CLASSROOM ANTECEDENTS AND LEARNER ATTAINMENT IN MATHEMATICS IN UNIVERSAL SECONDARY SCHOOLS: A CASE OF KAMPALA CITY, UGANDA

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A DISSERTATION SUBMITTED TO DIRECTORATE OF RESEARCH AND GRADUATE TRAINING FOR PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE OF MASTER OF EDUCATION IN POLICY, PLANNING AND MANAGEMENT OF KYAMBOGO UNIVERSITY

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DECLARATION

I, Moses Mugerwa, affirm that this dissertation titled: “Classroom Antecedents and Learner Attainment in Mathematics in Universal Secondary schools: A Case of Kampala City, Uganda”, is my work and has not been offered for any degree award in any other university.

Signature…… Date…….

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APPROVAL

This is to declare that this dissertation titled: “Classroom Antecedents and Learner Attainment in Mathematics in Universal Secondary schools: A Case of Kampala City, Uganda” has been written under our tutelage.

Signature…… Date…….

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DEDICATION

I commit my dissertation to my numerous friends and family. I am especially grateful to my devoted parents, Mr. Kibalama Edward and Ms Nsangi Zaina, whose support and insistence on perseverance have left a lasting impression on me.

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LIST OF ACRONYMS

USE	-	Universal Secondary schools
SESEMAT	-	Secondary Science and Mathematics Teachers
NLSC	-	National Lower Secondary Curriculum
MoES	-	Ministry of Education and Sports
O- LEVEL	-	Ordinary level
UNEB	-	Uganda National Examinations Boards
LEI	-	Learning Environment Inventory

ABSTRACT

The classroom antecedents in secondary school are the elements that are known to affect learners' learning and attainment in Mathematics. The major objective of this study was therefore to ascertain the influence of classroom antecedents on attainment in mathematics by firstly to find out the availability of classroom infrastructure regarding the subject and finding out the factors that influence adequacy. Classroom management and teacher commitment were also examined to establish their influence on attainment in mathematics. The study also provides some of the learners' behaviors as a result of their use of infrastructure towards attainment in Mathematics and would further in assisting the learners to advance a progressive attitude towards attainment which is a process for improved in the Mathematics. The research was conducted in 10 secondary schools in Kampala city and the focus population was Mathematics learners in senior three, attending the new lower secondary curriculum. The purposive and random sampling techniques were employed in selecting the schools; learners from those schools were selected randomly with the use of learner's questionnaires as a method of data collection. The questionnaires were designed to capture the learners' comprehension and understanding which were grouped according to themes Factual knowledge, Conceptual, knowledge, Procedural, knowledge Meta-cognitive, knowledge regarding mathematics as subject, learners' mathematical ability and achievement. The learners responded to the questionnaires and data was collected, calculated and converted into percentages. Based on the study, the majority of students had positive attitude towards mathematics and thought it was important, practicable, and learnable, but this did not convert into basic scores. The results also demonstrate that learners' ability levels were impacted by their perceived learning capacities and competences, comprehension and understanding, and prior mathematical performance, which resulted in poor performance.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Mathematics is important as far as formal education was developed in Uganda Ayebale et al. (2020) further noted that mathematics attainment is used to solve problems and predict outcomes in many fields of study; it is an enormously valuable science subject that is used in practically every academic field. A nation's ability to solve problems and make decisions in a variety of life scenarios, as well as in domestic and business transactions, scientific discoveries, and technological advancements, depends on its citizens' proficiency in mathematics. (Mamolo & Sugano, 2020). Considering the importance of mathematics, this study investigated factors that influence attainment in it by students, considering classroom antecedents.

1.1 Background of the Study

In this section, the study presented the background of the study which is sectioned into four subdivisions, historical perspective, theoretical perspective, contextual perspective and conceptual perspective

1.1.1 Historical Perspective. Mathematics Scholars have been debating learner attainment since formal education began decades ago (Kolar-Begovic et al., 2017). Throughout the centuries, revolutions in Mathematics have occurred through the use of clay tablets, scrolls, papyrus scrolls, and books (Kolar-Begovic et al., 2017). The printing processes enhanced access to

knowledge offered in theoretical works as well as vernacular publications, making accomplishment in mathematics extremely difficult.

This approach was advanced in the eighteenth century throughout Christian Europe, both by Protestants and Catholics, to provide superior mathematical instruction for all citizens in the European civic society. During the nineteenth century, the French Revolution witnessed a rise in Mathematics schools for all, including arithmetic (Belhoste, 2014). By the twentieth century, professional mathematicians have highlighted concerns about mathematics instruction and learning, particularly at the secondary level (Belhoste, 2014). The establishment of the international journal L'Enseignement Mathematique in 1899 was a significant milestone in communicating concerns and ideas, as was the founding of the International Commission of Mathematics Instructions in 1908, which provided a platform for the growth and development of mathematics education throughout Europe. Mathematics attainment and accomplishment in Africa has been an essential subject, but it is typically lacking in the secondary level of school in Sub-Saharan Africa (Ayebale et al., 2017). It has been researched and concluded that the attitudes, expectations, and perceptions of administrators and learners regarding mathematical attainment are crucial components that underlie their academic success and experience. In many circumstances, students approach Mathematics in a methodical and rule-based way. This Keeps learners from experiencing the richness of Mathematics and the several techniques that can be employed to gain competence in the subject (Ayebale et al., 2017).

When Uganda gained independence in 1962, education was considered as a means of removing poverty, illiteracy, and disease from the country, meaning that learner attainment was

viewed by society as a foundation of knowledge of science and technology that is dynamic in the nation's social-economic growth. Although academic success in mathematics learning holds a prominent place in Ugandan culture, the nation has historically had low mathematics performance in UNEB exams and in the classroom (Abenawe, 2022). Since many years ago, learner attainment in mathematics has been cited as the main issue Uganda's education cycle faces in its efforts to achieve national development, frequently serving as the demise of numerous scientific projects and advancements (Abenawe, 2022).

1.1.2 Theoretical Perspective. The research's theoretical perspective was grounded on cognitive theory, which was developed by Jean Piaget in 1950 and asserts that learning can be inclined by both internal and external forces. This theory helps learners understand how their thinking affects their learning and behaviour (Luong et al., 2017). Knowing one's own mental processes can aid in the development of certain mathematical skills, cognitive theory has an impact on learners (Praetorius et al., 2018).

Teachers can provide opportunity for learners to inquire questions and imitate on their mathematical accomplishments and acquired skills (Lenz & Heinz, 2018). These processes can help learners understand how their minds work and apply their understanding to create advanced learning opportunities. Brandt, (2020) Continue to explore the fact that before learners can master particular language usage strategies that will enable them to be understood, they must possess a unique psychological aptitude or cognitive competence.

According to the notion, students are born with cognitive abilities that determine their potential for attainment and help them develop their mathematical competencies (Brandt, 2020). classroom antecedents are a significant element determining learner achievements in mathematics, which is explained by cognitive theory, which ties human academic achievement with the knowledge learned from external and internal sources (Preckel and Strobel, 2017). Cognitive theory adequately addresses the demands of school management antecedents which must be put in place to in order decide perfect, detailed goals, and select contributions, approaches which can be converted from huge fruitful procedures to skilled learners with competencies in mathematics.

The Cognitive Theory assumes that recognizable behaviour reveals whether or not the learner has studied something. To ensure successful learning outcomes, learners should receive immediate feedback, be assessed, and practice again with feedback, utilize practice, reinforcement, and instructional signals to enhance stimulus-response relationships (Ertmer & Newby, 2013).

According to the Cognitive Theory, teachers use instant feedback, assessment, continual practice/revision, instructional signals, and reinforcement to influence learner attainment. Cognitive Theory promotes a learner-centered approach to teaching. According to cognitive Theory, individuals are naturally drawn to secure and comforting partnerships. Secure attachments promote confidence in others and self-reliance.

Ludigo (2019) found that those who are securely bonded and have favorable expectations of themselves and others are more confident in their lives. Secure learners are

more confident, resilient, and able to cope with stress. They also have stronger interpersonal relationships, focus, and cooperative skills.

According to the cognitive Theory, teachers should employ the teacher-student pedagogical technique that requires the use of instructional materials to foster bonds with pupils to improve their attainment in mathematics.

1.1.3 Conceptual Perspective. Classroom antecedents are factors that exist before or logically precede another (Dugan, 2017). They are determinants or factors that assist universal secondary schools' administrators to achieve their set goals which are measured as the teaching and learning preparations like provision of adequate classroom infrastructure, classroom management and teachers' commitment (Mugizi et al, 2016). In this study, classroom antecedents were looked at in terms of classroom infrastructure (Yang et al, 2017), classroom management (Lazarides et al, 2020) and teacher commitment (Mugizi et al, 2016). Classroom infrastructures (Yang et al, 2017) are Facilities and amenities that are offered to help teachers make learning more meaningful.

Learner attainment refers to the knowledge acquired and skills perfected in the subject content of the classroom (Ludigo et al., 2019). In the same line, Learner attainment also relates to performance findings that show how successfully an individual has achieved specific objectives that were the main focus of activities in educational settings, such as schools, colleges, or universities (Mimrot, 2016). Mathematics attainment is typically thought of as the demonstration of knowledge acquired or skills gained in the study subject (Ludigo et al., 2019).

However, in this study learner attainment in Mathematics entails factual, conceptual, procedural, meta-cognitive knowledge attainment (Ludigo et al., 2019). According to Vukić (2020) attainment is a multidimensional notion that encompasses factual, conceptual, procedural, and metacognitive knowledge achievement. Factual knowledge refers to the distinct facts and essential components that specialists utilize to communicate, comprehend, and organize their discipline methodically (Watts & Hogdson, 2019). Conceptual knowledge refers to students' capacity to describe concepts in their own terms and apply learning to new contexts (Ludigo, 2019). Procedural knowledge is the mastery of the principles for when to utilize numerous measures and displays understanding of diverse processes (Ludigo, 2019). Meta-cognitive knowledge refers to the learner's responsiveness of the learning progression and the ability to adjust to problems that arise throughout the progression using appropriate solutions (Güner, 2021)

1.1.4 Contextual Perspective. The research was conducted in Kampala Capital City which has 10 schools under the universal secondary program. Each of these schools has a recognized administrative structure which is directly in charge of Mathematics learning. Since 2021 it has been observed that there is unsatisfactory learner attainment as portrayed by the poor and inconsistent grades of students in NLSC as abridged in Table 1.1.

Table 1.1

The NLSC Mathematics results of senior three learners in USE schools in Kampala City

Year	Number of use schools	Total of NLSC Learners	Numbers in Passes	Percentage pass	Numbers below average	Percentage below average
2021	10	1808	64	2.2%	1744	70%
2022	10	1593	82	3.1%	1593	64%
2023	10	1243	50	1.2%	1143	74%

(Extracted from NLSC, 2023), Ministry of Education and Sports, Uganda

Kampala city council authority has invested heavily in Mathematics teacher training through SESEMAT and STEM training programs in partnership with Japan government (Manyiraho at el., 2021).

Despite of the efforts made, learner attainment has remained a huge problem confronting USE in Kampala, from 2021 to 2023 the NLSC results of all USE schools in Kampala City (Table 1.1) are characterized with less than 4% of the total of outstanding grades compared to the 60% passes and failures of the many numbers of students that sat for Assessment (The Ministry of Education and Sports, 2023). If this challenge is not addressed with advanced in-service pedagogical strategies students' Achievement in mathematics may continue gradually decline at Ordinary Level in Region (Manyiraho at el., 2023). Although Mathematics is mentioned in the curriculum as compulsory subject in USE school, there is little emphasis on activities other than learning and performing calculations processes.

According to Manyiraho (2023), competency-based Mathematics that allows logical reasoning and written communication is still lacking in the USE School making it huge challenge towards improvement in NLSC.

The research inspected the influence of the classroom antecedents on learner attainment in mathematics in the USE within Kampala.

1.2 Statement of the Problem

Achievement in Mathematics should allow learners construct their own meanings, beginning with their beliefs, understandings, and cultural practices in a classroom. Learners should be able to score grade A with a range of 64% – 100 %, grade B with a range of 48%-63%, grade C with range of 32%-47%, grade D with range of 16%-31%, grade E with range of 0 – 15% (MoEs, 2020). However, statistics from USE schools reveal that there has been consistent undesired and massive failure of learners in mathematics at school level. Since 2021 there is unsatisfactory learning attainment in mathematics in the USE schools in Kampala as indicated by the poor and inconsistent grades of students in assessment (Wakhata et al., 2023). The mathematics results of USE schools in Kampala are characterized with none or less than 20. As at Ordinary Level in Mathematics vis-à-vis the many numbers of leaners that sit for end of year assessment (MoEs 2023). The results of activities of integration of up to 2024 considering a previous two years, and the UNEB results of 2024 revealed that learner attainment in mathematics had not exceeded 20% in grade A. Many students neglect mathematics with the assumption that mathematics is very hard, expensive and meant for bright students (MoEs 2024).

Accordingly, in schools where classroom antecedents are not managed properly instructional materials, maintenance of small class size ,availability of committed teachers,

provide a basis for mathematics teacher to miss lessons, many students score below the average pass mark including grade D with range of 16%-31%, grade E with range of 0-15% resulting in numerous students failing to meet the minimum competence requirements in the O-level cycle within the Universal Secondary schools consequently many parents have chosen to transfer learners to private institutions.

1.3 Purpose of the Study

The study was to investigate the influence of classroom antecedents on learner attainment in Mathematics under Universal Secondary schools within Kampala City.

1.4 Objectives of the Study

The research was guided by three objectives;

i. To examine the relationship between classroom infrastructure adequacy and learner attainment in Mathematics in universal secondary schools in Kampala city.
ii. To assess the relationship between classroom management and learner attainment in Mathematics in universal secondary schools in Kampala city.
iii. To examine the relationship between teacher commitment and learner attainment in Mathematics in universal secondary schools in Kampala city.

1.5 Study Hypotheses

The research was steered by the ensuing hypotheses below:

i. H_O: There is no statistically significant relationship between classroom infrastructure adequacy and learner attainment in mathematics in the universal secondary schools Kampala city.

ii. H_O: There is no statistically significant relationship between Classroom management and learner attainment in mathematics in the universal secondary schools Kampala city.

iii. H_O: There is no statistically significant relationship between Teacher commitment and learner attainment in mathematics in the universal secondary schools Kampala city.

