

**GOVERNMENT BIOLOGY CURRICULUM FOR SCHOOLS AND ITS
IMPLEMENTATION IN SECONDARY SCHOOLS IN BAHATI SUB-COUNTY,
NAKURU COUNTY, KENYA**

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**A Research project presented to Graduate school in partial fulfillment of the
requirements of the award in Post Graduate Diploma in Education of the University
of Nairobi.**

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DECLARATION

This project is my original work and has not been submitted for a Diploma or other recognition at any university.

Signature

Date

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Approval by the Supervisor

This project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This work is dedicated to my family

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Firstly, many thank goes to Almighty God in enabling me to pursue this program. More so to family as well as friends for their support. Many thanks go to Dr Makatiani due to his great advice he gave in guiding this work. I likewise thank administration in the University of Nairobi for facilitating this course.

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ABBREVIATIONS AND ACRONYMS

AFL	Assessment for Learning
BAT	Biology Assessment Tests
CAT	Continuous Assessment Tests
DVD	Digital Versatile Disc
ETL	Effective Teaching and Learning
OECD	Organization for Economic Co-operation and Development
PBL	Problem Based Learning
TTM	Traditional Teaching Method

ABSTRACT

Successful implementation of the Biology curriculum has suffered which has resulted in low biological achievement. The objectives were: to determine the extent to which teaching methods influence implementation of Biology curriculum Bahati Sub County, to determine the extent to which assessment methods influence implementation of Biology curriculum Bahati Sub County and to assess influence of teachers' characteristics on implementation of Biology curriculum Bahati Sub County. Descriptive design was chosen for the study and based in Bahati Sub County area amongst targeting Biology teachers. The participants were chosen using a simple random sampling method. Krejcie & Morgan table used to develop the sample of 103. Data was obtained through structured questionnaires. In this analysis, instruments reliability was calculated by split-half method, while supervisor also validates testing tools. The findings show that use of teaching methods significantly influences curriculum implementation in Biology ($\beta=0.449$; $p=0.000$). Secondly, assessment methods negatively influence curriculum implementation in Biology ($\beta=-0.155$; $p=0.363$). Lastly, teachers' characteristics significantly influence curriculum implementation in Biology ($\beta=0.484$; $p=0.001$). A conclusion made that use of inquiry method, project-based teaching; problem solving method could enhance proper curriculum implementation. It was evident that assessment methods that are significant in the implementation of Biology curriculum include provision of timely feedback on examination, conducting outdoor student assessment tests, administering mid-year examinations with at least a practical. Lastly, teachers' characteristics that are important in curriculum implementation include teachers' class workload, student-teacher ratio, in-service training on instructional practices and teaching experience.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The present section introduces background to the study, which is then followed by statement of the problem, purpose of the study, objectives of the study, research questions, significance, delimitations, limitations, and assumptions of the study.

1.1 Background of the Study

Kenya's science curriculum envisages that it will include scientific and practical education. Biology is among the scientific disciplines present in Kenya 's High school education curriculum. Biology remains at delivery with the crucial information, competencies, and opinions to control and safeguard the environment to learners. The subject's significance cannot be overemphasized. The subject helps the students to enter professions like health, agriculture, environment, and education. Biology is the basis for an industrial and technical growth resource for biotechnology (Wamukota & Masibo, 2017).

Biology is a critically important subject as it helps us to grasp the natural world. Biology expertise is applicable in many areas such as medicine, pharmacy, nursing, dentistry, and agriculture (Allen et al., 2015).

All elements of the program are therefore considered to be an integral aspect of teaching scholarship. Technology advances have had a profound and lasting impact on the essence of the curriculum. The training should be conducted in such a way that by preparing

students to become able to use such technologies, the training is kept in line with such developments.

Atilla (2012) carried out a research in Turkey on what makes biology learning difficult and effective. He found that lessons in biology are usually conducted through lectures by teachers which he described as teacher-centered lessons without hands-on activities and student-centered experiences. He remarked that there what learners learnt was not linked with the everyday lives of the participants, and that teachers could not support them relate the learnt concepts with their day-to-day lives. This shows that teachers are simply talking and passing theoretical or abstract information during biology lessons, making students unable to understand why they were studying certain concepts and ultimately negatively affect their academic achievement.

Xiaohu (2013) discussed in another study a situation in China where teachers spend significant time in an attempt improve in instruction. What was noticed was that the interaction time in class was significantly lower, nearly 30 percent, than in English schools where 80 percent -90 percent is the rule, while classes of 40 or more students are larger. This shows that adequate time enables teachers to conduct immediate marking with feedback, tutorial work, individual support as well as addition of more classes to be trained. Chinese curriculum emphasizes on professional development at all levels. This discovery is noteworthy because at all stages, as the Chinese focus on professional growth. It is academically important to note that teachers, organized by senior staff, are expected to improve their skills by means of participation in one or more thematic studies within the institution.

Omorogbe and Ewansiha (2013) explain that the implementation of science curricula in Nigerian schools is ineffective due to low academic achievement. The reasons proposed for these findings were explicitly specified to be teachers' insufficient experience on subject matter, inadequate teaching methodologies as well as lack of preparation and refresher in-service courses on the side of teachers. Hence, it was critical that influence of selected factors which influence curriculum implementation in Biology in Biology be investigated.

In Tanzania, Nkuba (2012) steered a research to analyze the problems fronting implementation in the science curriculum at schools along with the situation of science in regard to teaching and learning. He found that there was a substantial decrease in students' interest in science subjects which resulted from low level of classroom teaching. This research shows that the reason for fading students' interest in science could be explained by how teachers teach in a classroom setting.

In Rwanda, Bizimana and Orodho (2014) observed that the education system must be up to the challenge at all stages. This is not limited to shortage of facilities, equipment coupled with deficiency in educational supplies. The researchers further perceive that numerous citizens, comprising teachers and the department of education, are stressing that training resources are in short supply in Rwanda's instruction sector. This suggests that in the absence of essential instructional tools, actual teaching and learning may be unsuccessful. Absent vital tools for teaching, efficient teaching and learning may be futile. It can be determined that when the amount of teaching and learning tools is inadequate, the efficiency of the classroom management and the delivery of content has been compromised.

In Kenya, the Kenya Institute of Education (2006) recommended many techniques of instruction that is capable of meeting goals of the Biology curriculum in secondary schools. The methods include practical work, class discussions, demonstrations, excursion/field trips and project work. Despite this order, Dinah (2013) avers that student's achievement in Kenya's national examinations has long remained unsatisfactory. Consequently, Kenya's government has felt a need to develop the science education it provides to create a professional workforce required for its industrial and technological transformation (SMASSE Project, 2000).

