom management skills determine Mathematics achievement of class six pupils with dyscalculia.
iv. To assess the influence of teacher's instructional delivery on Mathematics achievement of class six pupils with dyscalculia.

1.3.3. Research Questions

The following research questions guided the study;

i. How does teacher's qualification influence Mathematics achievement of class six pupils with dyscalculia?
ii. How does teacher's use of locally available materials influence Mathematics achievement of class six pupils with dyscalculia?

iii. How does teacher's class management skill determine Mathematics achievement of class six pupils with dyscalculia?

iv. How does teacher's instructional delivery influence achievement of class six pupils with dyscalculia?

1.4. Significance of the Study

The study findings may be an eye opener to awareness creation on causes of dismal performance in Mathematics by class six learners with dyscalculia in Kiritiri division, Mbeere South sub-county and offered suggestions on possible interventions mechanisms to improve their performance. The study may also be used to interrogate the influence of the teacher, teaching/ learning resources and this may provide improvements on the SNE teacher training and capacity development. It also may also form the baseline for future researchers and a reference by education policy formulators' .It may also enhance affirmative action by allowing inclusive learning.

1.5. Limitation and Delimitation

1.5.1. Limitations of the Study

Data was collected from class six teachers and pupils in public primary schools in Kiritiri division, of Mbeere South Sub- County so as to be all inclusive and avoid any bias during data collection. Data collection methods included the use of questionnaires and interviews to get both quantitative and qualitative data for easy and quick interpretation. Most pupils had various levels of learning disabilities and disability level varied from pupil to pupil thus displaying different behavior of dyscalculia. The findings were only to be appropriate in Kiritiri division, Mbeere South Sub- County.

1.5.2. Delimitations

To overcome, the delimitation, all respondents were assured of confidentiality and that the data collection would only be used for the sole purpose of answering the research questions. Further, the learners with diverse learning challenges were assisted by interpreting the interview questions in Kiswahili and some in mother tongue. The head teachers was also consulted.

The study was to determine the influence of teacher's qualifications, teacher's use of locally available materials, teacher's class management skills and teacher's instructional delivery on Mathematics achievement by class six pupils with dyscalculia, hence limited to the study's constructs and location of study. However, the study makes recommendations for future studies to assess the effect of the teacher competencies on diverse scope and focus.

1.6. Assumptions of the Study

The study assumed that class six teachers had information on disabilities of their pupils and that all respondents were truthful and gave accurate data about pupils' disabilities and performance. It also assumed that, pupils' disability assessment and achievement data was readily available and that there were learners with dyscalculia in class six in the selected study area.

1.7. Theoretical and Conceptual Framework

1.7.1. Theoretical Framework

This study was based on social development theory of learning by Vygotsky (1978). The theory states that social interaction plays a fundamental role in cognitive development. The theory emphasizes the fact that the cognitive process develops through social interaction from learning mediated by interaction between pupils and persons who are more Knowledgeable. The principle of Vygotsky social development theory is the impact of more knowledgeable others (MKO) and the zone of proximal development (ZPD) on learners (McLeod, 2007). MKO includes competent and skillful instructors (teachers) and adults who effectively impart education to pupils through social interaction. ZPD according to Vygotsky (1978) refers to the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with capable peers. It refers to the gap between what a child can achieve independently and what a child can achieve with guidance and encouragement from a skilled partner. Skills that are difficult for the child to master are done with guidance and assistance of knowledgeable persons. Such assistance is called Scaffolding by Bruner (McLeod, 2007).

The current study is based on Social development theory because pupils with dyscalculia need an educator with appropriate competency in this case MKO. Regarding ZPD, pupils with dyscalculia highly depend on well trained teachers for management of remedial intervention mechanisms referred to as Individualized Education Programs (IEP). These

remedial programs would close ZPD gap that upgrades cognitive skills and therefore improve mathematics achievement of pupils with dyscalculia.

1.7.2. Conceptual Framework

The study used the conceptual framework given below to guide the data collection;

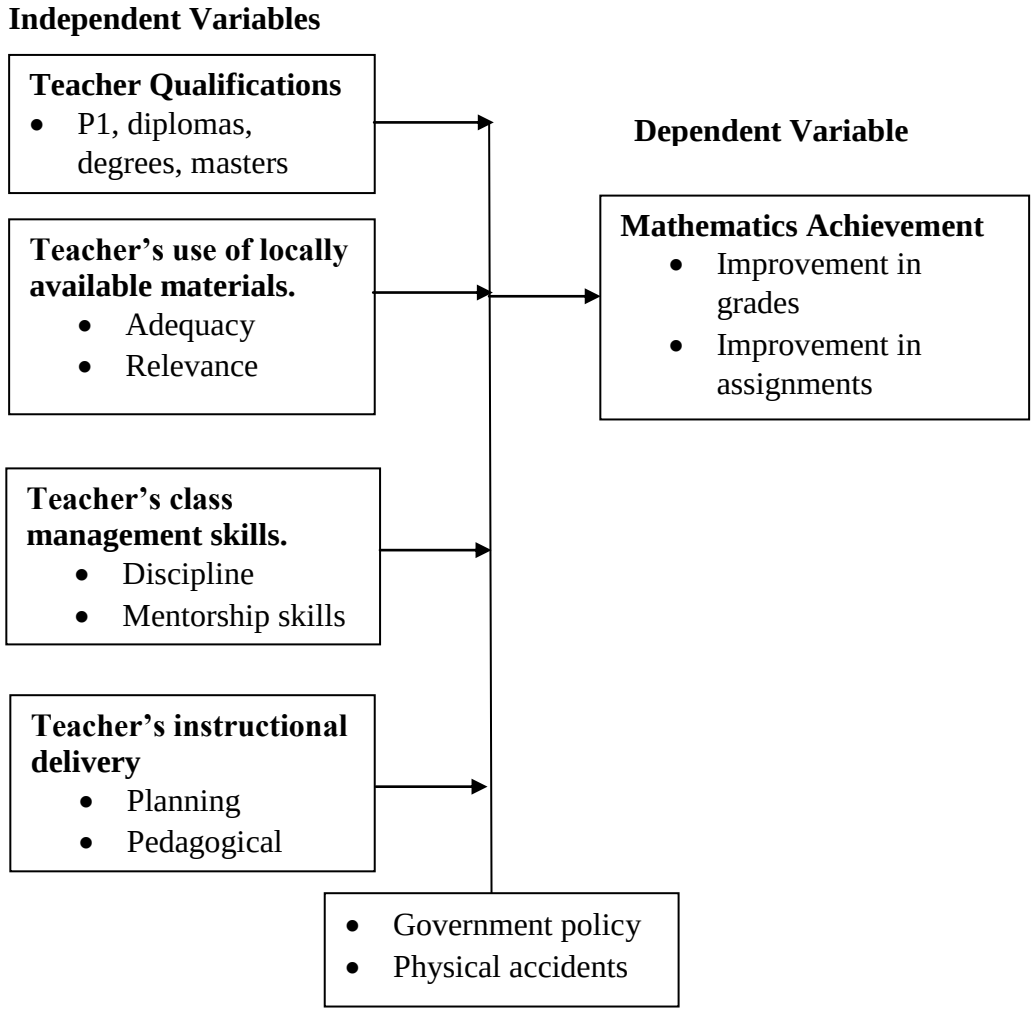

Figure 1: Conceptual Framework

Key
Independent variables - Teacher competency factors
Dependent variable - Mathematics Achievement
Intervening variables - Government policy & Physical accidents

The diagram above illustrates the relationship between pupils with dyscalculia need and achievement as a result of highly competent teacher for any meaningful achievement to be realized. The four independent variables were competencies and resource adequacy of a teacher which include: qualifications, use of locally available materials, classroom management skills and instructional delivery to determine mathematics achievement among class six pupils with dyscalculia in Kiritiri division, Mbeere South Sub-county. The government policy occasionally intervenes in the relationship through legislation, in addition to physical challenges.

1.8. Operational Definition of Terms

Competency -A set of individual performance behaviors which are observable, measurable and critical to successful individual performance.

Determinant -Crucial factor that influence learners achievement.

Dyscalculia -Learner's inability to grasp and comprehend mathematical concepts, numeracy, formulae and number manipulation. It is difficulty in arithmetical calculations as a result of brain disorder.

Inclusive Education -The philosophy of ensuring that schools are centres of learning and educational systems are open to all children. It is a system where learners with special needs learn together with the non-special needs pupils.

Mathematics achievement -Feedback mechanism to evaluate Mathematics performance amongst class six learners with dyscalculia after undergoing through a teaching /learning process.

Teacher competency -Teacher proficiency, skills and attitudes that enhance Teaching and learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

This chapter reviews a variety of scholarly works related to classroom intervention mechanisms for pupils with dyscalculia. It covers: Influence of the teacher qualification, influence of the teacher's ability to use locally available materials, influence of teacher's class management skills and the influence of teacher's instructional delivery.

2.2. Teachers Qualifications and Learners with Dyscalculia

Teaching is regarded as the process of imparting new knowledge, behaviour, skills, values, attitudes and understanding that may involve synthesizing different types of information to a person (Westwood, 2008). Primary school teachers who have taught for many years were noted to be reasonably skilled in identifying when children were having numeracy problems, much faster and easily than teachers who had taught for a few years since training. This was attributed to inadequate exposure on dyscalculia to the teacher at the point of pre-service training (Kithuka, 2008). Dyscalculia is a learning disability where pupils have severe difficulties in making arithmetic calculations and cannot make significant meaning of numbers and quantities (Price, 1998). Dyscalculia is caused by a brain disorder either through heredity or physical damage (Bandura, 1997).

Robuck (2009) indicated that, general teacher training should include specific content on dyscalculia and the causes and the teacher training curriculum should devote some class hours to train teachers on challenges that dyscalculia pupils face, and ways to upgrade them. However, the study observed that primary school teachers who did not train as

special needs teachers typically did not pursue any further studies or capacity development courses that focused one effective ways to teach pupils with dyscalculia. Education officials also did not supervise quality education provision to pupils with dyscalculia by teachers as there is no special training for quality assurance officers on dyscalculia. The alternative argument raised was that many teachers did not realize that children with dyscalculia needed extra attention to cater for their difference while they had to work much harder than their peers to acquire, retain and perform academic and social skills on daily basis (Cook, 2007). This would amount to overwhelming stress for dyscalculic pupils who had limited coping mechanism that very often translate to behaviours that teachers may not understand or sometimes interpret the behaviour as rudeness.

