LEARNING ENVIRONMENT AND LEARNERS ACHIEVEMENT IN MATHEMATICS:

A CASE STUDY OF SELECTED SECONDARY SCHOOLS IN

AMOLATAR DISTRICT.

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UNIVERSITY

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DECLARATION

I, **Kanakulya Fred,** declare that this research is my own original work that has never been presented to any other academic institution for a similar or other degree award. Where the work of other authors has been used, it has been acknowledged.

Signature …………………………… Date ………………………….

KANAKULYA FRED

2020/A/EDM/2364/R

APPROVAL

We certify that this dissertation has been submitted by **Kanakulya Fred** under our guidance.

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DEDICATION

I dedicate this research to God for the provision of both physical and mental strength to work and complete it within the time limit; to my wife, Flavia, and my children, Freda, Fernando, Faith, Florence, and Felix, for their support in all aspects of life; my friends, Isingoma, Tomson, Mugisha David, and Auk Timothy. Thank you for everything you did for me.

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ABSTRACT

Amolatar district has been struggling with poor performance in Mathematics for several years. The aim of this research is to determine how teacher competence, provision of good quality instructional materials and learners attitude, affect learning achievement in Mathematics among Ordinary level students in selected secondary schools of Amolatar District. With the overall goal of finding the combination of factors that can be targeted to improve performance. The findings showed that, **35%** of the learners strongly agreed and **32%** agreed to the fact that their teachers ask questions to see if they have understood the lesson content followed by **46%** of the learners who strongly agreed that their Mathematics teachers help them in describing the lesson. Finally 39% also strongly agreed that their Mathematics teachers use practical examples on board. The adjusted R-square of **0.886 (88.6%)** shows that there is a strong positive relationship between the learners' scores and the three factors identified above. The study also found out that most of the teachers (**47.1%**) often use instructional materials when teaching Mathematics. The study concludes that provision of good quality instructional material improves students learning achievement. Therefore, the study recommends vigorous sensitization, seminars and career guidance to the students so as to improve their interest for positive attitude toward Mathematics.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study was carried out to establish how learning environment (teacher competencies, provision of good-quality instructional materials, and learners' attitude affect learning achievement in Mathematics) among ordinary-level students in selected secondary schools in Amolatar District. This chapter further presents the background to the study, the statement of the problem, the purpose of the study, specific objectives, research questions, the scope, and the significance of the study.

1.1 Background to the study

The background to the study was classified into historical, theoretical, conceptual, and contextual backgrounds.

1.1.1 Historical Background

Since the beginning of formal education, the issue of students not understanding and mastering what they were taught has been prevalent throughout the world. For instance, according to Rugut and Chemosit (2005), this issue first became apparent in the middle of the 20th century, when academic researchers like Carall, Glaser, Welbarg, and Bennet (2018) were interested in understanding why students were performing poorly in examinations. Since then, this issue has grown throughout numerous academic fields. Moore (2019) demonstrated that previously, academic learning achievement was thought to be a significant result of formal education experiences. This suggested that this accomplishment had changed over time as formal schooling progressed.

Dr. Sizwe Mabizela (2019) in his book said; that the average failure rate in Mathematics over the period 2008- 2018 at the University of Pretoria South Africa is about 50%.

Leomarich, Casinillo conducted a study to explain the main factors affecting the failure rates in Mathematics in Visayas State University. Findings indicated that 51% of the students who failed Mathematics failed as a result poor study habits 13.9% failed because of emotional reasons.

In Uganda, Kiwanuka (2015) investigated the variables influencing first-year secondary school students' Mathematics learning achievement in central Uganda. By analysing descriptive result frequencies, it was found that socioeconomic status, gender, past Mathematics achievement, parental support, and peer influence were all strongly correlated with Mathematics learning achievement.

1.1.2 Theoretical Background

The Attribution Theory of B.Weiner (1966) a social psychologist was the underpinning theory that guided the study. According to his view, all certainties of success are the result of either internal or external forces. Internal factors are those that originate from a performer specifically: while the external elements come from sources other than the specific performance. In accordance with this theory, it is therefore presumable that students' learning achievement in Mathematics at the Ordinary level is either influenced by internal or external causes, as claimed by Bandura's theory (1986).

The internal elements may include performer motivation, mental aptitude, and attitude. External factors include the school environment, teacher skill and methods, family guidance, and career guidance. Other theories include, correspondent interference theory, Kelly's co - variation model,

Behaviourism theory and others. These were not considered because this theory adequately explains teacher competencies, student attitudes, and instructional resources as internal and external contributing variables to students' academic progress in Mathematics. The researcher

felt that there was more going on since Kiwanuka researched the impact of other social elements on performance, but the issue of underachievement has continued, so he wanted to concentrate more on the quality of children's school time. The researcher also investigated those elements that the instructor might be able to influence in order to improve student performance and achieve the goals of studying Mathematics.

1.1.3 Conceptual Background

Webster (2006) defined learning achievement as the degree to which a student or an institution has met either short or long-term educational objectives. He continued by saying that the academic success of students has caught the attention of numerous academics, parents, policymakers, and planners. Although student's performance in Mathematics assessment is often evaluated based on their grade, their understanding and mastery of the material are also considered. Students' use of their knowledge outside of the classroom and the ease with which they discuss subjects, including Mathematical content, are good indicators of this. Therefore, improving academic learning attainment across all subject areas was one of secondary schools' main responsibilities.

The same idea is described by Bhat (2014) as the outcome of student involvement with teaching and learning processes. He goes on to say that a student's ideas are influenced by his or her academic performance because he or she learns how others perceive them and how they perceive themselves. It is the knowledge learned in academic courses that is typically created as a result of ongoing examination. According to Webster (2006), a determinant is anything that affects how something happens. Teachers' qualifications, the availability of tools for teaching Mathematics, and students' attitudes about the subject will all played a part in the current study's determinants. In this study, teacher competences included their credentials, abilities, and level of knowledge mastery.

Students' attitudes included, including their enthusiasm for the subject, reading attitudes for Mathematics, Mathematics books, graphs, calculators and Mathematical sets round out the list of educational materials. These three factors were chosen by the researcher simply because they were the most important incidental factors affecting students' learning achievement in Mathematics.

Figure 1.1 Conceptual frame work showing determinants of learning achievement in Mathematics.

IV: Determinants   **DV:** Learning achievement in Mathematics

Teacher competencies
- Qualifications (formal)
- Skills
- Masterly of knowledge

Provision of instructional materials
- Books (text books)
- Graphs
- Mathematical sets

Student attitudes
- Frequency of lesson attendance
- Frequency of revision

- Grades in tests
- Grades in a recent examination
- Ability to memorize
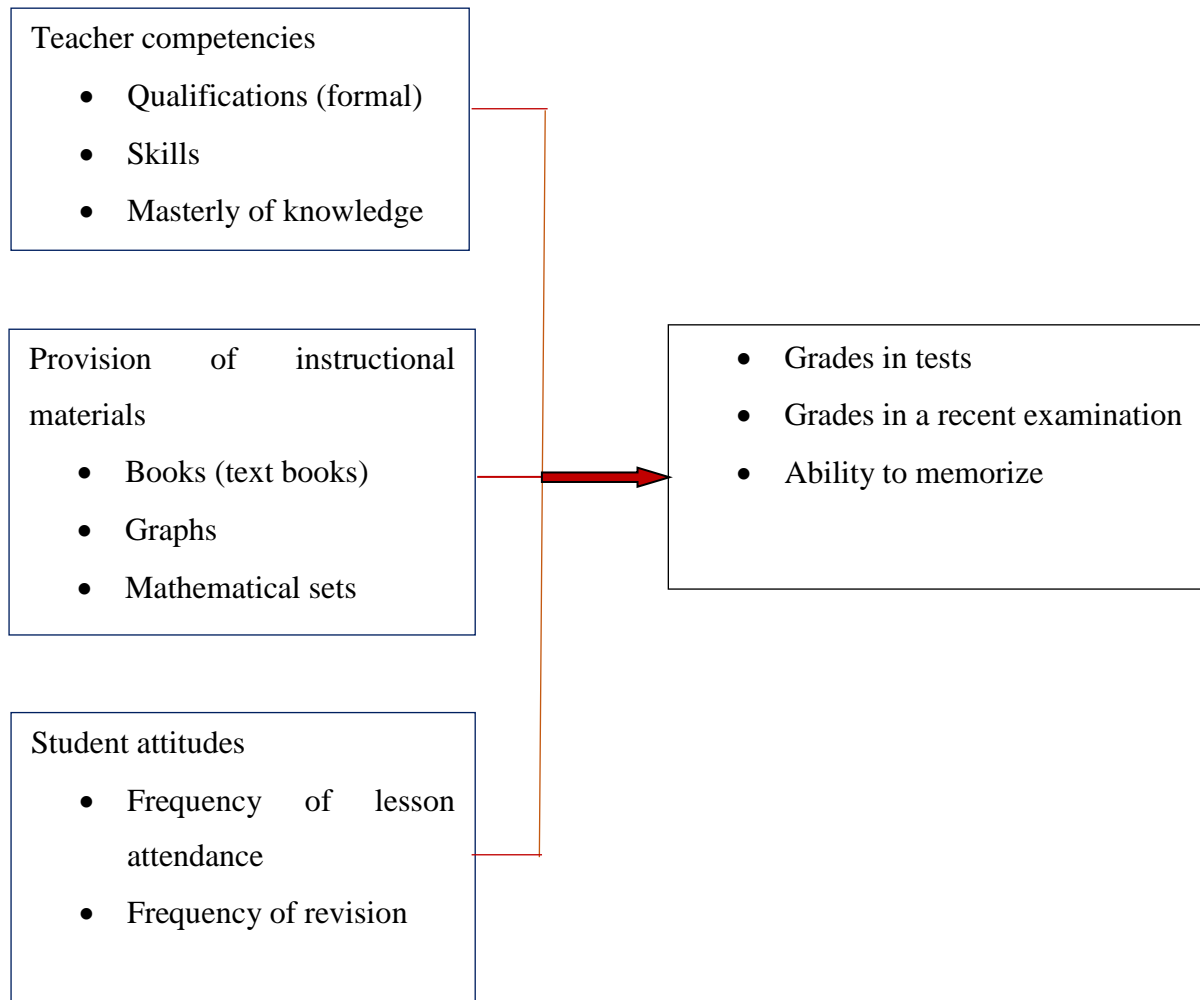
Source: Adopted from Adipo (2015)

