MAKERERE  UNIVERSITY

TEACHERS' INSTRUCTIONAL EFFECTIVENESS AND LEARNERS' ENJOYMENT OF SECONDARY SCHOOL MATHEMATICS IN KIRA MUNICIPALITY - WAKISO DISTRICT

BY

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2016/HD04/1566U

A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILMENT OF THE DEGREE OF MASTER OF EDUCATION OF MAKERERE UNIVERSITY

DECEMBER, 2018

Declaration

I, **Francis Ssengendo** solemnly declare that the work presented in this dissertation is my original work and has not been presented to any other university or institution of higher learning for an academic award. All other secondary sources have been acknowledged.

Signature .....

FRANCIS SSENGENDO

2016/HD04/1566U

Date 20/11/19

Approval

This is to certify that this dissertation has been written under our supervision and is now ready for examination.

Signature……

Associate Professor Joseph Oonyu

Date: 20/11/2019

Signature……

Dr. Henry Kariisa Ampeire

Date……

Dedication

This work is dedicated to all my learners of mathematics whose love for mathematics I have always struggled to make a reality.

Acknowledgement

I wish to thank God for this other opportunity for me to dare this wonderful experience. I am deeply indebted to my research supervisors for their patience with my inadequacies as they guided me through the research process. Without your parental and professional input, this research would have been difficult to elevate to its current level.

I acknowledge with gratitude the contributions and co-operation made by the respondents from secondary schools in Kira municipality - Wakiso district, for their willingness to provide the necessary information when I visited during the research process. Without their cooperation, this study would have been impossible to accomplish.

I also thank my colleagues at School of Education, Makerere University and the persons who dealt with secretarial work and those who read through the questionnaires and perfected the draft report.

I deeply treasure the contributions of all the above persons and ask God Almighty to richly bless them.

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ABSTRACT

The study aimed at assessing the relationship between 'Teachers' Instructional Effectiveness and learners' enjoyment in the learning of secondary school mathematics in Kira Municipality - Wakiso District'. It was prompted by the observation that learners of mathematics rarely proudly talk about enjoying their learning experience in relationship to their mathematics teacher. Could it be about the teachers' instructional effectiveness among other factors? The study objectives were: assessing the relationship between the teachers' communication skills, the teachers' classroom engagement and organisation skills and the teachers' pedagogical skills and the learners' enjoyment of mathematics. A cross sectional design with both quantitative and qualitative research approaches was used. Data was obtained from a sample of 360 math learners and 10 teachers as key informants. It was analyzed using the statistical package for social sciences (SPSS) version 22 to generate frequencies, percentages and tables. Pearson correlation co-efficient was used to establish the relationship between the independent and dependent variables. The findings of the study showed that there is a positive and significant relationship between teachers' pedagogical skills, the teachers' classroom engagement and organisation skills and the teachers' communication skills and learners' enjoyment of mathematics. Hence an improvement in these skills can lead to an increase in learners' enjoyment of mathematics. Although all the three factors were significant, the regression analysis rated the relationship between the teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics highest. Hence they exert the greatest influence in developing the learners' passion and value of mathematics. The study recommended that in teacher training colleges, among other things, the communication laboratories that simulate classroom situations should be revived so that trainee teachers are helped more to learn specialized teacher communication; teachers should be encouraged to do team-teaching in order to improve on their classroom engagement and organisation skills and to always be aware that classroom control is more than maintaining discipline but a real socialization setting in which relationships are developed; school administrators to organize and facilitate annual refresher courses for teachers as to keep the combination of sociology and pedagogy a reality and Secondary Science and Mathematics Teachers, SESEMAT to do regular inspection of mathematics teachers in order to constantly monitor, evaluate and provide feedback and technical support to them amidst competing challenges such as large classroom sizes, inadequate resources and funding.

CHAPTER ONE

1.0 Introduction

This chapter gives the foundational information about the variables: teacher instructional effectiveness and learners' enjoyment in the learning of mathematics. It gives the background, the statement of the problem, purpose of the study, specific objectives of the study, study questions, scope of the study, significance and justification of the study.

1.1 Background of the study

Uganda has developed "Vision 2040" whose National Vision Statement is "A Transformed Ugandan Society from a Peasant to a modern and prosperous country within 30 years" built on infrastructure (for energy, transport, water, oil and gas and ICT); Science, Technology, Engineering and Innovation (STEI) (Uganda Vision 2040). Mathematics permeates the entire society, for which reason it is becoming necessary for everyone to have mathematical skills to function intelligently in today's world. The place of mathematics in the life of any nation is said to be inextricably linked with the level of development in that nation (Nuria, 2006). The increasing attention given to mathematics stems from the fact that without mathematics there is no science, without science there is no modern technology, and without modern technology, there is no modern society (Anaduaka 2011). This therefore suggests that there could be no real development technologically without a corresponding development in mathematics both as conceived and as practiced. Mathematics plays an indispensable role in realizing any nation's dream of rapid scientific and technological development. Indeed no nation that wants to develop scientifically and technologically neglects the mathematical component of her school curriculum (Anaduaka 2011).

The development of mathematical understanding rests upon the idea that teachers can provide learners with the opportunity to experience mathematics in authentic situations (Anaduaka, 2011). The skill of being a teacher is one of a learned capacity to keep shifting states of order intelligently in such a way that the emotions of children are caught up and organized toward achievement of a specific goal (Helenrose, 2003). Mascolol (2005) suggests that if teachers take the time to build relationships with their learners, they can motivate them to learn. Teachers have to ensure that they are meeting learner needs, both academically and emotionally. Creating classroom environments that promote positive cultures with healthy interactions can motivate learners to set higher goals for themselves and channel their energies and desires to reach their goals (Andualem, 2006) hence realizing the fun and enjoyment of the experience of math.

1.1.1 Historical Perspective

For a certain period of time, research findings have discovered different factors affecting learners' enjoyment in mathematics (Silesh, 2015). Some of these are demographic factors such as gender, parents' educational level and socio economic status. While learners' enjoyment in mathematics is favourable in developed countries such as USA, Britain and Germany, this may not be the case for many developing countries where leaners are not given the freedom of choice of whether to offer mathematics or not which is seen as hardening some learners' life and future especially those who lack interest in mathematics (Silesh, 2015). This could be attributed to the digital divide, which has favoured the development of mathematics and its progress in the education systems of developed countries, and not so for the developing countries.

The researcher singled out instructional effectiveness and evaluated its relationship with learners' enjoyment of mathematics. Teacher instructional effectiveness has evolved over the

years from teacher-centred to learner-centred in the recent past in an attempt to improve on the learning and appreciation of mathematics. The distinction between learner- and teacher-centered pedagogy is often made with reference to the distribution of expertise and authority in the classroom with special attention to how the teacher communicates, manages the classroom and the actual pedagogical skills (Mascolo, 2009). He defined traditional teacher-centered pedagogy as a style in which the teacher assumes primary responsibility for the communication of knowledge to learners. From this view, because teachers command greater expertise about the subject matter, they are in the best position to decide the structure and content of any given classroom experience. Over the years however, this approach has been modified while others have challenged it. Piaget (1972) for example, rejected the idea that learning was the passive assimilation of given knowledge. Instead, he proposed that learning is a dynamic process comprising successive stages of adaption to reality during which learners actively construct knowledge (Mascolol, 2005). Piaget opened the eyes of educationists to the fact of the development stages of learners and how teacher instructional effectiveness is tied to these stages, placing the learner at the centre of the teaching/learning process. He highlighted the importance of the learners' engagement hence their enjoyment of learning. Learner-centered education is based upon the idea of an active learner (Mascolo, 2009) who directly participates in the learning as opposed to one who passively listens, swallows and regurgitates what the teacher gives.

The foregoing contrast of the teacher-centred and the learner-centred approaches in schools hints at the efforts made over the ages to improve the learning experience to be a satisfying one for the learner. Teacher instructional effectiveness seemed to be at the centre of the two paradigms in terms of the teacher approach when communicating, managing the classroom and delivering the content. And all this is true to the learning of mathematics (Bullard, 2003).

In Uganda, the obligation for learners to offer mathematics as a compulsory subject dates back from colonial education, where the colonial masters required native Ugandans to learn basic arithmetic skills in order to work better in industry, offices and basic living. The Ugandan secondary school mathematics curriculum was established in colonial times to serve a small, select minority of high achievers in academic, and it was delivered with a 'dominant pattern of expository, whole-class teaching' (Muwonge, 2009).

In 2005, science teaching/learning became compulsory for all secondary school learners from Senior one to Senior Four (Uganda National Academy of Sciences, UNAS, 2010). Mathematics stands out as the hinge on which all science rotates. Many efforts are being made to make mathematics in particular popular and loved. These include among others, supply of text books and resource materials and pre-service and in-service training of teachers.

Following the introduction of Universal Primary and Secondary Education Policies in 1997 and 2007 respectively (Uganda National Academy for Sciences - UNAS, 2010), the necessary resources required to help learners in broadening their knowledge in mathematics became inaccessible to the majority of learners due to ever soaring numbers of learners and given the limited number of teachers who could not match with ever increasing number of learners, many learners were bound to be left unassisted which reduce their interest for the subject (Muwonge, 2009). One of the major outcomes of this situation is the dread of mathematics by learners which is a big challenge to their enjoyment. They end up avoiding math and math-related professions, severely limiting their future career and earning opportunities (Beilock & Maloney, 2015).

To make things worse, sub-math was introduced at Advanced Level for those offering Economics. Having a fear or dread of mathematics, will continue to leave many learners academically and emotionally "stuck." There remains the challenge of learners' interest of the learning of mathematics. It is therefore important to evaluate the teachers' effectiveness in light of these developments.

1.1.2 Conceptual Perspective

Learners' enjoyment of secondary mathematics is the dependent variable. Enjoyment is an emotion (Markle & O'Banion, 2014). It refers to a feeling of pleasure and satisfaction; delight; gratification and fascination. The expression of these often involves statements of opinions, beliefs, or an assessment of worth (Smith & Ragan, 2009). Like job-satisfaction as applied to the world of employment and work that means much more than a good salary or good working conditions, enjoyment of math is more and deeper than good grades and correct answers. It is an inner feeling of joy and fascination with the experience of math.

The concept of enjoyment represents the deeply held personal views of individuals and as such, they are often firmly held, experientially-based and jealously guarded. As such, when considering learners' enjoyment in education—particularly mathematics learning, care, empathy, respect and understanding are required (Simonson, 2010). The four dimensions: beliefs, values, attitudes and emotions, are widely accepted as fundamental aspects of the learners' enjoyment (Hughes, 2015).

In this study, enjoyment of mathematics referred to feeling at home with math, fascination and fun doing math and the beliefs, attitudes, satisfaction, values and emotions that learners acquire

from the learning of mathematics and these are expressed in terms of liking/disliking, enjoyment or avoidance of mathematics, belief that one is good/bad and that math is useful/useless.

In this study, instructional effectiveness means teachers' professional skills and ability to bring about learning as the end result of teaching (Oladele, 2015). The researcher used teachers' instructional effectiveness in terms of communication skills, classroom engagement and organisation skills and pedagogical skills and their relationship with the learners' interest in the learning of mathematics.

Instructional effectiveness focuses on two key components, the teachers' ability to perform actions (communication, classroom engagement and organisation and pedagogy) and the power of those actions to influence learner learning (Helenrose, 2003).

1.1.3 Theoretical Perspective

This study was guided by the affective-cognitive consistency theory developed by Rosenberg (1956). The theory postulates that the affective component of the attitude system may be changed by providing new information (changing the cognitive component) via a persuasive message. Once the individual has processed the new information, he or she will undergo an attitude change to bring the knowledge and affect into harmony. It has been adopted for this study because affective-cognitive consistency theory examines the relationship between attitudes/emotions and beliefs and posits that individuals are in an unstable state when their attitudes/emotions towards a subject, event or person and their knowledge about that object, event, or person are inconsistent (Greenfield, 2009). In the context of this study, the theory holds that if mathematics teachers could deliver mathematics content to learners via a persuasive method of communication, engagement and participative teaching methods, this could positively

influence learners' interest in mathematics. The issue of consistency is in fostering this engagement and largely depends on the teachers' effectiveness, the teacher being the guide in this interaction, driving the engagement towards specific goals. Consistency means a correlation. Instructional effectiveness does not necessarily cause enjoyment however it is related to it in arousing the requisite emotions towards learner satisfaction with the experience of mathematics.

