

**IMPACT OF ADVANCE ORGANIZERS TEACHING APPROACH ON STUDENT'S
ACHIEVEMENT AND MOTIVATION IN BIOLOGY IN SECONDARY SCHOOLS
IN KITUI CENTRAL SUB- COUNTY, KITUI. KENYA.**

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**This Project Report is Submitted to the Board of Postgraduate Studies in Fulfilment of
the Award of Master of Education in Curriculum Studies of South Eastern Kenya
University**

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DECLARATION

I understand that plagiarism is an offence and I declare therefore that this research project is my original work and has not been presented by any other institution for any other award.

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DEDICATION

I dedicate this study to my husband Eliud, my two sons Ian and Caleb and my daughter Daisy for their patience, emotional and financial support while I did this research.

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ABBREVIATIONS AND ACRONYMS

ANOVA	:	Analysis of Variance
AO	:	Advance Organizers
AOTA	:	Advance Organizers Teaching Approach
BAT	:	Biology Assessment Test
CEMASTE	:	Centre for Mathematics and Science and Technical Education in Africa.
KCSE	:	Kenya Certificate of Secondary Education
KICD	:	Kenya Institute of Curriculum Development
KIE	:	Kenya Institute of Education
KNEC	:	Kenya National Examination Council
LIO	:	Lists of Instructional Objectives.
RTM	:	Regular Teaching Methods.
SMASE	:	Strengthening Mathematics and Science Education
UNESCO	:	United Nations Education Science and Cultural Organization
CCP	:	Content Production Process
TIMMS	:	Trends in International Mathematics and Science Studies.

DEFINATION OF TERMS

Achievement	Scores in a standardized test. This study refers to students in Biology.
Advance Organizers	An advance organizer is a piece of information presented by an instructor that helps the student organizes new incoming information
Conventional Teaching Approach	Traditional mode of instruction, the teacher uses various teaching methods, and the learners listen and carry out the activity as directed. In this study, it is the method used in the control groups.
Effectiveness	The extent to which an activity is capable producing the desired result. In this study, it is the measure of the ability of Advance Organizers to change students' achievement and motivation that can be measured quantitatively and qualitatively.
Effect	The extent to which an activity is capable of producing desired results. In this study, it is the measure of the ability of Advance Organizers to change students' motivation and Achievement.
Instruction	It is detailed information telling how something should be done.
Motivation	It is the driving force that stimulates a learner to achieve a certain goal in the learning of biology. In the present study, it refers to the intrinsic drive that the learner gains once the use of Advance Organizers teaching approach is applied in teaching biology.
Performance	Refers to the overall grades a student attains after prolonged period of instruction.

ABSTRACT

Information in biology plays a principal part in most angles of human life. In spite of this critical part there's a concern for low achievement in biology in examination at secondary school level. The low accomplishment has been faulted on unseemly instructional procedures used by the teachers. Teachers are looking for teaching procedures that would address students' accomplishment and inspiration towards learning sciences and especially biology. The reason for this investigation therefore was to determine the impact of the use of Advance Organizers on the students' achievement and motivation towards the learning of biology in secondary school education in Kitui county. The investigation embraced Quasi-Experimental research design and in specific Solomon's Four Non-Equivalent Control Group Research Design. The target population was 3260 form three students in Kitui Central Sub County. The accessible population was 252 form three students from four girls' schools and four boys' schools in Kitui Central Sub County. Purposeful sampling technique and simple random sampling was utilized to choose and assign schools in experimental and control groups respectfully. The research utilized Biology Achievement Test (BAT) and Students Motivation Questionnaire as tools for information collection. Legitimacy of the instruments was achieved through authorization from the Department of Education of South Eastern College Kenya. The instruments were piloted in a school within the neighbouring sub counties with comparable characteristics as examined schools. The reliability coefficient was assessed utilizing Cranach's coefficient alpha and K.R 21 Formula. A reliability coefficient of 0.81 was obtained. Descriptive statistics (means and standard deviation) and inferential statistics (one-way ANOVA and t-test) were utilized to analyse the information. Hypothesis were tried at $\alpha=0.0$ level of significance. Results of this research uncovers that the utilization of Advance Organizers altogether improves the achievement and motivation of students to learn sciences biology in particular. The researcher prescribes broad utilization of Development Organizers be communicated to directors, instructors and learner instructors of all grades and disciplines through on-going steady proficient improvement exercises.