Reddy (2000) further suggested that, the challenge of achieving full integration of pupils with dyscalculia within the regular classroom could be easily achieved if teachers possessed knowledge about dyscalculia. Shaley (2007) argued that primary school teachers should possess specific competencies by enrolling for professional courses in assessment, planning individualized education programs (IEP) apart from guiding and counselling children with dyscalculia (Bett, 2016; Jukes et al., 2017). Teachers fresh from training should possess a strong mastery of content that includes understanding the concept of dyscalculia, characteristics, identification, assessment and teaching methods (Desimane & Parmar, 2006). Such knowledge would enable them manage pupils with dyscalculia which in turn would lead them towards acquisition of basic skills due to early intervention programs provided in class.

In Britain, teachers had negative attitudes towards pupils with dyscalculia because they required more contact time than other regular children. Shalev (2007), revealed that out of 10500 teachers in Asia, two thirds were not ready to teach dyscalculia pupils and 75% supported the placement of dyscalculia pupils in institutions with specialized personnel. The teachers felt that their Asian education policy makers were not conscious of the classroom realities. In Lesotho, teaching methods, teacher qualification and experience determined mathematics achievement of learners (Iheanachor, 2007). Further, the findings by (Devine et al., 2013; Keong et al., 2016; Rasanen et al., 2021) found that gender difference did not have any significant influence on dyscalculia manifestation.

In Nigeria, study by Eyo and Eme(2020) on teachers' competence in identifying pupils with learning disabilities noted that, although some primary school teachers were qualified to handle learners with learning disabilities, such qualifications were insufficient for practical use in class. Low competence was as a result of inadequate exposure of teachers to courses in special education during their training. The study also revealed that a number of teachers in the system did not have teaching qualifications and so they could not handle learners with learning disabilities including those with dyscalculia. Studies by Shama (2006) found that, most teachers in Uganda were not professionally qualified to handle pupils with severe dyscalculia. As a result of that, teachers were shying away from giving remedial lessons to such pupils who exhibited EBD in mathematics tasks. In addition, more experienced teachers had more knowledge of dyscalculia than the less experienced. In Tanzania, induction course crash program produced teachers who were not well trained as they were trained for one month and posted to teach thus they did not perform well.

In Kenya, A study by Gateru (2011) in Makandara Division, established that 79% of teachers were aware of existence of pupils with dyscalculia and had identified them in their respective classrooms while only 20% had remedial programs for them. This is because they lack qualifications required to handle them. A competent qualified teacher possesses positive attitudes towards the needy learners in this case dyscalculic pupils (Craig, 2016; Odongo et al., 2016). The attitudes and beliefs of qualified teachers are important in ensuring that inclusive education is achieved as this affects teachers' commitment to implement it (Thuman, 2010). Further if enables teachers to promote understanding among pupils with identified disabilities (Carew et al., 2019). If a teacher has negative attitudes towards the dyscalculic pupil, the learner may not learn. Silas (2012) established that teachers in Kilifi County had a negative attitude towards pupils with dyscalculia. They believed that they are a bother and caused low mean scores during examinations. Moreover, most head teachers in Kilifi were not trained in special education and therefore they did not fully support dyscalculia pupils with resources for mathematics basic skills.

A study by Ochieng, Kiplagat & Nyongesa (2017) in Migori, teacher educational qualification, teacher training and experience determined teacher competency. Teacher qualification is measured by teacher's understanding and mastery of Mathematical knowledge. They also found out that students gained a lot with well-educated teacher's and that mathematics achievement worked well when the teacher's had standard certification. While studies by Ochieng, Kiplagat & Nyongesa focused more on teachers' competence on Mathematics performance in KCSE examination and was done in Migori, the current study will expand the knowledge gap by probing how teachers' qualification

influence the achievement of Mathematics for class six pupils in Kiritiri division, Mbeere south Sub-County.

2.3. Teachers Ability to Use Locally Available Materials and Dyscalculic Learners

Adequacy and relevance of locally available materials can motivate the learner to be actively involved in learning (Kisirkoi et al., 2016; Mwendwa, 2017). Provision of instructional support material in the teaching /learning process helps in stimulating learners' interest as well as physical, mental, social, emotional, moral and spiritual development (Cameroon, 2007). It also enhances reading ability as a result of teacher pedagogical skills (Ayiema et al., 2018; Mwoma, 2017). When pupils interact with materials, they use all their senses during the learning thus enhancing understanding of concepts. Teachers therefore need to use a wide variety of age - appropriate locally available instructional material such as audio, visual, audio-visual and manipulative material that are all from the environment (Tankersley, 2007). In USA, teachers have been provided with skills of using locally available materials to impart knowledge to all learners including those with dyscalculia (Ross-Hill, 2009).

This education program provides activities, a variety of materials and experiences that allow and encourage the young pupils to become aware of the differences and similarities of the world around them, including members of the communities in which they live. This has helped to improve performance of dyscalculic pupils in USA. In Botswana, Sirvastava (2010) observed that most schools were ill-equipped with locally available teaching aids and there was an acute shortage of teaching aids and equipment appropriate for special needs education including pupils with dyscalculia as indicated by 71.4% head

teachers. In Kenya, Yusta (2015) observed that there existed a direct relationship between the use of readily available material amongst learners and mathematics achievement. Kamau (2000) also emphasized the use of different types of locally available material in teaching dyscalculia pupils existing in Kenyan rural schools. Kithuka (2008) further suggested that in Kitui teachers should create a good impression of instructional material to pupils so as to have a positive learning impact on them.

Gateru (2011) also noted that pupils learn better when they are helped to construct their knowledge through use of manipulative material. At the same time, when teacher apply varied pedagogies such the use of locally available learning material, it helps in minimizing learning difficulties and errors (Teygong et al., 2018). Previous studies such as of Ross-Hill (2009), used checklist and observation as data collection instrument. They also emphasized the use of a variety of locally available material, the current study will extend further on use of questionnaires and an interview guide and the adequacy and relevance of locally available material in upgrading the class six pupils with dyscalculia in Kiritiri division, Mbeere South Sub- County.

2.4. Teacher's Class Management Skills and Dyscalculic Learners

For one to teach Mathematics, one does not only require to know the subject, but also have the required skills (UNESCO, 1994). BF Skinner (1954), relied on the assumption that the best skill to modify behaviour was to modify the environment, in this case the classroom. He also advocated for the frequent use of the skill of reinforcement like rewards to modify and influence pupil's behaviour, thus instill discipline to the learners.

John Dewey (1916) believed that classroom management should be guided by democratic practices with consequences. He further noted that children were capable of learning, behaving cooperatively, sharing with others and caring for one another with the teacher as facilitator. Rasungu (2003), noted that, pupils with dyscalculia in Starehe division in Nairobi province were misconstrued by their respective teachers as either rude or indiscipline. This was perhaps because the pupils did not answer nor did any mathematics tasks correctly. Other studies in Kenya have also revealed that teacher management skills play a central role in learner achievement across subjects (Barasa, 2020; Bold et al., 2017; Owuor Jonyo & Odera Jonyo, 2017). Learner centred approach is considered for example as key approach in teaching and learning in primary schools (C. Mackatiani et al., 2016).

As a result, the behaviour of pupils with dyscalculia further expanded the psycho-social gap between teachers and pupils due to the teacher's inability to control the class indiscipline. Pupils' class indiscipline was even worsened by abolition of corporal punishment in schools by the ministry of education in Kenya (ROK 2005). Kamau (2000), noted that for effective upgrading of dyscalculia pupils in Kiambaa Division, the pupils should be engaged with a remedial IEP program that was tailor- made on the pupils immediate numeracy needs. This mentorship program could only be effectively done when the pupil is receptive and disciplined to take up any instructions provided by the teacher. The study emphasized the teacher as a sign of authority for classroom control during the teaching/learning process. Further, teacher preparedness is also considered to support learning progress among primary school learners (Waweru, 2018).

Further to that, Osman (2001), observed that pupils who also include dyscalculic pupils emulate their teacher's behaviour. Well-dressed and good talking teachers would impress their pupils and be good role models to their pupils while roughly dressed and abusive teachers would send wrong signals to pupils. In addition, the ability of a teacher to apply technologies in classroom teaching greatly motivates learners (Garbutt et al., 2018; Sarker et al., 2019). Pupils would therefore take up from their teachers and behave the same way during class time or out of class sessions. While the previous studies of Osman (2001) concentrated much on pupils with learning disabilities as the cause of indiscipline, the current study will probe further into the teacher's influence of classroom management on class six pupils with dyscalculia in Kiritiri division, Mbeere South Sub- County.

2.5. Teacher's Instructional Delivery and Dyscalculic Learners

According to Geary (2001) since learners with dyscalculia cannot perform according to their abilities, direct methods allow teacher's to consider each learner when planning and teaching mathematics. John Dewey (1916) believed that instructional management included natural approach involving direction and guidance. Methods of instructional delivery used by teachers can determine the level of attainment of basic competencies acquired by learners (Mullis, 2009). In USA, multisensory techniques were frequently used for pupils with dyscalculia. Broch (2002) noted that in South Africa, a large number of pupils with dyscalculia also had difficulties in understanding the language that was used as a medium of delivery. This made performance of dyscalculic pupils even worse as they could not effectively communicate back their mathematical ideas. Schroeder (2005), observed that in Swaziland for effective teaching /learning process for all learners

including those with dyscalculia, effective extraction of feedback is important through pupil's classroom assessments.