The study was also guided by the socio-cultural constructivist theory of learning (Bullard, 2003). From a socio-cultural constructivist perspective, learners are seen as actively constructing knowledge and understanding through cognitive processes within a social and cultural context (Greenfield, 2009). Bullard (2003) assumes that applying constructivist principles in the teaching and learning process generates a new way of teaching mathematics, constituting a shift from teacher-centred to learner-centered pedagogy. The choice for this theory was to emphasize that instructional effectiveness must pay attention to learner needs and ensuring skills that communicate to the learner in his/her situation and setting up classroom engagement and organisation controls that ensure a conducive environment for learner engagement as sure foundations to learner enjoyment of mathematics.

1.1.4 Contextual Perspective

Despite the introduction of mathematics as a subsidiary subject at A-level in order to boost the understanding of economics and other sciences, many learners prefer other subjects such as computer science (Ministry of Education and Sports, 2015). In 'O' level, the ministry also reported that learners had low interest in mathematics as a subject, with many others dodging lessons, failing to consult their teachers or colleagues at school, hence explaining the decimal performance in the same subject (Ministry of Education and Sports, 2015). Other learners wish

that the subject was not compulsory at 'O' level. These are indicators of threats to learners' enjoyment of mathematics.

Due to many other reasons ranging from teacher training, teacher preparedness, teachers' communication skills, teaching methods, availability of resources and the learners' home environment, the teaching/learning of mathematics in Uganda has not been effective enough (Agaba 2013). In 2015, only 21.3% of senior four candidates reached the minimum competency of credit 6 (Uganda National Examinations Board report, 2015). The table below gives an idea of the situation of mathematics in Uganda.

Table 1: ***Performance of Senior Four Mathematics Candidates from 2013 to 2015***

Year	**Number of candidates**	**Percentage failure rate: learners who scored pass 7, pass 8 and failure 9 (together)**
2013	261,641	76.1
2014	286,166	72.8
2015	303,893	78.7

Adapted from Uganda National Examinations Board (UNEB) reports of 2013, 2014 and 2015

Teacher instructional effectiveness is greatly challenged in Ugandan schools. The established practice of mathematics teaching in Uganda is of chalk-and-talk and teacher-dependent pedagogy (Baale, 2014). The teacher stands at the front of the class, textbook in hand, and writes notes and examples on the board. The 'silent learners' copy it all down. Many Ugandan mathematics teachers would rather use a more active, learner-centred approach, but they feel they have little choice given the pressure to 'cover' the syllabus with large classes and very limited resources (Sikoyo, 2010). It is evident that learners are given very little chance to appreciate the beauty of mathematics.

The other predicament is that in most cases, mathematics teachers are considered intellectually gifted. It is therefore a cause of alarm when they fail to reconcile their intellectual prowess with inspiring of their learners. Educational theorists have argued that there is much more to learning than just the processing of information (Pintrich & Marx, 2013). It is important for a learner to feel comfortable and at ease with mathematics.

1.2 Statement of the problem

Mathematics permeates the entire society. It is becoming necessary for everyone to have mathematical skills to function intelligently in today's world (Anaduaka 2011). Teachers have to ensure that they are meeting learner needs, both academically and emotionally. The teachers' instructional effectiveness in terms of communication, classroom and pedagogical skills plays a very vital role in ensuring that the learning of mathematics is a satisfying experience to the learners. However, mathematics is acknowledged to be the most universally disliked subject once school has been left behind (Green, 2017). For most learners, engagement with mathematics is not a source of satisfaction, but rather one of frustration, discouragement, and anxiety (Nuria, 2006). Groups of adults discussing school days happily admit to having been "hopeless" at math (Green, 2017).

The main variable in the classroom is not the learner, but the teacher (Whitaker, 2004). The measure of the success story of the learners is a function of the effectiveness of a teacher through interaction with learners, teaching strategy, motivation, pedagogical content knowledge and classroom engagement and organisation (Aina 2015). However, few mathematics learners share wonderful and fulfilling experiences during and after school. There seems always to be a deplorable story about the teacher even before they talk about the real content of mathematics. Learners do not seem to forget the name and character of their mathematics teachers. This means

that among all factors that determine a good experience of mathematics engagement, the ones related to the teacher instructional effectiveness are especially outstanding. This is because teachers are the first and perhaps most important point of contact in a learner's life (Whitetaker, 2004).

The major effects of this state of affairs are in forms of dislike, dread and avoidance of math and math related subjects and contexts severely limiting their career and earning opportunities in the future (Beilock & Maloney, 2015). Many learners do mathematics because it is compulsory and they cannot wait to get done with that "stuff" after Senior Four. For example, only 20% of all learners who sat for the Uganda Advanced Certificate of Education in 2014 offered principal mathematics while in 2015 it was 24.8% (Uganda National Examinations Board reports, 2014). What if learners had a choice about doing math, how many would choose it? The real problem is the place of fascination, fun, satisfaction and enjoyment in the experience of mathematics.

The main concern remains: If teachers train in professional communication, classroom engagement and organisation and pedagogical skills, why should lack of fascination with mathematics persist? The researcher aimed at assessing relationship between this instructional effectiveness and the learners' enjoyment of mathematics in order to enable the interaction with mathematics to be a satisfying experience for both academic and real life purposes.

1.3 Purpose of the study

The purpose of the study was to evaluate the relationship between the teachers' instructional effectiveness and the learners' enjoyment of mathematics.

1.4 Specific research Objectives

The objectives of this study were to assess the relationship between the teachers':

i) To evaluate the relationship between teachers' communication skills and learners' enjoyment of mathematics.

ii) To evaluate the relationship between teachers' classroom engagement and organisation skills and learners' enjoyment of mathematics.

iii) To assess the relationship between teachers' pedagogical skills and the learners' enjoyment of mathematics.

1.5 Hypotheses

i) The teachers' communication skills have no significant relationship with the learners' enjoyment of mathematics

ii) The teachers' classroom engagement and organisation skills have no significant relationship with the learners' enjoyment of mathematics

iii) The teachers' pedagogical skills have no significant relationship with the learners' enjoyment of mathematics

1.6 Scope

1.6.1 Content Scope

The study had as its main focus to measure the relationship between the teachers' instructional skills and the learners' interest of mathematics. The researcher used communication skills, the teachers' class management skills and the teachers' pedagogical skills as the key elements of teacher instructional skills.

1.6.2 Geographical Scope

The study was conducted using randomly selected secondary schools in Kira Municipality, Wakiso District. The municipality has 42 secondary schools and ten of them were randomly selected for the study. 360 learners from these schools were also randomly selected for the study. Kira municipality was chosen because its schools are very representative of the typical secondary schools in Uganda ranging from the best to the poor schools both in terms of infrastructure human resources and academic standards. Therefore, the finding of the study could be generalized to the situation in the district.

1.6.3 Time Scope

The study was conducted in the academic year 2017/18 following the academic schedule and guidelines issued by the School of Education of Makerere University.

1.7 Significance

The study might be helpful to;

Curriculum developers to design more relevant learning experiences, methods and instructional strategies to lessen the current trends of high dread and avoidance of mathematics learning.

Classroom mathematics teachers to pay more attention to more specific communication, classroom engagement and organisation and pedagogical skills relevant to the different levels of mathematics teaching/learning to help inspire and motivate learners of mathematics.

Future researchers to delve deeper into pertinent issues with regard to the teachers' communication skills, social relations and methods of teaching in order to develop more relevant

theories necessary in effective teaching/learning of mathematics that guarantee learners' enjoyment.

1.8 Justification

In Uganda, mathematics is one of the basic and compulsory subjects all the way from primary school until completion of senior four. It is absurd that many times, the experiences that learners get with mathematics instead become nightmares. Learners either simply endure or even shun mathematics. In addition, mathematics and English form the basis for grading and determining academic success especially at Primary Seven and at Senior Four, and right now at Senior Six for those doing subsidiary mathematics. Anyone without at worst a credit six cannot pass with a first grade even if the other subjects qualify him/her to.

Teachers do their work but maybe there is still a lot lacking in order for them to be more effective. The researcher identified the teachers' communication skills, classroom engagement and organisation skills and pedagogical skills as crucial in bringing about instructional effectiveness and learners' enjoyment of mathematics. These need attention.

It was therefore a matter of urgency that this study was done in order to contribute positively towards improving mathematics teaching/learning if learners are to escape being declared failures due to their challenges in mathematics learning. In addition, mathematics traverses almost every aspect of life. There is urgent need to fight the nervousness and negativity that it is tainted with even in ordinary day-to-day life. It is now more than ever very important to understand that emotional satisfaction derived from mathematics is an important educational outcome, regardless of academic achievement level and that instructional effectiveness is key.

Chapter Two

Literature Review

2.0 Introduction

This chapter presents the theoretical framework, the conceptual framework and review of related literature on teachers' instructional effectiveness and learners' enjoyment.

2.1 The Theoretical Review

The study was guided by the affective-cognitive consistency theory developed by Rosenberg (1956). Affective-cognitive consistency theory examines the relationship between attitudes, feelings and beliefs and posits that individuals are in an unstable state when their attitudes towards a subject, event or person and their knowledge about that object, event, or person are inconsistent (Simonson & Maushak, 2001). The theory suggests that the affective component of the attitude system may be changed by providing new information (changing the cognitive component) via a persuasive message. Once the individual has processed the new information, he or she will undergo an attitude change to bring the knowledge and affect into harmony. Affective-cognitive consistency theory suggests that the affective component of the attitude system may be changed by first changing the cognitive component through providing new information. It does not matter how the new cognition is produced, only that it occurs. In relation to this study, if mathematics teachers could deliver mathematics content to learners via a persuasive method of communication, engagement and participative teaching methods, this could positively influence learners' interest in mathematics, and the reverse is true. The issue of consistency is in fostering this engagement and largely depends on the teachers' effectiveness, the teacher being the guide in this interaction, driving the engagement towards specific goals. Consistency means a correlation. Instructional effectiveness does not necessarily cause

enjoyment however it is related to it in arousing the requisite emotions towards learner satisfaction with the experience of mathematics.

The researcher also employed the constructivist theory of teaching/learning. Constructivists view the learner as an active participant involved in structuring their learning experience (Mascolo, 2009). The emphasis is on the active learner and the learner-centred approach. The teacher of mathematics is a guide in the process. This learner engagement is a promise to learner enjoyment of the process of doing math. Bullard (2003) assumes that applying constructivist principles in the teaching and learning process generates a new way of teaching mathematics, constituting a shift from teacher-centred to learner-centered pedagogy. The choice for this theory was to emphasize that instructional effectiveness must pay attention to learner needs and ensuring skills that communicate to the learner in his/her situation and setting up classroom management controls that ensure a conducive environment for learner engagement as sure foundations to learner enjoyment of mathematics.

The learner owns up, discovers and enjoys math as a reality of his/her own experience. By his/her communication skills, pedagogical skills but most especially engagement and motivation skills, the teacher creates a learning environment that promotes the learners' value and conscious option for math (Bullard, 2003). The theory has its limitations of free flow according to the learners' interests however, the role of the instructor is important; to direct and organize meaningful experiences for the learner (Mascolol, 2005). Instructional effectiveness demands that the teacher behaves as a guide and facilitator by applying relevant communication and classroom engagement and organisation skills that enable the learner to construct meaning and value in the learning of mathematics.

2.2 The Conceptual Framework

The researcher investigated the reality of teachers' instructional effectiveness and learners' enjoyment under teacher-factors: the teachers' communication skills, the teachers' classroom engagement and organisation skills and the teachers' pedagogical skills.