Figure 2.1: Conceptual Framework Showing the Effect of Determinants on student's learning achievement in Mathematics.

The independent variable (IV) and the dependent variable (DV) were research variables. The variables that stood alone and were unaffected by the other factors being measured were known as independent variables. These were variables for effective learning, such as the teacher's competencies, the learners' attitude, and the quality of instructional materials, among others.

Dependent variables were those that depended on other factors, for example, test scores, examination scores, the ability of a learner to memorize what is taught, and others.

The conceptual framework illustrates the factors influencing teacher competencies with regard to skill acquisition and mastery of Mathematics. The availability of high-quality Mathematics teaching resources, including text books, calculators, graph books and Mathematical sets, was the second research factor. The final factor was how students felt about Mathematics, including their passion for the topics, their views on reviewing Mathematics, their confidence in Mathematics, when these factors are successfully implemented during the teaching and learning process, it is anticipated that students will acquire good grades. This has a direct positive impact on learning achievement. The expected grades would be low if the aforementioned factors weren't applied.

1.1.4 Contextual Background

In the northern portion of Uganda, in the Amolatar District of the Lango sub-region, learning achievement in Mathematics at the Ordinary Level was reported to be low (UNEB, 2020). According to the Amolatar District Education Report (2020), Mathematics is one of the worst performed subjects in the district, with more than 76% and 74% of the learners who took UCE examinations in 2019 and 2020, respectively, failing the subject. However, the aforementioned district education assessment found that students' overall performance at UCE level was being impacted by their poor academic performance in Mathematics.

Because it was crucial to identify the underlying reason for this ongoing inadequacy in achieving the desired learning outcomes for this particular subject by looking at the learning determinants proposed in this study, the study looked at the determinants of learning achievement in Mathematics at the Ordinary level in Amolatar District. It was conducted among the district's teachers and students, two groups whose participation directly affect performance.

1.2 Problem Statement

The fulfillment of a good secondary school scientific education depends heavily on students' success in Mathematics at the ordinary level. Due to this, the Government of the Republic of Uganda has developed a number of policies that support the teaching and study of Mathematics, particularly those that declare the subject as a science and a required subject (NCDC, 2016). In comparison to other districts in the area, Mathematics learning and passing rates in Amolatar District have remained unacceptably low. According to the Amolatar District Education Report (2020), Mathematics is one of the poorly performed subjects in the district, with more than 76% and 74% of learners who took UCE examinations in 2019 and 2020, respectively, failing the subject. Based on the 2019 and 2020 UNEB results, this conclusion was reached. This current state of affairs is likely to undermine government initiatives to support science education, foster scientific inventions and innovations, and transition of Uganda from a low-income to a middle-income state. The deplorable situation has been addressed in a variety of ways, including the addition of Mathematics teachers to some schools (Ministry of Education and Sports 2022) and the distribution of Mathematics textbooks to all government-owned and -aided secondary schools, but poor performance has persisted.

This situation may be caused by a variety of variables, including low teacher morale brought on by low pay, whether the teachers actually receive the teaching materials, whether the teachers use any other instructional materials outside text books, and many more. No other factors have been studied in Amolatar for teachers in government-owned schools, and it appears that no conclusive results have been established to establish how competency levels of teachers, provision of good quality instructional materials, and learners' attitudes may be influential on the Mathematics learning achievement of ordinary level students in their secondary schools (MOES, 2022). While improving science teachers' morale through better pay has been instituted in 2022/2023 budget (MOES, 2022),

Additionally, the review revealed that there has not been any empirical research on the ideas put forth in this study in the same setting. In the light of this context, the researcher set out to evaluate how the aforementioned determinants influence Mathematics achievement among students at the Ordinary level in a few secondary schools in the Amolatar district.

1.3 Objectives

1.3.1 Main objective

The study established how the selected determinants: teacher competency, provision of good quality instructional materials and learners attitude, affect learning achievement in Mathematics among Ordinary level students in selected secondary schools of Amolatar District.

1.3.2 Specific Objectives

The study was guided by the following specific objectives;

I. To determine the extent to which teacher competences affect learning achievement in Mathematics among learners at Ordinary level in selected secondary schools of Amolatar District.

II. To analyse the extent to which students' attitude affects learning achievement in Mathematics among learners at Ordinary level in selected secondary schools of Amolatar District.

III. To investigate the role of provision of good quality instructional materials on students' learning achievement in Mathematics among Ordinary level learners in selected secondary schools of Amolatar District.

1.4 Research questions

The study was guided by the following research questions

1. To what extent do teacher competences affect learning achievement in Mathematics among learners at Ordinary level in selected secondary schools of Amolatar District?

2. To what extent does student's attitude affect learning achievement in Mathematics among learners at Ordinary level in selected secondary schools of Amolatar District?

3. What is the effect of provision of good quality instructional materials on student's learning achievement in Mathematics at Ordinary level in selected secondary schools of Amolatar district?

1.5 Scope

1.5.1 Content Scope

The study content scope includes the following determinants: teacher competencies, students' attitudes towards Mathematics, and the provision of good quality Mathematics instructional materials. These, together, can lead learners to acquire good grades in tests, in examinations at the end of the academic cycle, the ability to memorize what is taught, and others. These were assessed by soliciting responses from teachers and students using a questionnaire as the research instrument. All these had a direct positive effect on learning achievement in Mathematics. Since these determinants were effectively considered and applied during the

teaching process, the quality of grades is expected to improve in Mathematics. Failure to consider the above determinants would mean that the quality of grades would be poor.

1.5.2 Geographical Scope

This current study was carried out at the Ordinary level in selected secondary schools in Amolatar District in northern Uganda. This district is neighboured by Kwania District in the north, Dokolo District in the northwest, Kaberamaido District in the east, Buyende District in the south-east, Kayunga District in the south, and Nakasongola District in the west. The district is located 160 kilometres from Kampala District. It was chosen for the study because it is one of the districts where UNEB 2019 and 2020 revealed high failure rates in Mathematics.

1.5.3 Time Scope

The study's time frame covered the months of January 2022 to may 2023. January 2022 to July 2022 were for proposal development and defence. August 2022 to may 2023 were for data collection, analysis, and report writing.

1.6 Significance of the study

The following groups of individuals may benefit from the study findings:

The Ministry of Education and Sports' policy makers are aware of how the examined predictors affected students' academic learning achievement, so they may consider strategies of this study to make improvements.

To the Amolatar District Education Board policy makers, who are informed of how the studied incidental factors influenced students' learning achievement so they can come up with potential solutions for improvement.

The study's findings are crucial for Mathematics teachers in UCE schools in Amolatar and across all of Uganda because they will help them improve on the variables that influence students' Mathematics learning achievement.

The findings are critical to the researcher because they might be used to make recommendations on how to improve the factors studied in order to improve students' Mathematics learning achievement.

The findings are essential for students because by improving on the indicators studied, they will be able to do better on the subject.

The study may be of great importance to future researchers as the findings from this research could be applied as a source of reference in their suggested studies, creating gaps to fill in their suggestions.