CHAPTER ONE

1.0 Introduction

1.1 Background to the problem

Science education is central in energizing globalization of information. This is due to the perceptible effect of science and innovation on the world of today (Marginson & Vander Wende, 2007). Science has become the common hub of national development when it is well utilized. The science within the setting of this study envelops biology, the science of life. Biology introduces individuals to the information of medical sciences, which has brought advanced instruments, which are presently utilized to test indeed the deepest portion of the human life structures. Too, the utilization of programmed patient monitoring tools in hospital's intensive care units ensures progress in healthcare care conveyance framework, moreover, they are used in monitoring unattended patients with the measurement of crucial parameters like pulse, blood pressure, body temperature patients of diseases such as HIV /AIDS (Chukunoye, 2011).

Throughout the world, Biology education has ended up as an incredible device for understanding socio-economic issues such as mass unemployment, starvation, destitution, poor health institutions, rural-urban drift, population blast, environmental destruction, and a whole set of other issues assailing a developing nation like our own. Typically based on the awesome gains (social, economic, innovative technology, and political) that biology education and its information have brought to first world countries, such as Japan, the USA, Canada, Britain, France, Germany, etc. These countries have supported science and its application to an advantageous status where it has ended up as part and portion of the peoples' culture (Hulya & Pinar, 2010). Issues related with reproduction, sustenance, environment, wellbeing, infections, marriage, connections, and memory are frequently fathomed through biology education (Sucuoglu, 2003). Natural information plays a basic portion in most viewpoints of human life. Its application in gene-splicing has made an extraordinary commitment towards assembly the push of food security, pharmaceutical and controlling spread of illnesses (UNESCO, 2013).

Inspite of this critical part, there's worldwide concern about the academic accomplishment in biology by high school students, particularly at physiological and anatomy topics, especially in all the first world countries. According to the ministry of education in Kenya, Kenyans'

secondary school student's achievement in biology has remained low as recorded by the Kenya National Examinations Council (KNEC, 2019), as shown in Table 1 below.

Table 1 Academic Achievement of Students in Biology in the Kenya National Examination From 2015 To 2019

YEAR	PAPER	CANDIDATURE	MAXIMUM SCORE	MEAN SCORE	% MEAN
2015	1		80	27.43	
	2		80	19.56	
	3		40	22.62	
	OVERALL	465584	200	69.59	34.80(D+)
2016	1		80	27.30	
	2		80	20.11	
	3		40	10.99	
	OVERALL	509982	200	58.37	29.19(D)
2017	1		80	13.74	
	2		80	16.43	
	3		40	7.68	
	OVERALL	545663	200	37.85	18.93(E)
2018	1		80	15.81	
	2		80	11.92	
	3		40	13.65	
	OVERALL	589900	200	51.38.	23.26(D-)
2019	1		80	18.00	
	2		80	18.00	
	3		40	13.65	
	OVERALL	618654	200	51.16	23.26(D-)

Table1 above shows that students' academic mean scores in biology in Kenya Certificate of Secondary Education (KCSE) is low and requires intervention. According to KNEC (2018) only 18% of the candidates who scored c+ and above in Biology which is the least necessity required for confirmation to different science courses. This dismal result is replicated in other African countries as indicated in Trends in International Mathematics and science Study (TIMSS, 2011). UNESCO (2017) contends that performance in stem subjects can make strides by a more engaging study methodology. This study looks to examine the impact of Advance Organizers teaching approach on students' accomplishment and inspiration.

Achievement of a person in any given task focuses to the person's level or degree of exertion towards fulfilling the errand. According to (Ayiro, 2017) students' achievements are accepted to spur, lift a few students to world-class benchmarks, help increase national efficiency and contribute to the reclamation of our worldwide competitiveness. Low achievement in biology implies that fewer students will pursue higher education in the biology-related discipline. The low achievement of students in biology from 2014 to 2019 indicates that attaining sustainable development goals and attaining vision 2030 may be impossible.