Frequent mathematical exercises would therefore display the individual pupil's area of weakness that requires to be addressed (Mazana et al., 2019). Studies from the National Institute of Child Health and Human development (NICHHD) have shown that for pupils with dyscalculia, a multisensory teaching method is most effective. This is because the method stimulate learning by engaging them on multiple levels to use some or all their senses to learn hence linking ideas they already know and understand (Mullis, 2009). In his studies, Munyeki (2007), observed that teachers did not cater for pupils with dyscalculia in their instructional delivery in Githunguri Division in Kiambu. The lesson delivery methods used did not include pleasurable activities and therefore the dyscalculic pupils were not stimulated to learn and thus posted undesirable mathematics achievement. It is also noted that remedial lessons, adequate resources and teacher preparedness are some of the notable approaches to teaching mathematics in primary schools (Momanyi et al., 2019; Nyakundi et al., 2019; Thesis et al., 2016). The teachers were therefore covering the curriculum content very fast with fast learners, leaving the dyscalculic pupils behind. Oyaro (2005), noted that pupils in Nairobi enjoyed lessons when teachers created interest and were friendly during the lesson delivery. This is also enhance if teacher quality in lesson delivery is to be considered (Ongus & Gichuru, 2016).

A study by Nyaga (2012) on influence of learning support strategies on academic performance of learners with dyscalculia in Nairobi noted that teaching methods for

dyscalculic learners must be sensible and direct to learning targeted and should be conducive for learners needs. Further, mother tongue was found to be an ingredient when passing concepts to learners especially in rural-based schools (Boholano & Englis, 2021; Makau et al., 2019; Njoroge, 2017). While the previous studies of Mullis (2009) focused more on teaching methods for dyscalculia pupils, the current study explored into effective assessment of class six pupils with dyscalculia in Kiritiri division, Mbeere south sub-county.

2.6. Summary of Literature Review

The studies reviewed established that the teacher's qualification, use of locally available materials, class management skills and instructional delivery influence mathematics achievement of pupils with dyscalculia. The study by Tuchura (2016), Ayiema (2018), Mwendwa (2017), Ongus (2016) and Kipkemo were carried out in Nyandarua, Machakos, Rwanda and Kericho respectively. This offers the impetus for the current study to be carried out in Kiritiri division so as to examine the influence of teacher competencies on mathematics achievement among class six learners. The above studies focused also primarily on use of remedial lessons, resource availability, teacher quality and ICT integration, whereas the current study focuses on teacher qualification, management skills, instructional delivery and use of locally available resources respectively.

Previous empirical data also makes generalization made out of samples drawn far away from Kiritiri division that has different and unique social standards, norms and characteristics. Moreover, there has been no study on dyscalculia and teacher competency

carried out elsewhere in Kenya and especially among class six learners. There is therefore a knowledge gap regarding intervention strategies to upgrade mathematics achievement by class six pupils with dyscalculia in Kiritiri division, Mbeere South Sub-County. That was the rationale for this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter focused on the methods used in the study. These included: research design, location of the study, study population, sampling techniques and sample size, research instruments, pilot study, validity and reliability of instruments, data collection procedures, data analysis and logical and Ethical considerations.

3.2 Research Design

The study adopted a mixed method research approach, and a descriptive survey design. This design was viable to the study because it allowed questionnaires and interviews to be easily subjected to a large population within a short time and thus gain information about the phenomenon under study (Mugenda & Mugenda, 2003). Descriptive research design provides the necessary information sought by the study in conformity with the research problem. It is suitable, when studying elements within a population. It aims to obtain information that describes the phenomenon under investigation. More specifically, descriptive research design helps researchers to answer the what, when, where, and how questions regarding the research problem being investigated (Driscoll et al., 2007).

3.3 Location of the Study

Kiritiri Division is in Mbeere South Sub-County, Embu County. It boarders Gachoka division to the north, Makima division to the south East, and Mwea division to the west. It is located in Eastern region of Kenya. It is situated approximately 30 kilometers from

Embu town along B7 Embu-Kiritiri Road. Kiritiri division has 28 public primary schools distributed in Mavuria Zone (11 schools), Gichiche zone (10 schools) and Kinthuthire zone (7 schools).

3.4. Target Population of the Study

According to (Smith & Shorten, 2017), a target population encompasses all persons, items or objects of interest to which a research is carried out on. By adopting a descriptive research design, the researcher targeted 378 class six primary school learners, 97 class six primary school mathematics teachers and 1 QASO, giving 476.

Table 1: Target Population

Population	**Number (N)**
Class Six Mathematics Teachers	97
Class Six Pupils	378
QASOs	1
Total	**476**

Source: Mbeere South Sub-County Education, 2018 (The ICT Authority, 2018)

3.5. Sampling Techniques and Sample Size

3.5.1. Sampling Techniques

Sampling is the process of selecting a sub-set of items within a population due to inability to cover the entire population owing to cost and logistical challenges (Hürlimann, 2019). The study adopted a mixed sampling approach where simple random sampling technique was used in selecting pupils, while purposive sampling was used in selecting, teachers and

the quality assurance and standards officer (QASO). Simple random sampling allows every item in the population an equal chance of being selected, hence creating equal probability of selection (Kothari, 2004). Purposive sampling is preferred since it allowed the researcher to rely on judgment of respondents considered to hold crucial information for the study (Mugenda & Mugenda, 2003).

3.5.2. Sample Size

According to Mugenda and Muganda (2003), when carrying out a descriptive research, a sample size of 10-50% is a good representation when the population of study is less than 10, 000 (Mugenda & Mugenda, 2003). As such the study, sampled 38 class six pupils that was approximately 10% and 30 teachers that was approximately 30% as it is indicated on the divisional distribution on the table below. In addition, 2 QASOs were purposively selected.

Table 2: Study Population and Sample Size

Population	**Number (N)**	**Sample (n)**	**Percentage of sample (n)**	**Sampling Technique**
Schools	28	14	50%	Purposive sampling
Class Six Mathematics Teachers	97	30	30%	Simple random sampling
Class Six Pupils	378	38	10%	Simple random sampling
QASOs	1	1	100%	Purposive sampling
Total	**476**	**69**	**14.7%**	**Mixed approach**

Source: Mbeere South Sub-County Education, 2018 (The ICT Authority, 2018)

3.6. Research Instruments

This section included the description of the instruments that were used in the study. Two instruments were used in the study namely: the questionnaires and interviews. Questionnaires were administered to teachers and QASOs officers while interviews were administered to standard six pupils. The questionnaires gathered information on teacher competencies constructs. On the other hand, the interview guide gathered information from the learners on teacher support given to the pupils with dyscalculia.

3.6.1. Questionnaire for Teachers

The questionnaire was used to collect data from 30 teachers and the 2 QASOs on teacher qualifications, methods of instructional delivery, resource availability and class management and experience. Sub-Construct Questions related to research objectives were asked on both positive and negative manner to control the study outcomes. This instrument was preferred because it was easy to administer for a large group of respondents (Orodho & Kombo, 2002).

3.6.2. Interview Guide for QASO and Standard Six Pupils

The interview schedule gathered data from QASOs on class six assessment criteria used, the availability of teaching resources in primary schools, teachers' assessment and qualifications and their influence on achievement levels of class six pupils with dyscalculia. The interview schedule was preferred because it provided talking points on key issues of the study (Creswell et al., 2020).

3.7. Pilot Study

Pilot study was done in one of the schools in the study area and was not considered in the final study. This was done by subjecting the questionnaires to 4 teachers and 10 class six pupils so as to examine the validity and reliability of the research instruments. A pilot study is usually carried out so as to check faults and improve data collection in the data protocols (Blumberg et al., 2014).

3.8. Validity and Reliability

The validity and reliability of the study instruments was determined as follows;

3.8.1. Validity of the Instruments

Validity refers to the extent to which data collections instruments measures what intended to by research study (Cooper & Schindler, 2014). The study used face validity so as to ensure a logical link between the questions in the research instrument and research objectives was established. To achieve this, the questionnaire and the interview guide was pretested through the pilot study. In addition, this was done using respondents that had similar characteristics as those used for the final data collection (Creswell et al., 2020; Mugenda & Mugenda, 1999). This was achieved through consultations with the Kenyatta University Supervisor for feedback and also pilot study respondents. This helped to revised any inconsistence and ambiguity in the questionnaire and the interview guide. As a result, all feedback received were incorporated before preparing final copies of the instruments for data collection.

3.8.2. Reliability of the Instruments

Cronbach`s alpha being a test of reliability was generated and used to assess reliability. In order to achieve internal consistency of the data protocols, the study considered internal consistency Cronbach alpha (α) value that was above 0.7 and above (Kothari, 2004). Questionnaires and interview schedules were piloted by administering them in one primary school where 4 teachers and 10 pupils were picked in the study. The same group was given the same tools 2 weeks later and the scores from their feedback subjected to correlation analysis. A reliability coefficient of 0.7 was achieved thus making it acceptable. The piloted school and the results realized were not included in the final study. The questionnaires and interviews questions were also revised based on the feedback from the pilot study for use in the actual study. The results of the reliability test are presented in table 19, where the four constructs of the study returned 0.754, 0.811, 0.782, 0.791 coefficients and were considered to have met the threshold. The dependent variable scores returned a Cronbach alpha coefficient of 0.756, thus meeting the requirement set for the tools to be deployed.

3.9. Data Collection Procedures

Data collection was done through questionnaires and interview schedules. The researcher visited the primary schools to make arrangements on the appropriate date for data interview with the pupils, while the questionnaires were issued and collected within 1 month after administration. Questionnaires were distributed with the assistance of two research assistants, whose qualifications were course work in masters and research methods specifically and who were trained on questionnaire management. Later, they were sent to collect to the field. On the interview day, permission was sought from the

QASOs and the school heads for the interview proceedings where short-notes were taken for compilation. For the young learners, probing and interpretation was done where possible to ensure appropriate responses were recorded.

3.10. Data Analysis

The quantitative data obtained from the Likert scale type were analyzed descriptively using frequencies and percentages. They were then presented using tables and charts. Qualitative data realized were coded and analyzed in an on-going process and presented thematically. Statements that made meaning to the study were picked and then categorized accordingly and reports written respectively to compliment quantitative data. Overall, data was presented using tables and charts for easier interpretation and discussion of the study findings.

3.11. Logistical, Ethical, and Legal Considerations

3.11.1. Logistical Considerations

The researcher obtained an introduction letter from Kenyatta University, School of Graduate studies to conduct research. The researcher also sought permission from NACOSTI and Mbeere South Sub-county director. Piloting was done to ensure the instruments met the study requirement. This was done where the researcher visited the location prior to the actual date to develop a good rapport with the respondents as well. The two research assistants were trained on questionnaire administration and management before the actual data collection exercise.