A research by Owiti (2011) showed that trained teachers are less likely to transfer misunderstandings on to their students and use insufficient tools. He also affirmed that these teachers are more secure in delivering information and can present various examples, provide evaluation with feedback to the students. This study by Owiti provides a framework of further inquiry onto the nature of teachers' preparedness may influence students' academic achievement. If this problem of unpreparedness is not addressed amicably, the curriculum delivery in secondary schools would remain implicit and untenable.

Achievement in Biology in Nakuru County was below the national average. Among the reasons that seem to be given for this low performance is the application by biology teachers of ineffective teaching strategies, with traditional teaching methods (TTM) prevailing (Wachanga, Githae, & Keraro, 2015). This finding is noteworthy because the researchers focused on teaching methods as a yard stick of measuring academic achievement. This is also the factor affecting curriculum implementation.

No research has been conducted towards demonstration of aspects that could directly affect implementation of Biology curriculum Bahati Sub County. It was in this context that an examination on Government Biology curriculum for schools and its implementation in secondary schools in Bahati sub-county, Nakuru County, is required.

1.2. Statement of the problem

Successful achievement in the Biology Curriculum has not been realized from the context to this review. For example, in Nakuru County, poor biological achievement was lower than the national average due to the application by biology teachers of ineffective teaching approaches (Wachanga, Githae, & Keraro, 2015). Such finding justifies the need for this research. It is appropriate then to find out whether selected factors can have shared influence in efficacious execution of Biology curriculum. Hence, This present research sought to examine Government Biology curriculum for schools and its implementation in secondary schools in Bahati Sub-County, Nakuru County, Kenya.

1.3 Purpose of the study

The goal of the research was to examine Government Biology curriculum for schools and its implementation in secondary schools in Bahati Sub-County, Nakuru County, Kenya

1.4. Objectives of the study

The study was guided by the following objectives

- i. To determine the extent to which teaching methods influence implementation of Biology curriculum Bahati Sub County
- ii. To determine the extent to which assessment methods influence implementation of Biology curriculum Bahati Sub County

- iii. To assess influence of teachers' characteristics on implementation of Biology curriculum Bahati Sub County

1.5 Research questions

- i. To what extent does teaching methods influence implementation of Biology curriculum Bahati Sub County
- ii. To what extent does assessment methods influence implementation of Biology curriculum Bahati Sub County
- iii. To what extent does teachers' characteristics influence implementation of Biology curriculum Bahati Sub County

1.6 Significance of the study

The results could be of interest among involved parties:

The results will be helpful to quality control and compliance officers who will reinforce on unceasing supervising school events so that the prescribed standards for the syllabus are enforced in schools. In addition, the results of this study will give teacher development programs insights into how effective teaching and learning can be accomplished by identifying and educating teachers.

1.7 Delimitations of the study

This study had been conducted in Bahati sub County being guided by the following independent variables: teaching methods, assessment methods and teachers' characteristics. Moreover, the study targeted biology teachers in the locale.

1.8 Limitations of the study

The present study anticipates wholesome cooperation from respondents during data collection. In this regard, however, some respondents who may fear providing data were guaranteed of the secrecy and privacy of their answers.

1.9 Assumptions of the study

The research assumption was the availability of participants throughout the data collection period and their understanding of the issue under investigation.

1.10 Theoretical Framework

The basis of the analysis encompassed the idea of implementation of curriculum inventions propounded by Gross *et al.* (1971). Curriculum implementation is a function of the following conditions: the availability of facilities and equipment, the degree to which representatives of the school community are aware of the nature and substance of the curriculum, the nature of the implementers, beneficiaries and other stakeholders of the new curriculum; the assistance received by the administrators. Also, it entails, the extent in which leaders of the school association have competencies essential to execute the curriculum implementation process; current organizational structures and the ability to devote time and energy to execute the curriculum.

Equally, Fullan (1992) who is another theorist proposes some metrics which are essential determinants of successful curriculum implementation: introducing tracking and program assessment procedures, organizing resource training practices; lucidity of school policy

as regards the program goals taught besides provision of professional help to the teachers in need of assistance.