Kenya requires scientists and technologist to oil its wheel of improvement in science and innovation, which is the index for development of a nation. Courses like medicine require a solid foundation in science i.e. biology (GoK 2012a). According to Samikwo (2013) in his research, factors affecting academic performance in Kenya also observed that the achievement of students in form three in biology was low and majority 40.5% score between D+ and C. On the other hand, the students' motivation was good and this was attributed to positive guidance received from biology teachers making biology interesting and fun. Despite the apparent liking of Biology, the subject achievement is low. There exists a lot of literature of possible causes of these low achievements such as congested syllabus, heavy workload, lack of laboratory facilities etc., high measures are attributed to teaching methodologies used by teachers (Malongo, 2015).

The low achievements have probably affected student's motivation and creativity towards biology. Research has shown that teaching strategies adopted by teachers affect students' achievement (Malongo, 2015). Adunalo (2011) report indicated that, low achievement by students in Nigeria is in a general sense connected to an infective teaching approach by instructors when imparting information to students. Munuve (2010) reported that students in

Kitui County perform poorly due to poor teaching approaches applied by teachers and instructional instruments used during lessons of sciences and mathematics.

One of the striking intervention in teaching of biology is the utilization of Advance Organizers teaching approach. According to Ausubel (1960) an Advance Organizer is data displayed by a teacher that makes a student to prepare well to take in new information. Advance Organizers give a structure for thinking, acts as a conceptual bridge from old data to new information, a person's existing information around concepts and most critical variables and it decides whether unused materials will be significant and how it can be learned and held. There are three fundamental purposes of Advance Organizers, to begin with it coordinates the students' consideration to what is imperative within the upcoming lesson, highlight relationship among thoughts that will be displayed and reminds students of significant data that they have already. Mayer (2003) accepted that Advance Organizers made a difference in organizing unused materials by, arranging, outlining, and sequencing the most important thoughts of the modern materials keeping in mind of what the students knows.

The advance organizer employs recognizable terms and ideas to link what the students knows to new data displayed within the lesson, this helps in changing information and imaginatively applying it in modern circumstances. This process makes a difference to implant into long-term memory, the new information. Advance Organizers don't need to be length or complex, just clearly comprehended on and related to the materials (Mohammad, 2010). Advance Organizers can include pictures, verbal description, requisitioning techniques, graphic, visual Advance Organizers. Ausubel and Robinson (1969) contend that the material displayed to the learner must have pertinent thoughts to which the new thought can be related or tied down.

Research has shown that the teaching strategy adopted by teachers affects students' achievements (Mugambi, 2015). Over the years, the standard practice of teaching biology focused on drilling students in exercise based on materials presented in class. The feeling is that once the students have mastered the technique, understanding of concepts will follow. This practice still persists across biology teaching (Mugambi, 2015). The conventional educating and learning circumstance call for comprehensive alter in nearly each level of learning so that common-sense and energetic approach can be given to existing and unused areas of biology in education. The core of present-day learning is to stir learners covered up interests, sound conduct and convictions to cultivate essential and basic long-lasting learning aptitudes, and the capacity to think critically (Samreen & Sufiana, 2012). In Kenya, the biology syllabus

emphasizes small groups teaching, experiment, and projects with specific procedures and numerical manipulations to help students get answers, rather than applying ideas and generalizable procedures that could be implemented over a wide run of settings (Mwangi, 2003).

There has been a paradigm shift in pursuing learning and teaching of science subjects in the country. Wachanga (2002) found out that there was a significant effect of Advance Organizers in chemistry learning than conventional methods; they found out that students taught using Advance Organizers performed better in chemistry than those taught using RTM. Githua & Nyabwa (2005) found out that though using Advance Organizers had significantly higher mathematics achievement tests than students taught using conventional methods.

Research has uncovered that there's a relationship between motivation and academic prowess. Kourosch A. et al. (2011) investigated the relationship between the components of inspiration and scholastic accomplishment and affirmed that there is a relationship, and the administration and educational planners should pay more attention. According to (Nasr, 2011) in the study motivation towards biology and its effect on student achievement, his study showed that among the five dimensions of motivation towards biology, only 'biology is fun for me' has a meaningful relationship with student's achievements. Studies concur that inspiration towards science influences learners in learning science (Hulya & Pinar, 2010). Research recommends that the partition of genders improved instructive involvement (Njue, 2016). Those supporting single-sex classrooms recognize that mixed-sex classrooms can be hurting to child educator accomplishments (NASSPE, 2013). Wachanga & Mwangi (2004), while looking at the affect of school category on students' execution, found that students in a single-sex school performed superior than those in coeducational learning educate in Nakuru County, Kenya.