3.11.2. Ethical Considerations

Participants were informed that they would participate in the study voluntarily and were free withdraw anytime they wished. They were also requested to sign consent forms as a sign of free participation. Further, they were also informed that no identifiers or personal information such as names, school, will be collected. In doing so, the questionnaires were serialized for ease of issuance and collection. Consent was sought from respective heads of institutions before interviewing the young learners. The researcher put into consideration the use of appropriate language in the level of the respondents during research. Dressing code and respect of one's culture was also considered during the research period.

3.11.3. Legal Considerations

In order to acknowledge other scholarly contributions, all cited work were referenced and checked against plagiarism. As a standard practice, it ensures originality of the study and thus reducing chances for litigation.

CHAPTER FOUR

PRESENTATION OF FINDINGS INTERPRETATION AND DISCUSSION

4.1 Introduction

Presented in this chapter are the results of the study based on analysis of data collected from the field, interpretation and discussion. The main objective of the study was to assess the influence of teacher competency on mathematics achievement among class six learners with dyscalculia in Kiritiri Division, Mbeere south sub-county, Kenya. The data was presented in tables and charts, and was done thematically as per the objectives of the study. The study's specific objectives were;

i. To examine the influence of teacher qualifications on mathematics achievement of class six pupils with dyscalculia
ii. To assess the influence of teacher's use of locally available materials on mathematics achievement for class six pupils with dyscalculia.
iii. To evaluate how teacher's classroom management skills determine mathematics achievement of class six pupils with dyscalculia.
iv. To assess the influence of teacher's instructional delivery on mathematics achievement of class six pupils with dyscalculia.

4.2 Background Data of the Respondents

4.2.1 General Information

The study sampled of 38 pupils, 30 teachers and 1 QASO, as respondents. Owing to the small number of respondents and the use of research assistants, all questionnaires were returned and interviews carried out with the 38 pupils, thus providing a best response rate of 100%. Kothari (2004) proposed that a response rate of over 50% obtained is satisfactory, 60 percent is better and a response rate of over 70% is considered the best.

4.2.2 Demographic Information (Pupils, Teachers, and QASO)

Out of 38 pupils who successfully took part in the study, 25 (66%) were males while 13 (34%) were females. Among the 10-teacher respondent, 6 were females whereas 4 were males. The two Quality assurance and Standard officers were all male. Table 1 & Table 2 illustrates age of the respondents.

Table 1: Pupils Gender Information

Pupils' Gender	**Frequency**	**Percentage**	**Pupils with dyscalculia**	**Percentage of pupils with dyscalculia (using totals)**
Male (boys)	25	66%	2	5.2%
Female (girls)	13	34%	1	2.6%
Total	**38**	**100%**	**3**	**7.8%**

Source: Researcher, (2020)

The table 1 showed that there are more boys (66%) than girls (34%) in standard six classrooms. This still points to the gender inequalities existing among basic institution of learning, countrywide. However, gender the study concluded that gender had no significant effect on dyscalculia manifestations, since previous studies have found no correlation among genders with dyscalculia (Keong et al., 2016; Rasanen et al., 2021). Table 1 above also showed that 2 boys and 1 girl were identified to have dyscalculia in among the 38 pupils sampled. This agrees with the finding of (Keong et al., 2016) that the learning disability (dyscalculia) is prevalent at the rate of 1.57% in rural population and ranges between 1-10% among both genders. Hence, the current study returned a prevalent percentage of 7.8% in Kiritiri division, thus supporting the earlier study findings.

Table 2: Age of Teachers in Years

Age (years)	**Frequency**	**Percentage**
25 – 30	6	20
31 – 40	12	40
41 – 50	6	20
Over 50 years	6	20
Total	**30**	**100.0**

Source: Researcher, (2020)

As shown in the Table 2, 40% of the teachers sampled were aged between 31 – 50 years. This implies that majority of the teachers are in their middle ages and therefore were expected to have adequate experience, in addition to being conversant with the mathematics curriculum designs and pedagogies. According to the Kenya Institute of

Special Education (KISE) report of 2019, over 60% of teachers in basic education possess the ability of identifying learners with learning disabilities (Kenya Institute of Special Education, 2019). The study therefore, assumed that the teachers sampled had adequate abilities to detect learners with dyscalculia challenge.

Table 3: Professional Qualifications of Teachers

S/No.	Grade	Number of teachers	Percentage
1	Untrained	3	10%
2	Certificate	15	50%
3	Undergraduate	9	30%
4	Masters	3	10%
TOTAL		30	100%

Source: Researcher, (2020)

As shown in Table 3 above, (10%) of the teachers was reported not to have been trained (this may have changed with TSC regulation that all teachers in basic institutions in Kenya must be registered), 50% of the teachers had P1 qualifications, (30%) had undergraduate degree, while (10%) had master's qualifications. This shows that most of the teachers in primary schools in Kiritiri division, Mbeere South Sub-County had relevant training to handle learners with dyscalculia and that they had met the Teachers Service Commission (TSC) requirements. The untrained teacher was assumed to have been engaged to support learners especially with the current shortage of teachers in public primary schools which currently stands at 46,109 countrywide (Awich, 2021).

Table 4: Teaching Experience in Years

Experience in years	Frequency	Percentage
5 and below	3	10
6 - 10	6	20
11 – 15	15	50
15 – 20	6	20
Total	**30**	**100%**

Table 4.4 shows that, majority (70%) of the teachers have been in the teaching career for a period of 11 – 20 years. This shows that the respondents had a long time experience and therefore they could give reliable information on teacher competency as a determinant of mathematics achievement among class six learners with dyscalculia. This is supported by the finding of (Gateru, 2011) who observed that 79% of primary school teachers are aware of disability challenges faced by learners, and as such, are able to recognize and support such learners.

4.3 Teacher's Qualification on Mathematics Achievement by Class Six Pupils with Dyscalculia

The first study objective was to examine the effect of teacher's qualifications on mathematics achievement among class six pupils with dyscalculia. To address this objective, respondents were presented with 6 items in which they were expected to rate their agreement levels on a five point –Likert scale ranging from strongly agree to strongly disagree. Table 5 shows the responses obtained.

Table 5: Effects of Teacher's Qualifications

ITEM	SA		A		U		D		SD	
	F	%	F	%	F	%	F	%	F	%
Class six mathematics teachers are well trained and have full knowledge of the meaning of dyscalculia	10	33.3	8	26.7	5	16.7	4	13.3	3	10.0
Class six mathematics teachers have long experience and are aware of the causes of dyscalculia	9	30.0	10	33.3	2	6.7	5	16.7	4	13.3
Class six mathematics teachers are able to identify pupils with dyscalculia in that class	9	30.0	8	26.7	4	13.3	4	13.3	5	16.7
Class six mathematics teachers do not set guidelines for appropriate classroom behavior for pupils with dyscalculia.	7	23.3	6	20.0	0	0.0	9	30.0	8	26.7
Class six mathematics	4	13.3	5	16.7	5	16.7	7	23.3	9	30.0

teachers are not able to cope with pupils with dyscalculia										
Class six mathematics teachers dislike pupils with dyscalculia	4	13.3	5	16.7	5	16.7	7	23.3	9	30.0

Key: Strongly Disagree **(SD),** Disagree **(D),** Undecided **(U),** Agree **(A),** Strongly Agree **(SA)**

Table 5 shows that majority of respondens strongly agreed or agreed that the teachers are well trained and have adequate knowledge to be able to teach class six learners (60%). The finding agrees with the findings of (Bett, 2016) that continuous professional development among primary school teachers has improved, and that this has positive effect on how teachers handle classroom learning. Teacher respondents also strongly agreed and agreed that class six teachers have adequate experience and awareness to be able to handle pupils with dyscalculia (63.3%). This finding is affirmed by the study of (Jukes et al., 2017) who noted that teacher professional development courses strengthen teacher capacities to teach not only humanities subjects but also in science based subjects such as mathematics. Further, 56.7% of teacher respondents strongly agreed and agreed that mathematics teachers are able to identify class six learners with dyscalculia. 56.7% of respondent teachers disagreed that teachers are not able to set guidelines for learners with dyscalculia, implying that the on average, most teachers are able to, thus creating a positive pupil support among those with dyscalculia. The finding of (Carew et al., 2019) on inclusive education in Kenya to enable teachers cater appropriately for the needs of all

learners, provides a concurrence with the current study finding, though our result shows an average performance where 53.3% of the respondents strongly disagreed and disagreed that mathematics teachers are not able to cope with pupils with dyscalculia. This offered an indication that teacher's qualifications attained through training enabled them achieve a lot in supporting mathematics achievement among learners with dyscalculia. This was also observed by (Kithuka, 2008) who noted that adequate exposure on dyscalculia by the teacher at the point of pre-service training coupled with a long experience enables the teacher to deliver mathematics concepts effectively to pupils with dyscalculia.

According to (Westwood, 2008), teaching is a process of imparting knowledge, behaviour attitudes and skills that are already in a person to another person. Table 5 also showed that 53.3% of teachers appreciate learners with dyscalculia and offer them necessary support to cope with mathematics subject. According to 3/14/2023 the structure of teacher training has greatly improved teacher preparation in Kenya. He further asserts that the structure of teacher effectiveness in the classroom is a comprehensive ingredient that integrates the teacher trait, perspective, and so as to yield an accountable process-product output of teaching to account for the relationship between teacher competence, teacher performance, pupils' learning experience and educational outcomes. Moreover, teacher effectiveness in managing pupils with dyscalculia should be regarded not as a stable characteristic of the teacher as an individual but as a product of the interaction between certain acquired teacher characteristics and other factors of which vary according to the situation in which the teacher performs (Odongo et al., 2016).

4.4 Effects of use of locally available instructional materials to teach pupils with dyscalculia this aspect can be handled by learners.

To assess the effect of teacher's use of locally available instructional materials in influencing mathematics achievement by class six pupils with dyscalculia, respondents were required to either strongly agree or disagree with six statements as provided below.