1.6 Scope of the Study

1.6.1 Geographical Scope

The study was conducted in Kampala City where a teacher – learner ratio is widest. Since 2020, there is low attainment in Mathematics in the USE schools as portrayed by the poor and inconsistent grades of students in end of year assessment of progress in education (MoES,2020).

1.6.2 Content Scope

This study looked at the relationship between learner attainments in Mathematics (dependent variable) and consisted of aspects such as learners' knowledge (Factual knowledge, Conceptual knowledge, Procedural knowledge and Meta-cognitive). classroom antecedents (independent

variable) were looked at in terms of classroom infrastructure, class management and teacher commitment in the targeted USE schools in Kampala city.

1.6.3 Time Scope

This study covered the years 2021–2023 as a representation period, because in this period Mathematics results of USE schools in Kampala City were characterized with none or less than 20 As in mathematics vis-à-vis numbers of students that attempted school end year assessment (MoEs,2023).

1.7 Significance of the Study

This study will be useful in establishing the influence of classroom antecedents and learner attainment in mathematics in universal secondary schools Kampala City.

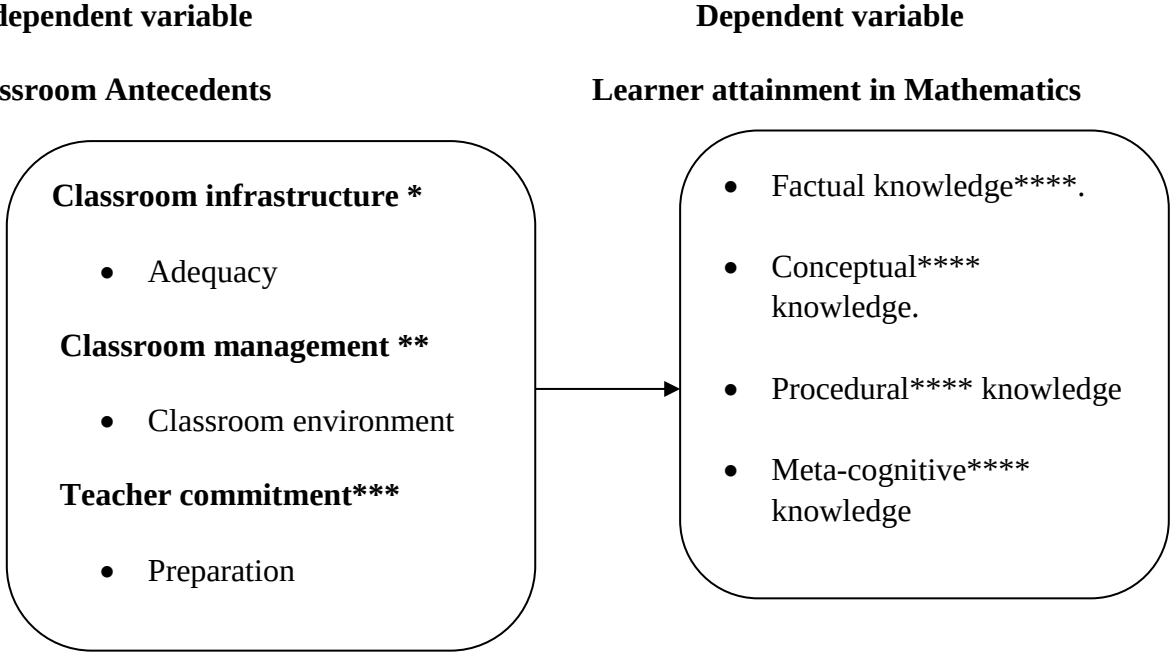
It is hoped that this will be of benefit to many stakeholders in diverse ways:

Firstly, to the schools, this study may help to provide an explanation on how to improve learner attainment in mathematics as well as students UNEB results in the long run through institutional factors. To the policy makers and administrators in education field, the outcomes of this research may help to point out how to improve learner attainment in mathematics of schools. In the long-term, this could contribute to the city's overall educational achievement. Finally, the results of this study could help scholars by adding to the scope of knowledge already available on institutional antecedents and learner attainment in mathematics in universal secondary schools. This may assist the impending researchers to make reference to the study for future research under takings.

1.8 Conceptual Framework

Figure 1.1

Conceptual framework displaying how classroom antecedents can drastically cause improved learner attainment in Mathematics in Universal Secondary schools



Source: Concepts adapted and modified from (Sephania et al., 2017)
* Concepts adapted from an earlier instrument Obtained from (Mugizi et al, 2021)
**Concepts adapted from an earlier instrument Obtained from (Mugizi et al, 2021).
***Concepts adapted from an earlier instrument from (Mugizi et al, 2021).
**** Concepts adapted from an earlier instrument (Ludigo et al., 2019)

Figure 1.1 illustrates that learner attainment is the dependent variable. The research looked at learner attainment in terms of students' knowledge (conceptual knowledge, factual knowledge, meta-cognitive knowledge and procedural knowledge). The researcher looked at classroom antecedents in terms of school infrastructure, classroom management, and teacher commitment.

1.9 Definitions of Terms

Learner attainment -refers to the knowledge acquired and skills perfected in the subject matter of the classroom.

Classroom infrastructure – refers to things like school desks, writing boards, markers and chalk, roof, walls. Infrastructure contributes to a constructive educational setting.

Classroom management - the steps instructors take to establish a setting that encourages and supports academic and social-emotional learning are collectively. It involves spatial management.

Classroom environment – refers to physical, emotional safety, organization and inclusivity.

Teacher commitment - is an internal drive that encourages educators to devote more time and effort to maintaining their contributions to the school.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter covers literature review in terms of theoretical and review of related literature. The theoretical overview opens the chapter, followed by a review of relevant literature organized according to the objectives of the study.

2.1 Theoretical Review

The research was guided by the cognitive theory advanced by Jean Piaget in 1950. Cognitive theory asserts that learning can be swayed by both internal and external forces. According to the cognitive theory, teachers use instant feedback, assessment, continual practice/revision, instructional signals, and reinforcement to influence learner attainment. Cognitive theory promotes a learner-centered approach to teaching. According to cognitive theory, individuals are naturally drawn to secure and comforting partnerships when it comes to learning. Secure attachments promote confidence in others and self-reliance. Piaget confirms that learners who are securely bonded and have favorable expectations of themselves are more confident in their lives. Secure learners are more confident, resilient, and able to cope with stress most especially during Mathematics lessons. They also have stronger interpersonal relationships, focus, and cooperative skills that allow concentration when handling Mathematics task.

In addition, the cognitive theory asserts teachers should employ the teacher-learner pedagogical technique that requires the use of classroom infrastructure to foster bonds with

learners to improve their attainment in mathematics. The active role that students take in their own achievement is highly valued in Piaget's theory.

According to Piaget, learners are not impassive receivers of content, they keenly explore and engage with their environment especially within a classroom learning environment. cognitive theory asserts the commitment of active teachers who engage with the environmental aspects allows learners to progressively increase their comprehension of the mathematical realm by assimilating, implying that committed teacher get to appreciate learners' mental processes which can aid in the development of certain mathematical skills.

Cognitive theory relays on assumptions that Children have different ways of thinking and seeing the world than adults do. Learners are not passive beings that wait for their teachers to impart knowledge to them meaning that learners should be left to discover knowledge by themselves. Finally, the theory assumes the paramount way to teach mathematics concepts is to view the content from learners' point of view.

COGNITIVE THEORY adequately addresses that school management should put in place instructional antecedents in order to make decision on perfect, detailed goals, and selected contributions, approaches which can be converted from huge fruitful procedures to skilled learners with competencies in mathematics.

Various scholars have used the cognitive theory to conduct studies and further explain how the theory effects attainment in Mathematics.

Ertmer and Newby (2013) used the cognitive theory to explain that learner's behaviour indicates if the learners have gained knowledge or not. And went further to mention that to

ensure successful learning outcomes, learners should receive immediate feedback, be assessed, and practice again with feedback, this improves stimulus-response connections, use instructional materials, practice with teachers, and reinforcement for better attainment in mathematics.

Semeraro (2020) explained the high correlation between mathematical attainment and general cognitive capacities using the cognitive theory. Furthermore, according to Semeraro, to fully understand mathematical tasks, intellectual representations of the qualitative and quantitative relationships between variables must be generated. This means that the ability to manipulate classroom infrastructure and link second-order relationships logically and orderly are prerequisites for solving mathematical tasks.

Dunn (2020) used the cognitive theory to examine the relationship between competency in reading and mathematics among a group of students with intellectual disabilities. The study demonstrated that individual disparities in academic accomplishment, even across a limited range of highly capable individuals, may be explained when intelligence is based on neurocognitive processes to learners most especially when it comes to mathematics attainment. Dunn examined the data with Regression analysis whereby results indicated that both internal and external cognitive elements were important indicators of proficiency in Mathematics and reading.

2.2 Review of Related Literature

2.2.1 The correlation between classroom infrastructure and learner attainment in Mathematics. The existent bodies of literature encompass studies on classroom infrastructure and learner attainment in Mathematics. In this subdivision, the researcher presents empirical research that examines the connection of learner achievement and classroom infrastructure. For example, Castro et al. (2017) examined the connection between attainment levels in Swedish preschool classes and factors linked to classroom infrastructure quality, in 55 preschool units across Sweden, information was collected from 165 preschoolers. The findings indicate that classroom attainment and classroom infrastructure are positively correlated. A methodological gap was identified where the study was done using Mathematics Achievement Test, gap which this study sought to fill by using correlational analysis in USE schools in Kampala city**.**

Mugizi (2021) investigated student engagement and lecture room infrastructure quality at a private university in Uganda, the correlational research design served as the study's guidance, and a sample of 183 students' answers to a questionnaire were used to gather data. According to descriptive research, there was a high level of student attainment, competent lecture room infrastructure, and adequate university amenities. A contextual gap was identified where the study was done in private university, gap which this study sought to fill by looking at secondary schools in Kampala City.

Oluwunmi et al. (2015) examined Comparative Analysis of Students' Satisfaction with Classroom Facilities in Nigerian Private Universities Students completed 570 surveys in total; the results were analysed to show the conclusions for each university and revealed varying

degrees of satisfaction. Thus, a contextual gap was identified which this study sought by carrying research in USE schools in Kampala city.

Alhazmi (2023) conducted an investigation on the Influence of University Accommodations on Student's views on Academic Achievement to accomplish the study's main goal, Taibah University used a descriptive correlational approach with a randomly chosen sample of 382 male and female students. Academic achievement and the quality of university facilities were shown to be positively correlated. Thus, by using correlational analysis, this study aimed to close a methodological gap.

Weerasinghe et al. (2018) conducted an investigation about university facilities and learner attainment amongst students' population in Sri Lanka, from which 650 undergraduate students were drawn as a sample using the stratified sampling method. Data was gathered by the researcher using a closed-ended questionnaire with two sections and thirty-one items. Research findings showed that lecture room facilities strongly influence student overall attainment at regional state universities. Therefore, this study aimed to close a contextual gap by doing research in secondary education.

Abdullahi et al. (2019). Investigated the influence of facility performance on university students' contentment in northern Nigeria. Students' experiences and satisfaction with both physical and non-physical amenities were taken into consideration when creating the questionnaires used to gather data on academic facilities. Research results of the exploratory factor analysis showed that facilities performance had an influence on learners' performance. The effects of both physical and non-physical facilities aspects were examined. This study

aimed to address this contextual gap by conducting research at Kampala's USE secondary school.

Kara et al. (2016) looked into student satisfaction and the quality of academic resources at Kenyan public universities. The study employed a cross-sectional research design.
Using stratified random sampling, a sample of eight universities was taken. 1062 third- and fourth-year undergraduate learners were chosen to partake in the study as responders. Regression analysis, factor analysis, and descriptive statistical analysis were used to examine the study. The study revealed that quality of educational services provided by universities influence student attainment in the university. A contextual gap was identified which this study intends to fulfill conducting research in USE schools.

Umar et al (2023) studied the impact of Infrastructure Quality on Secondary School student outcomes in Public and Punjab Education Foundation-funded schools. The province of Punjab's three districts served as the study's boundaries. 300 learners were designated from the general population and 300 from Punjab Education Foundation-funded schools using purposive sampling. The study was intended to be a quantitative, cross-sectional survey. A five-point Likert scale was used to collect the data. It was found that learners' accomplishment levels are influenced by high-quality infrastructure.

Different scholars have written and explained the relationship between classroom infrastructure and learner attainment in mathematics Umar et al (2023), Mugizi (2021), Kara et al. (2016), Abdullahi et al. (2019), however there are number of gaps including population,

analysis and concepts that were identified which the researcher intended to fill by carrying out this study.

2.2.2 The correlation between Classroom management and learner attainment in Mathematics. The body of literature includes research on learning outcomes in mathematics and class management. The researcher provides empirical research in this section that examines the connection between Class management and learner attainment in Mathematics.

In Akure, Ondo State, Nigeria, Lazarides (2020) employed a quasi-experimental research design to examine the impact of class management on students' Mathematical attainment. In order to include one hundred and fifteen (115) public secondary school pupils, a cluster random sampling technique was used. Attainment in Mathematics was found to be significantly impacted by the number of learners in a classroom. A methodological gap was found, and the researcher planned to use correlational analysis to close it in this study.

Barksdale (2021) used mixed methods to investigate the connection between middle school pupils' achievement in Mathematics and the classroom management. The Learning Environment Inventory (LEI) was used to examine middle school students' impressions of their classroom management in relation to achievement. A sample of 428 learners was used to carry out the study, the quantitative results showed no correlation between classroom management and learners' mathematics attainment, the qualitative data showed that developing relationships, having resources available, and setting rules for the classroom all have an impact on learners'

learning. A contextual and methodological gap was found, which the researcher planned to address by studying secondary education.