Advance Organizers has been demonstrated to be a compelling device in upgrading accomplishments, inspiration, and imagination in mathematics, chemistry, and physics. However, very little studies have been done in Kenya to assess the viability of the utilize of Advance Organizers on student's achievements and motivation in biology. It's against this foundation that the study thinks about and looked to examine the impacts of the Advance Organizers approach on student's accomplishments and motivation in biology in secondary schools in Kitui central sub-county Kitui County

1.2 Statement of the problem

The Government geared towards giving qualified instructive preparing and advancement in schools and other institutions of learning. Biology education gives us the imperative expertise that would move the country out of its woods into the lifted-up position of national advancement and financial liberation. They include engineers, specialists, surveyors, researchers, technologists, medical caretakers, computer researchers, drug specialists. But, unfortunately, students have continued to perform poorly in biology, which probably has negatively affected the motivation of learners towards learning Biology.

The country of Kenya has allocated massive capital to the education department, which is still confronted with challenges that are likely to weaken the imagined improvement. Several interventions have been put in place to improve the achievement in biology. The Government of Kenya has corroborated with the Japanese Government to cascade the SMASE programme in secondary schools. The purpose of SMASE was to entrench effective classroom practices in biology to ensure a strong foundation was laid for the subject. However, with such an effort, the accomplishment of learners in biology has continued to decline. The substance of this research is to examine the impact of the progress organizers instructing approach on learners' achievement and motivation in biology in Kitui central sub-county.

1.3 Objectives

1.3.1 General Objective of the study

This inquiry was designed to establish the impact Advance Organizers' teaching approach on students' achievements and motivation in biology in secondary schools in Kitui County, Kenya.

1.3.2 Specific Objectives of the study

The following objectives guided this study:

- I. To determine the impact of Advance Organizers teaching approach on student's academic accomplishments in Biology in secondary schools in Kitui County.
- II. To determine the impact of Advance Organizers teaching approach on secondary school students' motivation to learn biology.

III. To determine the impact of Advance Organizers on students' achievements and in biology is dependent on gender.

1.4 Hypotheses

The following hypotheses guided this study:

Ho1 There is no statistically significant impact in achievement scores between students taught using Advance Organizers and those taught using conventional methods.

Ho2 There is no statistically significant impact in motivation level between students taught using Advance Organizers and those taught using conventional methods.

Ho3 There is no statistically significant impact in achievements of students taught using Advance Organizers based on gender.

1.5 Significance of the study

This study will give data on the impact of Advance Organizers on the student's accomplishment and inspiration in biology. This information will be crucial in determining the best way of organizing students for effective teaching leading to meaningful learning. In addition, the information will supplement the government's effort towards improving biology education in Kenya secondary education.

It'll too be supportive to educational modules designer at the Kenya institute of curriculum development (KICD) in their review of secondary school biology syllabi and instructional objectives. The information of this study will help the quality affirmation and measures officers within the education sector in their task force of supervising classroom practices of the teaching of biology. Heads of department and biology teachers will get insight into preparing instructional materials for biology lessons from this information. The study adds literature to the existing body of information.

1.6 Limitation of the study

This study was conducted inside an indicated time outline and assets of the researcher. Subsequently, as it were distinguished a variable that is achievement and inspiration levels of inspected schools were examined. The sub-topic tested was ecology as displayed within the

endorsed KIE New syllabus (2007); hence, the generalization of the outcomes was constrained to this topic and not Biology as a subject. The statistical difference in KCPE means necessitated categorization of schools based on learner's ability to create homogeneity of regression. This reduced the power of statistics used due to reduced sample sizes in subgroups. This created a large standard error of the difference in means, making it hard to detect differences even when there is one in the population.

1.7 Delimitation of the Study

The research encompassed Form 3 students from secondary schools in Kitui central sub-County. The sub-county was selected because of its poor results in science and mathematics, as reflected in the KCSE examination. In addition, form3 learners were chosen since the topics including environment and ecology is instructed in this course and that Form 3 student can express their scientific ideas in written form. The sections to be covered were ecology; the topic is chosen since students' achievements in this region has been poor in KCSE examinations. These topics are prerequisites for understanding the interaction between the quantitative and qualitative aspects of the interaction between living things within the environment.