Table 6: Effects of use of Locally Available Resources

ITEM	**SA**		**A**		**U**		**D**		**SD**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Class six mathematics teachers use charts and flash cards to enhance teaching and learning	10	33.3	9	30.0	3	10.0	5	16.7	3	10.0
Class six mathematics teachers use manipulative or real objects during teaching/learning process	10	33.3	9	30.0	3	10.0	4	13.3	4	13.3
Class six pupils with dyscalculia are occasionally taught using tape recorders	8	26.7	8	26.7	4	13.3	6	20.0	4	13.3
Class six mathematics	6	20.0	6	20.0	4	13.3	5	16.7	9	30.0

teachers do not use videos in teaching										
Class six mathematics teachers do not issue textbooks to pupils	5	16.7	5	16.7	4	13.3	7	23.3	9	30.0
Class six mathematics teachers do not use teacher's guidebook to enhance delivery	4	13.3	5	16.7	5	16.7	7	23.3	9	30.0

As portrayed on the table 6 above, (63.3%) of respondents strongly agreed and agreed that mathematics teachers use charts and flash card to enhance teaching and learning. This is a necessity in teaching mathematics subject as found by (Teygong et al., 2018), who noted that teachers who vary their teaching methods increase learner understanding and interest in what is being taught. The table also shows that (63.3%) of the respondents strongly agreed and agreed that their teacher uses manipulative or real objects to drive the teaching process. The analysis also showed that 53.4% of the respondents noted that the teachers use tape recorders occasionally in the teaching of mathematics. The use of technology is considered to stimulate and simplify learning processes, and there is enough evidence advanced as by (Mwendwa, 2017). He notes that technology also increases learners interest and stimulates reading among rural pupils (Mwoma, 2017). This however, was also as a result of the primary schools using Kenya Institute of Education radio programmes to supplement mathematics teaching among class six

learners. However (40%) of teacher respondents did not use video lesson when teaching mathematics lessons, while another 53.3% did not issue extra text books to learners nor used teacher's guide. This implies that despite class six pupils having dyscalculia, majority of the teachers them did not adequately use instructional support material in enhancing delivery. This in consideration that the use of extra text books and teacher's guide materials contributes greatly to the learner interest in understanding the content well and systematic revision (Kisirkoi et al., 2016). This in turn stimulates thinking in learners and enables them to gain motivation, understanding, interpret facts and ideas in books. The pupils are likely to have positive attitude if the textbooks required are available, adequate and relevant to their needs. This would eventually translate into high mathematics achievement by the pupil with dyscalculia. The same observation was noted by (Yusta, 2015) that there existed a direct relationship between the use of readily available materials amongst learners and mathematics achievement.

4.5: Effects of class six teacher management skills on mathematics achievement by class six pupils with dyscalculia

To verify this objective, teacher respondents were presented with six items of a five point Likert scale that required them to respond to.

Table 7: Effects of the Teacher's Classroom Management Skills

Item	SA		A		U		D		SD	
	F	%	F	%	F	%	F	%	F	%
Class six mathematics teachers encourage parents of pupils with dyscalculia to bring them to school	8	26.7	9	30.0	5	16.7	4	13.3	4	13.3
Class six mathematics teachers encourage pupils with dyscalculia to learn with others in the mainstream class.	9	30.0	9	30.0	4	13.3	4	13.3	4	13.3
Class six pupils with dyscalculia are placed in mainstream class for free interactive and inclusive learning	10	33.3	8	26.7	4	13.3	4	13.3	4	13.3
Class six mathematics teachers do place pupils with dyscalculia with mainstream ones.	4	13.3	5	16.7	5	16.7	7	23.3	9	30.0
Class six mathematics	5	16.7	4	13.3	5	16.7	8	26.7	8	26.7

teachers do not cater by offering IEP for pupils with dyscalculia by keenly marking their written work.										
Class six mathematics teachers do not distribute oral evaluation questions to include pupils with dyscalculia.	4	13.3	5	16.7	4	13.3	8	26.7	9	30.0

Table 7 above illustrates that (56.7%) of the respondents strongly agree and agree that mathematics teachers encourage parents to bring pupils with dyscalculia to school. This was for curbing absenteeism by pupils with dyscalculia so that they are always available to cover the expected content. The study by (Bold et al., 2017) observed that teacher preparedness, knowledge and skills is fundamental in addressing learner challenges in primary school in Kenya. This is further supported by (Barasa, 2020) who noted that the quality of training possessed by teachers in mathematics subject is necessary for positive learning outcomes. 60% of the respondents noted that mathematics teachers encourage pupils with dyscalculia to attend to school and to their lessons with mainstream classes. This enabled the learners with dyscalculia have a sense of belonging and thus promote free interactive and inclusive learning CITE. However, when the same questions was posed to the teacher respondents in negative form, 53.3% of the teachers respondents

noted that teachers placed the learners in mainstream classrooms giving an average of 56.7% agreement. The importance of teacher management skills in classroom situation is considered a necessary and basic requirement among learners in primary schools (Owuor Jonyo & Odera Jonyo, 2017).

From the responses also, it emerged that majority of the teachers (53.4%) strongly disagree and disagree that their teacher does not cater for pupils with dyscalculia during the marking of pupils' written work. Further, (56.7%) of the teacher respondents also strongly disagreed and disagreed that class six-mathematics teacher do not distribute evaluation questions to include pupils with dyscalculia. The importance placed on teachers pedagogies such as learner centered approach, class room activities were found to be a necessary component among during classroom teaching among class six learners (C. I. Mackatiani et al., 2018; Muraya et al., 2020; Waweru, 2018). This implies that the teacher's management and classroom control skills captured the requisite discipline and attitudinal predisposition to enhance effective delivery of mathematical concepts by the teacher to pupils with dyscalculia. This was also observed by (John Dewey, 1916) who believed that classroom management should be guided by democratic practices to enable learning, behaving cooperatively, sharing with others and caring for one another with the teacher as a facilitator. This finding compares well with Kamau (2000) whose study in Kiambaa division of Kiambu County revealed that for effective upgrading of dyscalculia, pupils should be engaged with remedial IEP program that is tailor made on pupils' immediate numeracy needs.

4.6. Effects of the teacher's instructional delivery on mathematics achievement by class six pupils' with dyscalculia

The fourth study objective was to find out the effect of the teacher's instructional delivery on mathematics achievement by class six pupils with dyscalculia. To address this objective, teacher respondents were presented with 6 items in which they were required to rate their opinion levels on a Five point–Likert scale ranging from strongly agree to strongly disagree. Table 8 shows the responses obtained.

Table 8: Effects of the Teacher's Instructional Delivery on Mathematics Achievement

Item	SA		A		U		D		SD	
	F	%	F	%	F	%	F	%	F	%
Class six mathematics teachers use systematic phonic when teaching	8	26.7	8	26.7	4	13.3	5	16.7	5	16.7
Class six mathematics teachers use multi-sensory approach during mathematics teaching/ learning process	8	26.7	9	30.0	4	13.3	4	13.3	5	16.7
Class six mathematics teachers modify activities from simple to complex tasks to enhance understanding mathematics	8	26.7	9	30.0	4	13.3	5	16.7	4	13.3

Class six mathematics teachers do not use drills and repetition in verbal and written work to cater for individual differences in teaching mathematics	4	13.3	5	16.7	5	16.7	7	23.3	9	30.0
Class six mathematics teachers rarely design and implement individual instructions in teaching mathematics for pupils with dyscalculia	4	13.3	5	16.7	4	13.3	8	26.7	9	30.0
Class six mathematics teachers do not use mother tongue when teaching mathematics to pupils with dyscalculia	5	16.7	5	16.7	3	10.0	8	26.7	9	30.0

From table 8 above, (53.7%) of respondents strongly agreed and agreed that class six mathematics teachers use systematic phonic when teaching. Other 56.7% respondents strongly agreed and agreed that their teacher uses multi- sensory approach during mathematics teaching/ learning process and that similar respondents noted that the teachers do modify learning activities to introduce learners from simple concept to complex ones. According to the study by (Mazana et al., 2019), learner attitude also play a key role in addition to teachers efforts when teaching mathematics subject.

At the same time, (53.3%) of the same respondents strongly disagreed and disagreed that the teachers do not use drills and repetitions in verbal and written work to cater for individual differences in teaching and learning mathematics, implying that this was an appropriate strategy to address learning challenges among learners with dyscalculia. This finding concurs with the study by (Ongus & Gichuru, 2016) who noted that class six learners stand to benefit more if teachers are able to utilize what is in their disposal to ensure learner centered teaching takes place. Majority of teachers (56.7%) also strongly disagreed and disagreed that their teacher rarely designs and implement individual instructions teaching mathematics for learners with dyscalculia while a similar response was recorded among the respondents on not using mother tongue to promoted better understanding among class six learners with dyscalculia challenge. The use of mother tongue had been found to be of profound benefit among lower primary school learners, and especially those in rural areas of Kenya (Boholano & Englis, 2021).

This implies that most class six pupils with dyscalculia believed that their teacher uses appropriate instructional methods to deliver mathematics curriculum. This was also noted in the related literature by (Mullis, 2009) who indicated that methods of instructional delivery used by the teacher can determine the level of attainment of basic competencies acquired by learners. In his studies (Munyeki, 2007) realized the same findings and observed that teachers in Githunguri Division in Kiambu County did not cater for pupils with dyscalculia in their instructional delivery. The lesson delivery methods used did not include pleasurable activities and therefore the dyscalculia pupils were not stimulated to learn and posted undesirable mathematics achievement. The teachers were thus covering

the curriculum content very fast with fast learners, leaving pupils with dyscalculia behind.

4.7 Teacher Competency on Mathematics Achievement among Class Six Pupils

The study also assessed the contribution of teacher competency on mathematics achievement as the dependent variable. To verify the effect of teacher competency on mathematics achievement a rating frequency of occasions of teaching/learning behavioral outcomes ranged from rarely to very often. The table 9 below shows the results of responses from the teacher respondents table 9.