Marder (2023) examined classroom management and learners' Mathematics attainment the study evaluated the efficacy of Mathematics teachers' classroom management strategies while accounting for disruptive student behaviour in two sizable datasets of German secondary school learners. Study findings showed no correlations were found between the structure and rule clarity of teachers. Methodological gap was identified, which the researcher intended to bridge.

Tacadena (2021) studied the classroom management and students' mathematical learning, and the study's goal was to determine the relationship between classroom management and Mathematics learning in grade VI pupils. A descriptive correlation method was utilized in a quantitative study design. The grade VI pupils from 13 schools in the Carmen District of Davao Del Norte were the respondents. Two sets of questionnaires were used including a checklist evaluating the level of classroom management and a teacher-made test gauging pupils' mathematical proficiency. The results showed that although classroom management was used to a certain extent most of the time, student learning in mathematics was not always evident. This implies that there was a substantial correlation between students' mathematics attainment and the level of classroom management. This study aims to close a contextual gap that was found at Kampala's USE school.

Ahmad (2020) investigated classroom management in mathematics class and data was gathered from a section population of 120 learners using a survey method. Five main indicators

class arrangement, discipline enforcement, student behaviour control, student-teacher communication, and effective class organization formed the basis of the surveys. The findings demonstrated that the lecturer's methods of class management were well-liked by the pupils and enhanced attainment in mathematics class. A contextual and methodological gap was identified of which the research intended to fill by carrying out research in USE schools with correlational analysis.

Cuabo (2024) investigated how mathematics attainment in the Philippines was correlated with teachers' classroom management, students' attitudes, and their home environments. Out of the 272 students in the population, a sample size of 160 was chosen. The pupils were then given questionnaires using purposive sampling. Using a descriptive-correlational research design and Stepwise Multiple Regression Analysis to analyse the data, the researchers found that although the teacher was excellent at managing the classroom, students' math achievement was relatively poor. The students' attainment in mathematics and the teachers' classroom management did not correlate. By conducting this study, the researcher hopes to close a methodological gap that was found.

Asare (2024) Examining how Mathematics achievement in secondary schools in Ghana is affected by classroom management, teacher quality, and mathematics interest Data from the respondents was gathered using well-crafted questionnaires. Three senior high schools' 300 final-year students were chosen using convenience sampling and basic random sampling. The study used structural equation modeling to evaluate the different correlations between the variables based on the 285 completed questionnaires. The findings of the study demonstrated

that effective classroom management positively impacted students' achievement in mathematics. The researcher had to close a contextual gap that was found by conducting study in Kampala's USE schools.

Arop et al. (2020) in their research on school administration procedures, the efficacy of teachers, and students' academic achievement in mathematics in Nigeria, Student Mathematics Achievement Test (SMAT) was employed as a data collection tool and one multivariate statistical approach used was multiple regressions. It was found out that classroom management styles and academic attainment of learners is closely related. The researcher used national examinational grades to come up with conclusion a gap which this research filled by examining learners in continuous assessment.

Jutaa (2021) investigated classroom management in the central province of South Africa as a means of addressing difficulties in Mathematics attainment. A review of pertinent literature was conducted, and theoretical viewpoints that offer investigative value for the administration of classrooms were investigated. Data for the four emphasis group interviews were gathered through specific semi-structured interviews with five instructors from each school and the directors of four mathematics departments. It was found that duties related to overseeing instruction and learning in mathematics classes may be divided into setting up group projects and inspiring students hence enhancing attainment in mathematics. It was determined that there was a contextual gap in Jutaa's study of learners' mathematics experiences. The researcher filled this gap by concentrating on students in USE schools in Kampala.

Cahyani (2019) looked into how mastery goal orientation and classroom management affect students' ability to self-regulate when studying mathematics. Purposive sampling was used to choose 177 students from Sleman's state high schools to participate in the study. The mastery goal orientation scale, classroom management scale, and self-regulation of mathematics learning scale were the instruments used. Two-predictor regression analysis of the data discovered that classroom management and mathematics attainment were achieved concurrently. One could draw the conclusion that developing high level attainment in Mathematics can be influenced by classroom management. After identifying a methodological gap, the researcher used a cross-sectional research design to analyse data from Kampala's USE school.

The literature above portrays the relationship between Classroom management and learner attainment in mathematics by different scholars Ahmad (2020) Cuabo (2024), Asare (2024), Arop et al. (2020) and Jutaa (2021) but there were some gaps among the investigations that were identified which had an impact on the researcher and it is for the gaps identified made researcher carried out this study to fill up the identified gaps.

2.2.3 *The correlation between teacher commitment and learner attainment in Mathematics*

The body of literature includes the study on the relationship between mathematics attainment results and teacher commitment. In this section, the researcher presents empirical research that examines the connection between student achievement in mathematics and teacher dedication.

Altun (2017) conducted a study with 288 secondary school students in Iraq to examine the impact of teacher commitment on learner attainment. Respondents completed questionnaires in order to gather data after the scales' validity and reliability were examined and to establish the degree of correlation, the variables were subjected to Pearson correlation analysis.

The study investigated how teacher dedication affects students' academic attainment and focused on variances of passionate teachers in class rooms, high-commitment teachers encourage their students to participate in class activities, according to the study's findings. After engaging in learning activities, students are more likely to improve their performance. Research at USE School was done to close the contextual gap.

Insaf El Kalai et al., (2021) studied the impact of teacher dedication on students' academic commitment and, in turn, academic accomplishment was investigated. This study aimed to identify the variables that affect Moroccan teachers' dedication at Tangier-Assilah, Morocco's qualifying secondary level.

Findings from the empirical investigation were obtained using a quantitative methodolo gical technique of a positivist hypothetical deductive type. The study population was 380 qualifying secondary school students who provided the questionnaire through email, which was employed to gather the data. The empirical research findings demonstrate that teacher commitment had a satisfactory and statistically significant impact on learners' academic achievement. Insaf El Kalai et al (2023) conducted their research through an email and in this research, the research shall move to the secondary school by himself to conduct the entire research.

Mwesiga (2018) investigated the degree of teachers' commitment to the teaching profession in secondary schools in the Kagera Region. The study's main objective was to examine secondary school teachers' levels of commitment to teaching. In the Kagera Region of Tanzania, 288 secondary school teachers, 32 academic masters, and 32 school heads replied to the questionnaires. A mixed research approach and convergent parallel design were used in the study.

Participants were sampled using both nonprobability and probability sampling strategies. Data was gathered using questionnaires, interview guides, and document analysis guides,

The survey also discovered that poor training, a lack of regular seminars, workshops, and professional development were among the problems that prevented teacher from giving their all to their work as educators. According to the poll results, educators were very committed to doing their duties.

Kyalimpa (2021) examined the connections between family environments, commitment to learning as well as the four senior students in Makindye division's academic achievement in language and Mathematics. Of the 439 Senior Four registered students in the three government-aided secondary schools selected from the target group, 214 participated in the survey. The questionnaire that was utilized to gather the data was self-made.

The data was analysed using percentages and frequencies, and the Chi-squared test was run.

The study's conclusions showed that exceptional achievement was rewarded with a strong dedication to learning. A contextual gap was identified where Kyalimpa focused on senior four

and the research did carry out a study amongst senior three, the gap this current research sought to fill.

Bibiso (2017) investigated the relationship between the academic achievement of female pupils and the commitment of their teachers in a chosen secondary school in the Wolaita zone of southern Ethiopia. The survey study employed three sample procedures as part of its methodology including stratified random sampling, basic random sampling, and purposeful sampling. A survey was given to 162 female students and 76 teachers.

Additionally, interviews and document analyses were done, the gathered data was analysed using statistical instrument, including the Spear rank order correlation coefficient, frequency, percent, mean, standard deviation, weighted mean, and mean. The findings demonstrated a strong correlation between female students' academic success and their teachers' dedication. A Contextual gap was observed where the study was based in female schools which the researcher sought to fill by carrying the study in USE school in Kampala city

Dahiru et al., (2020) assessed the degree of dedication among teachers at Katsina State's Funtua Local Government Public Secondary Schools Nigeria. All 14 of Funtua, Katsina State's public secondary schools made up the research population. Using Morgan and ten schools were chosen at random from a total of fourteen schools for the study using Krejcie's methodology. The study was conducted using a survey design. Information from the participants was gathered using the Teacher Commitment Questionnaire (TCQ), which Allen (1997) developed and has eighteen (9) items. The collected data was then analysed using descriptive statistics. In Funtua, Katsina State, a moderate degree of teacher dedication (M=2.75, SD=0.41) was discovered.

A methodological gap was identified, Dahiru used survey design of which the research intended to fill up by conducting research using cross sectional research design.Gill (2017) evaluated senior secondary school teachers' commitment to their jobs. A lottery was used to randomly choose 95 government senior secondary school teachers from various Nagar schools in Nigeria. The data was analysed using descriptive statistics including ANOVA, skewness, kurtosis, S.D., mean, median, mode, and so on. The findings showed no discernible interaction effect between (a) gender and teaching experience or (b) stream and teaching experience on college students' commitment to their careers.

The research focused on teachers alone, resulting in a contextual gap that was discovered. This research aimed to address this gap by integrating learners into the experiment. Shoaib (2017) investigated the dedication of outstanding educators, often known as nation builders, to their vocation. A study of teacher educators at Punjab's Government. Colleges for Elementary Teachers (GCETs) were carried out. Using a proportionate random selection technique, 320 teacher educators from GCETs — 120 females and 200 males — were chosen as a sample from the 540 teacher educators in the population.

A five-point scoring system was created for the Professional Commitment Questionnaire (PCQ), which is employed for data collection. The data was analysed using two inferential statistics, ANOVA. The results of the analysis showed that older teacher educators had higher levels of commitment than younger ones. Similarly, comparing teachers with lower qualifications to those with higher academic and professional qualifications shown greater commitment. A contextual gap was observed in the study where by the research focused on only

teacher of which in this research the focus was on both teacher and learner themselves which this research intended to fill.

The literature above portrays the relationship between teacher commitment and learner attainment in Mathematics as the investigations by different scholars like Altun, (2017), Insaf El Kalai et al., (2021) and Mwesiga, (2018), Gill (2017), Dahiru et al., (2020) , Bibiso (2017) and Shoaib (2017) but there were some gaps inclusive of contextual, methodological and empirical among the investigations that were identified which had an impact on me and it is for the gaps identified that the researcher carried out this study sought to fill up.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodologies that were used to carry out the study about "Classroom antecedents and learner attainment in Mathematics in the USE schools in Kampala City". It covers the research approach**,** research design, population, sampling, data collection methods, data collection instruments, research procedure, quality control, data management and ethical considerations.

3.1 Research Approach

This research employed quantitative approach which involved strategy that includes the techniques and steps for gathering, processing, and interpreting data. It offers a structure that a researcher can adhere to and guarantees that the investigation is authentic. Quantitative approach provides high degree of precision and causality McFadden, (2021). The approach is capable of yielding accurate and dependable outcomes. The researcher used quantitative approach be to uncover patterns, trends and correlations and the tested the hypothesis with a high degree of accuracy and reliability in order to come up with results without bias or personnel opinions.

3.2 Research Design

The research design used in this research was cross-sectional, as stated by Wallen and Fraenkel (2000), a cross sectional design is an observational study design in which data is collected at a

distinct point in period from a specific population or a representative sample. Cross sectional design is well suited to investigate institutional antecedents which are factors within USE schools that influence learner attainment.

The researcher was able to discover if proper management of classroom antecedents could upgrade the mathematics scores in the O-level USE schools in Kampala City.

Finally, the researcher engaged a quantitative research approach. Odiya, (2009) states that this method collects numeric data that statistically evaluated so as to establish the correlation among the variables.

3.3 Population

The target population consisted of 1018 senior three Mathematics learners in schools under USE program in Kampala city. However, 278 learners were used as target population. The participating schools were as coded -named; KBS School, KAM School, KOL School, KOLL School, STD School, and LUZ School, KIT School, MAC School, CIT School and finally Up School.

3.4 Sample Size

The sample size consisted of 278 learners in senior three learners. This section was considered to be appropriate representative of the accessible population of 1018 as suggested by Krejcie and Morgan (1970) sample size determined table appendix B. The breakdown of the population, the sample, and the various methods used to choose the sample is represented in Table 3.1

Table 3:1

Study sample

Name of the School	Category of Respondents	Class population	Sample size	Sampling strategy
KBS	Learners	101	20	Simple random
KAM	Learners	104	20	Simple random
KOL	Learners	106	20	Simple random
KOLL	Learners	105	20	Simple random
STD	Learners	106	20	Simple random
LUZ	Learners	108	20	Simple random
KIB	Learners	110	20	Simple random
MAC	Learners	115	20	Simple random
CIT	Learners	112	20	Simple random
UP	Learners	51	20	Simple random

Source: Adapted from updated school registers and daily attendance books

3.5 Sampling Techniques

Simple random sampling technique was used. Each learner was selected by chance basing on the sample frame provided by excel comprising the number of participants in this research, a random number generator was created corresponding to the population and finally the choice of individual corresponding to the generated random numbers was done. Simple random sampling was selected because it allowed the generalizability of the findings (Fricker, 2021).

3.6 Data Collection Methods

Data was gathered using questionnaire surveys. Self-administered questionnaires were the major instruments used in data collection in order to reduce chances of bias from the researcher (Amin, 2005). As the primary study participants, a single set of structured questionnaires was created for the learners. It was used in this research to collect the quantitative data through taking the respondents' views in this research in the sampled O-level USE schools in Kampala City. This enabled collection within short period of time.

3.7 Data Collection Instruments

Section A of the collection instruments had the demographic characteristics of the respondents; namely gender and age in the school. Section B is on learner attainment (DV) adopted from Ludigo et al. (2019) and it comprised of four subsections, namely factual knowledge (5 items, 3items α=0.609, 2 items α= 0.609), conceptual knowledge (5 items 2 items α= 0.696, 3 items α= 0.696), procedural knowledge (11 items 6 items α= 0.748, 5 items α= 0.818), meta cognitive knowledge (9 items 5 items α=0.690 4 items α= 0.693). Section C comprised three subsections, namely; Classroom infrastructure (8 items, 4 items α = 0.75,4 items α = 0.73) classroom management (8 items, 4 items α= 0.83,4 items α=0.85) and teacher commitment (8 items, 4 items α= 0.83,4 items α=0.84) from Mugizi et al. (2021). The ranking was a five Likert scale (where 1= strongly agree 2= Agree 3= Neutral 4=disagree 5=strongly disagree).