1.11 Conceptual Framework

The project was directed by the following conceptual Framework

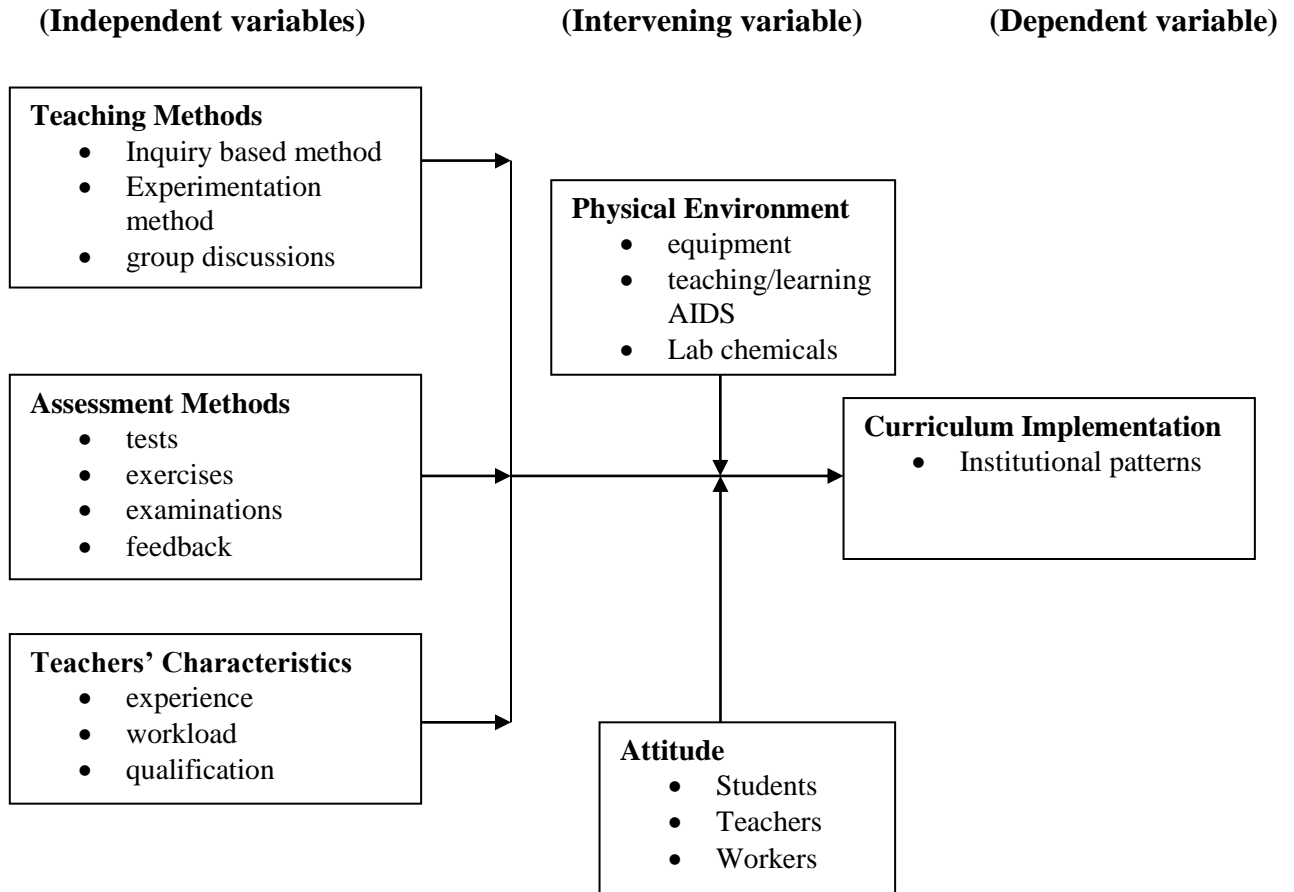


Figure 2. 1: Conceptual Framework

The conceptual framework indicates a connection amongst the independent and dependent variables. The first independent variables are teaching methods which include inquiry based, experimentation and group discussion. The assessment methods include tests, exercises, examinations, and feedback. The teachers' characteristics include experience, workload, and qualification. The intervening variables are physical environment which encompasses equipment, teaching and learning aids and laboratory chemicals. Moreover, intervening variable include attitude of students, teachers, and workers. The dependent variable of the study includes curriculum implementation.

1.12 Definitions of operational Terms

Teaching methods:	In this study, it refers to a range of instructional tools used by teachers during instruction of Biology
Assessment methods:	It refers to evaluation approaches used during instruction by the teachers of Biology
Teachers' characteristics:	This refers to composition of teaching staff in terms of experience, workload, administrative responsibilities, and in-service training.
Implementation of Biology curriculum:	This refers to how the prescribed curriculum is taught in schools.

1.13. Conclusion

This chapter's purpose was to define the problem and put it in a proper framework for the gain of the researcher and reader. The importance of the study and the assumptions on which it was founded have been identified. Moreover, study questions directed the survey. These questions were established at this section. The study also formulated its delimitations and limitations. The next chapter deals with an analysis of the related literature relating to the study.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

The current chapter describes implementation in Biology curriculum with respect to teaching methods, assessment methods and teachers' characteristics. It further expounds the conceptual and theoretical context for the research.

2.1. Curriculum Implementation Concept

Implementing the designed curriculum includes bringing the programs, subjects and officially approved courses of study into effect. The cycle consists of aiding students to gain knowledge or understanding. It should be recalled that program's execution without the learner is not feasible. Consequently, the learner is seen to be the main character in carrying out the curriculum procedure (Chaudhary, 2015).

The curriculum development phase in Biology reveals discrepancies by many schools at state, school, in addition to classroom levels. Such variations are based upon the physical layout of the schools and services, teachers' characteristics and some of teachers' creeds and views. Nevertheless, one mutual aspect of all these diverse situations is the need for a transition from tutor-focused learning to teaching and learning focused on students' process, and the need to update curriculum content and timing to incorporate it.

2.2. Teaching Methods in Biology

Teaching strategies are the approaches a teacher should follow to achieve the various learning goals. These activities allow students to concentrate their attention on the course of study, coordinate their studying materials to become strategic learners. Teachers have

a role in creating learning to be fun and encourage learners enjoy their learning. The teaching methods concentrate not only on the educational material but also on the teaching process and environment (Richa, 2014).

Sakiyo and Waziri (2015) agree that many of the knowledge transfer approaches have been shown to be fairly ineffective on the ability of the students to learn and maintain concepts. The way the subject of Biology is presented to students may have a detrimental effect on their achievement; the presentation should be focused on experience rather than teacher-centered. This finding failed to demonstrate how teachers' understanding and selection of appropriate instructional strategies could affect academic achievement. When teachers understand instructional strategies, they can select the strategy which best fit the topic under inquiry.

Curriculum implementation is influenced by the approach used by teachers to exchange information with classroom pupils. Chang (2010) notes that while effective instructional methods will possibly improve learning performance, ineffective teaching approaches are recognized to stifle the acquisition of information and the achievement of learning goals. Can have a detrimental impact on curriculum implementation.

It has been reported that students facing difficulties during Biology learning may affect their motivation and achievement. The challenges that students face can be due to the challenge of understanding biological principles, analytical knowledge and crowded curriculum (Agboghoroma & Oyovwi, 2015). This finding of this research did not however, inquire into the influence of teaching method on effective curriculum implementation of Biology which is the focus of the present study.

Çimer (2012) clarifies the techniques such as teaching biology using visual resources, teaching through practical practice, to resolve these difficulties and make Biology Learning more successful. This finding is interesting in that it did not explain that instructional strategies must be appropriately selected and organized by the teacher before learning begins. In addition, teacher must first have knowledge on the problems which affects students learning before selecting teaching method. This finding also never demonstrated the effect of selection of quality instructional materials on students academic achievement.

Chatila and Husseiny (2017) claim that collective learning has a constructive impact at the skills in teaching and learning of scientific processes, while those aren't necessarily important, although it strengthens the knowledge and preparation phase of competencies learned besides in helping to learn new skills. He further noted that teachers should pay attention to teaching technical competencies in addition to implementing range of instructional techniques to address most important challenges pupils face during gaining skills in the scientific method.

Guided inquiry has been recognized as one of the suggested instructional techniques focused on the students. A research carried out by Nbina (2014) on the impact of guided inquiry learning approaches on retention and academic achievements in biology from high school graduates has shown a substantial gap in percentage of graduates taught with directed inquiry and those taught with expository teaching methods. Guided inquiry approaches increase the academic success of high school graduates more than the expository learning strategy.

Cooperative learning is another practical instructional practice. Han-Yu and Hwang (2013) reports this type of training promotes reasoning tasks, facilitated elevated degrees of accomplishment as well as the acquisition of information. Since all students in the treatment community were accustomed to a teaching style focused on the instructor, they could adapt to this modern, cooperative learning style. Cooperative learning as an alternative I is strongly recommended. In addition, throughout collaborative learning, learners not only understand to value others, but also make their learning success easier. This method also empowers students to effectively obtain large amount of information which is helpful to them in creating new ideas for completing their learning tasks (Han-Yu & Hwang, 2013).

The problem-based learning is another teaching method. Wilder (2014) opines that this is a teaching strategy that emphasizes active learning. With a high degree of trust, one cannot say that problem-based learning is generally beyond efficient in boosting students' understanding of the content learnt. Although it is clear from the results that PBL constructively affects learner academic performance, there could be many factors precluding a larger, secondary school population from generalizing those findings. The existing literature published lacks adequate, comprehensive evidence supporting PBL 's supremacy over conventional instruction methods.

It is believed that students taught by PBL approach are seen to be more motivated to study biology than their peers learned in lecture-method. Achuonye (2010) researcher maintained that learners who learn through PBL approach always have a tendency to take responsibility for their own learning. This is quiet intriguing as a researcher because learning becomes sustainable when learners construct their own learning.