1.7 Justification of the Study

The current study was supported on the grounds that success in Mathematics at the ordinary level is crucial for advancing science education. The ability to study and pass Mathematics at the Ordinary level allows students to enrol in science-based combinations at the Advanced level of secondary school (such as PCM, PEM, and MEG), which will allow them to pursue a variety of STEM courses at universities and careers in the future (such as engineering, computer science courses, basic science, statistics, and data science, among others). In contrast, students who want to enroll in life science courses only require functional basic Mathematics, but many of these students also need to pass Mathematics at the ordinary level, expanding their Mathematics education to help them become effective scientists and ultimately lead the significant industrialization required to fuel Uganda's growth and change in accordance with Uganda's Vision 2040. The goal of the Uganda National Development Plan (NDP3), which runs from 2020–2021 to 2024–2025, is to convert Ugandan societies

from subsistence-based to be rich and modern. This research is crucial since the NDP3, the third in a series of six national plans, will direct the country and fulfil all Ugandans' objectives for the next five years.

The draft plan includes the following ideas: a focus on industrialization, with the goal of ensuring sustained, accelerated growth by increasing the value of the numerous resources in agriculture, minerals, oil and gas, and other sectors. Amolatar schools may be given the push they need to advance the science agenda as required of all schools by the Ministry of Education now that the role of Mathematics in future learning and attaining science careers in life has been established. Teachers, students, and parents may use the knowledge gained from this study to improve performance by focusing on areas that are directly influenced by each stakeholders.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature pertaining to the three study objectives is reviewed in this chapter. The results of studies on the factors influencing academic success by various scholars, researchers, and journals are contrasted. The main goal of this chapter was to familiarize readers with alternative perspectives on the factors that influence learning achievement in Mathematics. The chapter presents empirical reviews of the study objectives, which covered the quality of the teachers, the availability of learning resources for the students, and the attitudes of the students toward Mathematics. These are displayed in the subsequent sections that follow below:

2.1 Empirical review

2.1.1 Teacher Competence and Learning Achievement in Mathematics

Wekesa (2013) evaluated the factors influencing students' performance in Mathematics at the KCSE level in secondary schools in Kenya's Kakamega County as one of the studies analysed for this goal. Using Pearson's correlation coefficient and regression analysis techniques, results showed that student-teacher ratio and teacher level of readiness were important predictors of student learning achievement in Mathematics. This study found that teachers with higher levels of education had students who performed better in Mathematics than teachers with lower levels of education.

Michael (2015) investigated the causes of poor Mathematics performance at Kibaha Secondary School in Tanzania. The results of the descriptive data analysis showed that there were difficulties in teaching, such as a bad learning environment. It was stated that poorly managed Mathematics instruction had a negative effect on students' success in the subject.

This study, however, was descriptive in nature, whereas the current study was co-relational in nature.

In order to improve students' cognitive and motivational growth, the effectiveness of the teachers and their instruction is crucial, according to Seoul longitudinal research at Korea University JW Han (2018). This study sought to determine the long-term trends in students' perceptions of Mathematics teachers' professional competence and to investigate the relationships between these trends and students' engagement, learning outcomes, and college major preferences. Out of a study of 2714 secondary students who were tracked for five years in a row, it was found that students who consistently believed their Mathematics teachers to be highly competent were more likely than other students to choose majors that required a lot of Mathematics, such as engineering majors and others.

2.1.2 Provision of good quality Instructional Materials and Learners' Achievement in Mathematics

On this goal, empirical research by Makondo and Makundo (2020), who investigated the reasons behind poor academic performance in Mathematics at the ordinary level, was evaluated. Using descriptive statistics, percentages demonstrated that one of the main causes of poor learning achievement in Mathematics is a lack of adequate resources. Additionally, while this study was inferentially done, this study was not.

Tety (2016) conducted research on how instructional materials affected student achievement in community secondary schools in Kenya's Rombo District. Descriptive statistics-based findings indicated that instructional materials were crucial in ensuring that students achieved high levels of academic learning. However, this study found that teachers lacked sufficient teaching resources, which had a negative effect on students' levels of learning performance. However, our investigation was not influenced by the attribution theory.

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Additionally, Prado and Tan (2019) investigated how students' attitudes, self-efficacy beliefs, and academic performance were affected by the teaching materials used in general Mathematics and high school statistics. According to statistical findings, instructional materials may be useful in raising students' Mathematics proficiency. The environment of this study, however, was different from that of the secondary schools in Amolatar.

Wekesa (2013) found that student-to-Mathematics-textbook ratios had less of an effect on students' learning achievement in Mathematics than did Plado and Tan's research. This investigation determined whether Amolatar had a comparable situation. The primary causes of the ineffectiveness of Mathematics teaching in secondary schools, according to Abdu-Raheem (2011), are a lack of and inadequate provision of instructional materials. Ahmed (2003) had previously said that the majority of secondary schools in Nigeria lack the most basic instructional resources, making it extremely difficult to teach and study Mathematics in those settings.

2.1.3 Students attitudes and learning achievement in Mathematics

In trying to understand students' attitudes and learning achievement in Mathematics, Wekesa (2013) evaluated the variables influencing secondary school students' performance in Mathematics at the KCSE level in Kakamega County, Kenya. Results from multiple regression analysis and Pearson correlation showed that student's attitudes toward Mathematics had a favourable and significant impact on students' learning achievement in Mathematics. Students who had a positive attitude toward Mathematics were performing better than those who had a negative attitude. The study discovered that how students react to participating in learning activities in Mathematics lectures is crucial to how well they perform. It was found that more than half of the learners did better in Mathematics because they loved participating in educational activities with their teachers and fellow classmates.

According to Amato (2001), a mismatch can occur when a teacher instructs using tasks assigned to students and the student tries to understand what to do and why he or she should do it, leading to the generation of negative attitudes toward Mathematics.

According to research by Aaronson (2003), learners who are taught by teachers who are friendly with them and have a positive attitude about their work considerably increase their learning achievement in Mathematics. The survey was conducted in America, and there was an information gap regarding the educational situation in Uganda.

Bayern, Ayebale, Habaasa and Tweheyo (2020) used a desktop review of the literature from ERIC, Google Scholar, and random Google searches to investigate factors affecting students' learning achievement in Mathematics in secondary schools in developing countries. Results showed that teacher attitudes and students' attitudes towards Mathematics were significant influences on students' learning achievement in Mathematics. The present study, however, was empirical in nature, whereas our study was a desk review of the literature.

In a similar vein, Brazauscek, Jerebic, Rus, and Znidarsic (2020) investigated the variables affecting university students studying social sciences' ability to acquire Mathematics. By utilizing structural equation modelling (SEM) to evaluate the data, it was discovered that students with favourable attitudes towards mathematics have lower levels of anxiety about the subject. As a result, these students did better, and the opposite was also true. However, the result of the current study was based on Pearson's correlation coefficients, whereas the preceding study used a structural equation model.

In a study on the attitudes, self-efficacy beliefs, and academic performance of high school students, Prado and Tan (2019) examined the effects of teaching materials in general Mathematics and high school statistics. Results from the use of the t-test analysis technique

showed that student attitude had a favourable, substantial impact on learning achievement in Mathematics. However, our study adopted co-relational approach in its investigation.

In a study conducted in Ghana, Mensah and Kurancie (2013) discovered a substantial positive correlation between students' attitudes and Mathematics proficiency. Additionally, Joseph (2013) discovered that the majority of learners (55%) had an overall unfavuorable attitude towards Mathematics in his research of community-based secondary schools in Kagera, Tanzania. By contrast, this current study was undertaken in both selected community secondary schools and selected church-founded secondary schools in Uganda, Amolatar District.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter describes the thematic approaches used in the study's data management. It further presents the research design, population, sample size, sampling techniques, data procedures, data collection tools, data quality control, data analysis, and ethical considerations.

3.1 Research design

The study adopted cross-sectional design and took mainly a quantitative approach of research with less qualitative approach.

3.2 Study Population

This research was carried out in secondary schools of Amolatar in Northern Uganda. The district has 13 secondary schools (Amolatar District Local Government Education Report 2019). The researcher conducted the research in 8 of these 13 schools and the selection included both private and government (public) owned, rural and urban schools. The district has only three urban schools and all of them participated in this research. Therefore five schools were chosen in rural areas in the district. The district has eight publicly owned schools and only five privately -owned schools. However, the public owned schools have higher enrolment numbers than privately owned schools due the higher costs of education the private schools offer (Amolatar District Education Department 2020). For this reason, we choose to have six public and two privately owned schools for the research. The researcher did a pre visit to the eight selected secondary schools in the district to determine the study-population size this was done by talking to the Mathematics teachers in these schools, the population size per class for all the four classes of ordinary level were recorded in all the eight schools. The researcher then computed the average population size per class as;

67,60,65 and **45** for **S1,S2,S3**, and **S4** respectively. This brought the study population size to 1896. Mathematics as a subject was chosen for this research study because poor performance in the subject had been endemic in the district (UNEB 2019) and this greatly impacted student's performance even in other subjects.