3.8 Measurement of Variables

Table 3.2

Variables in the instruments, their source and liability

Variables	**Measures**	**No of items**	**Source instruments, number of items and their reliability (α)**
Learner attainment	Factual knowledge	5	Ludigo et al (2019) (items 5; α=0.609)
	Conceptional knowledge	5	Ludigo et al (2019) (items 5; α=0.696)
	Procedural knowledge	11	Ludigo et al (2019) (items 11; α=0.863)
	Mata –cognitive knowledge	9	Ludigo et al (2019) (items 9; α=0.790)
Institutional antecedents	Classroom infrastructure	8	Mugizi et al, 2021 (items 8; α=0.765)
	Classroom management	8	Mugizi et al, 2021 (2019) (items 8; α=0.854)
	Teacher commitment	8	(Mugizi et al, 2021) (items 8; α=0.825)

Learner attainment (DV) Concepts were adapted from an earlier instrument Obtained from Ludigo et al., 2019 and the institutional antecedent's concepts were adapted from an earlier instrument (Mugizi et al, 2021).

3.9 Quality of Data Collection Instruments

In collaboration within the supervisor, the researcher maintained the instrument's validity. Establishing the instrument's validity and reliability required going over each item to make sure it was pertinent.

3.10 Research Procedure

The researcher obtained a letter from the institutional researcher and ethics committee authorizing him to proceed with data collection after the proposal was reviewed and determined to be in compliance with research ethics. The researcher presented the letter to the head teachers who also introduced the researcher the class teachers who helped in collecting data in different classes.

3.11 Quality Control

This involved testing the validity and reliability of the instrument. In this, research the reliability and validity of the data were attained; Realization of the quality of the data collected, the researcher confirmed that the validity and reliability coefficients are at least above 0.70 as recommended by Oso and Onen, (2008).

3.11.1 Validity

The study established the content validity of the instrument by ensuring that indicator variables conformed to the constructed conceptual framework.

Content validity index was obtained through the inter judge of two consultants for research and determining the average index (CVI), each judge gave his or her choice on a two-point rating scale of Relevant (R) and Irrelevant (IR). Finally calculating the content validity index using the following formula:

$$CVI = \frac{No.\,of\ items\ judged\ relevant\ by\ all\ the\ judges}{Total\ number\ of\ items\ on\ the\ questionnaire}$$

The survey's minimum level, 0.70, was exceeded by the questionnaire's CVI, making it valid (Shirali, Shekari, & Angali, 2018). This guaranteed the instrument's precision, which resulted in the gathering of reliable data. The findings of the CVI were shown in Table 3.3.

Table 3.3

Content Validity Indices

Items	Number of Items	Content Validity Index
Learner attainment	30	0.950
Classroom management	8	0.750
Classroom infrastructure	8	0.750
Teacher commitment	8	0.812

3.11.2 Reliability

The researcher used the method of credibility and dependability to establish the reliability of the interview guide. Demonstrating the accuracy and honesty of the findings is what gives them credibility. In order to increase the precision and legitimacy of the information gathered during a research interview, the researcher additionally conducted member checking (Moon, Brewer, Januchowski-hartley, Adams & Blackman, 2016). Additionally, the researcher avoided personal

biases, ensured rigorous record keeping, demonstrated a clear decision trail, and made sure that data interpretations were visible and consistent throughout the data gathering process. It was shown that the thinking processes used during data analysis and subsequent interpretations were clear. (Noble & Smith, 2015). This guaranteed data reliability; nonetheless, the Cronbach's alpha (α) method, which SPSS offers, was used to examine the reliability of items in the various constructs. The benchmark of α=0.6 and above, which is the lowest threshold, was reached for reliability for the items in the various structures.

Table 3.4: Displayed the results of Cronbach's alpha.

Items	Number of items	Cronbach's alpha
Factual knowledge	5	0.609
Conceptional knowledge	5	0.696
Procedural knowledge	11	0.863
Meta–cognitive knowledge	9	0.790
Classroom infrastructure	8	0.765
Classroom management	8	0.854
Teacher commitment	8	0.825

3.12 Data Management

Following questionnaire returns, the researcher verified the accuracy and completeness of the raw data. Before being entered into the Statistical Package for spearman correlation, the questionnaires were appropriately coded. Data was processed and analysed using Spearman correlation. Data was examined using descriptive statistics and tables were used to demonstration summaries of responses. To test the stated hypothesis, regression analysis coefficients were used. This is because the regression analysis measures the grade and the

direction of the relationship among variables (Amin, 2005). All hypotheses were tested at 0.05, level of significance.

3.13 Ethical Considerations

The researcher adhered to research ethics in carrying out the whole study in the school's environment. Emphasis was placed on informed consent, anonymity, confidentiality, privacy protection, risk-benefit analysis, and truthfulness in data reporting as aspects of research ethics.

Informed consent: making sure that every responder contributed to the study knowingly, voluntarily, and intelligently was part of the informed concert. In order to influence the respondents' decision to join in the study on their own, the researcher gave them an explanation of its goal.

Anonymity: Anonymity was maintained by keeping the respondents' identities private and without connecting them to their answers, anonymity was preserved. This made sure the responders weren't associated with them.

Confidentiality: Ensuring respondents' freedom to disclose and withhold information from the researcher was one way to maintain confidentiality. As a result, the results are unrelated to the respondents' identity.

Honesty: Using study assistants and eliminating prejudice in reporting, honesty was upheld. The acquired data is the sole basis for data presentation, analysis, and interpretation.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter of the study cover the presentation, analysis and interpretation of the findings of the study on institutional antecedents and learner attainment in USE school in Kampala City. The findings include descriptive results in terms of descriptive statistics and inferential results in terms of correlation and regression.

The results are below:

4.1 Response rate

Initially, it was intended to gather data from 278 for the questionnaire survey. However, appropriate data were obtained from 200 respondents. This sample was considered good enough because Mellahi and Harris (2016) designate that response rate of 50% and above as adequate in humanity research.

4.2 Background Characteristics

This part of the study is on the background characteristics of the study participants that are namely; sex and age of the respondents. The data were as presented in Table 4.1.

Table 4.1

Background characteristic of the respondents

Characteristics	Category	Frequency	Percent %
Sex	Male	114	57.0
	Female	86	43.0
	Total	200	100.0
Age groups	15 to 16 years	70	35.0
	16 to 17 years	130	65.0
	17 years above	Non	00.0
	Total	200	100

The findings in Table 4.1 on sex of the respondents revealed that larger percentage (57.0%) was of male with female being (43.0%). The finding suggested that male respondents were more than female ones. None the less, the responses were representative of both gender groups because even the sample of females was high. The findings on age groups showed that the larger percentage (65.0%) was of those between 16-17 years followed by (35.0%) who were between 15- 16 years while 00.0% did not exist in senior three. The findings implied that respondents of different categories participated in the research. This ensured that the data collected was representative of the various age groups of learners.

4.3 Descriptive Results on the Dependent and Independent Variables

This section presents descriptive results on learner attainment and institutional antecedents as dependent and independent variables respectively. The descriptive results presented, analysed and interpreted are descriptive statistics. The results on the dependent variable are presented first followed by the results on the independent variable.

4.3.1 Descriptive Results on learner attainment

Learner attainment was studied as a multi-dimensional concept. The descriptive results on the same are presented in Table 4.2 below.

Table 4.2

Descriptive Statistics for Factual Knowledge

Factual Knowledge	SA	A	N	D	SD	Mean
I can explain most terms in mathematics	6 (3.0%)	31 (15.5%)	76 (38.0%)	57 (28.0%)	30 (15.0%)	3.4
I always think about the terms in mathematics	3 (1.5%)	24 (12.0%)	61 (30.5%)	88 (44.0%)	24 (12.0%)	3.5
The terms of the mathematics I have studied will be applicable when I join the work world after completing my studies	23 (11.0%)	20 (10.0%)	36 (18.0%)	90 (45%)	30 (15%)	3.4
I always know more about the topics I have studied in mathematics	5 (2.5%)	12 (6.0%)	56 (28.0%)	81 (40.0%)	46 (23.0%)	3.7
I Enjoy explaining the topics I have studied	7 (3.5%)	22 (11.0%)	34 (17.0%)	73 (36.0%)	64 (32.0%)	3.8
I master the topics I have studied very well	6 (3.0%)	21 (10.0%)	49 (24.0%)	50 (25.0%)	74 (37.0%)	3.8

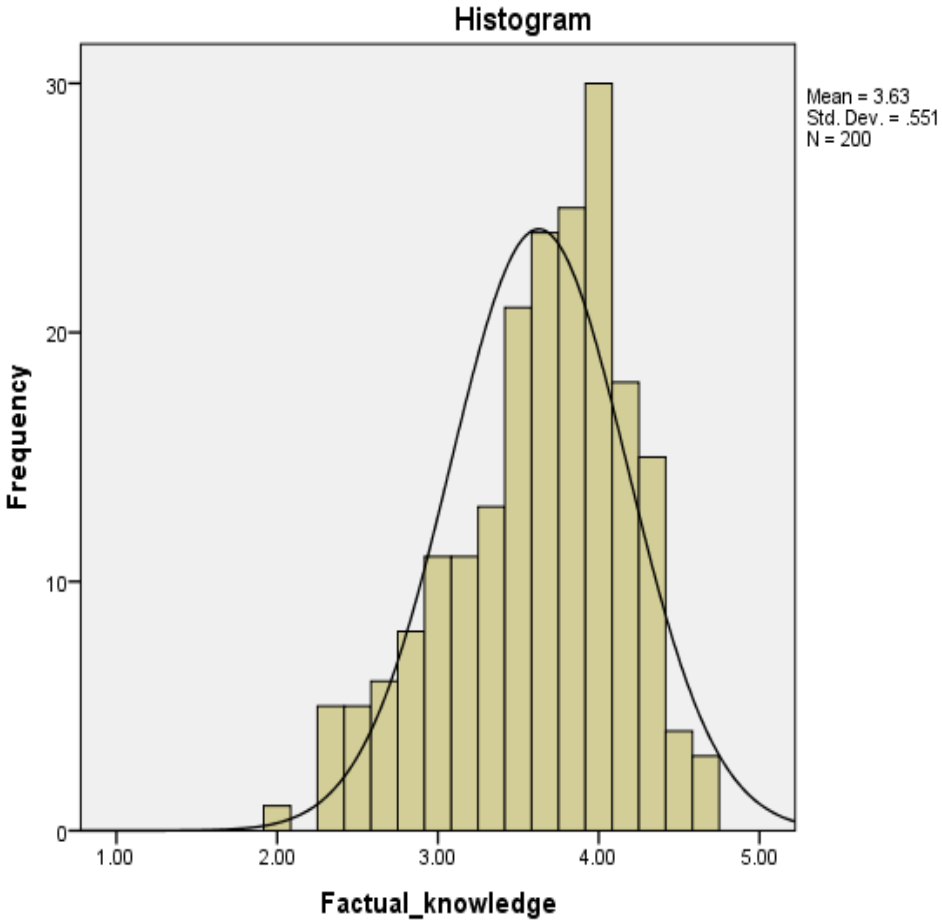
The results in Table 4.2 on whether learners in the USE can explain most terms used in Mathematics were exactly on the average mean = 3.40 The mean of code 3 equated to neutral on the five-point Likert scale, with three in the middle, the results revealed that, to a lesser

extent, learners in USE schools agreed that they can explain most words used in mathematics. As to whether learners always think about the terms in mathematics, the mean = 3.50 was disagree. This meant that to some extent learners could not think about most terms used in mathematics. With respect to whether learners use terms of the mathematics they have studied when they join the work world after finishing my studies, the results were an average mean = 3.4. This meant that fairly, learners could not use the mathematical terms in the lives after studies.

As to whether learners always knew more about the topics they have studied in Mathematics, the results were an average mean = 3.7. This meant that fairly, some learners did not know more about the topics they studied in their mathematics class. Concerning whether learners could explain the topics they have studied to other learners, the results were above an average mean = 3.8. This meant that fairly, some learners could not explain the topics they had studied. Regarding whether the learners had mastered the topics they had have studied very well, the results were above an average mean = 3.8. This meant that fairly, learner's disagreed that they had masters some of the topics they had been taught in the mathematics class. To establish whether results on factual knowledge of learners were normally distributed, an average index was derived for the 6 items measuring the construct, and a histogram was drawn as indicated in Figure 4.1.

Figure 4.1

Histogram for factual knowledge



The results in Figure 4.1 show an average mean = 3.63 which suggest that teachers moderately agreed. The standard deviation = 0.55 was low implying that the findings were normally distributed. The average mean meant that factual knowledge was fair while the low standard

deviation indicated low dispersion in the responses. Therefore, data on factual knowledge of learners could be subjected to linear correlation and regression and obtain appropriate results.

Conceptual Knowledge

The concept of conceptual knowledge was investigated using five items. The results were descriptive statistics, and they are shown in the table below.