Table 3: Teacher Competency on Mathematics Achievement

ITEM	**0**		**1**		**2**		**3**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Applying psychology in teaching class six pupils with dyscalculia abstract concepts of time and direction has improved their achievement	7	23.3	3	10.0	7	23.3	13	43.3
My presentation skills enhance ability in class six pupils with dyscalculia to recall schedules and sequences of past or future events.	3	10.0	7	23.3	10	33.3	10	33.3
Class six pupils with dyscalculia learn better when they use physical resources	3	10.0	3	10.0	10	33.3	14	46.7

to enhance counting backwards.								
Pupils with dyscalculia enjoy use of hard cash in learning to eradicate fear during money and cash transactions lessons.	3	10.0	3	10.0	3	10.0	21	70.0
Teacher's management and control skill does not enable pupils with dyscalculia to do all book work and pass in test and quizzes.	17	56.7	7	23.3	3	10.0	3	10.0
Teaching skills in maintaining discipline amongst class six mathematics pupils does not ensure that pupils with dyscalculia are absent chronically.	13	43.3	10	33.3	3	10.0	4	13.3
Teaching methodology does not enable class six pupils with dyscalculia understand the place value	3	10.0	10	33.3	7	23.3	10	33.3
Adoption of appropriate motivational skills does not break anxiety	13	43.3	7	23.3	7	23.3	3	10.0

Key: Never or rarely **(0),** Sometimes **(1),** Often **(2),** Very often **(3)**

From the table 9 above, the study examined the effect of teacher competency on mathematics achievement. To assess the effect of the dependent variables on mathematics achievement, two questions each for each of the four objectives were asked for the

respondents to answer in relation on where it contributes to mathematics achievement among standard six pupils with dyscalculia. For objective one, majority of teachers (66.6%) indicated that they often and very often apply their psychology in teaching abstract concepts of time and direction, as this were considered a key factor in understanding mathematics concepts. For the same objective one, responses from (66.6%) of the teachers also indicated that class six teachers poses and apply presentation skills that enhance pupils with dyscalculia to recall schedules and sequences of future and past events. This finding is supported by the study (Makau et al., 2019; Thesis et al., 2016) who noted that in addition to application of presentation skills, teacher ability to vary them when teaching mathematics enhances understanding among learners. This finding compares well with the responses on Table 9, item 3, on instructional delivery, (56.7%) of the respondents observed that teachers enhances understanding mathematics content by breaking complex activities into simple tasks. This is also supported by 63.3% of the respondents in table 1, item 3, who noted that class six teachers are able to identify appropriate resource as a result of their training and experiences. For objective 2, on resource use, the study analysis found that (80%) of teachers indicated that they often and very often use available resources and especially the use of hard cash as an example of locally available material to eradicate fear in pupils with dyscalculia when teaching the content on money and financial transactions. This also correlates with the earlier finding regarding the effects of teachers ability to use locally available material, in Table 2, where (63.3%) of the respondents strongly agreed and agreed that their teacher uses manipulative and real objects to enhance mathematics understanding. For objective 3, on management skills contribution to mathematics, achievement, (80%) noted that

management and control skills are critical in supporting learners with dyscalculia. A further 76.6% of the teachers noted that teaching skills are important in promoting class discipline so as to cater for the need of pupils with dyscalculia. This finding also correlates with the finding in table 3, item 60% of the teachers were able to place all learners in mainstream classes so as to promote a sense belonging among learners with dyscalculia. Thus results agrees with the study of Momanyi (2019) who (Ogada et al., 2020) noted that teacher preparedness as a result of lesson preparation enhance performance among learners with dyscalculia among standard six pupils and that the choice of instructional method enables learning of place value among learners. This result is also supported by an earlier finding in Table 9, item 1, that (53.7%) of teachers strongly agreed and agreed that their teacher uses systematic phonic to enhance curriculum delivery. Similar studies carried out on teacher competencies, have observed that resource availability and use of locally available ones enhance learning process among mathematics learners, especially those with challenges (Ayiema et al., 2018). Momanyi (2019) and Nyakundi (2019) also found that teaching methodology and teacher preparedness is key in teaching mathematics among primary school learners (Momanyi et al., 2019; Nyakundi et al., 2019).

4.8 Qualitative Data Analysis and Presentation

The study carried out interviews among quality assurance and standards officer (QASO) and 38 pupils along 5 interview questions. Their feedback are summarized as hereunder;

4.8.1 Do Class Six Mathematics Teachers Possess Minimum skills

In order to examine the perception on teacher competencies along the four objectives, the QASO and standard six learners were asked to provided responses alongside the four research objectives. The respondents gave their opinions by commenting on whether class six teachers possess requisite competencies, utilize available resources, possessed appropriate class management skills and used appropriate instructional methods to handle pupils with dyscalculia challenge.

For objective one, the question, "Do class six teachers meet minimum skills and competencies to assess pupils with dyscalculia" was asked and the respondents noted that as per training institutions curriculum, specific pedagogies are offered to trainees in handling pupils with different learning abilities. As such, the learners and QASO felt that, class six teachers were adequately trained and possess requisite skills and expertise in supporting learners with dyscalculia. In the study done to examine teacher qualification for rural and urban schools, the study noted that teacher characteristics and qualification which comprise teacher education and teacher professional development and teacher classroom practices are significantly associated with student achievement among primary school learners (Barasa, 2020). This shows that the finding of the current study concurs with this observation.

For objective two, the question, "are mathematics teaching and learning resources in school relevant and adequate to support learners with dyscalculia" was asked and the respondents noted that the, *"teachers always use available resource and sometimes we assist the teacher make some of mathematics objects such as boxes"* was recorded most

of the learners. QASO officer, noted that this was in line with the training experience and learning from peers among teachers since not all primary schools are adequately resourced and government support is limited. (Kisirkoi et al., 2016; Momanyi et al., 2019) opines that teacher preparedness and sourcing for resource materials as teaching aids increases learner understanding of learning concepts.

For objective three, the question, "how do class six mathematic teachers manage pupils with dyscalculia for effective instructional delivery" was asked and the respondents. Most of the pupils were of the opinion that, "*the teachers often move around the class when teaching and assist students who have difficulties"*. This was an indicator that class six mathematics teachers are able to diversify the pedagogies and apply them effectively to ensure that all learners, even those with dyscalculia challenge are supported. The QASO officer, noted that, every teacher is expected to embrace lifelong learning and thus the need for every teacher to enroll for teacher professional development (TPD) so as to diversify their approaches in teaching and learning process for effective learner centred approach. (C. I. Mackatiani et al., 2018) in his study on learning achievements in primary schools in Kakamega, Kenya noted that teacher ability as a result of consistent teaching is able to innovate and apply methods and techniques that are unique to the learning process. When applied effectively, these approaches constitute unique teacher-centred approaches that can support learning effectively.

For objective four, the question, "Do class six mathematics teachers possess effective lesson and delivery skills of mathematics content" was asked. Learners noted that their teachers use charts, and drawings to illustrate some concepts and the same drawings and

charts were pinned on the classroom wall. The QASO officer noted that such varied learning resources were necessary to enhance better and simpler way of enabling learners to grasp mathematics concepts. Further the QASO officer opined that, instructional methods is a key component of teacher curriculum in college or university and sometime they practice role-play among peers in teaching so as to benefit from feedback from teacher colleagues. (Garbutt et al., 2018; Sarker et al., 2019) also found that leveraging technology use can enhance lesson delivery among learners. As such, it is a necessity for teachers to incorporate novel teaching approaches that can enhance learning among class six pupils with dyscalculia.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter covers a summary of the key findings, conclusion of the study, recommendations and suggestions for further studies.

5.2 Summary of the Study

The main objective of the study was to establish the influence of the teacher competency in determining mathematics achievement among class six learners with dyscalculia in Kiritiri division, Mbeere south sub-county Kenya. The sampled population comprised of 38 pupils, 30 teachers and QASO officer. The following summary are the main findings of the study presented as per research objectives. The summary is also presented by assessing mean responses obtained from the study.

Table 5.1: Summary of Means Responses (Positives and Negatives)

Objectives	**Mean Response (Positives)-Agreed**	**Mean Response (Negatives)-Disagreed**
Teacher qualification on mathematics achievement (IV1)	60%	54.4%
Use of locally available resources on mathematics achievement (IV2)	60%	51.1%
Teacher management skills on mathematics achievement (IV3)	58.9%	54.4%

Teacher instructional delivery on mathematics achievement(IV4)	55.6%	55.6%
Effect of teacher competency on mathematics achievement (DV)	73.3%	66.7%
Total Average Responses	**62%**	**56%**

Source: Research Data 2020

Key:

- For independent variables, aggregates were obtained for the first 3 positive items and the last three negative items for each objective
- For dependent variables, aggregates were obtained for the first 4 positive items and the last 4 negative items for each objective

5.3. Effects of teacher's qualifications

The study established that (60%) of class, six mathematics teachers agreed that mathematics teachers are well trained and therefore knowledgeable to teach pupils with dyscalculia. Most of them 63.3% also agreed that teachers have the necessary skills and have acquired long teaching experience that possibly made them acquire a strong mastery of content due to repeated performance. 56.7% of the teacher respondents also agreed that they were able to identify pupils with dyscalculia owing to their experience in the teaching profession. Moreover, 56.7% of the respondent teachers disagreed that they do not set guideline for teaching pupils with dyscalculia. Majority of the teachers 53.3% also

disagreed that their they are not able to cope with pupils with dyscalculia while a further 53.3% disagreed that they have negative perception on learners with dyscalculia.

Cumulatively, 60% of teachers responded positively that they possessed minimum qualification, had requisite qualification and were able to identify learners with dyscalculia in their classrooms. This is considered to positively influence learner's mathematics achievement among. Further, when asked whether they do not set guidelines, or able to cope with learners and whether they disliked their learners with dyscalculia, 54.4% of the respondents disagreed with the statement with a further 11.1% undecided. This present s a positive indicator that majority of the teachers regarded learners with dyscalculia with respect and offered the necessary support. It can be inferred that, class six mathematics teachers put in a lot of effort to support all learners irrespective of the academic challenges.

With 60% positive cases being greater than 54.4% negative cases, teacher qualifications, experiences and abilities are considered to determine by a great extent mathematics achievement by class six pupils with dyscalculia.

5.4 Effects of the teacher's use of locally available resources

The study established that (63.3%) of class, six mathematics teachers agreed that use of charts and flash cards contributed greatly to the learning achievement among pupils with dyscalculia. Most of the respondent's teachers 63.3% also used real objects and manipulated the learning process to suit the learners with dyscalculia. 53.4% of the teacher respondents also agreed that the use of tape recorders enhanced learning

experience among the learners. Moreover, 46.7% of the respondent teachers disagreed that they do not videos in their lessons, while another 53.3% also disagreed that not issue reference materials to the learners and a further 53.3% disagreed that they do not use teachers guide when delivering their lessons. It is evident from the findings that adoption of technology is a challenge among rural primary schools as evidenced by the those felt that teachers use videos during their lessons (46.7%).