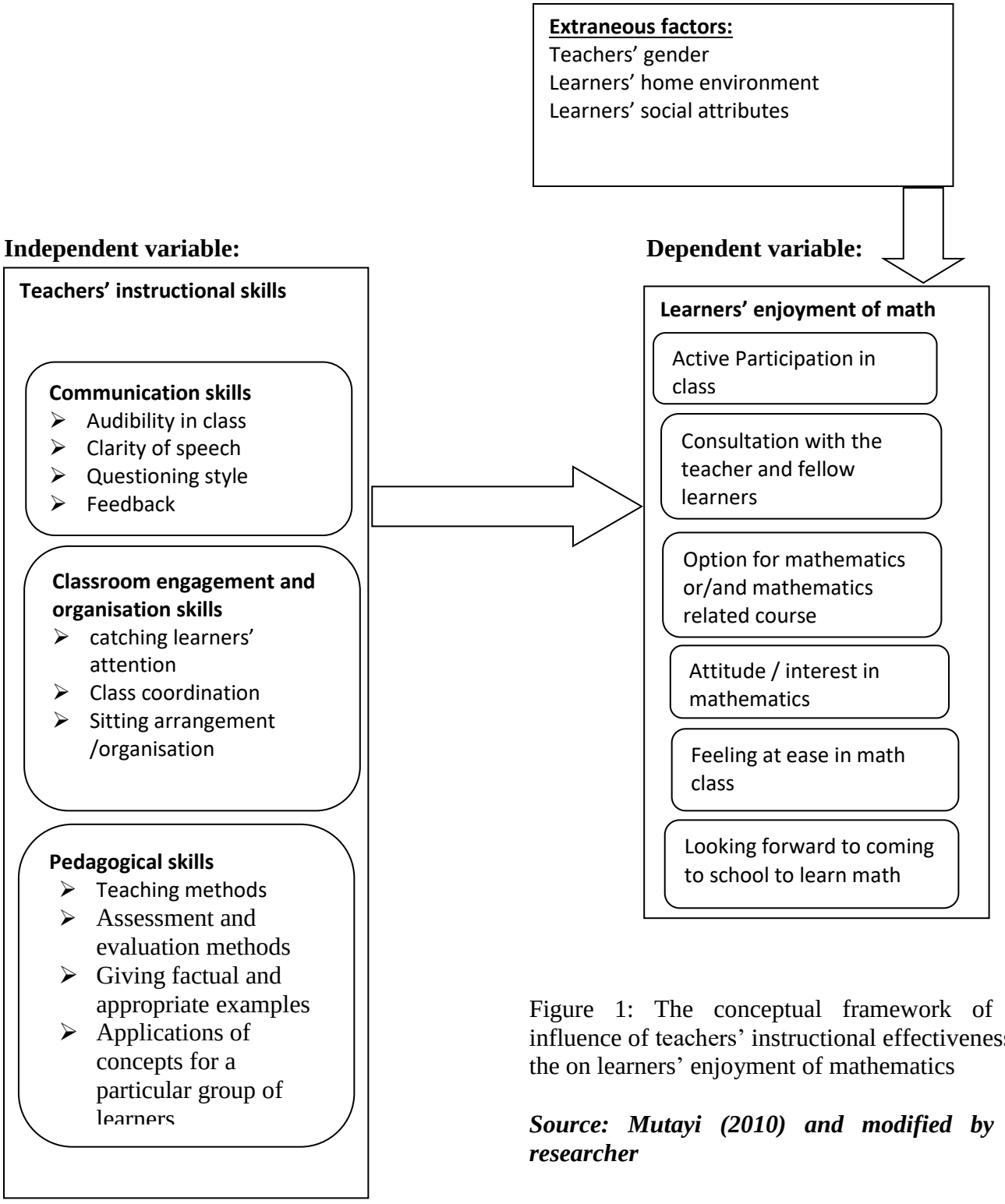

Figure 1: The conceptual framework of the influence of teachers' instructional effectiveness on the on learners' enjoyment of mathematics

Source: Mutayi (2010) and modified by the researcher

The conceptual framework above illustrates that the independent variable – teachers' instructional effectiveness has been operationalized into; communication skills (audibility in class, clarity of speech/teaching, questioning style, discussion methods, listening, and feedback); class room management skills (catching learners' attention, class coordination, and sitting arrangement) and pedagogical skills (teaching methods, assessment and evaluation methods, giving factual and appropriate examples, use of metaphors, and applications of mathematics concepts).

The dependent variable – learners' enjoyment has been operationalized into; participation in class, consultation with the teacher and option for mathematics or preference for a related course, attitude towards or interest in mathematics, looking forward to mathematics lesson and feeling at ease in a math lesson. This study therefore hypothesized that leaner's enjoyment among secondary schools in Kira Municipality; Wakiso district is determined / depends on teachers' instructional skills.

The conceptual framework indicates some extraneous factors that could influence the learners' enjoyment of mathematics. However the researcher didn't investigate them. They were controlled by eliminating any reference to them in the research tools.

2.3 Review of Related Literature

2.3.1 Communication skills and the learners' enjoyment

Since much learning is done within a social context, it is important to understand how dialogue between a teacher and learners, and among learners, can be used to enhance learner engagement. Instructional effectiveness has a lot to do with communication. Communication is a complex process (McKnight, 2013). It involves a real exchange between the teacher and the learner. A

constructivist perspective points to the need for communication skills that allow for active learning, where learners are engaged in writing, talking, describing, explaining, and reflecting processes (Bullard 2003). Enjoyment of mathematics comes with such a kind of engagement.

Some teachers like to talk, and expect the learners to write down what they say and to learn it (this style encourages superficial learning - and rapid forgetting) (Kalejaiye 2010). Other teachers see their role as one of helping the learners to learn at a deeper level - to understand new ideas and concepts so well that they can apply them in a work situation. Either way, these teachers will do a better job if they communicate well with their learners in clear and simple terms. (Kalejaiye, 2010).

In classroom discussions, effective teachers help learners to present and defend their own views, and critique the views of other learners. The instructor not only presents material, but also elicits questions and comments from learners, stopping periodically to pose questions for learners' consideration and giving them feedback. These instructional skills allow teachers to probe for learners' conceptual understanding and allow learners to work on tasks that require them to explore their reasoning, not just to give their answers hence giving a satisfying math experience to the learners (Bullard 2013).

2.3.2Classroom engagement and organisation skills and the learners' enjoyment

Instructional effectiveness depends a lot on a teachers' classroom engagement and organisation skills. Establishing the preferred management style in the first few weeks of school guarantees a smoother year with regards to both rapports between learners and teachers, and discipline issues within the classroom (Cheryl & Stutter, 2006). Teachers are told to establish their rules and expectations early so that the learners will know how they are expected to behave in the

classroom. This is classroom coordination. Another aspect of classroom engagement and organisation is how day to day activities will occur in the classroom. A majority of low achievement incidents that take place in the classroom originate from the insufficiency of teachers' classroom engagement and organisation skills (Adamson, 2008). The most successful classrooms often have a climate of respect between the teacher and the learner, where each feels as though they have a voice in the classroom and are respected mutually. The genuine enthusiasm displayed by the instructor is always a major factor in motivation because it is contagious. It engenders a pleasant atmosphere in the classroom and contributes to high motivation (Nugent, 2009).

In teaching any group of learners, classroom engagement and organisation is a priority for teachers (Adamson, 2008). Teachers must take into consideration each learner and create an atmosphere where all can be successful. This atmosphere includes any routines that the class will follow, as well as expectations of how classwork will be done and presented to the teacher for assessment. Many times, a balance must be met in order to facilitate this success, due to the different levels of motivation and aptitude in one classroom. The teacher must know when learners are having trouble with their work (Adamson, 2008).

According to Martin (2008), many strategies for classroom engagement and organisation including structure and organization have been introduced and implemented throughout the history of teaching. Many of these techniques have also been proven to help unmotivated children feel secure in a classroom and be able to succeed where they would not have in an unstructured environment. It has been assumed, however, that if a learner is found to be gifted,

they would not need these same techniques because of a natural ability for academics and success (Martin, 2008).

In school systems, there are many types of learners with differentiated needs for success in the classroom (Muwonge, 2009). Among these types are gifted learners. Though there is not one concrete definition of "gifted learners," most definitions agree that gifted children have different educational needs, thanks to their unique intellectual development. Even within this group, learners thrive in various environments—some need structure and organization to allow them to thrive within their boundaries, others are stifled by this type of environment. There are learners who are intrinsically motivated, and those that are content with coasting along. The challenge for the teacher of gifted children is to create an atmosphere where all learners can thrive (Muwonge, 2009). Instructional effectiveness ensures a level of classroom control that caters for the individual differences. Learners will enjoy depending on if the teacher knows when they are having trouble or not and gives the necessary support.

Classroom engagement and organisation also means relationships. The Hypothesis is that if teachers develop skills and take the time to build positive relationships, to create cultures of success and the expectation or value of such, then learners should or will be able to develop the desire for success and the love of learning (Nugent, 2009).

2.3.3 Pedagogical skills and the learners' enjoyment

Quality teaching occurs when the teachers' ongoing analysis of the context, and the teachers' decisions about which pedagogical knowledge and abilities to apply result in optimum learning by learners. All teachers are expected to meet the teaching quality standard throughout their careers. However, teaching practices will vary because each teaching situation is different and in

constant change. Reasoned judgment must be used to determine whether the Teaching Quality Standard is being met in a given context (Opolot, 2007). Quality of instruction includes elements such as effective questioning and use of assessment by teachers. Specific practices, like reviewing previous learning, providing model responses for learners, giving adequate time for practice to embed skills securely and progressively introducing new learning (scaffolding) are also elements of high quality instruction (Coe, 2014).

Instructional effectiveness requires that a teacher uses exciting methods applicable to particular classroom situations and appealing to real life situations (Allen, 2001). Mathematics content and objectives must be translated into meaningful learning activities. All this appeals to the learners' passion for math and increases the leaner's enjoyment.

According to Baale and Tandi (2003), pedagogical skills and motivation go hand-in-hand in the education of today's children. Without one, the other will not be as successful, and it is up to educators to determine the classroom balance that will render achievement of all types of learners. As Baale and Tandi (2003) state, "Each learner should have access to curriculum that is high level, authentic, meaning-making, expert-focused, and highly relevant to young adolescents" (p.9). While these facets are being applied to curriculum in this context, they can also be applied to the classroom in general. By not providing an authentic, interesting environment for learners to be successful in, an educator cannot delve into the learners' motivation and desire to learn (Baale & Tandi, 2003).

The antithesis of this idea is that a teacher who is patient, supportive and demonstrates a self-identified role as facilitator of mathematical learning can have a positive effect upon a learner's view of mathematics. They need to know that their teacher is able and willing to help them.

(Allen, 2001). The development of mathematical understanding rests upon the idea that teachers can provide learners with the opportunity to experience mathematics in authentic situations (Allen 2001). Sentamu (2006) provides three different scheduling options: (a) providing opportunities for independent study, (b) homogeneous groupings with learners of similar ability, and (c) heterogeneous groupings of mixed-ability learners. Each of these strategies has proven successful in different school systems, each with its own advantages and disadvantages.

Another consistent factor found in research that contributes to the success of reversing the trend of underachievement is the role of a specific teacher in a learner's educational career (Crotty, 2012). In Chinedu and Van Wyk (2015) study, the learners believed "a specific teacher was the single most influential factor in the reversal of the underachievement pattern". These teachers who proved influential were not the ones who let the learners get away with their underachievement, but those that had high but realistic expectations for success. Also, these learners were aware that the teachers had a positive regard for the learner's success, and were objective in their judgments of what interventions were necessary for the specific learner. By understanding the amount of influence one has as an educator, more active roles can be taken to ensure the learner's success in reversing the trend of underachievement (Chinedu & Van Wyk, 2015).

2.3.4. Learners' enjoyment of mathematics

Enjoyment is an emotion (Markle & O'Banion, 2014). It refers to a feeling of pleasure and satisfaction; delight; gratification and fascination. The expression of these often involves statements of opinions, beliefs, or an assessment of worth (Smith & Ragan, 2009). Like job-satisfaction as applied to the world of employment and work that means much more than a good

salary or good working conditions, enjoyment of math is more and deeper than good grades and correct answers. It is an inner feeling of joy and fascination with the experience of math.