1.8 Assumptions of the study

The learning institutions included in this study sample provided a comparable classroom environment for the learners and that the learners had similar entry behaviour in their respective schools. Therefore, it was assumed that the data collected and responses to the questionnaire are true feelings and perceptions of the learners and result from treatment and not prior instruction.

1.9 Organization of the study

This research is organized into six chapters. Chapter one is introductory to the study where the background to the research is given, statement of the problem, purpose of the study, specific objectives, and hypotheses. Other elements found in this chapter include the study's significance, limitation of the study, the scope of the study, and assumption of the study. Chapter two reviews literature which is related to the study on the importance of learning Biology and the influence of advance organizers in learning biology. In addition, the impact of Advance Organizers on motivation and the effect of Advance Organizers on sexes and what

other scholars have said about the use of Advance Organizers. Also, it includes a theoretical framework on which this study is anchored and a conceptual framework.

Chapter three discussed the proposed methodology used during this study. Research design, sampling procedure, data collection instruments, sample size, target population , data collection analysis techniques, the validity of the instrument's reliability of the instruments, data collection procedures, and ethical considerations are discussed in this chapter. The study comprises chapter four noted as research results in which the data collected was analysed and presented according to research objectives after analysis of personal information of the respondents. Chapter five is a discussion of research findings, while chapter six, final chapter, comprises of conclusion and recommendations in accordance with research objectives and research findings.

CHAPTER TWO

2.0 Literature review

2.1 Introduction

The chapter focuses on literature review of the studies that relate to Advance Organizers and facts related to Advance Organizers and biology learning. It includes the importance of teaching and learning biology, the effect of Advance Organizers on students' academic accomplishments and motivation, and the impact of the use of Advance Organizers on gender. It also deals with the effect of Advance Organizers on gender. Finally, this chapter further presents the theoretical framework and the conceptual framework of the study.

2.2 The Importance of Teaching and Learning Biology

Information attained by learning biology plays a crucial part in most points of view of human life. Its applications in genetics has brought about high-yielding plant and animals. This has made a huge commitment towards meeting the request of food necessities for the ever-growing numbers of humans (Burns & Bottino, 1989). Biological information is being utilized in medicine and pharmaceutical such as organ transplant and the control of a wide scope of sicknesses. Natural information in expansion is utilized inside the food industry, for example the utilization of microorganisms in food planning. Other regions where organic information has been utilized in population control and natural preservation (UNESCO, 1986). In conflicting research, particularly in challenges postured by diseases such as Ebola and HIV AND Helps, science remains an awfully imperative component (Minish et al., 2004).

A rapid change in industrial, communication, agriculture and medicine, and biology plays a vital part in tending to these changes through innovative advancement of national riches and industrialization (Njue, 2016). If the Kenyan government is to meet her goal of sustainable development goals, it ought to grow science and innovation instruction to create the desired human asset (Changeiywo, 2001). Therefore, teachers need to utilize approaches that are known to upgrade learners' inspiration towards science and, subsequently, learn biology. Without the advancement of positive motivations towards attaining knowledge in science, learners will not be in a position to procure the logical information and aptitudes vital for important commitment to talks about and choices on societal issues that have a logical introduction. Science includes

the interest of truth; consequently, it inculcates mental trustworthiness and tirelessness (Das, 2001).

In an inquiry conducted by Sakiyo (2015) about Execution for the achievement of years Advancement in Nigeria, He found that Students' scholarly execution in sciences is significant for national advancement and achievement of the millennium objective. Education is significant in freeing man from numbness and the fulfilment of any vision or objective. Science and innovation are the motors that drive mechanical advancement and national advancement. The dismal performance of students in science predicts the peril for national development. Most of the guideline's strategies utilized in Kenyan classrooms are ordinarily teacher-cantered, leaving students with few openings for dynamic support within the classroom discourse (Kiboss 2000, Tanui, 2003). Kiboss (2002) contended that the descriptive approach is the prevailing educating strategy commonly utilized for science learning in Kenyan schools. It is, in this manner, vital to utilize strategies that utilize guidelines exercises in which students are included in doing and considering of the application of what they are learning.