Table 3.1 showing school category by ownership (private and public)

Category	Number
Public	6
Private	2
Total	8

Table 3.2 shows school category by location (rural and urban)

Category	Number
Rural	5
Urban	3
Total	8

3.3 Determination of the Sample Size

To determine the minimum sample size for this research, we used Krejcie and Morgan table (1970) (in Appendix V). Since the study population size was approximated to 1896, the researcher used a sample population of 1900, which was the closest figure that appears on the Krejcie and Morgan table (1970) to determine that the sample size should be 320 students. From the pre visit by the researcher, it was discovered that most of the selected schools had two Mathematics teachers .However, there was one public school with five (the highest number) and one other school with only one Mathematics teacher. Overall the eight selected schools had 20 teachers between them. Using Krejcie and Morgan table (1970), this gave a sample size of 19 teachers.

Table 3.3: Sample size determination matrix

Category	Population	Sample size	Sampling technique
Students	1900	320	Stratified
Teachers	20	19	Purposive
Total	1920	339	

Source: Amolatar District Education Department (2021)

3.4 Sampling Techniques

With the aid of their classes, stratified random sampling was used to sample the study's participants. Due to the 32 Ordinary Level classes in the eight chosen secondary schools in Amolatar providing 10 respondents each, a total of 320 respondents served as the sample size. Since there were four Ordinary-level classes in each school, from Senior One to Senior Four, stratified random sampling was used. As a result, it enabled the depiction of all categories across all classes.

Table 3.4 shows the number of schools and the number of student respondents from each school.

SCHOOL NAME	NUMBER OF STUDENT RESPONDENTS PER SCH,
A	40
B	40
C	40
D	40
E	40
F	40
G	40
H	40
TOTAL=8	TOTAL =320

Purposive sampling was used to select the sample of teachers for this study since teachers of Ordinary-level Mathematics are the targeted respondents who could provide the necessary data. There were 20 of these teachers in the Amolatar District secondary schools that were chosen, yielding a sample size of 19 responses.

3.5 Data Collection instruments

3.5.1 Questionnaire

A survey method with a questionnaire was used to collect data. This technique was used to collect data from teachers and students at the district's Ordinary level. This approach was chosen because student samples were larger than teachers' samples. It assisted in obtaining information quickly and efficiently.

One of the instruments used to gather data was self-administered questionnaires with closed-ended and structured questions. This was enabled by its use since it was simple to disseminate to a sizable audience, such as the learners, and it precluded researcher intervention with the provided data. Ordinary-level secondary school students completed the first questionnaire, while Mathematics teachers in Amolatar District completed the second. Sections "A" on student biographical information, "B" on the impact of teacher skills on students' learning performance in Mathematics, and "C" on the impact of students' attitudes toward learning achievement in Mathematics made up the questionnaire for students at the ordinary level.

Sections "A" on the biographical information of the teachers and "B" on the impact of providing high-quality instructional resources on students' learning achievement in Mathematics were included in the questionnaire for teachers at the Ordinary level.

3.5.2 Interview guide

The second form of data collection instrument in addition to the questionnaire, was interviewing, which was used particularly for secondary school teachers. It was chosen to add to the information gathered by questionnaires. In-depth accounts of the factors that affect students' Mathematical learning achievement were also obtained through the interview approach. The three objectives were followed by sections of the questions. The researcher posed open-ended questions, taking notes as he did so and noting the main responses from the respondents. Participants were questioned on study themes in great depth using the interview guide. It was utilized to fill in any gaps that the self-administered survey might have had.

3.6 Procedure of Data Collection

After the project was approved, Kabale University was asked for an introductory letter to introduce the researcher to the students and instructors in the chosen secondary schools in the Amolatar District. Additionally, the researcher received a letter introducing him to the respondents and requesting their cooperation in gathering the required data. He hired two students from the chosen Amolatar secondary schools to serve as his study assistants and trained them in data collection techniques. These statistics were gathered directly from students and teachers (respondents). Testing the validity and reliability of the study tools came next. After the data had been gathered and processed, a final report was written and prepared for submission to Kabale University.

3.7 Data Analysis

Analysis was done at three levels; 1.univarint descriptive statistics, 2.bivariant and multivariant. Techniques such as frequencies, graphs, correlations, percentages, averages, regression analysis and standard deviations. The study's hypotheses were examined using Pearson's correlation coefficient index at the bivariate level. This method was chosen because it was believed that factors like student attitudes, teacher competency, and the availability of

high-quality Mathematics instructional materials were continuous. Since these were connected to a continuous or numerically dependent variable, Pearson's correlation coefficient index was chosen.

3.8 Ethical Considerations

The study cited and referenced all other authors' work, avoiding plagiarism. No instances of falsifying the information and sources given were approved. Every reference was listed as having been acquired during the review. The findings could not be changed to fit the objectives of the researchers. As a result, they were displayed in their original, field-based form. The data collected did not include interference from respondents. Before gathering data, respondents-students and teachers were asked for their permission. The results were handled with the utmost discretion to the best of my knowledge.

DATA PRESENTATAION, ANALYSIS AND INTERPRETATION

4.0 Introduction

The study was carried out to establish how the selected determinants; teacher competence, provision of good-quality instructional materials, and learners' attitude affect learning achievement in Mathematics among ordinary level students in selected secondary schools in Amolatar District. The study findings are presented according to the demographic characteristics of the respondents who participated in the study; the analysis of the collected data and its interpretation were in relation to the study objectives.

4.1 Rate of response

Out of the 320 questionnaires the researcher distributed, 318 were returned with all the necessary information, translating to a response rate of 99.4%. Also, 19 Mathematics teachers were sampled but only 17 participated in the study during the interview translating to 89.5% response rate. The table below displays the response rate.

Table 4.1: Rate of response

Instrument	No. Sampled	No. Interviewed	Percentage
Interview	19	17	89.5%
Instrument	No. Sampled	No. Returned	Percentage
Questionnaire	320	318	99.4%
Total	**339**	**335**	**94.5%**

Source: Field data (2022)

The overall response rate obtained was 94.5%. This can be supported by Mugenda (1999) who argues that a rate of response above 70% is sufficient to represent the research findings.

4.2 Background Information of Respondents

The respondents' backgrounds, as well as their gender and age, were taken into consideration. Due to the potential impact these characteristics may have on a learner's attitude, teacher competence, and the availability of instructional materials, it was thought to be of utmost importance. Table 4.2.1 below has the details of their rate by age.

4.2.1 Age of respondents

Table 4.2.1 Age of student respondents

	Frequency	Percent
10-13 years	23	7
14-17 years	245	77
18+ years	50	16
Total	**318**	**100**

Source: Field Data (2023)

From Table 4.2.1, the majority of respondents 245(77.04%) were between the ages of 14-17 years; 50(15.72%) were above the ages of 18years; and 23(7.23%) were between the age of 10-13 years. Consequently, the majority of students in ordinary secondary schools are between the ages of 14 and 17. This was due to the fact that most children in Uganda finish primary school at age 12. The percentage of students who completed ordinary level after the age of 17 years was quite low at 15.72%.

4.2.2 The Age Distribution of the teacher respondents

The following table shows the age brackets of the teacher respondents in this research.

Table 4.2.2 Age of teacher respondents

Age bracket	Frequency	Percentages
25-30 years	4	23.5
31-35 years	7	41.2
36-40 years	4	23.5
40+ years	2	11.8
Total	**17**	**100.0**

Source: Field Date (2023)

Evidently, the statistical findings in Table 4.2.2 above showed that the majority of the research participant fell in the age range of 31-35 years, 7(41.2%) and 2(11.8%) of the participants were 40+ years. This implies that there were less old Mathematics teachers in the selected ordinary secondary schools in Amolatar District.

4.2.3 Gender of respondents

The research was carried out on respondents that consisted of both male and female (students and teachers) as shown in Table 4.3 below:

Table 4.2.3 Gender of the respondents

	Students	Percentage	Teachers	Percentage
Male	184	57.9	11	64.7
Female	134	42.1	6	35.5
Total	318	100	17	100

Source: Field Data (2023)

Table 4.2.3, it shows that **57.9%** of student respondents were male and **42.1%** were female. This implies that in the context of this study, there were more male respondents than females since the respondents were chosen at random; this suggests that there are more male students and teachers in secondary schools in Amolatar than females. While the difference between female and male students was small, there is still a need for improved sensitization and creation of an enabling environment to improve female student numbers. The table further showed more male teachers participated in the research than female teachers. This can be explained by noting that there were more male teachers in STEM subjects in general than female teachers'

4.3 Analysis of results

In this section, the researcher presents the results and their analysis in line with the objectives of the study.