The pioneer in work on enjoyment in mathematics was McLeod (1989b), who referred to it as a broad range of positive feelings and moods which are generally considered to be different from pure cognition, including, as specific components, attitudes, beliefs, and emotions (Nuria, 2006). Enjoyment can stand alone but often give rise to attitudes and beliefs. Mathematics is commonly seen as a study based on reason, with the emotions rarely engaged. Smith and Ragan (2009) found that strong emotions predominantly negative ones are linked with mathematics. They argue that evidence of negative feelings and attitudes to mathematics learning is so common a factor amongst the least able pupils in our secondary schools that we are in danger of assuming that it will inevitably be present. Their work also focuses on the role of emotions. When a learner is given a mathematical task, he/she produces an action sequence to complete the task. If the learner experiences an interruption whereby he/she can't finish the task, the learner normally experiences arousal in the nervous system e.g. muscular tension, increased heart rate. The individual also uses cognitive processes to evaluate the interruption that is interpreted as satisfaction, frustration or some other emotion. It is such satisfaction or frustration that either motivates or destroys the learners' enjoyment of mathematics.

According to Nuria (2006), there have been various official descriptions of attitudes to be fostered and encouraged including:

- Fascination with mathematics
- Interest and motivation
- Pleasure and enjoyment from mathematical activities
- Appreciation of the power, purpose and relevance of mathematics
- Satisfaction derived from sense of achievement
- Confidence in the ability to do mathematics at an appropriate level.

Clearly many of the young learners in their study would be emotionally engaged in their mathematical learning, and these emotions would facilitate deeper participation in the mathematics of the classroom (Grootenboer &Marshman, 2016). They argue that participation is therefore one of the indications of learners' enjoyment of mathematics. They also generalize that learners who enjoy mathematics will give more time and effort to their learning, use deeper and

more effective learning approaches in the mathematics classroom, and have greater success in their learning.

Learners' enjoyment of mathematics also goes with option for mathematics and/or mathematics related courses. Unfortunately, in many countries, the number of learners who choose not to participate in mathematics at higher levels of school and beyond is increasing and causing a range of national and international problems (Hannula, 2014).

> *Enjoyment and motivation are important, because they determine how much people choose to study mathematics after it becomes optional and in many countries the society has a shortage of mathematically educated persons in scientific and technical fields* (Hannula, 2014)

Similarly, McGregor (2014) suggested that enjoyment of mathematics and learning mathematics influences learners' propensity to use mathematics in non-educational settings. He argues that enjoyment is a better determinant of further mathematical study and participation in careers that involve mathematics. It should be of concern for mathematics teachers and educators, particularly when it is considered that if a learner has a significant poor experience during their schooling, then math avoidance is likely to continue to reappear later in their life. It is therefore necessary that the affective domain of mathematics experience be given more attention. It is now more than ever very important to understand that emotional satisfaction derived from mathematics is an important educational outcome, regardless of academic achievement level (Nuria, 2006). Johnston (2005) emphasized that in order to enable the learning of mathematics to be a satisfying experience for both academic and real life purposes, educators must treat work on relationships, attitudes and feelings towards mathematics cautiously while accepting that enjoyment is a legitimate educational aim.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter shows how the research was carried out. It discusses the research design, population, sampling strategies, data collection instruments, research procedure and the data analysis techniques employed in the study.

3.1 Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2014). It constitutes the blueprint for the collection, measurement and analysis of data. This study used a cross sectional survey research design. It was mainly quantitative but with some qualitative highlights. It employed a descriptive cross-sectional non-experimental correlational survey design to evaluate the relationship between the teachers' instructional effectiveness and the learners' enjoyment of mathematics. The purpose of the cross-sectional survey approach was to collect data at once from the cross section of the study population. It was non-experimental because experimental studies are normally determined by including an intervention (not only control imposed on the respondents to condition them to answer in a specific manner etc.). An intervention is expected to change behavior not in a specific way but in ways that show its impact, just. The correlational nature was in line with the research objectives of this study in order to evaluate the relationship between teachers' instructional effectiveness and the learners' enjoyment of mathematics.

3.2 Study Population

A study population is the entire set of objects, things and people under consideration in an investigation (Prabhat & Meenu, 2015). The study population was secondary school learners of mathematics and teachers in Kira Municipality, Wakiso District who had different purposes. The municipality has a total of 42 secondary schools with an average of 500 learners per school. Ten of these schools were randomly selected for the study. This number of schools was big enough to ensure generalizability of findings (Amin, 2005). Therefore, the population to be studied had 5000 learners in all the ten schools. The study targeted learners in all the ten schools because all of them had done mathematics as a subject and had been in school for a reasonable amount of time right from their first exposure to formal mathematics learning.

3.3 Sample Size and Distribution

A sample is that part of the target population that has been procedurally selected to represent it (Kothari, 2014). The researcher administered the questionnaire to 360 learners selected from the 10 schools and a total of 10 mathematics teachers were selected for interviews in different schools. This meant that each school involved 36 learner participants for questionnaires and one mathematics teacher participant for interviews. The probable number of learners was determined using Krejcie & Morgan, (1970) table for determining sample size from a population. Therefore it should have been 357. However, the researcher allowed the extra three learners because they were willing and excited to participate in the study. There was no need to discriminate them. In addition, the extra three learners' responses were not likely to change the results. The size of 360 from a population of 5000 was an optimum one according to Krejcie & Morgan, (1970). The ten teachers were chosen by purposive selection. Only willing mathematics teachers were interviewed.

3.4 Sampling Technique

Sampling is the process of selecting few cases from a target population in order to provide information that can be used to make judgments about a much larger number of cases (Amin, 2005). There are two broad categories for techniques of selecting a sample: probability sampling techniques and non-probability sampling techniques. The study used simple random sampling which was a probability sampling technique such that every learner had an equal chance to participate. In simple random sampling the researcher wrote on papers using a letter A totaling to 36 and others didn't indicate anything. The papers were equal to the number of learners in a class and were folded and put in the bucket, mixed up and each learner was told to select one at a time. Those who selected papers that were written on qualified for the participation in the study. The advantage is that it allowed equal chances to all respondents to participate in the study.

Purposive sampling is a sampling technique where the elements are selected from the population because they conform to a certain characteristic that the researcher is looking for (Prabhat & Meenu, 2015). This was based on the researcher's judgment in as far as the purpose for which the information was sought. Therefore, 10 mathematics teachers were purposively selected using a non-probability sampling technique.

3.5 Data Collection Methods

Data collection methods refer to the strategies, processes and procedures that a researcher employs to gather data during research (Prabhat & Meenu, 2015). The data was collected using questionnaire survey method, interview and observations. By the survey method, it was possible to collect a lot of data from a large sample for generalization. Structured questionnaires were used to solicit information from the learners since they could read and write. The questions were presented with exactly the same wording and in the same order to all respondents. Resort was

taken to this sort of standardization that ensured that all respondents replied to the same set of questions (Kothari, 1990). The instrument assured them of anonymity since the responses were already suggested and there was no record of names anywhere. For interview, a face-to- face interviews was conducted to obtain primary data. This type of method is credited for allowing the interviewer with room for probing and gathering more information depending on the knowledge, ability and experience of the respondents (Prabhat & Meenu, 2015). Observations from the researcher and interviews from the key informant aided in capturing some pertinent data which might have been not revealed through the questionnaire.

3.6 Research Instruments

The study used a self-administered questionnaire, an interview guide and observation to gather data.

Questionnaires. A questionnaire is a self-report instrument used to gather information about the research problem under investigation based on the objectives of the study (Prabhat & Meenu, 2015). The researcher used self-administered questionnaires based on the objectives, conceptual framework and related literature. Questionnaires were used because the target population was literate and so the respondents could read, understand the questions and respond to the questions.

Questionnaires were used because they could be administered easily to a large population on the spot and this aided in both producing quick results and collecting data on the spot. The questionnaires catered for one category of respondents that is the learners. The questionnaire was divided into five sections. The first section was about the demographic data of the respondents in terms of their age and gender. The second section was about the teachers' communications skills containing 8 closed-ended items and one open ended item. The third section was about the teachers' classroom engagement and organisation skills and contained 8 closed-ended items and one open-

ended item. The fourth section was about the teachers' pedagogical skills and contained 20 closed-ended items and one open ended item. The fifth section was about the learners' enjoyment of mathematics and contained 19 closed-ended items and one open ended item. All the closed-ended items of the questionnaire were measured on a 5-point Likert scale where; 5 = Strongly agree, 4 = Agree, 3 = Not decided, 2 = Disagree, and 1 = Strongly disagree was used so as to have quantitative results easier for statistical analysis.

Interview Guide. An interview is a person-to-person interaction between two or more people with a specific purpose (Kothari, 2014). Structured questions basing on the objectives of the study were used in the interview guide for getting more information from mathematics teachers. The interview was used because it provided a chance for face to face contacts with respondents and this enabled the researcher to get personal emphasis from the respondents. Interviews gave chance for free expression about the respondents' opinions, perception, views and suggestions in their own words. Interview helped the researcher to extract detailed and accurate information from the mathematics teachers. Finally, interview guide helped the researcher to triangulate the findings in the questionnaires. The disadvantage with interviews is that it tends to be biased with the researcher and the respondents. This is can be minimized by having a pre-determined set of questions to interview on respondents as the researcher did during collecting data.

Observation Guide. Amin (2005) asserts that observation is a planned, carefully and thoughtfully selected method of data collection. The researcher can observe the elements under the study even without asking anything. The observation by the researcher was taken which assisted to reduce subjective bias. However, while applying the observation method of data collection, a researcher observed the way teachers communicate with learners and the way teachers associate with

learners. In addition to the above, Kothari (2009), noted that under the observation method, the information is sought by the way of investigator's own direct observation without asking from the respondent. The researcher personally observed what took place during the teaching and learning of mathematics to see the influence of teachers' instructional skills on the enjoyment of learners.

3.7 Data quality management (Validity and reliability)

Validity

Validity refers to appropriateness of the instrument – the ability of the instrument to measure what it was intended to measure (Amin, 2005). The construct and content validity of the instrument were established. Construct validity was established through the help of supervisors who vetted the research tools and the recommended corrections were made. Content validity was established through carrying out pre-testing measures and the Content Validity Index (CVI) computation formula below was used:

$$CVI = \frac{\text{Agreed items by all judges as suitable}}{\text{Total numbers of items being judged}}$$

$$CVI = \frac{57}{59}$$

$$CVI = 0.966$$

The instrument is regarded valid when the calculated index is greater than 0.7 (Amin, 2005).

Since the calculated CVI was 0.966 which is greater than 0.7, the questionnaire was considered valid. This implied that the questionnaire was able to obtain the data it was intended to obtain for the study.

Reliability

Reliability refers to the ability of the instrument to obtain similar results at different times- the consistence of an instrument to measure what it is intended to measure (Amin, 2005). In order to establish the reliability of the instrument, the researcher conducted a pilot study on 20 respondents (learners) in Kira Municipality secondary schools. Using the results of the pilot study, all adjustments and/or amendments such as grammar, meaning and sentence construction were made after this preliminary process and any clarity obtained from the supervisors of this study were observed in the instruments of data collection.

The data from the pilot study was also subjected to Cronbachs Alpha Co-Efficient where the reliability of the instruments was also established by using a Cronbach Alpha Method by SPSS (Amin, 2005) of inter-item consistence. Reliability of the instruments was established by using a Cronbach Alpha Method by SPSS of inter-item consistence;

Reliability Statistics	
	Cronbach's Alpha
Teachers' communication skills	0.824
Teachers' classroom engagement and organisation skills	0.856
Teachers' pedagogical skills	0.876
Learners' enjoyment of mathematics	0.877
Average	0.858

The instrument is considered reliable if Cronbach's Alpha is at least 0.7. An average reliability of .858 was considered adequate, implying that the instrument was reliable (Amin, 2005).

3.8 Procedure of data collection

After defending the proposal and went through, a letter of introduction (Appendix) was obtained from the Dean School of Education, College of Education and External Studies - Makerere University allowing researcher to go the field. This was used to introduce the researcher to management of the selected secondary schools in Kira Municipality, Wakiso District. The letter of introduction helped the researcher to seek permission from the head teachers at the different schools to access learners and teachers. He selected the participants, scheduled meetings and administered the questionnaires accordingly. The researcher first introduced himself, then explained to the participants the purpose of the research and assured them that they would be referred to anonymously. The questionnaire was designed with help supervisor and distributed by the researcher himself. The researcher collected all the questionnaires, his written documents for interviews and observations and embarked on data analysis and interpretation to derive meaning, conclusions and recommendations that were made in this report which was submitted for marking.