Table 4.3

Descriptive Statistics for Conceptual Knowledge

Conceptual Knowledge	**SA**	**A**	**N**	**D**	**SD**	**Mean**
I understand the main formulas in the topics I have studied in mathematics.	5 (2.5%)	18 (9.0%)	77 (38.5%)	62 (31.0%)	38 (19.0%)	3.5
I can apply the different formulas in the mathematics I have studied in life situation	2 (1.0%)	31 (15.5 %)	42 (21.0%)	99 (49.5%)	26 (13.0%)	3.6
I can easily distinguish between the different formulas that I have studied	4 (2.0%)	15 (7.5%)	63 (31.5%)	67 (33.5%)	51 (25.5%)	3.5
I can easily explain the formulas I have studied in mathematics.	4 (2.0%)	12 (6.0%)	63 (31.5%)	87 (43.5%)	934 (17.0%)	3.6
I can easily explain the formulas I have studied in mathematics	4 (2.0%)	15 (7.5%)	63 (31.5%)	67 (33.5%)	51 (25.5%)	3.7

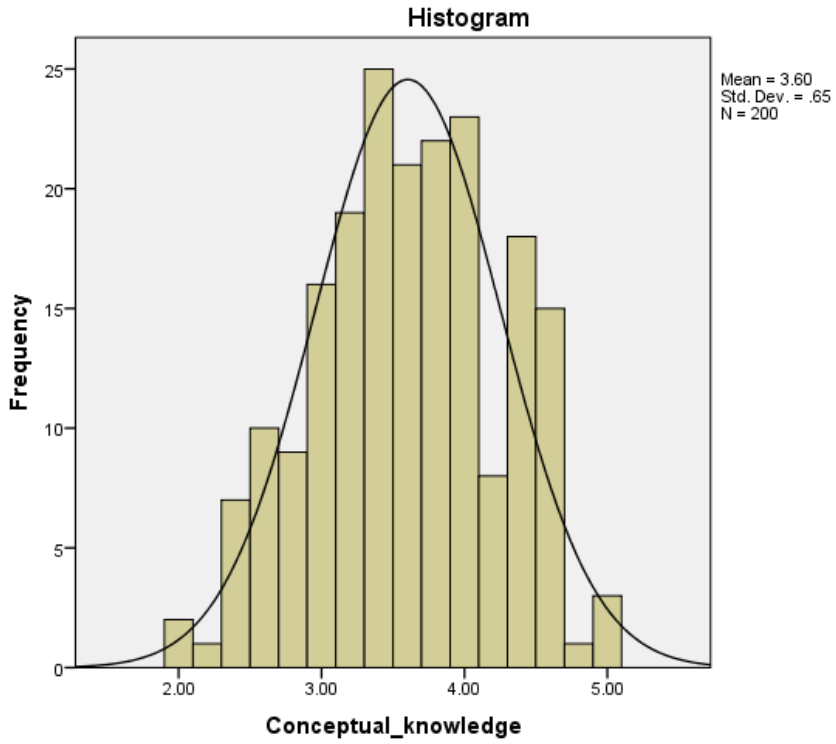
The results in Table 4.3 on whether learners understand the main formulas in the topics they had studied in Mathematics, fairly some learners valued the knowledge they had built in their subject were a just above average mean = 3.5. The mean was close to code 3 which on the five-point Likert Scale used corresponded to disagree. Three being average, the result suggested that fairly, learners did not adequately value the knowledge they had built in their mathematics subject. As to whether learners could apply the different formulas they had learnt in Mathematics in their life situation submitted, the mean = 3.6 was just above the average. This meant that to a large extent some learners disagree to apply the concepts they had learnt in their daily lives. With respect to whether learners were able to easily distinguish between the different formulas that they have studied, the results were an average mean = 3.4. This meant that fairly, learners could not be able to distinguish between the formulas they had studied in their respective classes.

As to whether learners can easily explain the formulas, they have studied in Mathematics to their fellow learners in their respective mathematics classes, the results were an average mean = 3.6. This meant that fairly, learners could not explain the formulas they studied in their respective mathematics classes to the classmates. Concerning whether learners can apply what they have in mathematics to different learning subjects. The results were above mean 3.7. This meant that learners could not connect well with what they have studied in math mathematic to other learning subjects in their class.

To determine if the results of Conceptual Knowledge were normally distributed, an average index for the five items measuring the construct was calculated and a histogram was produced, as shown in Figure 4.2

Figure 4.2

Histogram showing conceptual knowledge



The results in Figure 4.2 show an average mean = 3.6 which suggest that learners moderately agreed. The standard deviation = 0.65 was low implying that the results were normally distributed. The average mean meant that conceptual knowledge was fair while the low standard deviation indicated that the responses were not widely dispersed. As a result, conceptual data could be analysed using linear correlation and regression.

Procedural Knowledge

The concept of procedural knowledge was investigated using nine items. The results were descriptive statistics, and they are shown in the table 4.4 below.

Table 4.4:

Descriptive Statistics for Procedural Knowledge

Procedural Knowledge	SA	A	N	D	SD	Mean
I understand the steps to follow in handling different activities of mathematics.	4 (2.0%)	29 (14.5%)	73 (36.5%)	49 (24.5%)	45 (22.5%)	3.5
I can handle mathematics activities using different methods available.	8 (4.0%)	29 (14.5%)	60 (30.0%)	71 (35.5%)	32 (16.0%)	3.4
In handling my mathematics activities, I know the easiest and fastest way to them.	6 (3.0 %)	28 (14.0%)	53 (26.5%)	64 (32.0%)	49 (24.5%)	3.6
I can easily identify all possible steps necessary for me to accomplish my activities.	3 (15.0%)	15 (7.5%)	53 (26.5%)	82 (41.0%)	47 (23.5%)	3.7
I follow step by step in doing mathematics activities assigned to me.	7 (3.5%)	31 (15.5%)	49 (24.5%)	73 (36.5%)	40 (20.0%)	3.5
The way I normally do my mathematics work assignments is the best.	5 (2.5%)	16 (8.0%)	52 (26.0%)	75 (37.0%)	52 (26.0%)	3.7
I can ably explain the reason behind the steps I follow in doing my mathematics activities.	5 (2.5%)	24 (12.0%)	69 (34.5%)	62 (31.5%)	40 (20.0%)	3.5
I try to use steps that have worked in the past when studying mathematics.	12 (6.0%)	43 (21.5%)	34 (17.0%)	79 (39.5%)	32 (16.0%)	3.3
I have a specific purpose for each step I use	12 (6.0%)	16 (8.0%)	58 (29.0%)	74 (37.0%)	40 (20.0%)	3.5
I am aware of what step I use when I study mathematics.	41 (20.5%)	74 (37.5%)	59 (29.5%)	20 (10.5%)	6 (3.0%)	3.6
I find myself using helpful steps when learning mathematics automatically.	5 (2.5%)	18 (9.0%)	46 (23.0%)	68 (34.0%)	63 (31.5%)	3.8

The results in Table 4.4 on whether learners valued the understanding the steps to follow in handling different activities of mathematics they had built in their mathematics classes were a just above average mean = 3.5. The mean was close to code 3 on the five-point Likert scale utilized corresponded to disagree to the understanding the steps to follow in handling different activities of mathematics they had built in their mathematics classes. Whether learners can handle mathematics activities using different methods learnt in their respective mathematics classes, the mean = 3.4 was on the disagreement scale. This meant that to a lesser extent learners could not handle mathematics activities using different methods. With respect to whether learners are handling mathematics activities they know in the easiest and fastest way for them, the results were mean = 3.6. This meant that, learners disagreed to the fact that they can handle mathematics in the easiest way possible.

As to whether the learners can easily identify all possible steps necessary for them to accomplish their mathematics class activities, the results were an average mean = 3.7. This meant that, learners could not identity all the necessary possible steps to accomplish their mathematics activity. Whether learners can follow up step by step in doing mathematics activities assigned to them in their respective mathematics classes, the results were a high mean = 3.5. This meant that learners could not connect well with the steps they followed up in the mathematics classes. Regarding whether learners appreciated the way they normally do their mathematics work assignments as the best in their mathematics class, the results were an average mean = 3.7. This meant that, learners found could not normally do their assignment.

About learners' ability to explain the reason behind the steps they follow up in doing their Mathematics activities, the mean = 3.5 was average. This suggested that, learners were not able to explain the steps they could follow up in carrying out their Mathematics activities. With respect to whether learners could try to use steps that have worked in the past when studying mathematics, an average mean = 3.3 was obtained. These results suggested that fairly, in mathematics class learners could count on whenever they applied past knowledge.

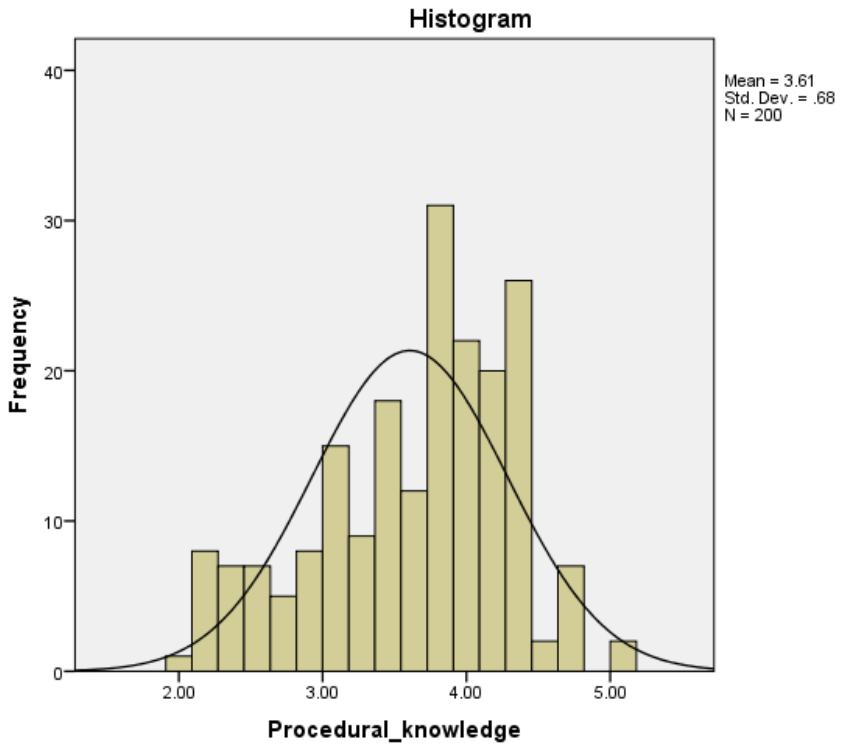
About learners having a specific purpose for each step they use in carrying their respective mathematics activities, the mean = 3.5 was above the average. This suggested that fairly, learners were not able to have specific purpose in carrying out their mathematics activities

As to whether the learners were aware of what step they use when studying and doing mathematics, the results were an average mean = 3.6. This meant that, learners could not identity all the necessary possible steps to accomplish their mathematics activity. Whether learners could find themselves using helpful steps when learning mathematics automatically, the results were a high mean = 3.6. This meant that learners could not connect well with the steps they followed up in the mathematics classes.

To determine whether the results on Procedural Knowledge were normally distributed, an average index for the nine questions measuring the construct was calculated and a histogram was produced, as shown in Figure 4.3.

Figure 4.3

Histogram showing procedural knowledge



The results in Figure 4.3 reveal an average mean of 3.61, indicating that learners disagreed. The standard deviation = 0.656 was low implying that the results were normally distributed. The average mean meant that procedural knowledge was fair while the low standard deviation indicated that the responses were not widely dispersed. As a result, data on procedural knowledge could be correlated and analysed using linear regression.

Meta Cognitive Knowledge

The concept Meta Cognitive Knowledge was investigated using nine items. The results were descriptive statistics, and they are shown in the table 4.5 below.

Table 4.5

Descriptive Statistics for Meta Cognitive Knowledge

Meta Cognitive Knowledge	SA	A	N	D	SD	Mean
I easily summarise the content I have studied in mathematics.	3 (1.5%)	19 (9.5%)	70 (55.5)	72 (36.0%)	36 (18.0%)	3.5
I critically analyse the concepts and formulas that the teachers present me.	3 (1.5%)	24 (12.0%)	55 (27.5%)	92 (46.0%)	26 (13.0%)	3.5
With certain topics, after studying them and thinking about them in-depth, I am capable of contributing personal ideas and justifying them.	1 (0.5%)	20 (10.0%)	59 (29.5%)	81 (40.5%)	39 (19.5%)	3.7
I ask myself questions about what I hear, read and study in mathematics to see if they convince me.	3 (1.5%)	24 (12.0%)	52 (26.0%)	85 (42.5%)	36 (18.0%)	3.6
When a formula, interpretation or conclusion is set out in class or in the books, I try to see if there are good arguments that maintain it.	3 (1.5%)	17 (8.5%)	54 (27.0%)	91 (45.5%)	35 (17.5%)	3.6
When I hear or read a math statement, I think of other possible alternatives.	1 (0.5%)	23 (11.5%)	47 (23.5%)	85 (42.5%)	44 (22.0%)	3.7
I use what I have learned in the class in everyday situations.	2 (1.0%)	15 (7.5%)	49 (24.5%)	92 (46.0%)	42 (21.0%)	3.6
I use what I have learned in mathematics subject in another subject.	1 (0.5%)	25 (12.5%)	51 (25.5%)	85 (42.5%)	38 (19.0%)	3.6
When faced with new tasks in mathematics, I use what I have learnt and apply this knowledge to this new situation whenever possible.	1 (0.5%)	15 (7.5%)	48 (24.0%)	86 (43.0%)	50 (25.0%)	3.8

The results in Table 4.5 on whether learners can easily summarise the content they have studied in their mathematics classes were an average mean = 3.5. The mean was close to code 3 on the five-point Likert scale used corresponded to disagree. Three being average, the result suggested that fairly, some learners did not care about summarising what they have studied. As to whether learners can critically analyse the concepts and formulas that their teachers presented to them, the mean = 3.5 was just above average. This meant that fairly, learners disagreed to the analysis of their formulas. As to whether learners appreciate certain topics, after studying and thinking about the content thoroughly, they are capable of contributing personal opinions and justifying them.

The mean = 3.7 meant that learners disagreed to the fact that they cannot contribute personnel ideas after studying some of the mathematics topics. With respect to whether learners ask themselves questions about what they hear, read and study in mathematics and seeing that they are convinced, the results were a mean = 3.6 just above the average. This meant that fairly, learners were aware not aware of their analysis of the concepts and formulas that they study in mathematics. As to whether students can grasp mathematical formulas and analyses that are presented in classrooms or in textbooks and trying to see as if they can support a good argument that maintain it. The results were a mean = 3.6 just above average. This meant that to a large extent learner did not show interest in developing personal ides and justifying them.