4.3.1 Objective one: The effect of teacher competences on learning achievement in Mathematics

The student respondents were asked a series of questions (as shown in Table 4.3.1) whose aim was to determine the extent to which teacher competences affect learning achievement in Mathematics at Ordinary level. Students were asked to record their responses to each of the questions in the questionnaire using the scale of 1= strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = strongly disagree the summery of their ratings and results is shown in the tables below and a summary of the five questions is shown below;

B1.My Mathematics teacher helps in describing the lesson.

B2. My Mathematics teacher uses practical examples on board.

B3. My Mathematics teacher asks questions to see if I have understood the lesson content.

B4. My Mathematics teacher uses recommended Mathematics text books.

B5. My Mathematics teacher explains the application of Mathematics topics in the real world.

Table 4.3.1: Ratings by the learners on teacher competences

Rating	Freq 1	%	Freq 2	%	Freq 3	%	Freq 4	%	Freq 5	%	Total	%
B1	147	46	110	35	30	9	15	5	16	5	318	100
B2	125	39	110	35	50	16	16	5	17	5	318	100
B3	112	35	100	32	41	13	44	14	21	6	318	100
B4	116	35	100	32	31	10	47	15	24	8	318	100
B5	85	27	100	31	32	10	35	11	66	21	318	100

Source: Field data (2023)

Evidently, Table 4.3.1 above shows the descriptive statistics about the effect of teacher competencies on learning achievement in Mathematics. Generally, from the table above, **10%** of the respondents reported that their teachers did not explain what each Mathematics lesson is all about and its importance. Students measured the level of teacher competence by the way their Mathematics teachers handled their classes. It was important to note that only **58%** of the student respondents reported that their teachers explained the application of Mathematics in the real world. This finding signified that teacher competence could help in improving students learning achievement in Mathematics especially if the teachers could show more of the application of Mathematics topics in the real world and also helping the learners through demonstration and describing Mathematics lesson content more, it may improve on the learner's negative attitude towards Mathematics and learning achievement will also improve. To determine the effect of teacher competence on the learning

achievement, students were asked to indicate the scores in the range of marks they obtained at a recent Mathematics examination. The ratings and responses are recorded below.

Table 4.3.2 Analysis of learners" scores at a recent examination

Range of score	Frequency	Percentage
0-35	47	15
36-50	75	24
51-65	93	29
66-80	68	21
81-100	35	11
Total	**318**	**100**

Source field Data (2023)

From Table 4.3.2, only **32%** of the students got a score in the range of **(66-100)** %, in their recent examination in Mathematics. Combining this with the finding in Table 4.3.1 which indicated that **81%** of learners said that teachers described each Mathematics lesson, we see that teacher explanations alone are not enough for learners to pass their examinations.

Furthermore, we note that **42%** of the learners respondents reported that their teachers did not explain the application of Mathematics in the real world while Table 4.3.2 shows that **39%** of the learners failed Mathematics in their most recent examination taking the pass mark to be **50%.** This together with result that **58%** of the learners reported that their teachers explained the application of Mathematics in the real world and that **61%** of the learners passed Mathematics in their recent examination suggests a strong positive relationship between learners' achievement and their awareness of real life application.

For more analysis of the effects of teacher competence on learning achievement, we had to run several regression analysis Here, paired independent variables were run against the

dependent variable (scores obtained by learners in one of the recent examinations administered by their teachers) and samples of them are shown below.

Table 4.3.3   shows the model summery of linear regression analysis

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9856363652
R Square	0.9714790445
Adjusted R Square	0.8859161778
Standard Error	7.75237754
Observations	5

a. Dependent variable scores in a recent Mathematics examination

b. Independent variables Mathematics teacher helps in describing a lesson, Mathematics teacher uses practical examples, and Mathematics teacher asks questions.

Note, the summery intends to predict the outcome based on both dependent and independent variables.

The adjusted R – square of **0.886 (88.6%)** shows that achievement in Mathematics (scores) (dependent variable) can be attributed to the three factors identified in b above. In other words, there is a strong positive relationship between the students learning achievement (scores) and the three factors above note should be taken that there are other factors that affect learners achievement but to a lesser extent.

Table 4.3.4. Analysis of variance (ANOVA)

ANOVA					
	Df	*SS*	*MS*	*F*	*Significance F*
Regression	3	2047.100642	682.3668808	11.35397963	0.2140000382
Residual	1	60.09935752	60.09935752		
Total	4	2107.2			

The degree of freedom (df) for the regression are 3 these represent the number of independent variables that were chosen in this analysis, The significance value of **0.213** which is above the standard of **0.05** suggests that the independent variables (Mathematics teacher helps in describing the content, Mathematics teacher uses practical examples and Mathematics teacher asks questions to see if I have understood) significantly shows that there is a strong relationship between teacher competence and learning achievement.

Table 4.3.5 shows the relationship between teacher competence and learning achievement

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	37.04216072	11.1855167	3.311618205	0.1866954743	-105.0833045	179.1676259	-105.0833045	179.1676259
X Variable 1	-2.021781798	0.376037504	-5.37654297	0.1170691879	-6.799791312	2.756227715	-6.799791312	2.756227715
X	1.44168	0.38163	3.77764	0.16474	-	6.29080	-	6.2908038

Variable 2	0554	4276	9558	40114	3.40744 2691	38	3.40744 2691	
X Variable 3	0.99767 73334	0.42287 93369	2.35924 8245	0.25522 59017	- 4.37551 41	6.37086 8767	- 4.37551 41	6.37086876 7

a. Dependent variable (learners' scores in a recent examination given by their teachers

b. Independent variables (Mathematics teacher helps in describing the content, Mathematics teacher uses practical examples and Mathematics teacher asks questions to see if i have understood) from the above analysis, when a Mathematics teacher explains the content to the learners, they tend to perform better compared to when he asks questions to see whether they have understood. likewise, when a Mathematics teacher uses practical examples, learners also perform better

Table 4.3.6 shows the model summary of linear regression analysis

Regression Statistics	
Multiple R	0.9363299968
R Square	0.876713863
Adjusted R Square	0.506855452
Standard Error	16.11795731
Observations	5

a. Dependent variable scores in a recent mathematics examination

b. Independent variables (Mathematics teacher helps in describing a lesson, Mathematics teacher uses practical examples, and mathematics teacher explains the application of Mathematics topics in the real world).

Note, the summary intends to predict the outcome based on both dependent and independent variables.

The adjusted R – square of **0.506 (50.6%)** shows that achievement in Mathematics (scores) (dependent variable) can be attributed to the three factors identified in b above. In other words, there is a strong positive relationship between the students learning achievement (scores) and the three factors above note should be that there are other factors that affect learners achievement but to a lesser extent.

Table 4.3.7 Analysis of variance (ANOVA)

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1847.411452	615.8038174	2.370404017	0.4376975497
Residual	1	259.7885479	259.7885479		
Total	4	2107.2			

The degree of freedom (df) for the regression are 3 these represent the number of independent variables that were chosen in this analysis, The significance value is **0.437** which is above the standard of **0.05** suggests that the independent variables (Mathematics teacher helps in describing the lesson content, Mathematics teacher uses practical examples and Mathematics teacher explains the application of Mathematics topics in the real world) significantly shows that there is a strong positive relationship between teacher competence and learning achievement.

Table 4.3.8 shows statistical relationship between teacher competence and learning achievement

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	71.44703742	23.29197383	3.067453103	0.2006238016	-224.505508	367.3996257	-224.5055508	367.3996257
X Variable 1	-1.342193766	0.7079350501	-1.895927833	0.3089915216	-10.33736145	7.652973921	-10.33736145	7.652973921
X Variable 2	1.540290584	0.7856467744	1.96053829	0.3002721277	-8.44229818	11.52287935	-8.442298183	11.52287935
X Variable 3	-0.3214779093	0.44624436	-0.7204077813	0.6025636485	-5.991550109	5.348594291	-5.991550109	5.348594291

a. Dependent variable learners' scores in a recent examination administered by their teachers.

b. Independent variables (Mathematics teacher helps in describing the content, Mathematics teacher uses practical examples and Mathematics teacher explains the application of mathematics topics in the real world) from the above analysis, when a Mathematics teacher uses practical examples on board, learners tend to perform better compared to when he asks questions to see whether they have understood.

4.3.2 Objective two: The effect of students' attitudes on learning achievement in Mathematics among learners.

The student respondents were then asked nine questions whose aim was to establish their attitude to Mathematics as a subject. The results are summarized in Table 4.3.2 the results from this table were analysed using regression techniques to determine the extent to which students' attitude influences learning achievement in the subject. The summary of the nine questions is shown below;

C1.The Mathematics we learn at school is useful in other subjects.