Sheya (2013) states that in Problem Centered Learning, students are encouraged toward acquisition of greater understanding for the topic and grow a concern in delving in the topic and attainment of improved expertise on the issue. They also build a greater capacity to coordinate and study all the topics in which they are enrolled. Likewise, students who do so are capable of retaining classroom knowledge, contradicted to conservative techniques of inactive studying while making of notes.

In comparison, Opara (2011) states that the teaching approach of inquiry typically has greater positive impact on student motivation, attitudes, and academic achievement. With a well-designed science laboratory activity based on investigation, learning opportunities can be given to help students learn to investigate, to create scientific assertions and to explain those claims in the peer investigators' classroom culture in touch with a more professional scientific group.

Sakiyo and Waziri's (2015) research results Did it reveal there existed a major gap amongst inquiry, concept mapping as well as lecture methods. This was discovered that the use in biology of student-centered teaching methods such as concept mapping and inquiry methods allows for an interactive lesson. The research also found that, using concept mapping approaches, students performed better than those teaching using inquiry and lecture methods. It can be argued that the finding by Sakiyo and Waziri demonstrates that student centered approaches enables students to perform better in their academics.

The research by Okoye, Momoh, Aigbomian and Okecha (2008) aver that interaction between the performance and learning methods of teachers did not yield the predicted positive significant relationship with scientific achievement. This study may have been

affected by the variables under investigation. It was also stated that teachers of science always should be firmly anchored in the subject matter, have technical knowledge and experience to remain successful as well as productive. They must be resourceful and regularly engage in career growth programs. This results provided a basis for future research on teaching approaches that positively impact learner's achievement.

2.3. Assessment Methods in Biology

Farooq (2014) argues that evaluation affects every level of the education system and can therefore act as an significant agent for improvement in the curriculum and instruction of science. Tests and examinations are a standard way to assess student development and are central to school and education system accountability. Assessment is the method of gathering data on a system to assess its worth or importance which enables the administrators choose whether to implement, discard or revise it. In this vein, public needs to know if the program that has been introduced has accomplished its objectives and goals; specifically educators who wish to recognize if whether their classroom activities yields any progress; while the inventor or designer needs to com to terms on by what means to develop the new program.

Kyalo (2016) argues that some forms of evaluation are better used in learning institutions throughout implementation curriculum than others. Written examinations, practical assessments and homework / tasks are the most widely used forms of evaluation.

Evaluation literacy is important for effective measurement of educational objectives in an instructional framework. It includes knowing how evaluations are carried out in addition to what kind of assessment is absolutely remedied by which inquiries. Furthermore, it shows by what means does evaluation data used to help teachers, pupils and other

interested parties make teaching and learning decisions. Evaluations will demonstrate a high degree of material validity, reliability, equity, student participation, motivation, and consequential relevance (Evans, 2013).

Sweet (2016) stresses that students need to get knowledge about their learning development. One possible solution is the use of formative assessment which provides students with feedback on how they do while they are still learning. Formational evaluation is believed to provide students with an incentive to make changes to improvements. This type of evaluation focuses more specifically on what the students are doing, rather than just what an instructor is trying to teach. This also allows students greater flexibility by finding their own way, through provision with numerous chances toward practicing without fear of failure repercussions and encouraging them to concentrate their time regarding the most successful forms of learning.

OECD (2005) claims that teachers who regularly use formative evaluation have transformed their classroom attitude by focusing on making students to be secure in taking chances and while making mistakes. This has shown to absolutely build self-esteem during learning period. It is advocated that tutors should utilize an number of combination of procedures to test learner awareness regarding what was taught. Teachers can employ investigative evaluation to assess the level of a pupil. Instructors can make written or verbal provision input about the work performed by the student. Teachers and researchers have found timely, precise, and bound to clear requirements to be the most powerful input. Teachers and researchers have found timely, precise, and tied to explicit criteria to be the most powerful feedback.

Gormally, Mara and Brickman (2014) are of the opinion that, whatever the assignment, feedback is usually intended to offer guidance from a tutor to assist a learner in enhancing along with maximizing future success. Feedback proved to be the most successful when given in a timely manner. It is less efficient to provide feedback after a delay compared to providing feedback right after performance.

Hattie and Timperly (2007) assert that feedback is one of the most important learning and achievement factors, but that effect may either be positive or negative. When learners have a input on their learning process, they will reflect on their strengths and eliminate their areas of weakness. Essentially, feedback offers valuable information for assessing performance against standards (a task standard) and recommends ways to address inconsistencies between one's performance and the task standard.

Chun (2010) is of the opinion that besides teacher-based feedback, peer feedback is included in this category. It is a input from student to student, in which learners help each other form their work. This form has been reported to help students gain an all-important understanding of what counts as high-quality disciplinary or subject work while encouraging them to play an active role. Chun (2010) further states that a performance-based assessment tests the ability of the students to use the knowledge as well as expertise gained during a study topic or experiment. The assignment usually asks learners to harness their know-how in thinking on a higher level to construct an invention.

On the other hand, performance-based testing provides an incredibly useful method of instructional evaluation. A research by D'Agostino, Welsh and Corson (2007) showed that performance-based learning through better integration of instruction and evaluation

maximizes responsiveness. Since performance-driven assessment compatible with the manner knowledge is learned as well as applied, the results of training can be more accurately assessed. Moreover, these evaluations can direct and inform teaching in an educationally beneficial manner (Darling-Hammond & Pecheone, 2010).

A research by Mwebaza (2010) aimed at examining influence of continual evaluation and student success at high schools in Kampala district of Masaka displayed a correlation between continuous evaluation approaches employed with student's achievement. The investigator found that continuous evaluation approaches contribute absolutely to student success. This prompted the research in order to explore the correlations if it exists between thenature of assessment and curriculum implementation.

The essence of the content of assessment have shown to impact pupils' attainment in science subjects. This research by Zhang and Hernderson (2015) on whether formative tests predict or enhance cumulative examination in academic achievement. It was revealed that use by using non-threatening formative quizzes, with input from teachers and quiz reviews, can be utilized to boost student performance besides recommending that it could help towards classification of learners those that would do dismally on succeeding cumulative assessments without further remediation.

A research conducted by Amakiri, Atisi and Ukwuije (2016) at Nigerian High Schools within Rivers state revealed that Assessment for Learning approaches have successfully improved student success in Biology. Likewise, it was observed that the students ' academic achievement in biology was improved using these learning approaches: Firstly, use of questions, and making comments as a way of marking. Undoubtedly, it was noted

that using peer evaluation is proving to be a good evaluator method. Nevertheless, the greatest and successful method was making comments as a way of marking. It shows subsequently that the role of instructors during student assessment process is critical for academic achievement to be realized. Nevertheless, this research never dealt with issues such as the essence of the assessment that may influence the successful application of the curriculum which this research aimed to tackle.