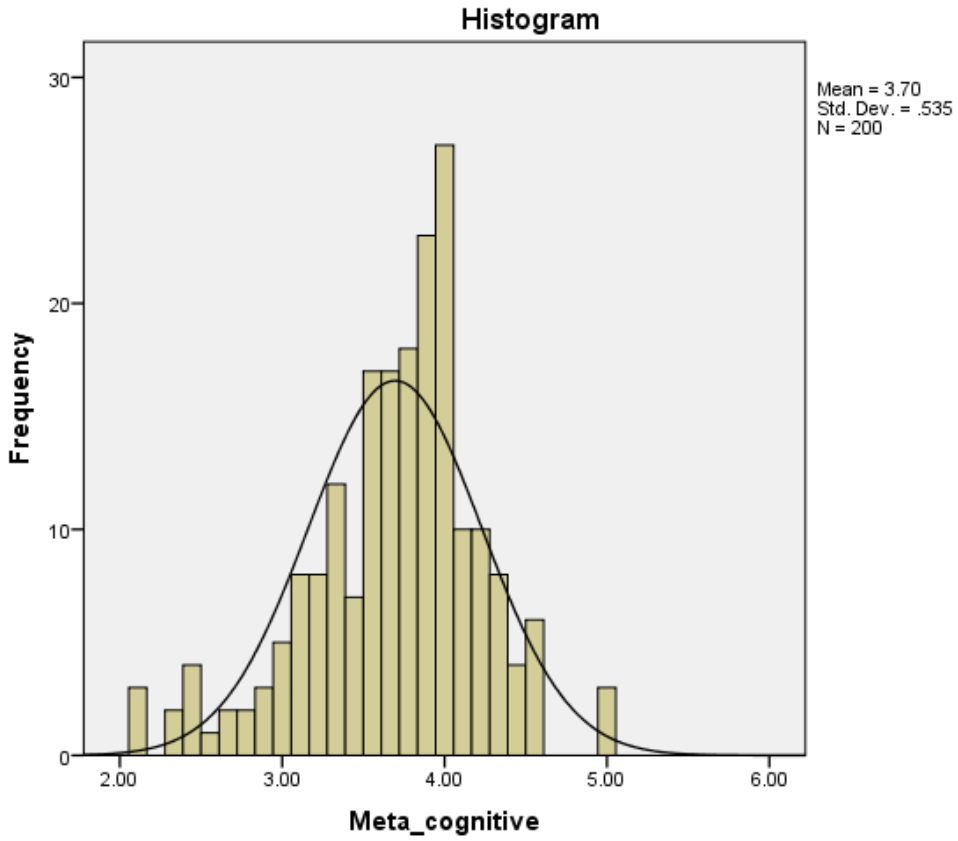
About whether learners hear or read a math statement and they do think of other possible alternatives in their mathematics lesson, the mean = 3.7 was disagreement. This suggested that, there were learners who sought that they were unaware of thinking about

alternatives methods in mathematics. With respect to whether learners use what they have learned in the mathematics class in everyday situations, average mean = 3.6 was obtained. These results suggested that to a large extent some learners were unaware of using what they have studied in their respective mathematics classes in their lives.

With regard to whether some learners can use what they have learned in mathematics subject in another subjects, an average mean = 3.6 was obtained. These results suggested that fairly, some learners disagreed that they could spontaneously use what they have studied in mathematics to relate it to other subjects. As to whether some learners when faced with new tasks in mathematics, they remember what they already know and the experience they have learned, and apply this knowledge to this new situation whenever possible, an average mean = 3.8 were obtained. These results suggested that fairly, some learners openly shared that they could not easily transfer mathematics experience in the new situation. To ascertain whether results on normally distributed an average The Meta Cognitive Knowledge index for the nine questions measuring the construct was calculated and a histogram produced, as illustrated in Figure 4.4.

Figure 4.4

Histogram for Meta Cognitive



The findings in Figure 4.3 reveal an average mean of 3.7, indicating that learners disagreed. The standard deviation = 0.534 was low implying that the results were normally distributed. The average mean meant that Meta cognitive knowledge was fair while the low standard deviation indicated that the responses were not widely dispersed. Therefore, data on Meta cognitive l knowledge was be analysed using linear correlation and regression.

Descriptive Results on institutional antecedents

Classroom antecedents were studied as a multi-dimensional concept covering Classroom **infrastructure, Classroom management, and Teacher commitment.** The results for each of the construct measuring **institutional antecedents** follow below.

Classroom infrastructure

The concept of Classroom infrastructure was studied using eight items. The results were descriptive statistics, and they are presented in the table below.

Table 4.6

Descriptive Statistics for Classroom infrastructure

Classroom infrastructure	SA	A	N	D	SD	Mean
The desks in my classroom enable me to write comfortably	17 (8.5%)	24 (12.0%)	30 (15.0%)	62 (31.0%)	67 (33.5%)	3.8
The chairs in my classroom are comfortable.	12 (6.0%)	18 (9.0%)	16 (8.0%)	74 (37.0%)	80 (40.0%)	4.0
The writing board in the classroom is good, easy to read and write.	8 (4.0%)	17 (8.5%)	27 (13.5%)	58 (29.0%)	90 (45.0%)	4.0
The classroom has enough chalk to use on the blackboard.	14 (7.0%)	24 (12.0%)	28 (14.5%)	64 (32.0%)	69 (34.0%)	3.6
The roof of the classroom is very good.	5 (2.5%)	12 (6.0%)	18 (9.0%)	59 (29.5%)	106 (53.0%)	4.2
The walls of the classroom are very clean and clear.	9 (4.5%)	7 (3.5%)	14 (7.0%)	65 (32.0%)	105 (52.5%)	4.2
The nature light in math class is sufficient.	35 (17.5%)	31 (15.5%)	29 (14.5%)	52 (26.0%)	53 (26.5%)	3.4
The ventilation in the classroom is sufficient.	38 (19.0%)	20 (10.0%)	19 (9.5%)	62 (30.5%)	61 (30.5%)	3.4

The results in Table 4.6 on whether the desks in the classrooms enable the learners to write comfortably in their respective mathematics classroom the average mean = 3.8. The mean was close to code 3 on the five-point Likert scale used corresponded to neutral. Three being average, the result suggested that fairly, some learners could not agree whether they had desks that were comfortable in their respective mathematics classes. As to whether learners have chairs in their respective mathematics classroom that are comfortable, the mean = 4.0 was just above the average. This meant that learners to a large extent disagreed to the fact that the chairs in their respective class were comfortable. With respect to whether learners have writing boards in their classroom that are a good, easy to read and write, the results were above the average mean = 4.0. This meant that learners disagreed that their writing boards that are good in their respective mathematics classes. As to whether learners in the classroom have enough chalk to use on the blackboard in their respective mathematics classes the results were an average mean = 3.6. This meant that fairly, learners did not agree to have enough chalk to be used in the mathematics classes.

Concerning whether learners have roofs in their classroom that are very good., the results were above the average mean = 4.2 This meant that some learners disagreed to have good classroom roofs in their mathematics classes, regarding whether learners have clean and clear walls in their respective mathematics classroom., the results were an average mean = 4.2. This meant that learners disagreed to have clean and clear wall in the mathematics classes. About whether learners have sufficient nature light in mathematics classroom is, a high mean =

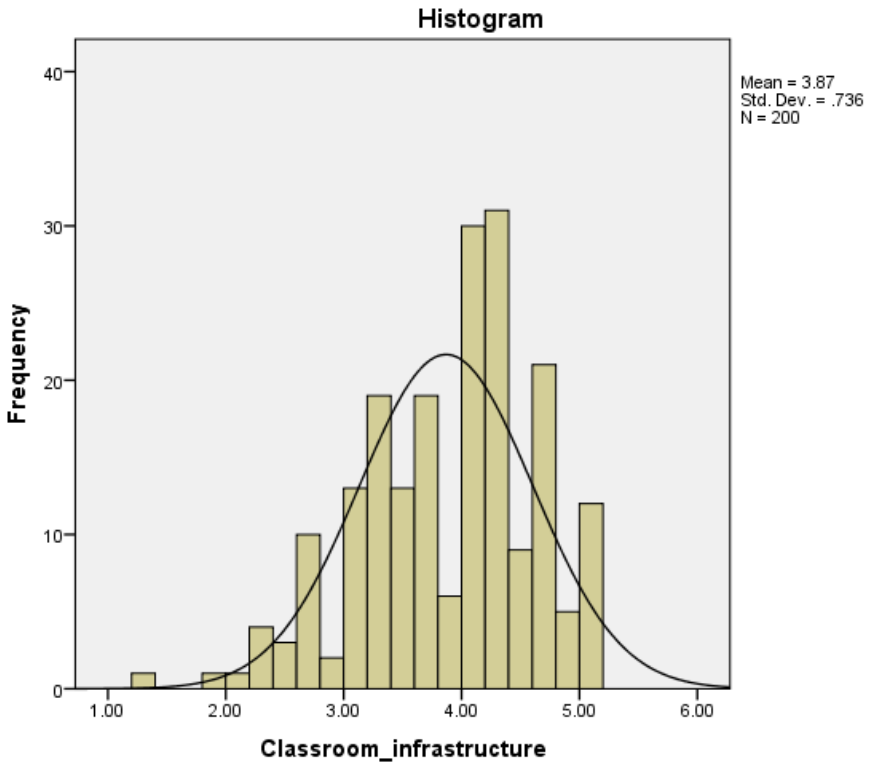
3.4 was obtained. This suggested that learners remained neutral about having sufficient natural light in their respective classes.

With respect to whether learners have sufficient ventilation in their respective classroom, an average mean = 3.4 were obtained. These results suggested that fairly, learners disagreed to the fact that there is no sufficient ventilation in their respective classrooms.

To determine if the results for Classroom infrastructure were normally distributed, an average index for the eight items measuring the construct was calculated and a histogram was produced, as shown in Figure 4.5.

Figure 4.5

Histogram for classroom infrastructure



The results in Figure 4.5 show an average mean = 3.87 which suggest that learners disagreed. The standard deviation = 0.736 was low implying that the results were normally distributed. The mean above the average meant that Classroom infrastructure was not fair while the low standard deviation indicated low dispersion in the repossess. Therefore, data on Classroom infrastructure could be subjected to linear correlation and regression.

Classroom management

The concept Classroom management was studied using eight items. The results were descriptive statistics, and they are shown in the table.

Table 4.7

Descriptive Statistics for Classroom management

Classroom management	SA	A	N	D	SD	Mean
My teacher encourages learners to determine classroom rules.	20 (10.0%)	26 (13.0%)	56 (28.5)	55 (27.0%)	43 (21.0%)	3.3
My teacher manages the mathematics class effectively.	15 (7.5%)	27 13.5%)	38 (19.0%)	84 (42.0%)	36 (18.0%)	3.4
My teacher provides effective communication in math class.	9 (4.5%)	25 (12.5%)	41 (20.0%)	78 (39.0%)	47 (23.5%)	3.5
My teacher notice misbehaving learners in math class.	79 (39.0%	49 (23.5%)	43 (21.5%)	15 (7.5%)	17 (8.5%)	3.4
My teacher ensures discipline in the math class.	75 (37.5%)	50 (25.0%)	40 (20.0%)	16 (8.0%)	19 (9.5%)	3.4
My teacher uses positive reinforcement and incentives.	67 (35.5%)	47 (23.5%)	40 (20.0%)	19 (9.5%)	27 (13.0%)	3.5
My teacher encourages all students to participate in class	79 (39.5%)	50 (25.5%)	25 (12.5%)	20 (10.0%)	26 (13.0%)	3.5
My teacher ensures that all learners sit in their groups	54 (27.0%)	37 (18.5%)	38 (19.0%)	29 (14.0%)	42 (21.0%)	3.8

The results in Table 4.5 on whether learners had their teacher encouraging them to determine classroom rules were an average mean = 3.3. The mean was close to code 3 on the five-point Likert scale, which matched to neutral. Three being average, the result suggested that fairly, learners had no shared interest in classroom management. As to whether mathematics teacher managed the mathematics room class effectively, the mean = 3.4 were just above average. This meant that to a lesser extent fairly, learners easily agreed that their mathematics teacher

managed their class effectively. With respect to whether teacher provided effective communication in mathematics, the results were an average mean = 3.5. This meant that teachers did not easily communicate with their learners effectively in their mathematics classrooms. As to whether teachers took notice of misbehaving learners in their respective mathematics class, the results were an average mean = 3.4. This meant that fairly, some learner cold not recognise whether their teachers were taking notice of misbehaving learners.

Concerning whether teachers ensured discipline in the mathematics class, the results were an average mean = 3.4. This meant that fairly, teacher's ensured discipline in their classroom. Regarding whether teachers used positive reinforcement and incentives in their mathematics classroom, the results were an average mean = 3.5. This meant that fairly, teacher could not use positive reinforcement towards learners in their mathematics classes. About whether teachers encouraged all learners to participate in class during mathematics classes, mean = 3.5 was obtained. This suggested that teachers could not engage their learners to participate in their mathematics classes. With respect to whether mathematics teachers ensure that all learners sit and discuss in their respective groups during the mathematics class, mean = 3.8 was obtained implying that learners did not agree to the fact that teacher should make sure that all mathematics learners do sit in their respective groups. .

To determine if the results of Classroom management were normally distributed, an average index for the eight items measuring the construct was calculated and a histogram was produced, as shown in Figure 4.6.