C2. Understanding the Mathematics we are doing is important to me.

C3. Mathematics is boring.

C4. I would like a job that involves using Mathematics.

C5. I find Mathematics difficult.

C6. I will avoid Mathematics once I leave school.

C7. I think I could cope with a harder Mathematics course.

C8. I revise Mathematics at least three times every day.

C9. I want to continue with Mathematics after ordinary level.

Table 4.3.2 shows the ratings on the effect of students' attitude on learning achievement in mathematics

Rating	Freq 1	%	Freq 2	%	Freq 3	%	Freq 4	%	Freq. 5	%	Total	%
C1	184	58	94	29	11	4	15	5	13	4	318	100
C2	135	43	131	41	13	4	13	4	26	8	318	100
C3	64	20	36	12	61	19	80	25	77	24	318	100
C4	105	33	95	30	31	10	51	16	36	11	318	100
C5	52	16	63	20	28	9	104	33	71	22	318	100
C6	56	18	59	19	36	11	92	29	75	23	318	100
C7	94	30	112	35	40	13	39	12	33	10	318	100
C8	110	34	101	32	49	15	40	13	18	6	318	100
C9	115	36	102	32	32	10	34	11	35	11	318	100

Source: Field data (2023)

According to Table 4.3.2 the effect of students' attitudes on learning achievement in Mathematics among learners was rated from strongly agree to strongly disagree. Different questions (9) were asked and several responses were generated as indicated in Table 4.3.2 From Table 4.3.2, only **32%** of the students got a score in the range of **(66-100) %,** in their recent examination in Mathematics. Combining this with the finding In Table 4.3.1 where **87%** of the learners believe that the Mathematics they learn at school is useful in other subjects we see that understanding Mathematics alone is not enough to make the learners pass their examinations.

Furthermore, we note that **68%** of the leaner's respondents reported that Mathematics is boring which is contrary to Table 4.3.2 that shows that **39%** of the learners failed Mathematics in their most recent examination taking **50%** to be the pass mark. This together with result that **66%** of the learners reported that they revise Mathematics at least three times every day and that **61%** of the learners passed Mathematics in their recent examination,

suggests a strong positive relationship between learners achievement and the number of times they revise Mathematics every day.

For more analysis of the effects of student's attitude on learning achievement, we had to run several regression analyses here, Paired independent variables were run against the dependent variable (scores obtained by learners in one of the recent examination administered by their teachers) and samples of them are shown below.

Table 4.3.3 shows the model summery of linear regression analysis

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.99690 1911							
R Square	0.99381 3421							
Adjusted R Square	0.97525 3684							
Standard Error	3.61058 9866							
Observations	5							
ANOVA								
	Df	*SS*	*MS*	*F*	*Significance F*			
Regression	3	2094.16 3641	698.054 5469	53.546 74088	0.10004 3056			
Residual	1	13.0363 5918	13.0363 5918					
Total	4	2107.2						

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	40.62377729	4.34337837	9.3530367	0.067807976	-14.56407752	95.8116321	-14.56407752	95.8116321
X Variable 1	-0.477808813	0.061943467	-7.713627193	0.082074075	-1.264875189	0.309257563	-1.264875189	0.309257563
X Variable 2	-0.401051373	0.088908996	-4.510807557	0.138885935	-1.530747283	0.728644538	-1.530747283	0.728644538
X Variable 3	1.238619005	0.131610942	9.411215996	0.067391927	-0.433656573	2.910894583	-0.433656573	2.910894583

Table 4.3.3 is subdivided into three parts 1.regression statistics under this section, the independent variables (the Mathematics we study at school is useful in other subjects, understanding the Mathematics we are doing is important to me, I revise Mathematics at least three times a day) are regressed against the scores by the learners in one of the recent examination administered by their teachers. The adjusted R -square value of **0.975** that translates into **97.5%** shows that **97.5%** of learning achievement can be attributed to those three factors above this shows that there is a strong positive relationship with the dependent variable.

Note. There are other factors that determine learning achievement but to a lesser extent**,** meaning that, these factors alone do not explain learning achievement.

The second sub division is that of ANOVA The degree of freedom (df) for the regression are 3 these represent the number of independent variables that were chosen in this analysis,   The significance value is **0.481** which is above the standard **0.05** suggests that the independent

variables (the Mathematics we study at school is useful in other subjects, understanding the mathematics we are doing is important to me, I revise Mathematics at least three times a day) significantly shows that there is a strong positive relationship between students attitude and learning achievement.

The third sub division is on correlation coefficients. This refers to the degree of responsiveness of independent variable to the dependent variable the Independent variables in this case (the Mathematics we study at school is useful in other subjects, understanding the Mathematics we are doing is important to me, i revise Mathematics at least three times a day) with coefficients **0.477, 0.401,** and **1.228** from the above analysis, when learners love reading books, they know that understanding the Mathematics is important to them and also know that Mathematics is useful in other subjects, their performance will be good.

Table 4.3.4 shows the model summary of linear regression analysis

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.9216 23735								
R Square	0.8493 90309								
Adjusted R Square	0.3975 61237								
Standard Error	17.814 73381								
Observations	5								
ANOVA									

	Df	SS	MS	F	Significance F			
Regression	3	1789.835259	596.6117531	1.879892996	0.4814249			
Residual	1	317.3647406	317.3647406					
Total	4	2107.2						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	77.98979232	22.29092818	3.498723413	0.177232422	-205.2433049	361.2228896	-205.2433049	361.2228896
X Variable 1	-0.141286134	1.345769953	-0.104985353	0.933408183	-17.24091468	16.95834241	-17.24091468	16.95834241
X Variable 2	1.385973172	0.729237317	1.900579058	0.308348283	-7.879865475	10.65181182	-7.879865475	10.65181182
X Variable 3	-1.471385931	1.266035912	-1.162199206	0.452332708	-17.55789743	14.61512557	-17.55789743	14.61512557

Table 4.3.4 is subdivided into three parts 1.regression statistics under this section, the independent variables (I would like a job that involves that involves using Mathematics, I think I could cope with a harder Mathematics course, I will continue with Mathematics after ordinary level) are regressed against the scores by the learners in one of the recent examination administered by their teachers. The adjusted R- square value of **0.307**, that translates into **40%** shows that **40%** of learning achievement can be attributed to those three factors above this shows that there is a strong positive relationship with the dependent

variable. Also to sum it up, attitude of the learners determine the quality of marks they get.(if their attitude is poor, the their scores will also poor) and the reverse is true.

Note. There are other factors that determine learning achievement but to a lesser extent meaning that, these factors alone do not explain learning achievement.

The second sub division is that of **ANOVA** The degree of freedom (df) for the regression are 3 these represent the number of independent variables that were chosen in this analysis, The significance value is **0.100** and which is above the standard of **0.05** suggests that the independent variables (I would like a job that involves using Mathematics, I think I could cope with a harder Mathematics course, I will continue with Mathematics after ordinary level) significantly shows that there is a strong positive relationship between students attitude and learning achievement.

The third sub division is on correlation coefficients this refers to the degree of responsiveness of independent variable to the dependent variable the Independent variables in this case (I would like a job that involves using Mathematics, I think I could cope with a harder Mathematics course, I will continue with Mathematics after ordinary level) with coefficients **0.14, 1.385** and **1.471** from the above analysis, when learners understand that the Mathematics they learn from school is useful in other subjects, and are also aware that they can cope up with harder Mathematics courses, and revise Mathematics at least three times a day, their performance will good.

4.4.1 Analysis of results from teachers

The teacher respondents were given a questionnaire with five questions regarding their work at school. The aim of these questions was to establish whether they were facilitated with instructional materials, the frequency with which they used the instructional materials, their computer literacy awareness and use of modern technology to teach the subject. The results

are indicated in Table 4.4.1. These questions are aligned with the objective three of this research study. In subsection 4.4.1, we present the data from teacher questionnaire. In subsection 4.4.2, we present results from the interviews that were conducted by the researcher on teachers.

Table 4.4.1: Analysis of data from teacher questionnaire

	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Total	%
Rating	1		2		3		4		5			
D1	5	29	9	53	1	6	1	6	1	6	17	100
D2	3	17.5	6	35	3	17.5	3	17.5	2	12	17	100
D3	1	6	7	41	3	18	5	29	1	6	17	100
D4	2	12	5	29	3	18	6	35	1	6	17	100
D5	6	35	6	35	0	0	3	18	2	12	17	100
D6	1	6	3	18	2	12	7	41	4	23	17	100

Source: Field Data (2023)

Table 4.4.1, shows that 53% of teacher respondents agreed that in schools where they teach there is plenty of mathematics text books and when combined with 41% who also agreed that learners have calculators, plus 35% who agree that learners are provided with mathematical sets, and looking at 61% of the learners scoring between (51 -100)% and also taking 50% to be the pass mark, we can conclude that there is a positive relationship between provision of good quality instructional materials and learners achievement.