Cumulatively means scores were obtained, where 60% of the teachers returned a positive agreement on the use of charts, real objects and tape recorders. Also, 54.4% of the teachers disagreed that they do not use videos, do not issue text books nor use teachers guide during their lessons. The opinion counts for agreement 60% was greater than for disagreement 51.1%. Though there was a small margin between the two measures, this indicates that class six teachers considered resource availability a key component that supports learning experience among learners with dyscalculia. This supported the above findings that the teacher's use of locally available resources determined mathematics achievement of class six pupils.

5.5 Effects of Teacher Classroom Management skills

The study established that (56.7%) of class, six mathematics teachers encouraged parents and regularly consulted them on the welfare of pupils with dyscalculia. Majority of the respondent's teachers 60% also encourage learners with dyscalculia. 60% of the teacher respondents also ensured that all learners were put together in mainstream classrooms to enhance a sense of belonging among learners with dyscalculia. 53.3% of the respondent teachers disagreed that they do not place learners with dyscalculia in mainstream

classrooms, affirming the positive item 4 (53.3%). A further 53.4% also disagreed that not cater for IEPs lessons for the learners and a further 56.7% disagreed that they do not offer oral questions to the learners with learning difficulty. It is evident from the findings that teacher support in the learning process, promoters better understanding of mathematics, thus contributing to greater achievement among learners with dyscalculia.

From table 12, cumulatively means scores were obtained, where 58.9% of the teachers returned a positive agreement on why parents should be encouraged, pupils to be encouraged and why placing learners with learning challenges in mainstream classrooms leads to a greater achievement in mathematics subject. Cumulatively also, 54.4% of the teachers disagreed that they do not place learners in mainstream classes, do not provide for individualized education experience and whether they offered oral questions to learners with learning challenge.

Overall, for objective 3, management skills is considered to enhance learning experience in mathematics among learners with dyscalculia. Therefore, the study avers that, aggregately, teacher's management skills determined class six pupils' mathematics achievement largely.

5.6 Effects of the teacher's instructional delivery

The study found that 53.7% of class, six mathematics teachers used systematic phonics to support learning with pupils with dyscalculia. Majority of the respondent's teachers 56.7% adopted a multi-sensory approach during their lessons. 56.70% of the teacher respondents also modified learning activities to encourage better understanding of

mathematics concepts. However, when the teacher respondents were requested to confirm if they did not used repetitions, used mother tongue or rarely designed the IEPs, 53.3%, 56.7% and 56.7% disagreed. This implied that, mother tongue, use do repetitions and designed IEPs contributed to a great extent the learning experience and thus mathematics achievement among learners. The findings thus provides an evidence that instructional delivery plays a great role in promoting mathematics achievements among learners with dyscalculia.

Cumulatively means scores was obtained, where 55.6% of the teachers returned a positive agreement on whether teachers should embrace novel instructional delivery methods when teaching mathematics among class six learners. The finding was however averagely confirmed by the results of the cumulative positive statement that was 55.6% for both positive and negative statements thus showing that teacher's instructional delivery thus determined class six pupils' mathematics achievement.

5.7 Effects of the Teacher's Competencies on Mathematics Achievement

From table 12, class six teachers who responded to the study had 62% of average responses agreeing that teacher qualification, availability of local resources, management skills and instructional delivery approaches contribute to the achievement of mathematics among pupils with dyscalculia by 62%. Further, 56% disagreed that qualification, resource use, management skills and teaching methods do not contribute to mathematics achievement among learners with dyscalculia. With a positive deviation of 6% (62-56), there is evidence that more teachers are bound to support the deployment of these strategies (qualification, resources, management skills and instructional methods) as key

ingredients to support learners with dyscalculia, not just in class six classrooms, but also in the entire basic education levels.

5.8. Effects of teacher's competencies from Learners and QASO responses

Through the interview findings, the study found out that teacher's qualification, resources and instructional delivery factors determined class six pupils' achievement in mathematics in Kiritiri division, Mbeere south sub county. The report findings also points out the importance of classroom environment and that sometimes pupils' attitudes towards mathematics may also lead to desperation and negative classroom behavior. There was an overwhelming concurrence among the learners that the teachers do go out of their way to source for locally available teaching aids, which are mostly left in the classroom to aid revisions and reference among the learners. The QASO officer, also noted that teacher qualification and innovative approaches during the learning process goes a long way in supporting learning achievement and experience among learners.

5.9. Conclusions

Based on the findings above, the study concludes that the teacher competencies determined to a great extend (62%, table 12) mathematics achievement of class six pupils in Kiritiri division, Mbeere South sub-county. However, teachers reported that despite the fact that they adopted the appropriate approach for instructional delivery, class six pupils' achievement in mathematics was to a large extent influenced by attitudinal factors that also affected their active classroom participation and educational outcomes. The study established that there was inadequacy of teaching and learning resources in schools and this hindered the effectiveness of the teaching process thus limiting the momentum for

persuasive learning. It also emerged that the teacher's classroom management skills factors influenced learners' attitude towards mathematics achievement and the performance trend was determined by individual candidates' ability and classroom discipline. Finally, the study concludes that provision of adequate resources, teachers' content mastery and pedagogical skills, and to some extent socio-cultural factors are likely to determine class six dyscalculic pupils' achievement in Mathematics in Kiritiri division, Mbeere South Sub-county of Embu County.

5.10 Recommendations

Based on the results of the study the following recommendations were made;

i. The school administrative body should ensure that there are enough teaching and learning resources in order to ensure persuasive learning process in schools. This can be done with cognizant that government support may not always be adequate.
ii. Teachers should strive to enrol for continuous in-service training to improve on their content mastery and pedagogical skills so as to be conversant with the tailor-made changing curriculum delivery demands to deliver mathematics content not only to pupils with dyscalculia but also to the mainstream pupils..
iii. Teachers and the community in general should endeavour to promote positive perceptions and attitudes towards mathematics as this determined pupils' achievement on the same.
iv. Teachers also are expected to guide and instruct pupils to attain desirable achievement levels in mathematics, by setting targets. They are expected to encourage and motivate pupils by giving them tasks they are able to do, while following up on them instils a sense of belonging and care.

v. The teacher should be a “model” (hidden curriculum) in which the pupils seek for identification and be able to communicate the essential relevance of mathematics both as forms of knowledge and in terms of their practical relevance to everyday life and employment.

5.11. Areas for further research

i. A similar study may be conducted in Secondary schools to find out whether the same findings would be replicated.

ii. Further research should be conducted on factors determining the pupils’ attitudes towards mathematics performance by pupils with dyscalculia in other levels of study.

iii. Socio-cultural factors determining mathematics achievement of class six pupils with dyscalculia can be further examined to assess the extent of its influence on mathematics achievement among pupils with dyscalculia

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APPENDICES

Appendix I: Introductory Letter and Consent Form

Dear Participant,

You are invited to participate in this study entitled "**TEACHER COMPETENCY AS A DETERMINANT OF MATHEMATICS ACHIEVEMENT AMONG CLASS SIX LEARNERS WITH DYSCALCULIA IN KIRITIRI DIVISION, MBEERE SOUTH SUB COUNTY, KENYA.**" I am master's students at Kenyatta University pursuing a course in special needs education. I am in the process of writing my master's project and thus the need for data collection. Attached is a questionnaire that is designed to assist in data collection.

Your participation in this exercise is voluntary. There are no known risks to participation beyond those encountered in everyday life. Your responses will be kept confidential and anonymous. No one other than the researcher will know your individual answers to this questionnaire. There are no direct benefits to you for participating in this research. If you agree to participate in this project, kindly answer the questions on the questionnaire as best as you can. It should take approximately 30-40 minutes of your time to complete answering the questions. Please return the questionnaire as soon as possible to the research assistant to enable me complete the project report.

If you have questions at any time about this study, you may contact the undersigned. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with me, please contact the Chairman, KU Institutional Review Ethics Committee (KU-ERC), P.O. Box 43844-01000.

CONSENT FOR TEACHERS AND QASOs:

I have read and I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand also that I will be given a copy of this consent form. I therefore voluntarily agree to take part in the study.

Participant's signature _____ Date _____

Investigator's/Research assistant signature: _____Date _____

Investigator's contact: 0723342138

Thank you for your assistance.

Appendix II: Questionnaire For Teachers

Kindly fill the information required truthfully. Please do not write your name or contact anywhere in this questionnaire.

Section A: Bio Data

1. Indicate your gender

   Male ( )

   Female ( )

2. Indicate your age (by ticking appropriately)

   25-30 years ( )

   31-40 years ( )

   41-50 years ( )

   Over 50 years ( )

3. Indicate your level of education (by ticking appropriately)

   Diploma/Certificate level ( )

   Degree level ( )

   Master`s degree level ( )

   Doctoral degree level ( )

4. Indicate the your length of service in teaching (tick appropriately)

   Less than 5 years ( )

   6-10 years ( )

   11-15 years ( )

   Over 15 years ( )

Section B: Questionnaire Items on Independent Variables

Instructions on filling the table

Kindly indicate your agreement level on the statement given from strongly agree to strongly disagree as provided below. The description of the items (SA, A, U, D and SD) are provided below the table

Table 4: Effects of Teacher Qualifications on Mathematics Achievement

ITEM	SA	A	U	D	SD
Class six mathematics teachers are well trained and have full knowledge of the meaning of dyscalculia					
Class six mathematics teachers have long experience and are aware of the causes of dyscalculia					
Class six mathematics teachers are able to identify pupils with dyscalculia in class					
Class six mathematics teachers set guidelines for appropriate classroom behaviour for pupils with dyscalculia.					
Class six mathematics teachers are able to cope with pupils with dyscalculia					
Class six mathematics teacher hates pupils with dyscalculia					

Key: Strongly Disagree **(SD),** Disagree **(D),** Undecided **(U),** Agree **(A),** Strongly Agree **(SA)**

Table 4: Effects of use of Locally Available Resources on Mathematics Achievement

ITEM	**SA**	**A**	**U**	**D**	**SD**
Class six mathematics teachers use charts and flash cards to enhance teaching and learning					
Class six mathematics teachers uses manipulative or real objects during teaching/learning process.					
Class six pupils with dyscalculia are occasionally taught using tape recorders.					
Class six mathematics teachers do not use videos in teaching.					
Class six mathematics teachers do not issue textbooks to pupils.					
Class six mathematics teachers do not use the teacher's guidebook to enhance delivery.					