According to Mamalanga & Madau (2014), who looked to discover components influencing Biology performance, the quality of instructors is one of the components influencing performance in Lesotho. They found that the way science is instructed and assessed may well be regarded as one factor affecting Science performance. The teaching fashion plays a very critical part within the academic success of the learners. Malongo (2015), in his ponder, found out that a high mean score for the test group was credited to instructing technique utilized by instructors through a hands-on learner-centred approach and exploratory plan.

Low achievement in science implies fewer students will seek after higher education in science and science-related disciplines and careers. The below-average performance of students in Science, Chemistry, Material science, Science, and English from 2008 to 2012 in Nigeria proposes that the achievement of the Millennium advancement objective by 2015 may be troublesome and outlandish. Nigeria required researchers and technologists to oil its wheel of advancement in science and innovation, which is the index of advancement of countries in the world (Badau, 2015). Auwalu (2014) examined the achievement in academics particularly in biology in Kano state Nigeria appeared students' scholarly accomplishment in Biology subject was exceptionally low. The declining performance in secondary school in Kano district was baffling. Poor performance in science is due to the poor quality instructors of science instructors. From the examination he came to a realization that the level of accomplishments of

students in Science was low; approximately 73% of the students, 11939 who took the SSCE examination in the year 2007 to 2011, had below 40% mean. Academic achievements refer to performance in school in a standardized series of educational tests (Good 1974).

2.3 The Effect of Advance Organizers on Student's Achievement

Advance Organizers impacted the students' inspiration enabling students to be active cognitively. Instructors are the most critical operators that can impact or alter in students' inspiration towards science through stimulating and guidelines strategies such as those in Advance Organizers (Hudson, 2009). In his ponder, Raj Rani Agarwal (2004) realized that the Advance Organizers show and the concept acquisition was found more reasonable than conventional methodologies in developing concept learning. Mayer (2004) Unique Forty-four distributed inquire about things in which Development Organizers were looked into. 27 studies involved a control gather vs Advance Organizer (standard progress organizer think approximately), and 17 other studies involved a post organizer group vs advance organizer (balanced progress organizer consider). The outcomes of the research were put into comparison to the estimates of a couple of hypotheses. In expansion, 4 specific desires of assimilation theory were surveyed: that Advance Organizers need to have a more grounded affect for ineffectually organized substance as compared to well-organized content, that Development Organizers need to have a more grounded positive affect for learners lost prerequisite data, that Advance Organizers need to have a more grounded impact for learners lost prerequisite capacities, which Advance Organizers ought to have a solid impact on measures of exchange instead of maintenance.

Keppell (2001) conducted a study that investigated the improvement, trial, and usage of the Content Production Process (CPP) planned to help directions designers in evoking and conceptualizing new content from subject matter specialists. Highlights included Advance Organizers, schema hypothesis, consultation practices, and information procurement in developing master frameworks. Githua & Nyabwa (2005) study illustrated the adequacy of utilizing Advance Organizers in educating mathematics in secondary schools. According to Bastick (2001), his ponder tried the common presumption that lists of instructional objectives (LIOs) displayed at the begin of a lesson are utilized as Advance Organizers) since conventional research designs have yielded clashing outcomes. An elective design was utilized that looked for to distort the vital affiliation between the objectives and their utilization that is brought about

when Advance Organizers are utilized. Callison (2000) centred on "organizers," devices or procedures that provided distinguishing proof and classification together with conceivable connections or associations among ideas, concepts, and issues. The discoveries talked about David Ausubel's study and notions of Advance Organizers, the consequences of Ausubel's theory to educational modules and educating, and "webbing," a particular organizational strategy and realistic organizers.