Furthermore, 35% of the teachers had smart phones but again only 6% knew the various Smartphone applications that could be used to teach Mathematics. This means, that these smart- phones were not helping them to handle properly the subject content and also partly explains the poor performance.

4.5 Objective three: The role of provision of good quality instructional materials on students' learning achievement in Mathematics

The researcher obtained qualitative data from respondents that were Mathematics teachers and the results were indicative of the importance of the provision of good quality instructional material on students' learning achievement in Mathematics.

To achieve this, several questions were asked and one of them was, what type of instructional materials do you use while teaching students Mathematics? The research participant mentioned the following instructional materials:

Table 4.5.1 Interview responses on the types of instructional materials used in teaching mathematics

- ❖ Graph papers
- ❖ Calculators
- ❖ Mathematical sets
- ❖ Meter rule
- ❖ Chalk board
- ❖ Coins and dice
- ❖ Mathematical tables (for log, trigonometry and other topics)
- ❖ Connected cubes
- ❖ Bottle tops

Source: Field data (2023)

The response generated showed that the teachers use different sets of instructional materials to facilitate Mathematics teaching and learning process. Some of them use graph books which is one of the Mathematical tools for solving linear function, coordinate geometry and other Mathematics problems. Others use Mathematical sets which are used to explore basic

concepts in geometry for example angle construction. For others they apply coins and dice for handling probabilities. Others use Mathematical or log tables when teaching logarithm. In summary, when various instructional materials are used, they determine the learner's ability to comprehend the topic of discussion during Mathematic class.

For better understanding of this concept, the researcher continued to explore to understand the extent to which the Mathematics teachers applied these instructional materials during Mathematics lessons. The table below showed the degree of frequency of their response.

Table 4.5.2 Correspondence on degree of application of the instructional materials during mathematics lesson.

Degree of Occurrence	Frequency	Percentage
More often	8	47.1
Often	4	23.5
Not often	5	29.4
Never	0	0
Total	**17**	**100**

Source: Field data (2023)

From the above table, it is clearly indicated that most of the teachers (47.1%) in most cases used instructional materials when teaching Mathematics to enhance students learning achievement. This was followed by 29.4% that did not often use instructional materials when teaching Mathematics as well as 23.5% that often used these instructional materials when teaching Mathematics to facilitated students learning achievement. It further expresses that there were no Mathematics teachers that did not use instructional material in their teaching processes which showed their awareness of the positive impact of applying these instructional materials to elicit learner's interest and achievement in Mathematics.

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Furthermore, the researcher asked, what role does good quality instructional materials play on students' learning achievement in Mathematics? During the interviews with the teachers, some of them made the following remarks:

> For me I believe that as a teacher of Mathematics, good quality instructional materials increase my students' achievement by supporting their learning process for example I use coins and the dice that help them to understand more the concept of probability by giving practical insights or hands on the topic like playing rudo game [Interview A]

> It helps the learners to find most of the learning topics interesting for example the use of bottle tops when handling the four rules of operations (addition, .subtraction, division and multiplication) in senior one [Interview B]

> It assists me in the differentiation of instructions like tailoring of lessons and instruction to the different learning styles and capacities within the classroom. [Interview C]

> It helps me in making sure that student learn from different methods as this with the aid of a picture, demonstrations and explanation of the Mathematical theorems, shapes, and others it will be easier for them to comprehend for example the use of connected cubes [Interview D]

> For me instructional materials help to elicit student's interest and curiosity even interest to learn more in Mathematics class for example teaching probability when using coins and a dice. [Interview E]

> It helps learners to use Mathematics to justify and support decisions for example, use of calculators [Interview F]

I use chats, calculators, graphs, chalk, and chalk board when presenting most of the lessons to the learners to make them remember what I teach in order to perform better.

[Interview G]

The researcher summarized from the above that good quality instructional materials aid student ability to achieve more in their learning process and as well it is a method that helps the learners to recall what was previously taught faster. More so the responses affirmed that good quality instructional material facilitate learning with ease and increase the interest of the learners to participate and learn Mathematics. Another interesting theme purported that using various method of teaching with instructional materials like, discussion, explanation and presentations makes learning easier and comprehensible to the students.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents and discusses the study's summary of the findings, conclusions, recommendations and areas for further study. Here, the study's contributions and potential research fields are also discussed. The discussion of the findings, conclusions, and suggestions in this chapter is organized in accordance with the study objectives in relation to the body of existing literature. The extent to which teacher competence, provision of good quality instructional materials and learners attitude, affect learning achievement in Mathematics among ordinary level students in selected secondary schools of Amolatar District were examined under the specific themes.

5.1 Discussion of the findings

5.1.1 Objective one: The effect of teacher competences on learning achievement in Mathematics

Statistics showed that students measure the level of teacher competence by the way their Mathematics teachers handle their classes. The descriptive statistics showed that 35% of the learners strongly agreed and 32% agreed to the fact that their teachers ask questions to see if they have understood the lesson content) followed by 46% of the learners who strongly agreed that their Mathematics teachers helped them in describing the lesson and 35% who agreed to the fact that their mathematics teachers help them in describing the lesson this was in confirmation of Wekesa (2013) who evaluated the factors influencing students' performance in Mathematics at the KCSE level in secondary schools and results showed that student-teacher ratio and teacher level of readiness were important predictors of student learning achievement in Mathematics. The least distribution fall between 27% who strongly agreed that their Mathematics teachers explain the applications of Mathematics topics in the

real world followed by 35% who agreed that their Mathematics teachers ask questions to see if they have understood the lesson content (This finding signified that teacher competence can help in improving students learning achievement in Mathematics especially if the teachers could show more of the application of Mathematics topics in the real world and also helping the learners through demonstration and describing Mathematics lesson this may improve on the learner's negative attitude towards Mathematics and learning achievement will also improve. In the same vein, Michael (2015) was in confirmation with these findings that there were difficulties in teaching, such as a bad learning environment. It was stated that poorly managed Mathematics instruction had a negative effect on students' success in the subject. In summary, in order to improve learning achievement, the effectiveness of the teacher and their instructional materials was important.

5.1.2 Objective two: The effect of students' attitudes on learning achievement in Mathematics among learners

The study confirmed that students attitudes seem to be better in those who think that the Mathematics they study at school is helpful in other subjects (58%) and those who say that understanding Mathematics they are taught is important to them at 43%. **33%** of the learners said they would like to do a job that has Mathematics and 34% of the learners said they would cope with a harder Mathematics course compared to those with negative attitude toward Mathematics; 16% of the learners strongly agree that Mathematics is boring, 18% of the learners said they find Mathematics difficult and they will avoid Mathematics once they leave school. This distribution showed that interest propels positive attitude and lack of interest and not seeing the need of Mathematics by the students leads to the negative learning achievement in Mathematics. Significantly, Wakesa's (2013) result also concurs with this study findings that student attitudes toward Mathematics have a favorable and significant impact on students' learning achievement in Mathematics meaning that, students who had a

positive attitude toward Mathematics were performing better than those who had a negative attitude.

Aaronson's (2003) research was also in agreement with this study findings assenting, those students who are taught by teachers who are friendly with them have, a positive attitude about their work and considerably increase their learning achievement in Mathematics.

Comparatively the study led by Bayern, Ayebale, Habaasa and Tweheyo (2020) on the investigation about the factors affecting students' learning achievement in Mathematics in secondary schools in developing countries unearth that teacher attitudes and students' attitudes towards Mathematics were significant influences on students' learning achievement in Mathematics.

In a similar case, Brazauscek, Jerebic, Rus, and Znidarsics (2020) findings on the variables affecting university students studying social sciences' ability to acquire Mathematics discovered that students with favourable attitudes toward Mathematics have lower levels of anxiety about the subject. As a result, these students did better, and the opposite was also true if the learning environment was un conducive then learning achievement in Mathematics also declined.

5.1.3 Objective three: The role of provision of good quality instructional materials on students' learning achievement in Mathematics

The response generated showed that the teachers use different set of instructional materials to facilitate Mathematics teaching and learning process. Some of them use bottle tops when handling the four rules of operations (addition, subtraction, division and multiplication). Others use coins and dice to help them teach the topic on probabilities, others use sets when teaching a topic on coordinate geometry and the concept of parallel lines. For others they print materials to use and help the learners to understand physically what the teacher is trying

to solve or demonstrate during the lesson. In summary various instructional materials used determine the learner's ability to comprehend the topic of discussion during Mathematics class. This was in contradistinction with Makondo and Makundo (2020) study whose findings showed that the reasons behind poor academic performance in Mathematics at the Ordinary level were lack of adequate resources.