3.9 Data Analysis

Data analysis is a process of systematically searching, arranging transcripts, field notes and other materials accumulated to enable you increase your understanding of them or to enable you present what you have discovered (Kothari, 2014). It is a process of bringing order, structure and meaning to the mass of data collected. The questionnaires were entered in SPSS in coded form and analyzed. The analysis of data was done using frequency distribution tables that formulated frequencies and percentages with the support of SPSS. Data from the field was sorted, edited and recorded. The findings were later analyzed by the researcher. Since the SPSS data were arranged in the ordinal scale, to enable the computation of Pearson correlation, the ordinal data were first converted to

continuous data through a process of computing variables. Each variable that is to say, communication skills, classroom engagement and organisation skills, pedagogical skills and learners' enjoyment of mathematics, its items were transformed into a single variable by using the computing technique in SPSS. The learners' enjoyment of mathematics was correlated against each of other variables (communication skills, classroom engagement and organisation skills, and pedagogical skills) to determine the relationship, upon which conclusions and recommendations were made. For qualitative data, narrative techniques of direct quotation and paraphrasing of responses were used to supplement on quantitative data. Some of the reported statements by key informants were quoted verbatim by indenting.

3.10 Ethical Considerations

The researcher obtained a letter of introduction from Makerere University which was presented to the respondents for identification purposes, in order to secure permission to collect data. Thereafter, the researcher proceeded to collect data. The researcher first obtained informed consent from all the respondents, observing extreme confidentiality while handling the respondents. Respect for respondents was held in high esteem by observing all courtesy, objectivity and truthfulness. Assurance was given that the information gathered during the research process would remain confidential and used for the designated research and academic purpose only. Issues relating to objectivity and full disclosure of proper identity like names were based on consent, where the researcher assured anonymity and confidentially of such disclosure to avoid bias. Additionally, participation was voluntary and benefits of the study were clearly explained to all willing participants.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the findings and analysis of the relationship between the teachers' instructional effectiveness and the learners' enjoyment of mathematics in senior secondary schools in Kira municipality - Wakiso district**.** It deals with the presentation of findings and analysis of the specific objectives of the study. The findings were presented with the help of tables for purposes of easier understanding and clarity. 360 respondents fully participated in the study by filling the questionnaire and 10 interviewees were involved in the study and the researcher was involved in observation process, thereby making a response rate of 100%.

The findings were presented based on the study objectives, namely;

i) To evaluate the relationship between the teachers' communication skills and the learners' enjoyment of mathematics.
ii) To evaluate the relationship between the teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics.
iii) To assess the relationship between the teachers' pedagogical skills and the learners' enjoyment of mathematics.

4.2 Demographic Characteristics of Respondents

The study obtained information from learners through questionnaires while mathematics teachers were engaged through interviews and observation information were obtained from the researcher. The presentation begins with the background information of respondents as follows.

Table 4.1: Demographic data on Respondents

Variables	Category(ies)	Frequency	Percentage (%)
Position of respondents	Teachers	10	03
	Learners (Senior three)	360	97
Age group of learners	12-15	127	35.3
	16- 18	213	59.2
	19 -25	18	5.0
	26 +	02	0.6
Gender of learners	Male	172	47.8
	Female	188	52.2

According to table 4.1 above, 97% were learners of senior three in 10 different schools while 03% were teachers in 10 different schools. However, regardless of position, all respondents were able to provide relevant information as required by the study.

4.2.1 Age of Respondents

According to table 4.1 the majority of respondents, 59.2% were in the age group of 16- 18 years, followed by 35.3% who were in the age group 12-15, followed by 5.0% who were in the age group of 19 -25years and then 0.6% who were in the age group 26 +. By implication, most of the respondents were learners aged below 18 years. However, regardless of their ages they provided pertinent information for the study under investigation.

4.2.2 Gender

The study found out that majority of respondents 52.2% were female compared with 47.8% who were male. However, all respondents provided relevant information about the study regardless of gender.

4.3 Research objective one: To evaluate the relationship between the teachers' communication skills and the learners' enjoyment of mathematics

Respondents were asked to state their level of agreement or disagreement to specific items indicating teachers' communication and how it related to learners' enjoyment of mathematics. Their responses were recorded, summarized and presented in table 4.2 below and information from observer and key informants is also provided to back up these findings.

Table 4.2 Responses on the relationship between the teachers' communication skills and the learners' enjoyment of mathematics

Item	**SA** Strongly Agree	**A** Agree	**NS** Not Sure	**D** Disagree	**SD** Strongly Disagree	**Mean**	**Std. Dev.**
B1. My math teacher is audible when teaching in class	253 (70.3)	76 (21.1)	12 (3.3)	14 (3.9)	5 (1.4)	1.45	0.8
B2. My math teacher uses simple and understandable terms when teaching	151 (41.9)	113 (31.4)	45 (12.5)	30 (8.30)	21 (5.80)	2.04	1.1
B3. My math teacher is a good listener to learners when teaching in class	132 (36.7)	101 (28.1)	28 (7.80)	46 (12.8)	53 (14.7)	2.409	1.4
B4. My math teacher gives feedback to learners in class	101 (28.1)	109 (30.3)	38 (10.6)	59 (16.4)	53 (14.7)	2.60	1.4
B5. My math teacher gathers and uses information about learners' learning needs and progress	69 (19.2)	91 (25.3)	71 (19.7)	43 (11.9)	86 (23.9)	2.96	1.4

Source: Primary Data 2018

Table 4.2 show that majority of the respondents 91.4% agreed to the statement that teachers are audible when teaching in class compared to 5.30 % who disagreed and 3.30% who remained neutral.

The researcher observed that mathematics teachers are generally audible and generally vibrant. Most of them taught with interest to impart the concepts in learners and making sure that each and every learner heard what they said.

In general, mathematics teachers use simple and understandable terms when teaching. The findings indicated that 73.3% agreed, 12.5% were neutral and 14.1 % disagreed. However, not all terms were simple and understandable to learners, only that some good number of teachers in the schools visited labored to explain to the learners the meaning of new terms, such as algebra and linear programming.

On whether teachers are good listeners to learners when teaching in class, the findings indicated that 64.8% agreed, 7.80% were neutral and 27.5 % disagreed.

On whether math teacher gives feedback to learners in class, the findings indicated that 58.4% agreed, 10.6% were neutral and 31.1 % disagreed. However, it was observed by the researcher that some mathematics teachers proceeded to new topics without having given full feedback of the previous work.

One teacher explained such a scenario thus;

> *"Sometimes, we have a lot to cover in the syllabus in order to beat the deadlines and when the time is not enough for us to go through class exercises with the learners, we simply encourage group work or refer the harder questions to a special period of revision, such as the period running towards exams… there we are able to give adequate and elaborative feedback to our learners".* (MT, 15th March 2018).

The findings indicated that on whether mathematics teachers gather and use information about learners' learning needs and progress 44.5% agreed, 19.7% were neutral and 35.8 % disagreed. This implies that a few mathematics teachers gather and use information about learners' learning needs and progress.

Ho1:

Null Hypothesis: There is no significant relationship between teachers' communication skills and learners' enjoyment of mathematics

To test the relationship between teachers' communication skills and learners' enjoyment of mathematics, the Pearson's linear correlation coefficient was used to establish the relationship between the two variables and the results were presented as follows;

Table 4.3: Pearson's linear correlation coefficient test results between teachers' communication skills and enjoyment of learners of mathematics

		Teacher communication skills	Learners enjoyment in math
Teacher communication skills	Pearson Correlation	1	0.309**
	Sig. (2-tailed)		0.000
	N	360	360
Learners enjoyment in mathematics	Pearson Correlation	0.309**	
	Sig. (2-tailed)	0.000	1
	N	360	360

*. Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation results above indicate that there is a positive and significant relationship between teachers' communication skills and enjoyment of learners of mathematics. The $r = .309^{**}$ and sig. value. $P<0.05$ which is less than the alpha value 0.05 means that an increase in application of effective teachers' communication skills can lead to an increase in enjoyment of learners of mathematics. Therefore, the null hypothesis which stated that

teachers' communication skills have no significant relationship with the enjoyment of learners of mathematics was rejected in favour of the alternative hypothesis, which states that there is a positive significant relationship between teachers' communication skills and enjoyment of learners of mathematics.

4.3 Research objective two: To measure the relationship between the teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics

Respondents were asked to state their level of agreement or disagreement to specific items indicating teachers' classroom engagement and organisation skills and how it related to learners' enjoyment of mathematics. Their responses were recorded, summarized and presented in table 4.4 below and information from observation and key informants is also provided to back up these findings.

Table 4.4 Responses on the relationship between the teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics

Item	SA	A	NS	D	SD	Mean	Std. Dev.
C1. My math teacher holds learners attention when teaching in class	155 (43.1)	109 (30.3)	27 (7.50)	37 (10.3)	32 (8.90)	2.11	1.3
C2. My math teacher ensures that there is class coordination when teaching	119 (33.1)	126 (35.0)	44 (12.2)	37 (10.3)	34 (9.40)	2.29	1.2
C3. My math teacher ensures that there is attention when teaching	163 (45.3)	139 (38.6)	15 (4.20)	31 (8.60)	12 (3.30)	1.87	1.0
C4. My math teacher is keen about the sitting arrangement/organization of the class	40 (11.1)	57 (15.8)	34 (9.40)	75 (20.8)	154 (42.8)	3.69	1.4
C5. My math teacher knows when we are having trouble	64 (17.8)	84 (23.3)	31 (8.60)	82 (22.8)	99 (27.5)	3.19	1.4

C6. My math teacher creates and maintains environments that are conducive to learner learning	93 (25.8)	108 (30.0)	44 (12.2)	62 (17.2)	53 (14.7)	2.65	1.4
C7. My math teacher establishes and maintains good relationships with learners to help them learn better	136 (37.8)	106 (29.4)	44 (12.2)	32 (8.90)	42 (11.7)	2.28	1.3

Source: Primary Data 2018

According to Table 4.4, it was found out that 73.4% of the respondents agreed with the statement that mathematics teachers hold learners' attention when teaching in class, 7.50% were undecided while 19.2 % disagreed.

The responses also show that mathematics teachers ensure that there is class coordination when they are teaching. (68.1% of the respondents agreed, 12.2% were neutral and 19.7 % disagreed).

The findings also indicate that mathematics teachers ensure that there is attention in the class when teaching, (73.9% of the respondents agreed, 4.20% were neutral while 11.9 % disagreed).

However, the researcher observed a different reality. Yes, there was not much loud noise but it was observed quite often that learners resorted to low voice conversations indicating a sign of not being attentive and not minding what the teachers were emphasizing. The backbenchers were notably seen conversing with their friends in the class when the math teacher was teaching in low voices that could hardly disturb the teacher, indicating that teachers cared less to the back benchers' attentiveness and only continued with those who followed most especially those who sat in front.

The findings indicate that mathematics teachers are not keen about the sitting arrangement / organization in class. Only 26.9% of the respondents agreed that teachers are keen, 9.40% were

neutral while 63.6 % disagreed. It was observed that most teachers were most interested in delivering the matter and as long as there was no loud noise, they didn't interfere with the sitting arrangement. The researcher observed in some cases that some learners sat together to make conversations. This was the case with especially among the backbenchers.

The findings also indicated that mathematics teachers don't know when their learners are having trouble with their work. Only 41.1% of the respondents agreed that the teachers know when learners are having trouble, 8.60% were neutral while 50.3 % disagreed.

One mathematics teacher however gave a different opinion that;

> *"…I know the strengths and weaknesses of my learners in mathematics. When they fail a number for about two or more times, I realize that the learner needs special attention for me to help… this is when I employ other techniques such as repeating the lesson, encouraging group work, and emphasis on doing corrections until the problems are solved. I personally conduct the corrections in the class rooms to overcome their weaknesses…"* (MT, 12th March 2018).