According to Wachanga and Mwangi (2009), cooperative class experiments as advance organizers facilitated chemistry learning more than regular teaching methods. Njue (2010) discovered that students taught utilizing constructivist method teaching strategy [CTS] accomplish moderately better scores in chemistry. Mugira, Arimba, Zachariah, Mbugua, and Wachanga (2013) found merit in utilizing the advance organizer approach to upgrade students' accomplishments. They found out that when learners are exposed to Advance Organizers prior to real learning, students' consideration is coordinated to the foremost imperative perspective of the lesson in understanding the main concept rather than recalling facts, definitions, and formulae. A research done by Toker, Korur and Eryilmaz (2016) uncovered that advance organizers online increase students' accomplishment scores. Adebola (2011) suggested that behavioural objectives and other shapes of Advance Organizers be utilized to educate mathematics at the secondary level. Adebola discovered out that the utilization of Advance Organizers is a successful procedure for educating and attainment of concepts mathematic in senior school. Wachanga & Mwangi (2004) clarified that effectual instructing and learning depends partly on right utilization of instructing strategies whose exercises target most learners' senses. Advance Organizers could be an explanation of comprehensive concept to present and whole up materials that follow (Woolfolk, 2001).

Anderson and Bransford (2004) concur with Ausubel that Advance Organizers are a fabulous way to attain and construct schema before genuine learning of unused materials by students following the introductory response of the material present within the organizer. Instructors can adjust the lesson plan and material to fit their students' earlier information way better; additionally, they sufficiently structure their time and basic focuses that have to be secured whereas rearranging complicated texts (Bransford, 2004). This improves higher-order reasoning development of in their students by making a difference them to organize their thoughts rapidly; in the event that no information is accessible, Advance Organizers are utilized to giving information to the student for this system to be taken after.

Research conducted by Wachanga, Orimba, and Mbugua (2013), concluded that students' achievement is higher when taught through the Advance Organizers teaching approach. Mohammad (2010) explored the part of Advance Organizers in English language learning and found out that research discoveries have given prove of the prevalent impacts when different sorts of Advance Organizers are utilized to encourage reading comprehensions. Evans (2003) explored the impact of graphic organizers for readers of Japanese on informative tests in language of English and found out that graphic organizers that are Student-generated offer assistance accommodate diverse learners' styles, lead to significant learning and improve comprehension in reading. Kapri (2017) and Wambugu, Muiruri, and Wamukuru (2016) noted that Advance Organizers progressed students' accomplishment and Student-centred and participatory methodologies make strides students' accomplishment towards biology.

Advance Organizers helped organize unused materials by laying out, organizing, and putting the main thoughts of the new materials depending on what the learner as of presently has knowledge of. Advance Organizers utilize recognizable concepts and terms to connect what the student already knows to advanced information displayed within the lesson, which makes a difference in changing data and creatively applying it in new circumstances. This process helps to implant the modern data into long-term memory (Meyer, 2003). Advance Organizers don't ought to be length or complex, fair clearly understood and related to the fabric (Mohammad, 2010). Advance Organizers can incorporate pictures, verbal portrayal, demanding procedures, realistic, visual Development Organizers. Ausubel & Robbinson (1969) fight that the material displayed to the learner must have related contemplations to which the unused thought can be related or tied down.

Research done by Bastick (1999) explored the assumption that students utilize directions and destinations as Advance Organizers. This assumption, created by (Ausubel, Novak, and Hanesion, 1978), is appealing to educators but has been troublesome to test. Tyler and Reynolds (1998) utilized a model where consolidating feature movies into a course for training group facilitators is displayed. Utilizing cognitive learning theories, the authors portray how movies may be utilized as an Advanced Organizer, as the premise for student learning evaluation, or as cases of particular theory in action. Particular illustrations are given. Shihusa & Keraro (2009) explored the impact of Advance Organizers on students Accomplishments in biology of Bureti District Kenya. The information was collected by employing a biology Accomplishment alpha level of 0.05. The discoveries demonstrated that students instructed utilizing Advance

Organizers essentially higher than those instructed utilizing conventional instructing strategies. Samuel Et al. (2010) conducted a study on the Advance Organizer instructing approach on secondary school students Accomplishments in Chemistry in Maara District, Kenya. Based on the study, it was observed that students who are instructed through Advance Organizers accomplished a better mean score than those instructed regular instructing strategies. Moreover, they observed that there was no impact on sexual orientation accomplishments when they are instructed through Advanced Organizers teaching Approach. Atomatofa (2013) uncovered that Advanced Organizers lead to improved students' accomplishment and maintenance than those instructed utilizing routine instructing strategies.