The study also construed that most of the teachers (47.1%) on a regular basis use instructional materials when teaching Mathematics to enhance students learning achievement. This was followed by (29.4%) that did not often use instructional materials when teaching Mathematics as well as (23.5%) that often use these instructional materials when teaching Mathematics facilitates students learning achievement. It further expresses that there were no Mathematics teachers that did not use instructional material in their teaching processes which showed their awareness of the positive impact of applying these instructional materials to elicit learner's interest and achievement in Mathematics. This study was in confirmation with Tety (2016) study findings that instructional materials were crucial in ensuring that students achieved high levels of academic learning. However, this study found that teachers lacked sufficient teaching resources, which had a negative effect on students' levels of learning performance.

Additionally, Prado and Tan's (2019) investigation on students' attitudes, self-efficacy beliefs, and academic performance were affected by the teaching materials used in general Mathematics and high school statistics. According to statistical findings, educational materials may be useful in raising students' mathematics proficiency.

The researcher summarized from the above that good quality instructional material aid student ability to achieve more in their learning process and as well it is a method that helps the learners to recall what was previously taught faster. More so the response affirmed that

good quality instructional material facilitates learning with ease and increase the interest of the learners to participate and learn Mathematics. Another interesting theme purported that using various methods with instructional materials like videos, chats and presentations made learning easier and comprehensible to the students.

5.2 Conclusions

Regarding the study objectives, study questions and corresponding study findings, the following conclusions were made in line with the teacher competence, provision of good quality instructional materials and learners' attitude, and how they affect learning achievement in Mathematics among ordinary level students in selected secondary schools of Amolatar District.

The first objective on the extent to which teacher competences affects learning achievement in Mathematics among learners concludes that teacher competences affects learning achievement and the need for teachers to relate with their learners in describing and showing the application of Mathematics in the real world should be boosted to improve learning achievement .

The second objective summarized that positive attitude of students toward Mathematics arises from interest interest of those who see it as a prospect for future jobs and those that believe they can cope with hard Mathematics courses. The negative attitude arise from lack of interest and hence see Mathematics as a boring subject and just want to finish and drop Mathematics after leaving school.

Significantly, objective three, concludes that most of the teachers use different sets of instructional materials and none does not use it in facilitating Mathematics teaching hence expects a positive result by the learners. It also affirmed that good quality instructional

materials improves students learning achievement in Mathematics as it outlines the various instructional materials in application.

5.3 Recommendations

Due to the various conclusions made above from the study findings, the study recommends the following;

First, the study recommends proper monitoring and evaluation of teachers' applications of instructional materials during the teaching and learning so as to boost students learning achievement.

Secondly, the study recommends vigorous sensitization, seminars and career guidance to the students so as to improve their interest for positive attitude toward Mathematics subject.
Also teachers need refresher courses to enable them keep updated methods and even notes for example, regular training on the new lower secondary curriculum that calls for ICT integration into modern teaching.

Finally, the study also recommends that schools should provide more instructional materials to facilitate the teaching and learning process of Mathematics in Ordinary level as this will improve the students learning achievement in mathematics.

5.4 Areas for Further Study

Due to some areas that may not have been exhausted in this current study, the researcher suggests that further study should be carried out in the following areas;

More study should be carried out to investigate the effectiveness of the instructional materials in use on students learning achievement in Mathematics.

More so, further research should be carried out to find out the level of teacher effectiveness and efficiency in teaching Mathematics in ordinary levels.

Lastly, future research should investigate the strategic interventions to improve students' learning achievement in Mathematics

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Appendix I: Questionnaire for Students

Dear Student,

This is not an examination or a test, where you are to give answers and be marked and marks awarded, but just a survey on the above research topic that will enable a researcher acquire a "Master Degree in Educational Management and Administration" at Kabale University. As students doing Mathematics, your ideas about the degree to which the determinants studied affect learning achievement in Ordinary Mathematics are needed. Basing on this background, you have been randomly selected to participate in this study as one of its respondents. Please follow instructions provided in this questionnaire to rate yourself on items that follow. The findings provided from the study, will be used for academic purpose only and also, they will not be divulged to any person.

Your positive response will make the study a success.

Yours faithfully,

……………………

KANAKULYA FRED

Section A: Respondents Bio-data

In this section, you are requested to tick appropriately the alternatives that suit you on each of the following statements.

A1. Age:

      1) 10-13   2) 14-17   3) 18+ years

A2. Gender:

      1) Male   2) Female

Section B: Examining the Effect of Teacher Competence on Learning Achievement in Mathematics

Follow a scale which is; 1= strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = strongly disagree

	How much do you agree or disagree with the following statements? Please tick a box in each row	1	2	3	4	5
B1	My mathematics teacher helps in describing the lesson					
B2	My mathematics teacher uses practical examples on board					
B3	My Mathematics teacher asks questions to see if I have understood the lesson content					
B4	My Mathematics teacher uses the recommended mathematic textbooks					
B5	My Mathematics teacher explains the applications of Mathematics topics in the real world					

Section C: Examining the Effect of Student Attitude on Learning Achievement in Mathematics

Follow a scale which is; 1= strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = strongly disagree

	How much do you agree or disagree with the following statements? Please tick a box in each row.	1	2	3	4	5
C1	The mathematics we learn at school is useful in other subjects					
C2	Understanding the mathematics we are doing is important to me.					
C3	Mathematics is boring.					
C4	I would like a job that involves using mathematics					
C5	I find mathematics difficult.					
C6	I will avoid mathematics once I leave school.					
C7	I think I could cope with a harder mathematics course.					
C8	I revise mathematics at least three times every day					
C9	I want to continue with mathematics after ordinary level					

Thank you for your kind response!

Appendix II: Interview guide for Teachers

Dear Teacher,

This is not an examination or a test, but just surveys on the above research topic that will enable a researcher acquire a "Master Degree in Educational Management and Administration" at Kabale University. As a teacher of Mathematics at Ordinary Level, your ideals on the effect of provision of good quality instructional materials on learning achievement in Mathematics are needed.

Follow instructions provided in this questionnaire to rate yourself on items that follow. The findings provided will be used for academic use only and also, they will not be divulged to any other person.

Your positive response will be highly appreciated.

Yours faithfully,

………………………………………..

KANAKULYA FRED

Section A: Demographic characteristics of the research participants

A1. Gender: A) Male   B) Female

A2. Age: A) 25-30 years   B) 31-35 years   C) 36-40 years   D) 41+ years

Section B

Time of interview……………………………………………………

Date of interview…………………………………………………….

Participant category …………………………………………..

Objective three: the role of provision of good quality instructional materials on students' learning achievement in mathematics

1. What types of instructional materials do you use during teaching students mathematics?

2. How often do you use these instructional materials in teaching mathematics?

3. What role does good quality instructional material play on student learning achievement in mathematics?

Appendix III: Teachers' questionnaire

Follow a scale which is; 1= strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = strongly disagree.

	How much do you agree or disagree with the following statements? Please tick a box in each row.	1	2	3	4	5
D1	School has plenty of mathematics text books					
D2	Learners are provided with a mathematics set from home					
D3	Most of my students have a mathematical set					
D4	Learners receive facilitation from home to attend at least one external seminar in a year					
D5	I have a smart phone or a computer					
D6	I know of various smart phone or computer applications that can be used to teach mathematics					

Thanks for your kind response.

Appendix IV: Table of Morgan and Krejcie (1970) for Determining Population Sample Sizes in Educational Research

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

Note.—N is population size. S is sample size.

Source: Krejcie & Morgan, 1970

Appendix V: student's scores in one of the previous examination

Rate your scores as between 1=0—35, 2=36—50, 3=51—65, 4=66—80, 5=81—100

Tick on the range of score were your marks fall in one of the previous examination given to you by your mathematics teacher.	1	2	3	4	5
What did you get in one of the last examination given to you by your mathematics teacher?					

Appendix VI: Letter of Approval for Data Collection

KABALE **UNIVERSITY**

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DIRECTORATE OF POSTGRADUATE TRAINING

September 13th, 2022

To whom it may concern

This is to certify that **Mr. Kanakulya Fred** **Reg. No. 2020/A/EDM/2364/R** is a postgraduate student of Kabale University studying for a **Masters of Arts in Educational Management** in the department of **Foundations of Education.**

He has successfully defended his Research Proposal for a study entitled,
"Examining the extent to which provision of instructional materials attitudes towards mathematics and teacher competency determines learning achievement in Mathematics in selected ordinary level secondary schools in Amolatar District."

The student is now ready for field work to collect data for his study. Please give the student any assistance you can to enable him accomplish the task.

Thanking you for your assistance.

Yours sincerely

Assoc.
DIRECTOR, POSTGRADUATE TRAINING