The results also indicated that mathematics teachers create and maintain environments that are encouraging to learner learning. 55.8% of the respondents agreed, 12.2% were neutral and 31.9 % disagreed. In the same way, mathematics teachers establish and maintain good relationships with learners to help them learn better. The finding indicated that 67.2% of the respondents agreed, 12.2% were neutral and 20.6% disagreed. The researcher also observed that in certain schools, the teachers after entering classes could first tell the backbenchers to pull the desks off the wall to avoid learners leaning against the wall and indication of caring more on class management.

As a general observation, the class seemed just available for the lesson. They were disciplined but it was hard to tell whether they were interested or not and the learners seemed to be comfortable with the teacher.

All the means in the descriptive statistics in table 4.4 indicated that they were below 4 indicating a statistically negative result; this implied that the contribution of teachers' classroom engagement and organisation skills on learner's enjoyment in mathematics is substandard; there could have been other factors then. The standard deviations were also below 2 indicating a statistically negative result, which implied that teachers possess less or apply less classroom engagement and organisation skills to influence leaners' enjoyment of mathematics positively.

Ho2:

Null Hypothesis: There is no significant relationship between teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics

To test the relationship between teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics, the Pearson's linear correlation coefficient was used to establish the relationship between the two variables and the results were presented as follows;

Table 4.5: Pearson's linear correlation coefficient test results between teachers' classroom engagement and organisation skills and enjoyment of learners of mathematics

	Teacher communication skills	Learners enjoyment in math

Teacher classroom engagement and organisation skills	Pearson Correlation	1	0.338
	Sig. (2-tailed)		0.000
	N	360	360
Learners enjoyment in mathematics	Pearson Correlation	0.338	1
	Sig. (2-tailed)	0.000	
	N	360	360

*. Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation results above indicate that there is a positive and significant relationship between teachers' classroom engagement and organisation skills and enjoyment of learners of mathematics. The r = .338; and sig. value. P<0.01 which is less than the alpha value 0.05 means that an increase in application of effective teachers' classroom engagement and organisation skills can lead to an increase in enjoyment of learners of mathematics. Therefore, the null hypothesis was rejected and the alternative hypothesis was adopted. There is a positive significant relationship between teachers' classroom engagement and organisation skills and enjoyment of learners of mathematics.

4.4 Research objective three: To assess the relationship between the teachers' pedagogical skills and the learners' enjoyment of mathematics

Respondents were asked to state their level of agreement or disagreement to specific items indicating teachers' pedagogical skills s and how it related to learners' enjoyment of mathematics. Their responses were recorded, summarized and presented in table 4.6 below and information from observation and key informants is also provided to back up these findings.

Table 4.6. Responses on the relationship between the teachers' pedagogical skills and the learners' enjoyment of mathematics

Item	SA	A	NS	DA	SDA	Mean	Std. Dev.
D1. My math teacher has the necessary skills to teach mathematics	128 (35.6)	98 (27.2)	52 (14.4)	51 (14.2)	31 (8.60)	2.33	1.3
D2. My math teacher knows there are many methods to teaching and learning	154 (42.8)	119 (33.1)	49 (13.6)	25 (6.90)	13 (3.60)	1.96	1.0
D3. My math teacher uses exciting teaching methods when teaching	116 (32.2)	104 (28.9)	39 (10.8)	53 (14.7)	48 (13.3)	2.49	1.4
D4. My math teacher applies a variety of technologies to meet learners' learning needs	46 (12.8)	84 (23.3)	65 (18.1)	85 (23.6)	80 (22.2)	3.20	1.3
D5. My math teacher applies teaching skills basing on classroom situations	106 (29.4)	110 (30.6)	56 (15.6)	55 (15.3)	33 (9.20)	2.44	1.3
D6. My math teacher uses good testing methods	128 (35.6)	141 (39.2)	38 (10.6)	26 (7.20)	27 (7.50)	2.11	1.1
D7. My math teacher gives factual and appropriate examples	142 (39.4)	119 (33.1)	32 (8.90)	42 (11.7)	25 (6.90)	2.13	1.2
D8. My math teacher uses real life stories when teaching	89 (24.7)	102 (28.3)	41 (11.4)	47 (13.1)	81 (22.5)	2.80	1.6
D9. My math teacher applies math concepts to real life situations	65 (18.1)	108 (30.0)	62 (17.2)	73 (20.3)	52 (14.4)	2.83	1.3
D10. My math teacher is clearly a teacher by choice	139 (38.6)	112 (31.1)	52 (14.4)	32 (8.90)	25 (6.90)	2.14	1.2
D11. My math teacher presents material in a clear way	103 (28.6)	143 (39.7)	51 (14.2)	39 (10.8)	24 (6.70)	2.27	1.2
D12. My math teacher seems to enjoy teaching mathematics	177 (49.2)	112 (31.1)	38 (10.6)	18 (5.00)	15 (4.20)	1.84	1.1
D13. My math teacher is willing to	182	108	35	22	13	1.82	1.1

give us individual help	(50.6)	(30.0)	(9.70)	(6.10)	(3.60)		
D14. My mathematics teacher translates mathematics content and objectives into meaningful learning activities	112 (31.1)	120 (33.3)	51 (14.2)	35 (9.70)	42 (11.7)	2.38	1.3

Source: Primary Data 2018

Table 4.6 above shows that on whether mathematics teachers have the necessary skills to teach mathematics, the findings indicated that 62.8% agreed, 14.4% were neutral and 22.8 % disagreed. This indicates that some mathematics teachers could have been associating with learners in a good way through trying to make the subject interesting which made many learners to state that some teachers have necessary skills to teach mathematics.

On whether mathematics teachers know many methods for teaching and learning, the findings indicated that 75.9% of the respondents agreed, 13.6% were undecided while 10.5 % of respondents disagreed. This implied that teachers used several methods on a single number which made majority of learners to say that teachers know many methods for teaching and learning.

On whether mathematics teacher use exciting teaching methods when teaching in class, 61.1% of the respondents agreed, 10.8% remained undecided and 10.8% disagreed.

Majority of the respondents agreed that teachers use different ways to teach and help learners learn. The findings indicated that 80.3% of the respondents agreed, 6.90% were neutral and 12.8 % disagreed.

However, the findings indicated that mathematics teachers do not generally apply a variety of technologies to meet learners' learning needs. Only 36.1% agreed that their teachers apply a variety of technologies, 18.1% were neutral and 45.8 % disagreed.

During observations of lessons, the researcher found out that some teachers employ chalk and talk method. Some even did not carry teaching aids like blackboard rulers, protractor among others even when the topic which was being taught needed these tools. They just used estimation for example when constructing angles which was a clear indication that in certain schools lessons that were observed involved chalk and talk and then solving mathematics numbers.

Respondents were also asked to state whether mathematics teachers generally apply teaching skills basing on classroom situations and the findings indicated that 60.0% agreed, 15.6% were neutral and 24.5 % disagreed. The association between teachers and learners and the freedom that teachers gave to learners in certain situations could have made the learners to state that their mathematics teachers generally apply teaching skills basing on classroom situations. The researcher also observed that some teachers in certain schools taught little and applied many ways of solving a number in a situation when a few learners understood the number and the reverse is true for other schools.

It was also noted that 72.5% of the respondents agreed that mathematics teachers give factual and appropriate examples while 8.90% were neutral and 18.6 % disagreed. They use real life stories when teaching (53.0% the respondents agreed, 35.6% disagreed and 11.4% remained neutral). They apply math concepts to real life situations (48.1% agreed, 17.2% were neutral and 34.7 % disagreed). In the same way, they present material in a clear way (68.3% agreed, 14.2% were neutral and 17.5 % disagreed)

On whether mathematics teachers are clearly teachers by choice, 69.7% agreed, 14.4% were neutral and 15.8 % disagreed. They also show a lot of interest in the learners (57.5% agreed, 12.5% were neutral and 30.0 % disagreed). They also enjoy teaching mathematics, (80.3% agreed, 10.6% were neutral and 9.20 % disagreed).

The study also indicated that mathematics teachers are willing to give learners individual help, (80.6% agreed, 9.70% were neutral, 9.70 % disagreed). When learners have difficulty in understanding concepts, the teachers try to be supportive, (76.6% agreed, 9.20% were neutral and 14.1 % disagreed).

However, the researcher observed that most of the time, the teacher faced the board and did more "talk-chalk" to drive the point home. In addition, the method of teaching was mostly giving knowledge while asking learners if they followed, to which they tended to just answer "yes" even when it was clear that many of them were not understanding. The main teaching aid was the teachers' notebook while most schools lacked learners' text books, or even any form of learning aids. One example was when one teacher introduced the topic "Inequalities". There was no introduction relating the topic to real life. The lesson began by the teacher writing the topic on the board, then indicating the signs $<$, $>$, $\leq$ and $\geq$. By chance, the learners were able to identify them. The teacher moved to solving a few examples involving these symbols and gave an exercise. Most interesting was when the teacher told the learners to memorize that when an inequality is divided by a negative, the sign is reversed. They were expected to simply know it. The main method of teaching involved "imparting" knowledge. In all the ten schools, the researcher didn't often observe alternative approaches such as exploration, discovery and manipulation in which learners are more involved. It was teacher-based "expository"

teaching/learning. The teacher "told" learners "how' it is done. The researcher observed that most learners had to do many exercises just to get it right. It was right because they got the correct answer! Some learners often looked surprised that they had it right. The teaching/learning of mathematics seemed more of a mental processing of formulae and numerical manipulations

All the means in the descriptive statics table above indicated that they were below 4; this implied that none of the items was significantly impacting on learner's enjoyment in mathematics; there could have been other factors then. However, of unique importance, some items under class room management were fairly related to the dependent variable, for instance on whether, my mathematics teacher applies a variety of technologies to meet learners' learning needs (3.19); The standard deviations were also below 2, which implied a low impact of the items on learners' enjoyment in mathematics.

Ho3:

Null Hypothesis: There is no significant relationship between teachers' pedagogical skills and learners' enjoyment of mathematics

To test the relationship between teachers' pedagogical skills and learners' enjoyment of mathematics, the Pearson's linear correlation coefficient was used to establish the relationship between the two variables and the results were presented as follows;

Table 4.7: Pearson's linear correlation coefficient test results between teachers' pedagogical skills and enjoyment of learners of mathematics

	Teacher communication skills	Learners enjoyment in math

Teacher pedagogical skills	Pearson Correlation	1	0.418**
	Sig. (2-tailed)		0.000
	N	360	360
Learners enjoyment in mathematics	Pearson Correlation	0.418**	1
	Sig. (2-tailed)	0.000	
	N	360	360

*. Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation results above indicate that there is a positive, strong and significant relationship between teachers' pedagogical skills and enjoyment of learners of mathematics where ($r = .418^{**}$; sig. value. $P<0.01$). This means an increase in application of effective teachers' pedagogical skills can lead to an increase in enjoyment of learners of mathematics. Therefore, the null hypothesis which stated that teachers' pedagogical skills has no significant relationship with the learners' enjoyment of mathematics was rejected and the alternative hypothesis was adopted. There is a positive significant relationship between teachers' pedagogical skills and enjoyment of learners of mathematics.