Figure 4.6

Histogram for classroom management

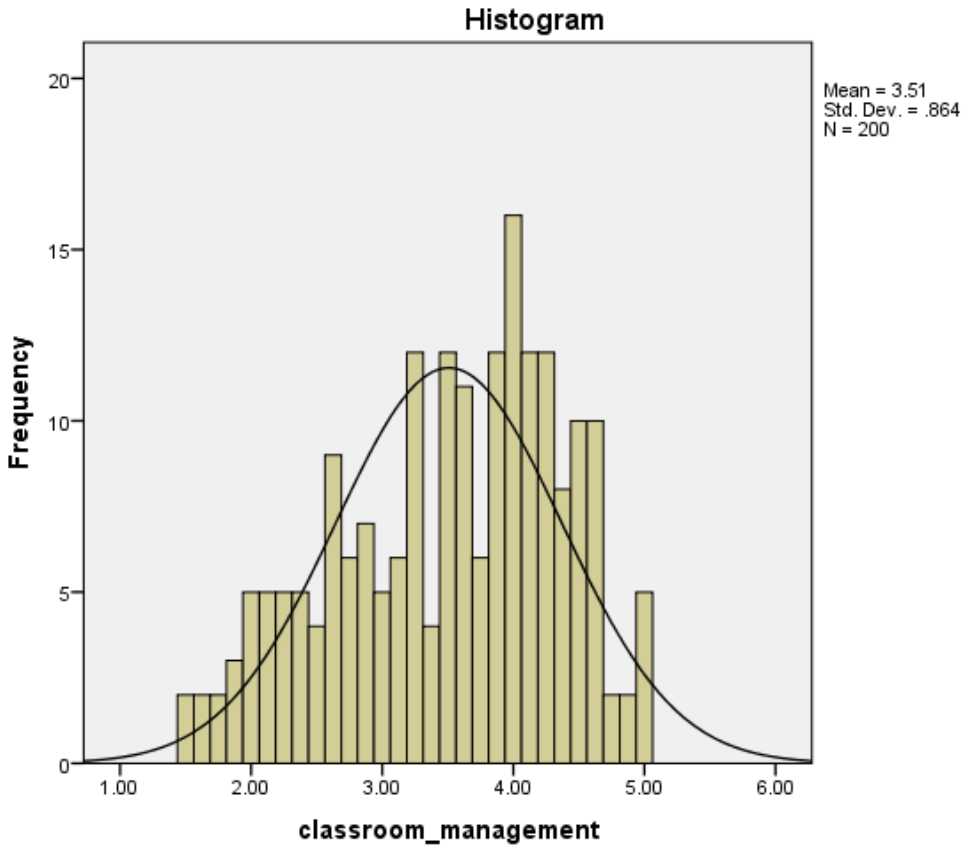


Figure 4.6 shows an average mean of 3.51, indicating that learners agreed. The standard deviation = 0.86 was low implying that the results were normally distributed. The average mean meant that Classroom management was fair while the low standard deviation indicated that the responses were not widely dispersed. As a result, data on classroom management was correlated and analysed using linear regression.

Teacher commitment

The concept Classroom management was studied using eight items. The results on the same were descriptive statistics and the results are in the table

Table 4.8

Descriptive Statistics for teacher commitment

Teacher commitment	SA	A	N	D	SD	Mean
My teacher makes sure all learners succeed in math class	21 (10.5%)	34 (17.0%)	41 (20.5%)	68 (34.0%)	36 (18.0%)	3.3
My teacher ensures good social relations amongst learners.	12 (6.0%)	49 (24.5%)	42 (21.0%)	71 (35.5%)	26 (13.0%)	3.2
My teacher mediates among rival learners	8 (46.0%)	34 (24.0%)	44 (16.5%)	72 (10.5%)	41 (3.5%)	3.5
My teacher conducts remedial math classes.	14 (7.0%	17 (8.5%)	14 (7.0%)	79 (39.5%)	76 (38.0%)	3.9
My teachers provide prepared charts and graph papers.	14 (7.0%)	17 (8.5%)	21 (10.5%)	68 (34.0%)	79 (39.0%)	3.9
My teacher keeps time for his math lessons.	37 (18.5%)	26 (13.0%)	18 (9.0%)	60 (30.0%)	59 (29.0%)	3.3
My teacher checks and marks the math books	19 (9.5%)	24 (12.0%)	24 (12.0%)	57 (28.5%)	76 (33.0%)	3.7
My teacher returns scripts and does corrections in the class	29 (14.5%)	17 (8.5%)	22 (11.0%)	37 (18.5%)	95 (47.5%)	3.7

Table 4.8 shows the results for whether teachers made sure that all learners succeed in mathematics class were a just below average mean = 3.3. The mean was barely over code 3, which on the five-point Likert Scale corresponded to neutral. Three being average, the result

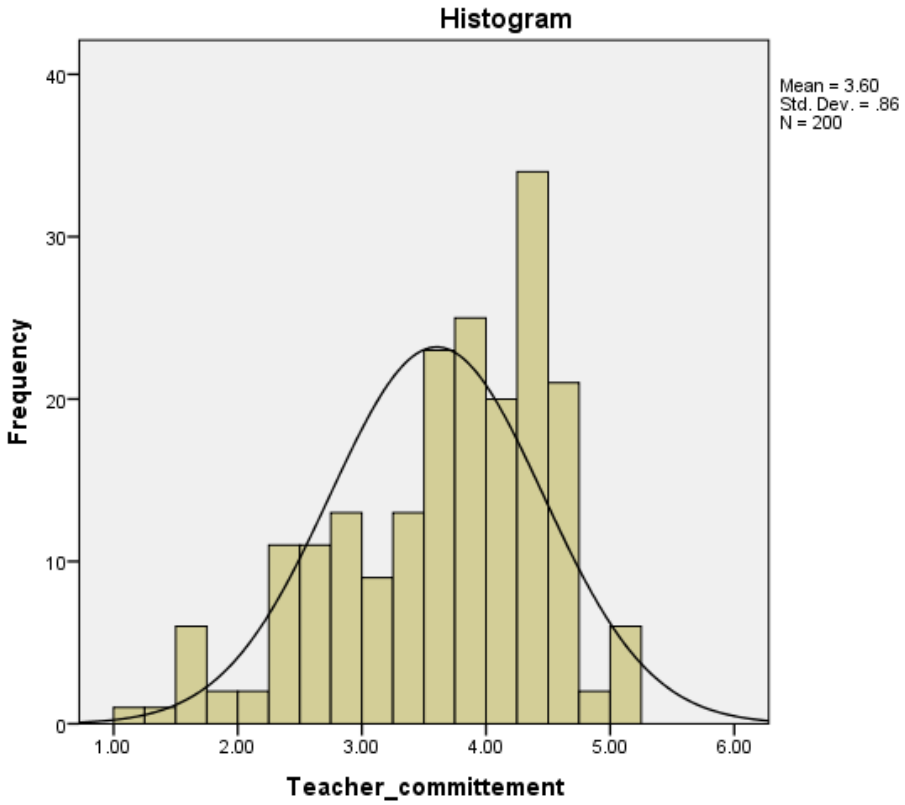
suggested that to a lesser extent, teachers make sure some learners succeed in math class. As to whether teachers ensure good social relations amongst learners in the mathematics, the mean = 3.2 was just above average. This meant that to a lesser extent teachers ensured good social relations amongst the learners. With respect to whether teachers mediate among rival learners the results were an average mean = 3.5. This meant that fairly, some teachers did not mediate among the rival groups in the mathematics classes.

As to whether teachers conduct remedial mathematics classes, the results were an average mean = 3.9. This meant that fairly, teachers did not conduct remedial mathematics. Concerning whether teachers provide prepared charts and graph papers to their learners in the mathematics classrooms, the results were an average mean = 3.9. This meant that fairly, teachers did not provide prepared charts and graph papers to their learners. Regarding whether teachers keep time for their mathematics lessons, the results were an average mean = 3.3. This meant that fairly, some teachers kept time for their mathematics lessons. About teachers actively involving themselves in checking and marking learners' Mathematics books, the mean = 3.7 was above average. This suggested that fairly, teachers did not actively get involved themselves in checking and marking s learner's mathematics books. With respect to whether mathematics teachers return scripts and do corrections in the class for the learners, the results were above average mean = 3.7. This meant that fairly, some teachers did not return learner's scripts for corrections in the mathematics classes.

To determine whether the results on teacher commitment were normally distributed, an average index was generated for the eight items measuring the construct, and a histogram was produced, as shown in Figure 4.7.

Figure 4.7

Histogram for classroom management



The results in Figure 4.7 show an average mean of 3.60, indicating that learners disagreed.

The standard deviation = 0.86 was low implying that the results were normally distributed. The average mean meant that teacher commitment was fair while the low standard deviation

suggested low dispersion in the responses. Therefore, data on teacher commitment was subjected to linear correlation and regression.

4.4 Inferential Analyses

To determine if there was a relationship between institutional antecedents and learner attainment, inferential analyses, specifically correlation and regression, were conducted out.

Inferential analyses follow here under.

4.4.1 Correlation of institutional antecedents and learner attainment in mathematics.

To establish whether institutional antecedents' aspects namely; classroom infrastructure, classroom management environment and teacher commitment related with learner attainment in mathematics, Correlation analysis. The results are shown in Table 4.9.

Table 4.9

Correlation Matrix for institutional antecedents and learner attainment in mathematics

	Learner attainment	Classroom infrastructure	Classroom management	Teacher commitment
Learner attainment in mathematics	1			
Classroom infrastructure	0.284** 0.000	1		
Classroom management	0.402** 0.000	0.457** 0.000	1	
Teacher commitment	0.516** 0.000	0.265** 0.000	0.521** 0.000	1

The findings in Table 4.9 indicate that all the school institutional antecedents namely; classroom infrastructure ($r = 0.284$, $p = 0.000 < 0.05$), classroom management ($r = 0.402$, $p =$

0.000 < 0.05) and teacher commitment (r = 0.516, p= 0.000 < 0.05) had a positive and significant relationship with learner attainment in mathematics this indicates that the hypotheses (H_1–H_3) were accepted.

4.2.2 Regression Model for institutional antecedents and learner attainment

At the confirmatory level, to establish whether school institutional antecedents namely; classroom infrastructure, classroom management and teacher commitment predicted learner attainment, a regression analysis was carried out. The results were as in Table 4.10.

Table 4.10

Regression of institutional antecedents and learner attainment

Institutional antecedents	Standardised Coefficients Beta (β)	Significance (p)
Classroom infrastructure	0.770	0.094
Classroom management	0.770	0.082
Teacher commitment	0.244	0.000
Adjusted R^2 = 0.548 F = 28.034, p = 0.000		

a. Dependent Variable: learner attainment

The results in Table 4.10 show that the institutional antecedents namely; classroom infrastructure, classroom management and teacher commitment explained 54.8% of the variation in learner attainment (adjusted R= 0.548). This means that 45.2% of the variation was accounted for by other factors not considered under this model. The results indicate that while classroom infrastructure (β = 0.770, p = 0.094 < 0.05) and classroom management (β= 0.770, p

= 0.082 < 0.05) had a positive but insignificant influence on students' attainment in mathematics, teacher commitment (β = 0.244 p= 0.000 < 0.05) had a positive and significant influence on learner attainment. This means that while hypotheses (H_1 and H_2) were rejected, hypothesis three was accepted.

CHAPTER FIVE

DISCUSSION, CONCLUSION, RECOMMENDATION

5.0 Introduction

Chapter five covers the discussion, conclusion and recommendation of the study on institutional antecedents and learner attainment in Mathematics in universal secondary schools: a case of Kampala city, Uganda. This chapter also discusses the limitations and offers suggestions for future research.

5.1 Discussion

This section presents the discussion of the findings of the study on institutional antecedents and learner attainment in mathematics in universal secondary schools: a case of Kampala city, Uganda. The discussion includes cross-referencing the findings of the study and related literature of previous scholars.

5.1.1 Hypothesis One (H1): There is no statistically significant a relationship between classroom infrastructure adequacy and learner attainment in mathematics in universal secondary schools in Kampala city.

The first hypothesis of the study stated that there is no statistically significant relationship between classroom infrastructure adequacy and learner attainment in mathematics in the universal secondary schools Kampala City. Hypothesis test results indicated that there was a positive insignificant relationship between classroom infrastructure adequacy and learner attainment in mathematics in universal secondary schools. This finding was inconsistent with

the findings of previous scholars. For example, Nasuna (2021) established that classroom infrastructure allows learners to participate in classroom activities that involve initiative and creativity in their mathematics classwork building them to be more committed hence higher levels of attainment in mathematics. Relatedly, Mugizi (2021) reported that classroom infrastructure determined learner attainment in mathematics. Similarly, Ahmed (2024) indicated that there is a significant relationship between classroom infrastructure and learner attainment in mathematics.

Consistent with the results of the study Yangambi (2023) revealed that there was a positive and significant correlation between classroom infrastructure and learner attainment process amongst learners. Accordingly, school building, school uniforms, school furniture, school textbooks, teaching aids, timetable, teaching materials, and class size affected learner attainment. Also, inconsistent with the finding of the study Assoumpta (2020) found out that there was a significant relationship between classroom infrastructure and learner attainment. Similarly, Nwando (2024) reported that relationships between classroom infrastructure and learner attainment made a significant contribution to learners' performance in the mathematics class.

However, inconsistent with the results of the study, Yunita and Maulida (2024) established that relationship between classroom infrastructure and learner attainment was insignificant. However, even if the relationship was weak, it was positive and significant. This means that the finding of the study in relation with the findings of all previous scholars with the point of inconsistence being on the magnitude of the relationship. Therefore, there is a positive

and significant relationship between classroom infrastructure and learner attainment in USE schools. There is statistically significant relationship between Classroom management and learner attainment in mathematics in the universal secondary schools Kampala city.

5.1.2 Hypothesis Two (H2): There is no statistically significant relationship between Classroom management and learner attainment in mathematics in the universal secondary schools Kampala city. Hypothesis test results indicated that there was a positive and insignificant relation between Classroom management and learner attainment in use secondary schools. This finding is inconsistent with the finding of previous researchers. For instance, Herman and Bradshaw (2022) concluded that effective classroom behavior management increase student achievement in mathematics. Findings from Seufert and Oberdörfer (2022) found out that good classroom environment had a positive and significant influence on performance of learners in mathematics. Relatedly, Ozem (2020) revealed that effective classroom management environmental had positively affected learners' mathematics performance.

Inconsistent with the finding of the study, Herman (2022) reported that increase in classroom management environment led to increased attainment in mathematics. Similarly, Setyaningsih and Suchyadi (2021) discovered the existence of a relationship between effective management of mathematics classroom environment and learner attainment. In the similar hint, Adedigba et al. (2020) established that there was a significant positive relationship existing between physical classroom management and Learner attainment in mathematics. Further,

concurring with the finding of the study Chen (2022) revealed that classroom management had a range of positive functions for learner attainment.

In the line with finding of the study, Abín (2020) reported that classroom management did not influence on learner attainment. Also, in consistent, Lazarides et al., (2020) reported that the classroom management did not have a significant effect on learner attainment. However, since the study's results support those of the majority of researchers, it can be inferred that there is a connection between classroom management and students' mathematical achievement in universal secondary schools.