Table 5: Effects of the Teacher's Classroom Management Skills on Mathematics Achievement

ITEM	**SA**	**A**	**U**	**D**	**SD**

Class six mathematics teachers encourage parents of pupils with dyscalculia to bring them to school					
Class six mathematics teachers encourage pupils with dyscalculia to learn with others in the mainstream class.					
Class six pupils with dyscalculia are placed in the mainstream class for free interactive and inclusive learning					
Class six mathematics teachers do not include pupils with dyscalculia with mainstream ones.					
Class six mathematics teachers do not cater by offering IEP for pupils with dyscalculia by keenly marking their written work.					
Class six mathematics teachers do not distribute oral evaluation questions to include pupils with dyscalculia.					

Key: Strongly Disagree **(SD),** Disagree **(D),** Undecided **(U),** Agree **(A),** Strongly Agree **(SA)**

Table 6: Effects of the Teacher's Instructional Delivery on Mathematics Achievement

ITEM	**SA**	**A**	**U**	**D**	**SD**
Class six mathematics teachers use systematic phonic when teaching					
Class six mathematics teachers use multi sensory approach during mathematics teaching/ learning process					

Class six mathematics teachers modify activities from simple to complex tasks to enhance understanding mathematics					
Class six mathematics teachers do not use drills and repetition in verbal and written work to cater for individual differences in teaching mathematics					
Class six mathematics teachers rarely design and implement individual instructions in teaching mathematics for pupils with dyscalculia					
Class six mathematics teachers do not use mother tongue when teaching mathematics to pupils with dyscalculia					

Key: Strongly Agree(SA), Agree(A),Undecided(U), Disagree(D), Strongly Disagree (SD)

Table 7: Questionnaire on Mathematics Achievement among Class Six Learners

ITEM	**0**	**1**	**2**	**3**

	F	%	F	%	F	%	F	%
Applying psychology in teaching class six pupils with dyscalculia abstract concepts of time and direction has improved their achievement								
My presentation skills enhance ability in class six pupils with dyscalculia to recall schedules and sequences of past or future events.								
Class six pupils with dyscalculia learn better when they use physical resources to enhance counting backwards.								
Pupils with dyscalculia enjoy use of hard cash in learning to eradicate fear during money and cash transactions lessons.								
Teacher's management and control skills does not enable pupils with dyscalculia to do all book work and pass in test and quizzes.								
Teaching skills in maintaining discipline amongst class six mathematics pupils does not ensure that pupils with dyscalculia are absent chronically.								
Teaching methodology does not enable class six pupils with dyscalculia understand the place value								
Adoption of appropriate motivational skills does not break anxiety								

Key: Never **(0),** Sometimes **(1),** Often **(2),** Very often **(3)**

Thank you

Appendix III: Interview Guide for Learners and QASOs Officers

CONSENT FOR HEAD TEACHERS:

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that the participation of class six pupils is voluntary and that I can withdraw their participation at any time, without giving any reason and without cost. I understand that I will be given a copy of this consent form.

Head teacher's signature /QASO_____ Date _____

Investigator's/Research assistant signature: _____Date _____

Investigator's contact: 0723342138

Thank you for your assistance.

This interview guide is prepared to evaluate the teacher competency as a determinant of mathematics achievement by class six pupils with dyscalculia. Any information given will be treated confidentially and will only be used for this research.

1. Do you think class six teachers are well trained and have skills and competencies to identify and assess pupils with dyscalculia?
2. Are mathematics teaching and learning resources in schools relevant and adequate to enhance class six mathematics instructional supports for learners with dyscalculia?
3. How do class six teachers manage pupils with dyscalculia for effective instructional delivery of mathematics?
4. Do class six teachers possess effective lesson skills for delivery of mathematics content to pupils with dyscalculia?

Thank you

Appendix IV: Reliability Coefficient Results

Table 8: Results of Reliability Coefficients Results

Variables	Measures	Cronbach`s alpha
Teacher competency	Teacher qualification	0.754
	Local teaching resources	0.811
	Teacher management skills	0.782
	Instructional delivery	0.791
Mathematics achievement	profit margins	0.756

Source: Researcher, 2020

Appendix VIII: Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **215964**

Date of Issue: **15/August/2022**

RESEARCH LICENSE

This is to Certify that Ms.. CHRISTINE MUTHONI NJIRU of Kenyatta University, has been licensed to conduct research in Embu on the topic: TEACHER COMPETENCY AS A DETERMINANT OF MATHEMATICS ACHIEVEMENT AMONG CLASS SIX LEARNERS WITH DYSCALCULIA IN MBEERE SOUTH SUB COUNTY, KENYA. for the period ending : 15/August/2023.

License No: **NACOSTI/P/22/19583**

215964

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NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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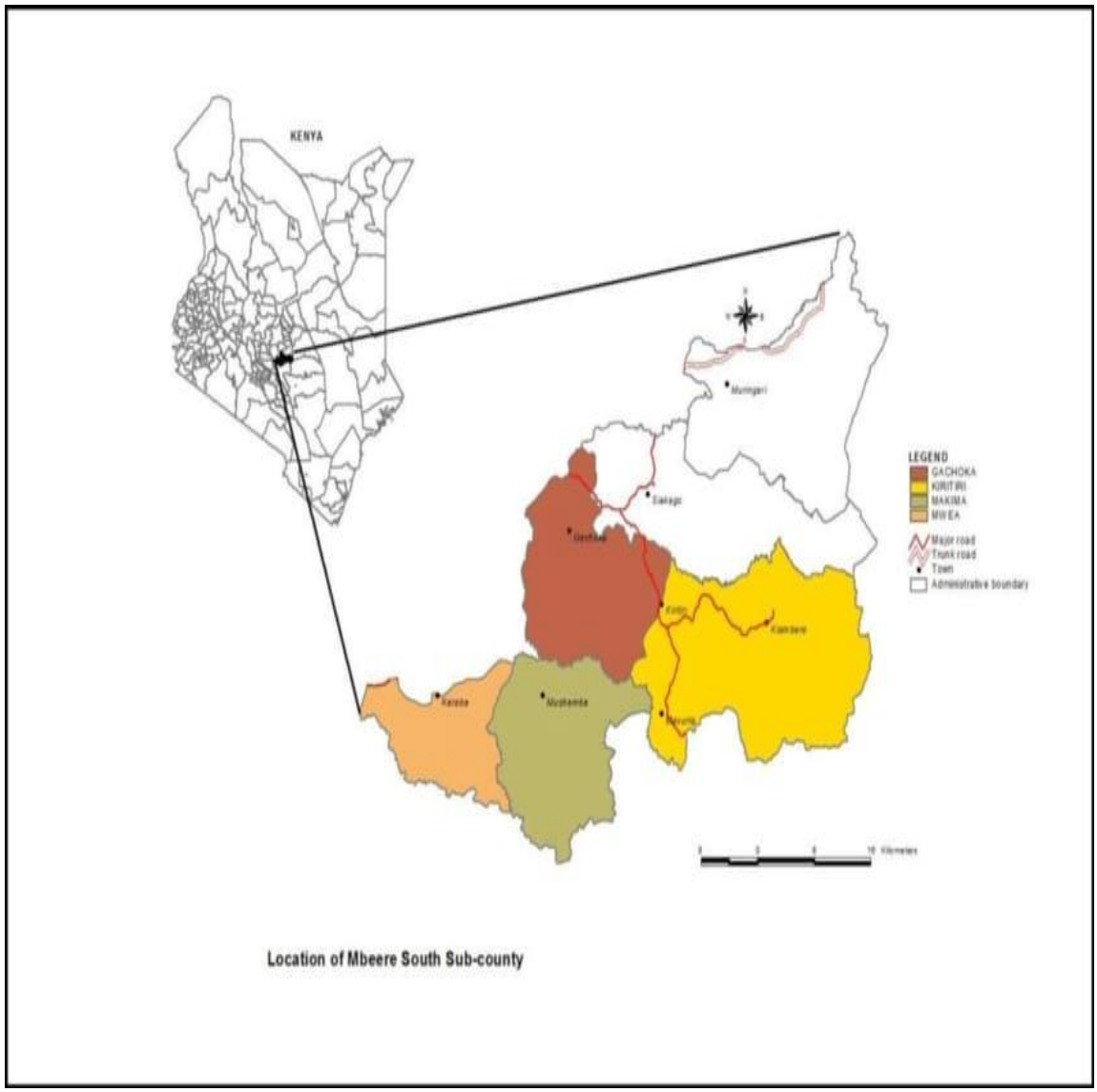
Appendix VII- Mbeere South Sub-County Administrative Map



Location of Mbeere South Sub-county

Appendix IX: Research Authorization

a

MINISTRY OF EDUCATION

State Department of Early Learning and Basic Education

Telegrams: "Provedu". Embu
Telephone: Embu 31711
Fax: 30956
E-mail: cde.embu@yahoo.com
When replying please quote:

OFFICE OF THE
COUNTY DIRECTOR OF EDUCATION
EMBU COUNTY
P o Box 123-60100
EMBU

Ref: EBC/GA/32/1/Vol. V/73
Christine Muthoni Njiru

Date: 24th August 2022

Kenyatta University

RE: RESEARCH AUTHORIZATION

Reference is made to NACOSTI letter dated 15th August, 2022.

This office acknowledges receipt of your research authorization to carry out research on **Teacher Competency as a determinant of Mathematics Achievement Among Class Six Learners with Dyscalculia in Mbeere South Sub-County Embu County Kenya for** a period ending 15th August, 2023.
This office has no objection and therefore wishes you success in this undertaking and requests prospective participants/respondents to accord you cooperation or support you may require.

J .K.KAIRU
County Director of Education
EMBU COUNTY

Copy to:

The Principal Secretary,MOE-**NAIROBI**
The Secretary/CEO, NACOSTI – **NAIROBI**
The County Commissioner – **EMBU COUNTY**
The Sub-county Directors of Education – **MBEERE SOUTH**