4.5 Dependent Variable: Learners' enjoyment of Mathematics

Table 4.8: Findings on Learners' enjoyment of Mathematics

Item	SA	A	NS	D	SD	Mean	Std. Dev.
E1. I have a positive attitude/interest towards mathematics	153 (42.5)	107 (29.7)	36 (10.0)	25 (6.90)	39 (10.8)	2.13	1.3
E2. When I hear the word mathematics, I have a feeling of dislike	33 (9.20)	71 (19.7)	47 (13.1)	70 (19.4)	139 (38.6)	3.59	1.4
E3. I actively participate in the mathematics class	106 (29.4)	149 (41.4)	44 (12.2)	37 (10.3)	24 (6.70)	2.23	1.1

E4. I regularly consult with my teacher and fellow learners on mathematics concepts	116 (32.2)	142 (39.4)	32 (8.90)	40 (11.1)	30 (8.30)	2.23	1.2
E5. I believe I will offer mathematics as an option at A level	99 (27.5)	57 (15.8)	64 (17.8)	30 (8.30)	110 (30.6)	2.99	1.7
E6. I want to do a mathematics related course after my senior four	92 (25.6)	95 (26.4)	58 (16.1)	52 (14.4)	63 (17.5)	2.71	1.4
E7. My grades/scores in mathematics are generally pleasing	65 (18.1)	96 (26.7)	64 (17.8)	66 (18.3)	69 (19.2)	2.93	1.3
E8. During tests given by my math teacher, I move myself to try and to satisfy my teachers' expectation	161 (44.7)	156 (43.3)	24 (6.70)	7 (1.90)	12 (3.30)	1.76	1.0
E9. I would like to spend less time in school doing mathematics	64 (17.8)	77 (21.4)	54 (15.0)	54 (15.0)	111 (30.8)	3.20	1.6
E10. Mathematics is a subject which I enjoy very much	103 (28.6)	104 (28.9)	56 (15.6)	49 (13.6)	48 (13.3)	2.54	1.3
E11. While my mathematics teacher is teaching, I look forward to when the lesson will end	69 (19.2)	72 (20.0)	47 (13.1)	55 (15.3)	117 (32.5)	3.21	1.6
E12. Mathematics makes me look forward to coming to school	103 (28.6)	104 (28.9)	54 (15.0)	46 (12.8)	53 (14.7)	2.57	1.4
E13. I feel at ease in a mathematics class	89 (24.7)	118 (32.8)	68 (18.9)	46 (12.8)	39 (10.8)	2.52	1.2
E14. I often think "I can do it" when a mathematics problem seems hard	146 (40.6)	141 (39.2)	35 (9.70)	16 (4.40)	22 (6.10)	1.97	1.1

E15. Sometimes I read ahead in our mathematics book	61 (16.9)	90 (25.0)	45 (12.5)	98 (27.2)	66 (18.3)	3.05	1.3
E16. All people should study some mathematics	233 (64.7)	74 (20.6)	23 (6.40)	11 (3.10)	19 (5.30)	1.63	1.0
E17. I want to teach mathematics in the future	32 (8.90)	45 (12.5)	59 (16.4)	56 (15.6)	168 (46.7)	3.79	1.3
E18. I find it comfortable to consult my teacher whenever necessary	110 (30.6)	125 (34.7)	56 (15.6)	46 (12.8)	23 (6.40)	2.30	1.2
E19. I always want to actively participate in the mathematics lessons	187 (51.9)	126 (35.0)	22 (6.10)	15 (4.20)	10 (2.80)	1.70	0.9

Source: Primary Data 2018

Table 4.8 above shows that majority of the respondents have a positive attitude / interest towards mathematics, (72.2% agreed compared to 17.7 % who disagreed and 10.0% who were undecided). They actively participate in the mathematics class (70.8% agreed), regularly consult with the teacher and fellow learners on mathematics concepts, (71.6% agreed), believe they will offer mathematics as an option at A level (43.3% agreed, 17.8% were neutral and 38.9 % disagreed) and they want to do a mathematics related course after their senior four (52.0% agreed, 16.1% were neutral and 31.9 % disagreed).

The findings demonstrated that learners' grades / scores in mathematics are generally pleasing (44.8% agreed, 17.8% were neutral and 37.5 % disagreed). During tests given by their mathematics teacher, they move themselves to try their best and to satisfy their teachers' expectation, (88.0% agreed).

Mathematics makes learners to look forward to coming to school, (57.5% agreed), they feel at ease in a mathematics class, (57.5% agreed), often think, "they can do it," when a mathematics

problem seems hard, (79.8% agreed). Only 41.9% agreed that they sometimes read ahead in their mathematics book as compared to 45.5% who disagreed. Majority of the respondents believe that all people should study some mathematics, (85.3% agreed).

However, learners do not want to teach math in the future. Only 21.4% of the respondents agreed that they want as compared to 16.4% who were neutral and the 62.3 % disagreed. The findings indicated that learners find it comfortable to consult their teachers whenever necessary. (65.3% agreed, 15.6% were neutral and 19.2 % disagreed). They always want to actively participate in the mathematics lessons, (86.9% agreed, 6.10% were neutral and 7.0 % disagreed).

Regression analysis

Table 4.9: Regression model between teachers' communication skills, teachers' classroom engagement and organisation skills and teaching skills and and enjoyment of learners of mathematics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32.750	2.094		15.643	.000
	TEACHER COMMUNICATION SKILLS	.071	.119	.042	.599	.549
	TEACHER CLASSROOM ENGAGEMENT AND ORGANISATION SKILLS	.136	.123	.080	1.103	.271
	TEACHING SKILLS	.259	.061	.334	4.270	.000

a. Dependent Variable: learners' enjoyment of mathematics

Source: Output from SPSS

Teachers' communication skills and learners' enjoyment of mathematics

The regression analysis results above reveal that the relationship with the learners' enjoyment of mathematics was strongest with teacher class room management skills (80%), followed by teacher communication skills (42%) and then teaching skills (34%). This means that teacher

classroom engagement and organisation skills exert the greatest impact on learners' enjoyment of mathematics than any other teacher related variable. It is not just about teaching well or having good content knowledge. Setting up a conducive learning environment fosters positive learning.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents a discussion of findings, conclusions and recommendations made by the study in line with the research objectives.

5.1 Discussion of findings

The discussion of findings is presented in line with the study objectives.

5.1.1 To evaluate the relationship between the teachers' communication skills and the learners' enjoyment of mathematics

The study demonstrated that enjoyment of learners of mathematics can be influenced positively by emphasizing that mathematics teachers gather and use information about learners' learning needs and progress, giving feedback to learners in class, being good listeners to learners when teaching in class, using discussion methods, having a good questioning style when teaching in class, using simple and understandable terms when teaching, being audible when teaching in class and making mathematics interesting.

The finding agrees with Whitaker (2004) who said that teachers recognize the importance of connecting with their learners through different ways with an objective to make them interested, that if they are unable to connect with them emotionally, then influencing their minds may be impossible. According to the researcher's observation, when teaching mathematics, some teachers could halt a bit to apply joking statements which make learners laugh, relax and feel at home with the lesson in progress.

The finding agrees with Helenrose (2003) who emphasized that the skill of being a teacher is one of a learned capacity to keep shifting states of order intelligently in such a way that the emotions of children are caught up and organized toward achievement of a specific goal. Teachers will do a better job if they communicate well with their learners in clear and simple terms. (Kalejaiye, 2010)

According to researcher's observation of the lessons, the teachers were audible enough for the learners to hear what they were saying. This was one way to hold the learners' attention and to get them concentrate on what was being taught.

However, through observations the findings showed that most of mathematics teachers did not gather and use information about learners' learning needs and progress. It was observed that the mathematics teachers did not ask learners what caused them not to comprehend the mathematics problem. They always just proceeded to calculate numbers which the learners had failed to handle. They never bothered to ask what the problem was for those who kept quiet but just continued with those who could go with them. Some of the common questions were "are we together?", "have you understood?" to which there was mainly one answer "Yes". In general, mathematics teachers were observed to communicate to the whole class and not to individual learners.

5.1.2 To measure the relationship between the teachers' classroom engagement and organisation skills and the learners' enjoyment of mathematics

The study found out that enjoyment of learners of mathematics can be influenced positively by emphasizing that mathematics teachers create and maintain environments that are conducive to learner learning, establishing and maintaining good relationships with learners to help them learn better, engaging in a range of class planning activities, ensuring that there is attention in the class when teaching and ensuring that there is class coordination when they are teaching.

The finding agrees with Silesh (2015) who asserted that teachers' instructional effectiveness not only impacts on learners' attitude towards learning but also on their mathematics achievement scores.

However, according to researcher's observation, classroom engagement and organisation was probably the biggest challenge of majority of mathematics teachers. Majority of them failed to

create and maintain environments that are conducive to learner learning as it was viewed through learners' failure to ask questions, learners' being bored, some learners especially those at the back being either absent minded or being involved in low voice conversations. Most mathematics teachers were also very fast and it seemed as if they were interested in just finishing the lesson/syllabus. There was not enough planning of classroom coordination apart from getting the teaching done. The purpose of classroom coordination is to build relationships for effective teaching/learning. However, this was not the case.

To rectify this state of affairs, Allen (2001) asserts that if teachers take the time to build relationships with their learners, they can motivate them to learn. Teachers have to ensure that they are meeting learners' needs, both academically and emotionally. Creating classroom environments that promote positive cultures with healthy interactions can motivate learners to set higher goals for themselves.

However, some teachers seemed to establish and maintain good relationships with learners to help them learn better which was viewed through mathematics teachers moving around the class and looking at what they were doing and correcting them accordingly, calculating numbers together, giving a chance to learners to calculate numbers on blackboard while others were observing and giving comments or corrections.

It was observed that in most schools, mathematics teachers couldn't know when their learners were having trouble with their work. Most mathematics teachers moved with a few learners who seemed and showed more interest than others. Most teachers simply calculated the numbers for the learners without exploring the causes/reasons for the learners' failure to provide solutions. In most lessons, it was easy to see who was either keen or bored or totally lost. Amidst all this, the

teachers didn't seem to be bothered or they were used to the status quo. They were keen on going with those who seemed responsive. It was clear that the teachers rarely know when the learners are having trouble with their work especially in terms of the reasons for this state of affairs.

This finding agrees with Adamson (2008) who says that a majority of low achievement incidents that take place in the classroom originate from the insufficiency of teachers' classroom engagement and organisation skills. The researcher observed that majority of the teachers were about "teaching" and getting it correctly done. If they paid attention to discipline, it was to control noise but not so much to create an environment for all learners to achieve. This was one of the missing gaps observed. The finding contradicts with the assertion that teachers must know when learners are having trouble with their work (Adamson, 2008).

The finding agrees with Helenrose (2003) who said that social efficacy of a teacher is his/her personal trait. He asserted that personal teaching efficacy focuses on two key components, the individual's ability to perform actions and the power of those actions to influence learner learning which teachers should do if they are to make learners fulfill their goals.

5.1.3 To assess the relationship between the teachers' pedagogical skills and the enjoyment of learners of mathematics

The study found out that enjoyment of learners of mathematics is influenced positively by emphasizing that mathematics teachers translate mathematics content and objectives into meaningful learning activities, being willing to give learners individual help, showing interest in

the learners, presenting materials in a clear way, using real life stories when teaching, giving factual and appropriate examples, using good testing methods, using different ways to teach and help learners learn, using exciting teaching methods when teaching in class, having the necessary skills to teach mathematics, knowing a lot about mathematic, applying teaching skills basing on classroom situations and showing learners that teaching mathematics is enjoyable.

The finding agrees with Silesh (2015) who asserted that teachers' instructional effectiveness not only impact on learners' attitude towards learning but also impact on their mathematics achievement scores. Sileshi (2015) stated that there are diverse factors affecting learners' enjoyment in mathematics and these include instructional factors such as curriculum instructional strategies and methods, teachers' competency, and school context and facilities.

The researcher observed that most of the time, the teacher faced the board and did more "talk-chalk" to drive the point home. In addition, the method of teaching was mostly "imparting" knowledge while asking learners if they followed, to which they tended to just answer "yes" even when it was clear that many of them were "lost" depending on the way they looked at the teachers with the dissatisfaction face. The main teaching aid was the teachers' notebook while most schools lacked learners' text books, or even any form of learning aids. One example was when one teacher introduced the topic "Inequalities". There was no introduction relating the topic to real life. The lesson began by the teacher writing the topic on the board, then indicating the signs $<$, $>$, $\leq$ and $\geq$. By chance, the learners were able to identify them. The teacher moved to solving a few examples involving these symbols and gave an exercise. Most interesting was when the teacher told the learners to memorize that when an inequality is divided by a negative, the sign is reversed. They were expected to simply know it. The main method of teaching

involved “imparting” knowledge. In all the ten schools, the researcher didn’t often observe alternative approaches such as exploration, discovery and manipulation in which learners are more involved. It was teacher-based “expository” teaching/learning. The teacher “told” learners “how’ it is done. The researcher observed that most learners had to do many exercises just to get it right. It was right because they got the correct answer! Some learners often looked surprised that they had it right. The teaching/learning of mathematics seemed more of a mental processing of formulae and numerical manipulations.