Akpan and Etim (2013) when investigating found learners' achievement in biology subject remains greatly impacted by a classroom evaluation. During their research, the Biology Achievement Test (BAT) was the analytical instrument used. From these findings it was clear that academic achievement alone can't be calculated conclusively through classroom environment. This is because students need to be assessed by outdoor activities such as a project development. This research did not probe into other aspects of evaluation outside classroom. This present research pursues examine effect of curriculum evaluation of Biology on curriculum implementation.

2.4 Teachers' characteristics and Composition

The quality of any program being introduced requires competent teachers (Wamala, & Seruwagi, 2013). Ilanlou and Zand (2011) also note that teachers need to be effective class managers by having clear communication skills with pupils in their classrooms, have study skills and assess academic achievement in the classroom. According to Prasertcharoensuk, Somprach and Keow (2015), teachers need to have the following skills: mastering curriculum content, providing students with curriculum content in a proper order, organizing content, mastering practical use of training tools, keeping accurate records and providing students with feedback.

Oni (2014) asserts that the consistency of teachers in terms of preparation, access to workshops and years of working experience are key determinants in the implementation of the program. This finding provides an insight on the nature of tutors quality and its influence on academic performance. However, this research did not delve into specifics of teacher experience and its effect on curriculum implementation which the present study seeks to provide.

Researchers and scholars believe that academic performance in learners is highly connected to instructors' expertise (Kosgei, 2013; Yusuf & Yinusa, 2016). These research focused on teachers ' teaching experience in general and never explored their students ' knowledge during instruction to teachers. Given this fact, these studies have not discussed teacher experience in relation to curriculum implementation.

Buddin and Zammaro (2009) indicate that there is no clear correlation amongst the generally accepted instructor performance and learner performance measures with time despite numerous researches that recommend that a teacher is an significant element of a learner's achievement. Whereas the analyzed result presents a challenge for instructors as well as policy makers trying to improve the excellence of teachers, it could assist explore new traditions of enhancing training in an attempt to improve school achievement.

Ndioho and Chukwu (2017) aver that the workload of the workers is a dimension of classroom human resource administration. The working-load of instruction staff includes administrative functions, the subjects they are teaching, learners monitoring and other activities. Ndioho and Chukwu (2017) further notes that a teacher who educates more than 70 students, he or she could face difficulties related to class management,

assessment, and evaluation. This challenge occurs when so many students in the same class limit the capacity of an instructor to personally control the students in addition to tracking them in order to determine areas where students have difficulty or areas, they understand the concept.

Ayeni and Amanekwe (2018) say that the instructional workload of teachers is reflected with respect to participation of students in curriculum guidance, preparation of the curriculum, preparation of classroom notes, continuing evaluation, and classroom administration. The total number of teachers participating in the program shall determine their workload compared with number of learners being trained, the scripts number being labelled, besides supplementary duties the school principal found it worthwhile, which could be allocated frequently to teachers sometimes.

Ayeni and Amanekwe (2018) further argue that the instructional workload of teachers is confronted with serious problems, including the scarcity of instructors, the lack of educational resources, the over-enrolment of students, the high number of instructional time for every week, lack of properly designed labs and the scarcity of adequate classes short of teaching information technology impact the academic achievement of students in high school education.

Molapo and Pillay (2018) conducted a study to understand how Grade Three teachers approach the execution of the most recent policies on the curricula in Limpopo, South Africa. They found that insufficient instructor preparation, lack of funding and too much paperwork were the reasons that irritated the respondents and therefore hindered the

program implementation. Adequate teacher preparation in lesson planning is necessary to empower them with teaching skills to effectively execute the program.

Ziganyu (2010) conducted a study of factors influencing adoption of curricula in Kenya's secondary schools. The general finding that was made was understaffing which affected the execution of the program. It was evident that teacher professional development was missing and that in several schools, they had employed BOM staff. There's not even the distribution of teachers within the district. That shows that the implementation of the curriculum will be hampered.

2.5 Summary of Literature

In conclusion, there are different aspects affecting curriculum delivery. This research aims at the school environment, instructional resource, supervision, and learner's evaluation. It can be noted that Teachers have a vital position to play during execution of every program, as they assess if the proposed curriculum change is being effectively implemented in the classroom as planned by decision makers (Hong & Liying, 2009). As confirmed by Omondi (2014) Absence of teacher preparation on matters curriculum, adequate allocation of resources, yet insufficient teaching and learning resources negative influence curriculum execution.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

The section details the procedures to be used to collect data from the field of research. It covers research design, target population, sampling techniques , sample size, research instruments, pilot study , research instrument reliability and validity, data collection procedure , data analysis and interpretation, as well as ethical considerations.

3.1. Research Design

Kumar (2011) claimed that a study design is a formal procedure adopted by the researchers in order to respond critically, correctly, economically and validly to questions. A study design is basically the rational series in which links the scientific evidence, research questions and conclusions (Yin, 2002). This study employed descriptive research design. This thesis used a concise nature of the analysis. This form of research design does not merely collect and tabulate facts but involves proper analyzes, explanations, comparisons, trend recognition.

3.2. Target Population

Lavrakas (2011) proposes that the target population for a survey includes the entire setting about where conclusions should be established employing survey data. The target category thus defines all the units into which survey findings are to be generalized. Here, it is believed that the first step in designing a survey is the setting of study objectives. Specific target groups must be identified and described if the cases examined are suitable

or not to be included in the analysis. This study targeted 144 Biology teachers from 48 public schools in Bahati Sub County. Basically, entire Biology teachers in the targeted schools formed the unit of analysis. Teachers were chosen because they are the primary curriculum implementers in schools. The sample population is shown in Table 3.1

Table 3. 1: Target Population

	No of secondary schools	Number of Teachers
Total	48	144

Source: TSC listing of schools (2019)

3.3. Sampling procedure and sample size

During sampling of teachers, simple random sampling was utilized in sampling the teachers in the area. Simple random sampling ensures that the population will be evenly sampled and eliminating clustered selection. Krejcie & Morgan (1970) size determination table (APPENDIX V) was used to design the sample. From the table, a total population of 144 teachers gives a sample of 103 teachers as the sample size.

3.4. Research Instruments

Tools for any investigation are analytic instruments intended to collect information from research subjects on the area of concern. Precise and logical data collection is important for scientific analysis (Karim, 2013). This study employed questionnaires which is used to gather together information from respondents. It remained favored because Questionnaires are one of the most affordable ways to gather quantitative data.

3.5. Validity of Research Instruments

This is the truthfulness of measurement which reflects how well a test method measures the underlying outcome of interest. The extent to which an estimate of what it wants to calculate is proven by validity (Oladimeji, 2015). The method of designing and validating a measurement tool focuses principally on minimizing error in the measuring process. A legitimate instrument is to what degree the tool processes whatever it is supposed to measure (Thatcher, 2010). Here, the instruments soundness was assessed by way of obtaining advice from experts in the education department in the university. They supported questionnaire validation.