5.1.3 Hypothesis Three: There is no statistically significant relationship between Teacher commitment and learner attainment in mathematics in the universal secondary school Kampala city.

Hypothesis test results indicated that there was a positive significant relationship between teacher commitment and learner attainment of teachers in universal secondary schools. These finding are consistent with those of earlier scholars. The finding of the study partly is in line with Ligaya and Daniel (2024) who revealed that teacher commitment was positively associated with learner attainment. This suggested that unlike the results of the study which showed that all levels of teacher commitment had a positive and significant influence on learner attainment. However, the finding fully agreed with Itankan (2024) who described that that teacher commitment increased learning attainment in mathematics.

In line with the results of the study, Mohanta. (2023) also established a significant positive relationship between teacher commitments, good social relations amongst learners with learning attainment in mathematics. Similarly, Musau (2023) revealed that, ensuring all learners succeed in mathematics classes, keeping time for mathematics lessons, checks and marks the math books had significant positive effect on the learners' performance. Likewise, Yahaya and Alias (2024) indicated that teacher commitment variables had a positive significant influence on learner attainment in mathematics. With the outcome of the study largely agreeing with all previous scholars, it can be ascertained that teacher commitment relates to learner attainment.

5.2 Conclusions

This study assessed the relationship between institutional antecedents and learner attainment in secondary schools. From the discussion on the findings on the same, it is hereby concluded that Institutional antecedents are paramount for learner attainment in Mathematics. If in schools' institutional antecedents are good with all learners having access good classroom infrastructure, appropriate classroom management environment and adequate preparations of the teachers for mathematics classes, learner attainment will be good. Still, if classroom infrastructures are adequate with learners having enough light in their classes, sharing desks among the learners, and valuing the classroom wall, windows and doors with learners, learner attainment will be high.

Classroom management is imperative for learner attainment. This is if the teacher is ensuring discipline with all learners sharing positive reinforcement and incentives in the

classroom, there is closeness between teachers and learners when there is participation of learners in mathematics class, siting in their groups and interact with another. In addition, if the classroom infrastructure is sufficient and suitable for learner attainment, management of teaching and learning processes when conducted appropriately in teaching mathematics, learner attainment will be high.

Teacher commitment is also imperative for learner attainments. If the school is formalized with teachers ensuring that all learners succeed, there is good social relationship, procedures, rules and policies guiding rival groups, commitment for teachers and monitoring through checking and marking books, learner attainment will be high. If the remedial classes are properly done with major decisions requiring approval of top administration, returning learner scripts and doing corrections for them in their individual classrooms, and there are rules and procedures guiding teacher commitment. In addition, if schools follow up teacher commitment with teachers having the opportunity to be assigned different tasks, departments given autonomy, with good flow of information, and autonomy in teaching execution, there will be high good learner attainment.

5.3 Recommendations

This study investigated the relationship between institutional antecedents and learner attainment in universal secondary schools. Based on the conclusions above, the following recommendations were made:

Firstly, the universal secondary school administrators should promote adequate classroom infrastructure in schools to allow excellent learner attainment to take place. Therefore, administrators should ensure that there are adequate classroom infrastructures for learners for to be facilitated in their mathematics learning, and connecting well with one another, Mathematics attainment will be good. In addition, USE administrators should ensure that there is good usability of the infrastructure in the classrooms, sharing affectionate and repairing the infrastructure, and ensuring that learners are valuing all the properties in their classes.

Secondly, the universal secondary school administrators should promote good classroom management environment in schools. Thus, administrators should ensure that the classroom management environment is good with all teacher and learners having shared interest in the school, understanding between teachers, teachers engaging in common connections. Administrators should also establish good physical environment that provide sufficient and suitable space for learning to take place, enable learners have access to safer learning environment, sufficient services.

Thirdly, the universal secondary schools should ensure appropriate teacher commitment. The structures should allow all learners to succeed in their respective mathematics class, appropriate formalization which allows good social relationships among the rival groups amongst the learners, formal communication, procedures, rules and policies guiding learning of mathematics activities. Administrators should centralise some activities with major decisions requiring approval of top administration, matters being referred to top management, and rules and procedures guiding teacher commitment. School administrators should also promote

teacher commitment where learners are having the opportunity to be assigned different mathematics tasks, where the mathematics departments are having autonomy, blameless flow of information.

5.4 Limitations of the study and Suggestions for Further Research

This study makes major contribution as far as showing how institutional antecedent enhance learner attainment in Mathematics. However, descriptive statistics revealed that the respondents rated institutional antecedents and learner attainment as key in the learning mathematics. Possibly, this was because the investigation was conducted in universal secondary schools. Therefore, future researchers should carry out their studies in Non-USE schools to establish differences in institutional antecedents and learner attainment in mathematics and how they relay to each other. In addition, the study was mainly quantitative which restricted in-depth analysis. Therefore, future researchers should implement the qualitative approach for advanced in-depth study.

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APPENDICES

Appendix A: Self-Administered questionnaire on Institutional Antecedents and Learner Attainment in Mathematics for senior three in USE Schools: A Case of Kampala City, Uganda

August, 2024

Treasured Respondent,

I am a student at Kyambogo University, undertaking a master degree in Education policy, Planning, and Management. I am currently doing research on the "Classroom antecedents and learner attainment in mathematics in universal o-level senior secondary schools*." I kindly request* you to participate in the study by filling in this questionnaire to the best of your knowledge. Be assured of the confidentiality.

Thanks in advance.

Yours faithfully,

Mugerwa Moses

SECTION A: Background Information

Pick the most appropriate optional that describes your background information.

Sex 1= male ☐ 2= female ☐

Age (years) 1= 15-16 ☐ 2 = 16-17 ☐ 3 = 17 above ☐

Class …… Stream …….

SECTION B: Academic Achievement (Dependent Variable)

This section presents items on academic achievement (DV). You are kindly requested to indicate how you feel about your academic achievement using the scale where; 1= Strongly Agree (SA), 2 = Agree (A), 3 = Neutral (N), 4 = Disagree (D) and 5 = Strongly Disagree (SD).

Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
1	2	3	4	5

FK	Factual Knowledge	1	2	3	4	5
FK.1	I can explain most terms in mathematics.					
FK.2	I always think about the terms in mathematics.					
FK.3	The terms of the mathematics I have studied will be applicable when I join the work world after finishing my studies.					
FK.4	I always know more about the topics I have studied in mathematics.					
FK.5	Enjoy explaining the topics I have studied.					
FK.6	I master the topics I have studied very well.					

Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
1	2	3	4	5

CK	Conceptual Knowledge	1	2	3	4	5
CK.1	I understand the main formulas in the topics I have studied in mathematics.					
CK.2	I can apply the different formulas in the mathematics I have studied in life situation.					
CK.3	I can easily distinguish between the different formulas that I have studied.					
CK.4	I can easily explain the formulas I have studied in mathematics.					
CK.5	I know the application pertaining mathematics in different subject.					
	(Schneider, Rittle-Johnson & Star, 2011)					

Strongly Agree (SA),	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
1	2	3	4	5

PK	Procedural Knowledge	1	2	3	4	5
PK.1	I understand the steps to follow in handling different activities of mathematics.					
PK.2	I can handle mathematics activities using different methods available.					
PK.3	In handling my mathematics activities, I know					

	the easiest and fastest way to them.					
PK.4	I can easily identify all possible steps necessary for me to accomplish my activities.					
PK.5	I follow step by step in doing mathematics activities assigned to me.					
PK.6	The way I normally do my mathematics work assignments is the best.					
PK.7	I can ably explain the reason behind the steps I follow in doing my mathematics activities.					
PK.8	I try to use steps that have worked in the past when studying mathematics.					
PK.9	I have a specific purpose for each step I use					
PK.10	I am aware of what step I use when I study mathematics.					
PK.11	I find myself using helpful steps when learning mathematics automatically.					

Strongly Agree (SA),	Agree (A)	Neutral (N)	Disagree (D	Strongly Agree (SD)
1	2	3	4	5

MK	Meta Cognitive Knowledge achievement					
MK.1	I easily summarise the content I have to studied in mathematics.					
MK.2	I critically analyse the concepts and formulas that the teachers present me.					

MK.3	With certain topics, after studying them and thinking about them in-depth, I am capable of contributing personal ideas and justifying them.					
MK.4	I ask myself questions about what I hear, read and study in mathematics to see if they convince me.					
MK.5	When a formula, interpretation or conclusion is set out in class or in the books, I try to see if there are good arguments that maintain it.					
MK.6	When I hear or read a math statement, I think of other possible alternatives.					
MK.7	I use what I have learned in the class in everyday situations.					
MK.8	I use what I have learned in mathematics subject in another subject.					
MK.9	When faced with new tasks in mathematics, I remember what I already know and the experience I have learned, and apply this knowledge to this new situation whenever possible.					

SECTION C: Institutional Antecedents (Independent Variable)

In this part, you will answer following the criteria in C above where; 1 = strongly agree, 2 = agree, 3 = Not Sure, 4 = Disagree and 5 = Strongly Disagree.

CI	**Classroom infrastructure**	**1**	**2**	**3**	**4**	**5**
CI.1	The desks in my classroom enable me to write comfortably.					
CI.2	The chairs in my classroom are comfortable.					
CI.3	The writing board in the classroom is good, easy to read and write.					
CI.4	The classroom has enough chalk to use on the blackboard.					
CI.5	The roof of the classroom is very good.					
CI.6	The walls of the classroom are very clean and clear.					
CI.7	The nature light in math class is sufficient.					
CI.8	The ventilation in the classroom is sufficient.					
CM	**Classroom management**					
CM.1	My teacher encourages learners to determine classroom rules.					
CM.2	My teacher manages the mathematics class effectively.					
CM.3	My teacher provides effective communication in math class.					
CM.4	My teacher notice misbehaving learners in math class.					
CM.5	My teacher ensures discipline in the math class.					
CM.6	My teacher uses positive reinforcement and incentives.					
CM.7	My teacher encourages all students to participate in class.					
CM.8	My teacher ensures that all learners sit in their groups.					
TC	**Teacher commitment**	**1**	**2**	**3**	**4**	**5**
TC.1	My teacher makes sure all learners succeed in math class.					
TC.2	My teacher ensures good social relations amongst learners.					
TC.3	My teacher mediates among rival learners.					
TC.4	My teacher conducts remedial math classes.					
TC.5	My teachers provide prepared charts and graph papers.					
TC.6	My teacher keeps time for his math lessons.					
TC.7	My teacher checks and marks the math books.					
TC.8	My teacher returns scripts and does corrections in the class.					

Thank you for your cooperation.

Appendix B: Work Plan

Activity	**Time**
Developing a research proposal	January – August 9, 2024
Approval of the proposal and proposal defense (Proposal vetting)	November 2024
Effecting vetting corrections	November 2024
Submitting final proposal and obtaining field letter	November 2024
Collection of Data	November 2024
Data analysis and report writing	January 2025
Handing in the research report for examination	February 2025
Viva examination	May 2025
Effecting viva corrections	June 2025
Final submission of dissertation	October 2025
Graduation	December 2025

Appendix C: Budget

Item	Description	Particulars	Amount (Shs.)
Developing a proposal	• Typing & printing • Binding		300,000/= 200,000/=
Research	• Typing • Data processing • Photocopying • Cover binding	6 dissertations	500,000
Total			1000,000

Appendix D: Sample Size Determination Table

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	280	1000000	384

Note N= population S= sample size

Source: Krejcie Morgan, (1970)

Appendix E: Validity of the instruments

Learner attainment

Judges	Relevant	Irrelevant	
Judge 1	30	1	
Judge 2	27	3	
			30

CVI = 30+ 27= 57÷ 2 = 28.5

28.5÷ 30 = 0.95

Classroom infrastructure

Judges	Relevant	Irrelevant	
Judge 1	5	3	
Judge 2	7	1	
			8

CVI = 5+ 7= 12÷ 2= 6

6÷ 8 = 0.750

Classroom management

Judges	Relevant	Irrelevant	
Judge 1	5	3	
Judge 2	7	1	
			8

CVI = 5+ 7 = 12÷ 2 = 6

6÷ 8= 0.750

Teacher commitment

Judges	Relevant	Irrelevant	
Judge 1	6	1	
Judge 2	7	1	
			8

CVI = 6+ 7 = 13÷ 2 = 6.5

6.5 ÷ 8 = 0.812

Appendix F: Reliability of the Questionnaire

Reliability Statistics for learner attainment

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
0.863	0.933	30

Item-Total Statistics for learner attainment

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.	0.307	0.609
2.	0.219	0.335
3.	0.332	0.236
4.	0.273	0.302
5.	0.375	0.221
6.	0.331	0.250
7.	0.437	0.652
8.	0.269	0.664
9.	0.315	0.610
10.	0.223	0.680
11.	0.299	0.618
12.	0.590	0.930
13.	0.447	0.859
14.	0.571	0.850
15.	0.489	0.857
16.	0.529	0.854
17.	0.594	0.849

18.	0.451	0.859
19.	0.421	0.861
20.	0.732	0.837
21.	0.661	0.846
22.	0.598	0.848
23.	0.365	0.784
24.	0.409	0.778
25.	0.486	0.769
26.	0.546	0.760
27.	0.503	0.766
28.	0.556	0.758
29.	0.533	0.761
30.	0.502	0.766

Reliability Statistics for classroom infrastructure

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.921	0.921	8

Item-Total Statistics for Item-Total Statistics

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.	0.690	0.915
2.	0.662	0.915
3.	0.450	0.920
4.	0.304	0.924
5.	0.627	0.916
6.	0.375	0.922
7.	0.239	0.925
8.	0.873	0.910

Reliability Statistics for classroom management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.805	0.808	8

Item-Total Statistics for classroom management

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.	0.446	0.792
2.	0.292	0.802
3.	0.336	0.798
4.	0.333	0.799
5.	0.486	0.794
6.	0.328	0.799
7.	0.264	0.802
8.	0.144	0.808

Reliability Statistics for teacher commitment

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.944	0.945	8

Item-Total Statistics for School Structures

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.	0.649	0.941
2.	0.588	0.942
3.	0.545	0.943
4.	0.687	0.941
5.	0.641	0.941
6.	0.644	0.941
7.	0.658	0.941
8.	0.637	0.942