However, Johnston (2005) emphasized that in order to enable the learning of mathematics to be a satisfying experience for both academic and real life purposes, educators must treat work on relationships, attitudes and feelings towards mathematics cautiously while accepting that enjoyment is a legitimate educational aim. Educational theorists Pintrich & Marx (2013) argued that there is much more to learning than just the processing of information and that it is important for a learner to feel comfortable and at ease in class.

The finding agrees with Ministry of Education, Science, Sports and Technology (2015) that indicated that despite many reasons ranging from teacher training, teacher preparedness, teachers’ communication skills, teaching methods, availability of resources and the learners’ home environment, the teaching/learning of mathematics in Uganda has not been effective enough.

This state of affairs seems to explain Green’s (2017) assertion that mathematics is acknowledged to be the most universally disliked subject during and once school has been left behind. Green (2017) said that groups of adults discussing school days happily admit to having been "hopeless"

at math and few mathematics learners share wonderful and fulfilling experiences during and after school as compared to those who study other subjects such as history.

The researcher also discovered that few learners expressed interest in being mathematics teachers in the future. This explains what Baale (2014) and Beilock & Maloney (2015) asserted; that one problem with most learners is the dread of mathematics which is a big challenge to their enjoyment. They end up avoiding math and math-related professions, severely limiting their future career and earning opportunities.

5.2 Conclusions

The study reached the following conclusions;

There is a positive and significant relationship between teachers' communication skills and enjoyment of learners of mathematics. This means an increase in application of aspects of teachers' communication skills can lead to an increase in enjoyment of learners of mathematics.

The study concluded that there is a positive and significant relationship between teachers' classroom engagement and organisation skills and enjoyment of learners of mathematics. This means an improvement and increase in application of effective teachers' classroom engagement and organisation skills can lead to an increase in enjoyment of learners of mathematics.

The study also concluded that there is a positive, strong and significant relationship between teachers' pedagogical skills and enjoyment of learners of mathematics. This means an improvement and increase in application of effective teachers' pedagogical skills can lead to an increase in enjoyment of learners of mathematics.

5.3 Recommendations

Based on the findings and conclusions, the study recommended that in teacher training colleges, among other things, communication laboratories that simulate classroom situations should be revived so that trainee teachers are helped more to learn specialized teacher communication.

The study recommended that teachers should consciously and always work on gathering and using information about learners' learning needs and progress, giving them feedback, listening to them when teaching in class, using different discussion methods, having a good questioning style when teaching in class, using simple and understandable terms when teaching and being audible when teaching in class. Teachers must realize that communication plays a very important role in the teaching/learning process. In fact, to teach is to communicate.

The study recommended that teachers should adopt new trends such as team teaching in order to improve on their classroom engagement and organisation skills. Team teaching enhances creation and maintenance of environments that are conducive to learner learning, establishing and maintaining good relationships with learners to help them learn better, ensuring that there is class coordination when they are teaching and being keen about the sitting arrangement / organization in class. Teachers should be constantly aware that teaching/learning is a real socialization experience through which values, attitudes and emotions are built.

In a special way, mathematics teachers should explore alternative approaches to teaching other than the commonly used expository method. Such methods include: discovery, exploration, group discussions and field tours.

Mathematics teachers should develop real relationships with learners to enable them identify their challenges and also be able to tell when they are having trouble in order to give them the relevant support they may need. Most learners expressed concern that their teachers did not know when they were having trouble with the learning of mathematics. On the whole, teachers should know that classroom engagement and organisation is not just about controlling discipline. It is the setting up of a conducive environment for learners to have satisfying learning experiences based on real social relations between teachers and learners.

School administrators should organize and facilitate refresher courses for teachers in order to keep the combination of sociology and pedagogy a reality. It was observed that all trained teachers learnt sociology of the classroom but after the years, most of them forgot or are rather driven by the pressure to complete the syllabus and they end up forgetting all about it.

School administrators, national education standards' agencies and in a special way officials from Secondary Science and Mathematics Teachers (SESEMAT) should do regular inspection and supervision of mathematics teachers and mathematics teaching to ensure that the link between mathematics and life is made real.

5.4 Areas for Further Research

The researcher also recommends that additional investigation should be conducted in the following areas to fully understand the phenomenon of enjoyment of learners of mathematics; this is in light of the fact that there are several inherent challenges relating to enjoyment of learners of mathematics.

i. Creating and maintaining conducive classroom environments and enhancement of the enjoyment of mathematics learners in Ugandan schools.

ii. Mathematics teachers' classroom engagement and organisation and control approaches specific to the enjoyment of mathematics learners.

iii. Studies in affective domain regarding the teaching/learning of mathematics. Is affection/satisfaction an academic goal?

iv. Are mathematics teachers born or made? Investigating the making of a teacher who teaches by inspiring learners.

v. Contrasting the mathematics teachers' classroom engagement and organisation skills against pedagogical skills in terms of their relationship with the learners' enjoyment of mathematics.

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Appendix A: Questionnaire Guide

Introduction: My name is Francis Ssengendo, a learner of a Master's Degree in Science Education at Makerere University. I am doing research to understand the influence of the mathematics teachers' socialization and teaching practices on how learners appreciate mathematics. I ask for your cooperation and openness. All your answers will be treated with maximum confidentiality. There will not be any mention of your name or identity anywhere. All the information you provide will be used for purely academic purposes. I will be asking you questions and please feel free to share your opinions and experiences. Thank you for your cooperation.

Section A: Respondents' Background Information

Please in this section, you are required to tick (✓) the appropriate answer.

AI Age in years: (i) 12-15☐ (ii) 16- 18☐ (iii) 19 -25 ☐ (iv) 26 + ☐

A2 Gender: (i) Male ☐ (ii) Female ☐

A3 Name of your school: ……

A4 Class: ……

Instructions: **Use a scale where; 5 = strongly agree (A); 4 = Agree (A); 3 = Not Sure (NS); 2 = Disagree (D); and 1 = Strongly Disagree (SD).**

SECTION B: TEACHER COMMUNICATION SKILLS

SN	Questions on teacher communication skills	SA (5)	A (4)	NS (3)	D (2)	SD (1)
B1	My mathematics teachers is audible when teaching in class					
B2	My mathematics teacher uses simple and understandable terms when teaching					
B3	My mathematics teacher has a good questioning style when teaching in class					
B4	My mathematics teacher is a good listener to learners when teaching in					

	class					
B5	My mathematics teacher gives feedback to learners in class					
B6	My mathematics teacher gathers and uses information about learners' learning needs and progress					

What other communication skills do mathematics teachers apply in class?

……

……

SECTION C: TEACHER CLASSROOM ENGAGEMENT AND ORGANISATION SKILLS

SN	Questions on teacher class room management skills	SA (5)	A (4)	NS (3)	D (2)	SD (1)
C1	My mathematics teacher holds learners attention when teaching in class					
C2	My mathematics teacher ensures that there is class coordination when he / she is teaching					
C3	My mathematics teacher ensures that there is attention in the class when teaching					
C4	My mathematics teacher is keen about the sitting arrangement / organisation in class					
C5	My mathematics teacher knows when we are having trouble with our work					
C6	My mathematics teacher engages in a range of class planning activities					
C7	My mathematics teacher creates and maintains environments that are conducive to learner learning					
C8	My mathematics teacher establishes and maintains good relationships with learners to help them learn better					

What other class management skills do mathematics teachers apply in class?

……

SECTION D: TEACHER TEACHING SKILLS

SN	Questions on teacher pedagogical skills	SA (5)	A (4)	NS (3)	D (2)	SD (1)
D1	My mathematics teacher knows a lot about mathematics					

D2	My mathematics teacher shows he understands the subject					
D3	My teacher has the necessary skills to teach mathematics					
D4	My mathematics teacher knows there are many methods to teaching and learning					
D5	My mathematics teacher uses exciting teaching methods when teaching in class					
D6	My teacher uses different ways to teach and help me learn					
D7	My mathematics teacher applies a variety of technologies to meet learners' learning needs					
D8	My mathematics teachers' applies teaching skills basing on classroom situations					
D9	My mathematics teacher makes mathematics interesting					
D10	My mathematics teacher uses good testing methods					
D11	My mathematics teacher gives factual and appropriate examples					
D12	My mathematics teacher uses real life stories when teaching					
D13	My mathematics teacher applies math concepts to real life situations					
D14	My mathematics is clearly a teacher by choice.					
D15	My mathematics teacher presents material in a clear way					
D16	My mathematics teacher shows a lot of interest in the learners					
D17	My mathematics teacher seems to enjoy teaching mathematics					
D18	My mathematics teacher is willing to give us individual help					
D19	When a learner has difficulty understanding a concept, the teacher tries to be supportive					
D20	My mathematics teacher translates mathematics content and objectives into meaningful learning activities					

What other teaching skills do mathematics teachers apply in class?

……
……

SECTION E: LEARNERS' ENJOYMENT IN MATHEMATICS

SN	Questions on learners enjoyment in mathematics	SA (5)	A (4)	NS (3)	D (2)	SD (1)
E1	I have a positive attitude / interest towards mathematics					
E2	When I hear the word mathematics, I have a feeling of dislike					
E3	I actively participate in the mathematics class					
E4	I regularly consult with my teacher and fellow learners on mathematics concepts					
E5	I believe I will offer mathematics as an option at A level					
E6	I want to do a mathematics related course after my senior four					
E7	My grades / scores in mathematics are generally pleasing					
E8	During tests given by my mathematics teacher, I move myself to try my best and to satisfy my teachers' expectation					
E9	I would like to spend less time in school doing mathematics					
E10	Mathematics is a subject which I enjoy very much					
E11	While my mathematics teacher is teaching, I look forward to when the lesson will end					
E12	Mathematics makes me look forward to coming to school					
E13	I feel at ease in a mathematics class					
E14	I often think, "I can do it," when a mathematics problem seems hard					
E15	Sometimes I read ahead in our mathematics book					
E16	All people should study some mathematics					
E17	I want to teach math in the future					
E 18	I find it comfortable to consult my teacher whenever necessary					
E 19	I always want to actively participate in the mathematics lessons					

What else shows that you have value for mathematics?

……
……

THANK YOU FOR YOUR VALUABLE TIME AND INFORMATION

Appendix B: Interview guide for Mathematics Teachers, Head Teachers and Directors of Studies

COMMUNICATION SKILLS OF THE TEACHER

1. What are the common modes of communication mathematics teacher use to pass on information to learners?
2. Does the teacher communicate both academic and non-academic material in clear terms?
3. How do these communication modes affect learners' interest in learning mathematics?

CLASSROOM ENGAGEMENT AND ORGANISATION SKILLS OF THE TEACHER

1. What methods do mathematics teacher use to keep order, discipline and attention in the classroom?
2. Which methods help teachers learning goals? Which ones don't?
3. Is the classroom environment friendly?
4. How would you recommend teachers to manage the classroom better?

TEACHING / PEDAGOGICAL SKILLS OF THE TEACHER

5. Which methods of teaching do mathematics teacher use?
6. What is your general impression of mathematics among learners based on the qualities of teacher?
7. Is mathematics a subject that learners are happy to be learning?

8. Regardless of how learners succeed in mathematics academic work, do you think learners feel any satisfaction in mathematics learning?
9. Comment on learners' performance in terms of attendance and scores or grades in mathematics.
10. What should be done to improve learner's enjoyment in mathematics?

THANK YOU FOR YOUR VALUABLE TIME AND INFORMATION

Appendix C: Observation Guide

The researcher shall observe the following elements during mathematics lessons;

1. The common modes of communication mathematics teacher use to pass on information to learners
2. Methods that mathematics teacher use to keep order, discipline and attention in the classroom
3. Skills and methods that teachers use during the lesson
4. Attentiveness, alertness and interest of leaners during mathematics lessons
5. Learners' performance in terms of attendance and scores or grades in mathematics
6. Any other observation

Appendix D: Table for determining sample size for finite population

Table 3.1

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

Source: Adapted from Krejcie & Morgan, 1970 in Amin (2005)