3.6. Reliability of Research Instruments

The consistency and accuracy of the measurement device is demonstrated by the reliability of a test instrument. Reliability assessments assess the regularity of the measurements, steadfastness in measuring instruments and the reliability of the instrument scores. Kimberlin and Winsterstein (2008) indicate that different ways of estimating the reliability of any measure exist. In this study the split-half technique has been used to calculate instrument reliability. It was made that predictors which generate a coefficient of 0.7 will be considered reliable. Table 3.2 shows the findings.

Table 3. 2: Split haft reliability

Variable	Part 1 (N of Items)	Part 2 (N of Items)	Spearman-Brown Coefficient	Decision
Use of teaching methods	4	3	0.785	Reliable
Assessment methods	3	3	0.761	Reliable
Teachers characteristic	3	3	0.763	Reliable

According to Table 3.2, all the variables had a Spearman-Brown Coefficient of above 0.7 indicating that the variables were reliable.

3.7. Data Collection Procedure

A permit was sought to conduct research from University of Nairobi in the school of education and external studies. Permission has been obtained from the selected schools' heads before carrying out the study. Self-administered surveys have being issued to the sampled respondents after which collection done.

3.8. Data Analysis Procedure

The data collected was primarily done using the questionnaires which was compiled, organized, and coded. Data was processed using Statistical package for social science (SPSS) version 20. Data is analyzed descriptively in percentage form and means to examine patterns and distributions of variables under study.

3.9 Ethical Considerations

In this study, respondents could provide data under assurance that their information will be treated with anonymity. Approval from the respondents was requested before embarking on actual data collection.

CHAPTER FOUR DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter describes how data was analyzed. It begins with respondents' response rate and then demographic information. Furthermore, descriptive analysis followed by correlation analysis and regression analysis is presented.

4.2 Response Rate

The sample size remained 103 respondents. The Entire instruments were distributed. During data collection, 82 instruments were collected. This gave a return rate of 80% understood to be adequate to give data for analysis. It is expected that for a survey to be perceived as "judicious," a high response rate of 70 percent must be achieved. (Groves ,2006) as can be seen in table results.

Table 4. 1: Response Rate

Sample Size	Frequency	Percentage
Initial Sample	103	100
Returned Questionnaires	82	80%

4.3 Basic Information

The basic data include respondents' level of education as well as gender.

4.3.1 Gender of respondents

The study analyzed distributional pattern regarding Gender. Table 4.2 illustrates Its finding.

Table 4. 2: Respondents' Gender

Characteristic	Frequency	Percent
Male	48	58.5
Female	34	41.5
Total	82	100.0

The results revealed that 58.5 percent were male respondents, 41.5 percent were female respondents.

4.3.2 College Qualification

The research aimed to analyze the educational level of the participants. The findings were presented in Table 4.3

Table 4. 3: Highest education Qualification

Characteristic	Frequency	Percent
Diploma	9	11.0
Bachelors	59	72.0
Masters	14	17.1
Total	82	100.0

It was noted that majority had bachelor's degree (72%) while 17.1% were master's holders. Finally, those with Diploma were 11% of the total sampled population.

4.4 Main Descriptive Analysis

In the present segment, the Frequency in use of selected teaching methods during Biology was analyzed. The finding is presented in Table 4.4.

4.4.1 Use of the Selected Teaching Methods

Selected Teaching Methods were analyzed in terms of frequency of usage. The finding is presented subsequently.

Table 4. 4: Use of the Selected Teaching Methods

Teaching method	Never (%)	Often (%)	Sometimes (%)	Always (%)	Total (%)
Inquiry method	6.1%	50.0%	17.1%	26.8%	100.0%
Class practical method	15.9%	45.1%	17.1%	22.0%	100.0%
Demonstration method	25.6%	30.5%	30.5%	13.4%	100.0%
Group discussion	31.7%	23.2%	31.7%	13.4%	100.0%
Project based	4.9%	43.9%	24.4%	26.8%	100.0%
Field trip	19.5%	39.0%	15.9%	25.6%	100.0%
Problem solving	20.7%	26.8%	26.8%	25.6%	100.0%

The study found that 50% of respondents affirmed that they often used Inquiry method. It was noted that only 26.8% aver that they always used the teaching method. Furthermore, it was noted that 45.1% often used Class practical method. It was worth noting that up to 15.9% never engaged their learners with the method. This could affect implementation of the biology curriculum negatively. The teaching approach used by tutors in classroom remains an aspect that impact influencing curriculum implementation. This study is in line with Chang (2010) who notes that while effective instructional methods will possibly improve learning performance, ineffective teaching approaches is believed to stifle the acquisition of information and the achievement of learning goals.

Use of demonstration is important in developing conceptual understanding among learners. From the study finding, it was noted that only 13.4% and 30.5% sometimes used Demonstration method. However, it was observed that 25.6% assert that they never used the method. This could be attributed to inadequacy of materials. This means that implementation of the curriculum could be disadvantaged. Furthermore, it was

discovered that 31.7% and 13.4% applied group discussion during teaching. On the other hand, up to 23.2% often used the method. Çimer (2012) clarifies the approaches such as biology teaching using visual resources, teaching through practical research, so as to address such challenges by making Biology learning to be successful.

Project based teaching involves development of models that serve to represent realities of concepts. From the finding, it was noted that, 43.9% often employ project-based teaching while 26.8% always used the method. This shows that when Project based teaching is used, some aspects of the curriculum is implemented. Furthermore, the study found that 25.6% maintain that they used of field trip as a teaching method. However, 19.5% affirm that they never used the method. This implies that implementation of some aspects of the curriculum could be lacking.

As regards problem solving method, 26.8% of respondents state that they sometimes used the method while 25.6% opine that they always used the method. However, it was noted that 20.7% affirm that they never used the method. This could affect implementation of the curriculum adversely. This agrees with Nbina (2014) who indicates that the problem-solving approach increases the achievement in high school biology students more than expository learning method.

4.4.2 Assessment Methods

In this section, the Frequency of use of the selected assessment methods during Biology teaching and learning computed descriptively while table 4.5 demonstrates the results.

Table 4. 5: Assessment Methods

Assessment Methods	Never (%)	Often (%)	Sometimes (%)	Always (%)	Total (%)
Provide timely feedback on examination	13.4%	43.9%	19.5%	23.2%	100.0%
Outdoor student assessment tests	7.3%	39.0%	35.4%	18.3%	100.0%
Mid-year examinations	26.8%	34.1%	25.6%	13.4%	100.0%
At least practical mid-term examinations	17.1%	35.4%	28.0%	19.5%	100.0%
At least weekly practical exercises	15.9%	40.2%	28.0%	15.9%	100.0%
At least weekly theory tests	7.3%	47.6%	29.3%	15.9%	100.0%

Assessment method is critical to implementation of Biology curriculum. It was noted that 43.9% affirm that they often provide timely feedback on examination. This was resonated by 23.2% who opined that they always provide timely feedback. However, 13.4% reported that they did not. Additionally, 39.0% reported that they conducted outdoor student assessment tests. On the other hand, only 7.3% never conducted outdoor student assessment tests. This could affect curriculum implementation. This finding is in line with Mwebaza (2010) who showed that a correlation exist between continuous assessment approaches used and learners' achievement

Regarding the frequency of provision of examinations, it was found that 13.4% and 25.6% administered mid-year examinations always and sometimes respectively. Furthermore, 19.5% conducted always at least a practical as a mid-term examination. On the other hand, it was noted that 17.1% never conducted a practical mid-term examination. This view was supported by 40.2 % who assert that they often conducted at least weekly practical exercises. This could affect curriculum implementation. Also closely 47.6% of respondents were in approval that they provided at least weekly theory tests.

4.4.3. Teachers Characteristics

In this section, descriptive analysis was conducted to determine teachers' characteristics and how they influence implementation of Biology curriculum. Table 4.6 shows the analysis.

Table 4. 6: Teachers Characteristics

Statement	SD (%)	D (%)	A (%)	SA (%)	Total
I have taught Biology for more than 3 years	11.0%	18.3%	23.2%	47.6%	100.0%
My average class workload is within the recommended	14.6%	41.5%	28.0%	15.9%	100.0%
I have other administrative responsibilities in school	20.7%	28.0%	31.7%	19.5%	100.0%
We have team teaching on topics in Biology	13.4%	42.7%	26.8%	17.1%	100.0%
The student-teacher ratio is high in my school	11.0%	35.4%	37.8%	15.9%	100.0%
I have attended in-service training on instructional practices	12.2%	41.5%	22.0%	24.4%	100.0%

According to results findings, 47.6% of respondents agreed that they had taught Biology for more than 3 years. Furthermore, 41.5% of respondents disagreed that average class workload is within the recommended establishment. This suggests that since they were overloaded, they were unable to implement the curriculum in entirety. Furthermore, 31.7% of respondents affirmed that they had other administrative responsibilities in school. This could be a hindrance to effective implementation of curriculum. The finding agrees with Ndioho and Chukwu (2017) who say that class of over 70 students , makes one face class management, assessment, and evaluation problems in the classroom. The problem occurs when so many students in the same class limits the capacity of an instructor to interact and track learners in order to determine problems facing the student.

Team teaching is important in delivery of scientific concepts. It was noted that 26.8% agreed that they practiced team teaching on topics in Biology. However, 42.7% disagreed on the statement. This could be a reason for issues in implementation of curriculum in Biology. This concurs with Molapo and Pillay (2018) who carried out a study found that insufficient instructor preparation, lack of funding and too much paperwork were the reasons that irritated the respondents and therefore hindered the program implementation.

A program can be effectively implemented if the implementers are trained correctly. From the findings, it was observed that 37.8% agreed that the student-teacher ratio is high in their school. This could pose a challenge while instructing thus affecting implementation procedure. It is important for tutors be trained on new trends and designs of the curricular. From the findings, it was found that 41.5% disagreed that they have attended in-service training on instructional practices. This could affect curriculum implementation. The result conforms to the Oni's (2014) who avers that teacher quality is factors that matter in curriculum implementation in terms of education, professional development and experience in work.

4.4.4. Curriculum Implementation

The dependent variable for the study was curriculum implementation. The descriptive analysis was computed.

Table 4. 7: Curriculum implementation

Statement	SD	D	A	SA	Total
	(%)	(%)	(%)	(%)	
We have adequate instructional resources to implement Biology curriculum	12.2%	42.7%	22.0%	23.2%	100.0%
We have adequate teaching staff to implement Biology curriculum	14.6%	36.6%	31.7%	17.1%	100.0%
We have adequate physical resources	9.8%	39.0%	32.9%	18.3%	100.0%

Instructional resources should be supplied adequately for curriculum to be implemented successfully. Up to 42.7% of responses disagreed that they had adequate instructional resources to implement Biology curriculum. Moreover, 36.6% disagreed that have adequate teaching staff to implement Biology curriculum. This view was confirmed by 39.0% who disagreed that have adequate physical resources to implement Biology curriculum

4.5 Main Correlation Analysis

A correlation between variables using pearson correlation was tested at 0.05 alpha level.

Table 4. 8: Correlations Matrix

		Curriculum Implementation	Use of teaching methods	Assessment methods	Teachers characteristics
Curriculum Implementation	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	82			
Use of Teaching Methods	Pearson Correlation	.461**	1		
	Sig. (2-tailed)	.000			
	N	82	82		
Assessment Methods	Pearson Correlation	.405**	.537**	1	
	Sig. (2-tailed)	.000	.000		
	N	82	82	82	
Teachers Characteristics	Pearson Correlation	.449**	.222*	.690**	1
	Sig. (2-tailed)	.000	.045	.000	
	N	82	82	82	82

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

* . Correlation is significant at the 0.05 level (2-tailed).

The study showed a significant association between use of teaching methods and Curriculum implementation ($r=0.461^{**}$; $p<0.01$). It means that application of appropriate teaching methods could enhance curriculum implementation in Biology.

Moreover, there exist a significant correlate between assessment methods and curriculum implementation ($r=0.405^{**}$; $p<0.01$). It too suggests method of choice during assessment of curriculum could affect its implementation.

Finally, there exist a correlate between Teachers Characteristics with Curriculum implementation ($r=0.449^{**}$; $p<0.01$). Showing that appropriate teachers' characteristic could improve curriculum implementation in Biology

4.6. Regression Analysis

Regression evaluation was computed in order to determine extent to which teaching methods, assessment methods and teachers' characteristics influence implementation of Biology curriculum.

4.6.1 Model Summary

Table 4.9 shows the results.

Table 4. 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.588 ^a	.346	.321	.604

a. Predictors: (Constant), Teachers Characteristics, Use of Teaching Methods, Assessment Methods

The model summary indicates that 34.6% in curriculum implementation can be explained by the assessment methods, use of teaching methods and teachers' characteristics with a standard error of the estimate being 0.604.

4.6.2 ANOVA

The relevance of the model was measured at 5 per cent alpha as shown below.

Table 4. 10: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.087	3	5.029	13.774	.000 ^b
Residual	28.480	78	.365		
Total	43.568	81			

a. Dependent Variable: Curriculum Implementation

b. Predictors: (Constant), Teachers Characteristics, Use of Teaching Methods, Assessment Methods

The study found That the model was very useful in prediction of the dependent variable, $R^2 = 0.346$, $F(3, 78) = 13.774$; $p < 0.05$.

4.6.3 Regression Coefficients

The impact of each predictor is summarized in Table 4.11

Table 4. 11: Coefficients^a

Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error			Tolerance	VIF
(Constant)	.609	.317	1.920	.059		
Use of teaching Methods	.449	.115	3.897	.000	.669	1.494
Assessment Methods	-.155	.170	-.915	.363	.369	2.712
Teachers Characteristics	.484	.141	3.431	.001	.493	2.029

a. Dependent Variable: Curriculum Implementation

Regarding unstandardized beta coefficients, it was established that use of teaching Methods positively significantly influences 0.449 units on Curriculum implementation in

Biology ($\beta=0.449$; $p=0.000$). This implies that frequent and appropriate utilization of teaching Methods will enhance curriculum implementation.

Moreover, assessment methods negatively influence 0.155 units on Curriculum implementation in Biology ($\beta=-0.155$; $p=0.363$). It means that absence by the application of prescribed teaching methods will reduce curriculum adequate implementation in Biology.

Lastly, teachers' characteristics account a significant 0.449 units on curriculum implementation in Biology ($\beta=0.484$; $p=0.001$). It implies that promoting the required teacher-characteristics will improve curriculum implementation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The summaries of the main results in accordance with the objectives of the report is presented in this section. It also sets out the conclusions and recommendations from the results.

5.2. Summary

5.2.1 Teaching Methods and its influence on implementation of Biology curriculum

It was noted that 50% of respondents affirmed that they often used Inquiry method. It was noted that only 26.8% aver that they always used the teaching method. However, 6.1% never employed this method. This could affect implementation of the biology curriculum negatively. It was further observed that 25.6% asserted that they never used the method. This could be attributed to inadequacy of materials. This means that implementation of the curriculum could be disadvantaged.

Project based teaching involves development of models that serve to represent realities of concepts. However, 19.5% affirm that they never used the method. This implies that implementation of some aspects of the curriculum could be lacking. Finally, it was noted that 20.7% affirmed that they never used problem solving method. This could affect implementation of the curriculum adversely.

5.2.2 Assessment Methods and its influence on implementation of Biology curriculum

Assessment method is critical to implementation of Biology curriculum. It was noted that 43.9% affirm that they often provide timely feedback on examination. Additionally, 39.0% reported that they conducted outdoor student assessment tests. Vis-à-vis the frequency of provision of examinations, it was found that 13.4% and 25.6% administered mid-year examinations

5.2.3 Teachers Characteristics and its influence on implementation of Biology curriculum

According to the study finding, 41.5% disagreed that average class workload was within the recommended curriculum-based establishment (CBE). This suggests that since they were overloaded, they were unable to implement the curriculum in its entirety. This view was corroborated by 31.7% of respondents who affirmed that they had other administrative responsibilities in school.

It is believed that curriculum could be efficaciously implemented when the implementers are adequately equipped. From the findings, it was observed that 37.8% agreed that the student-teacher ratio is high in their school. This could pose a challenge during teaching and learning thus affecting implementation process. Furthermore, it was found that 41.5% also disagreed that they have attended in-service training on instructional practices. This could influence curriculum implementation.

5.3 Conclusion

Appropriate application in teaching methods could impact curriculum implementation. Specifically, application of Inquiry method, project-based teaching; problem solving method could enhance proper curriculum implementation.

Assessment methods that are significant in the implementation of Biology curriculum include provision of timely feedback on examination, conducting outdoor student assessment tests, administering mid-year examinations with at least a practical as a mid-term examination as well as weekly practical exercises.

Teachers Characteristics that are important in curriculum implementation include average teachers' class workload, student-teacher ratio, in-service training on instructional practices and teaching experience

5.4 Recommendation

The report recommends

- i. Teachers should select appropriately teaching methods which will enhance adequate curriculum implementation.
- ii. Kenya National Examination Council should develop assessment methods modules that will equip teachers with varied Assessment methods.
- iii. The government should focus on improving teacher-characteristics such as workload and in-service training to promote effective curriculum implementation

5.5 Recommendation for further Study

- i. The report suggests that a study on the effect of student characteristics on curriculum implementation should be carried out

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APPENDIX I: INTRODUCTION LETTER

Bett Benard Kiprono

University of Nairobi

Dear Respondent,

I am a student in the School of Education at the University of Nairobi seeking a postgraduate education diploma. I am conducting research on "Government Biology Schools Curriculum and Implementation in Bahati Sub-District, Nakuru County , Kenya." As you are among the study-targeted community, I invite you to participate in this research study by completing the questionnaire attached. Thank you for taking the time.

Sincerely,

Bett Benard Kiprono

University of Nairobi

APPENDIX II: QUESTIONNAIRE

SECTION A: BASIC INFORMATION

1. Indicate your gender (*Tick appropriately*)

a) Male b) Female

2. Highest education Qualification

Diploma Bachelors Masters

SECTION C: USE OF TEACHING METHODS

Please rate the Frequency of use of the following teaching methods during Biology using the scale of 1 – 4 below: (1 – Never 2 –Often 3 – Sometimes 4 – Always)

No	Statement	1	2	3	4
1.	Inquiry method				
2.	Class practical method				
3.	Demonstration method				
4.	Group discussion				
5.	Project based				
6.	Field trip				
7.	Problem solving				

SECTION D: ASSESSMENT METHODS

Please rate the Frequency of use of the following Assessment methods during Biology using the scale of 1 – 4 below: (1 – Never 2 –Often 3 – Sometimes 4 – Always)

No	Statement	1	2	3	4
1.	At least weekly theory tests				
2.	At least weekly practical exercises				
3.	At least practical mid-term examinations				
4.	Mid-year examinations				
5.	Outdoor student assessment tests				
6.	Provide timely feedback on examination				

SECTION E: TEACHERS CHARACTERISTICS

Please rate the tabulated statements using the scale of 1 – 4 below by ticking appropriately

(1 – Strongly Disagree 2 – Disagree 3 –Agree, 4 – Strongly Agree)

	Statement	1	2	3	4
1.	I have taught Biology for more than 3 years				
2.	My average class workload is within the recommended				

3.	I have other administrative responsibilities in school				
4.	We have team teaching on topics in biology				
5.	The student-teacher ratio is high in my school				
6.	I have attended in-service training on instructional practices				

SECTION F: CURRICULUM IMPLEMENTATION

Please rate the tabulated statements using the scale of 1 – 4 below by ticking appropriately

(1 – Strongly Disagree 2 – Disagree 3 –Agree, 4 – Strongly Agree)

	Statement	1	2	3	4
1.	We have adequate instructional resources to implement Biology curriculum				
2.	We have adequate teaching staff to implement Biology curriculum				
3.	We have adequate physical resources to implement Biology curriculum				

Thank you!

**APPENDIXIII: KREJCIE AND MORGAN TABLE OF SAMPLE SIZE
DETERMINATION**

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

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

Source: Krejcie & Morgan, 1970