2.4 The Effect of Advance Organizers on Motivation of Students

Motivation is an innate phenomenon, which is impacted by four components of setting (environment and outside stimuli), temper (the inner condition of an organism), objective (goal of behavior, reason, and slant), and instruments (instruments for accomplishing the objective). To realize their objectives, needs, and instinctual, human creatures require adequate motivation. Especially for students, motivation for academic accomplishment is of extraordinary significance. By such, persuaded individuals are stimulated to total task, accomplishing a goal or a degree of capability in their professions (Mohamadi, 2006)

Motivation characterizes the reasons behind people's behaviour and decides why they behave in a specific way. Motivated behaviours are lively, arranged, and changeless (Omidian, 2006). Therefore, motivation is the most important contributing factor to academic achievement. In their study, Charles & Haffiet (2017) demonstrated that inspiration may be a essential formula for academic victory. It includes external and internal components that invigorate energy and desire in individuals to be persistently committed and interested in work, role, and subject or try to achieve an objective. In other words, motivation is what gets one going, keeps you going, and determines where you are trying to go.

Motivational beliefs are basic to students' academic accomplishments since they offer degree to which students will consider, value, put in the effort, and show interest within the assignment (Charles & Haffiet, 2017). Ouma Wanzala (2015) researched the force behind students' performance in science and discovered that instructors play a key part in empowering or disheartening studies from taking up science subjects in secondary school. The study conducted by the center for mathematics, science and technology education in Africa (CEMASTEA)

showed teachers routinely advise students they consider weak students not to take up science courses and encourage them instead. Vision 2030 is premised on more students taking up Mathematics and science within the trust that this will drive science inquiry and innovation (Njoronge, 2010). A critical distinction between the inspiration of public and private school students towards science is observed. Students in private institution are more persuaded than those in public (Hussain, 2015).

Motivation is critical in student's success and that of biology teachers (Gulay, 2010). According to Adair (2009), motivation for both the teacher and student affects the students' performance directly. So also, inspiration may be a process that begins with physiological deficiency or need that actuates the conduct or drive that's pointed at a objective or motivation (Okumbe, 1998). Moreover, inspiration has been appeared to emphatically impact study methodology, academic execution adjustment, and prosperity in students' education space (Vansteenkiste et al., 2005). Study effort and academic performance mean how much the students' motivation originates from within herself /himself apart from what is originating from outside. Sustained self-regulated learning of a student is directly linked to beliefs and motivational feelings of students. Self-regulated students are for the most part are better achievers and more motivated (white, 2009).

Benpechat (2004) concludes that motivation contributes to students' achievement through how it affects the self-regulatory behaviour and strategies of the study. Abedi (2008) perceives motivation for academic achievement as a psychological condition acquired once an individual perceives themselves to have autonomy. Motivation frequently changes depending on the setting the individuals are involved within, the task, and the circumstance. Students come into classes with various levels of inspiration to learn. There may be numerous activities an educators can take that will increment the student's inspiration. To increase the motivational impact on your students, a method that suits the topic, the students, and the setting is preferred. If a teaching method is chosen carefully, it may produce a valuable effect on student motivation (Roxanne et al., 2008).

Education reforms advocates have committed tremendous sums of time and vitality to moving forward open schools and raising student's improvement. With the leading chairman educational modules and materials in place, in the event that students are not propelled to learn and exceed expectations, achievement gains will be troublesome in case not incomprehensible (Barry, 2007). Inspiration plays a vital part in student's development by collaboration with

intellectual improvement and creating readiness for responsible application of what is instructed (Albert, 2004). The inspiration of students incorporates a positive relationship with achievements (Cavas 2011). Inspiration may be a crucial education variable because it makes a difference already acquired skills, techniques, and practices to advance new learning and achievements; the school environment optimizes inspiration and learning when it is secure, and engaging. Researches indicate that teacher's knowledge and skills, motivational level and enthusiasm can contribute to the motivation of learners (Williams and William C, 2011).

In an investigation Palmer (2007), noted that student motivation is a basic component for education of high-quality. Learning happens with steady motivation given for students. Lin, Huifen, Chan Tsui-pihy (2007) classified learning and motivation as a five-step process, desire to know, willingness to take an interest in an activity, The inner push to adhere to requirements, a move to reach the social objective, and to elude. According to Suhag, Ataga, Sorangi & Larik (2016), motivation has a few impacts on the behaviour of students. To begin with, it leads to particular objectives and sets specific objectives that individuals endeavor for, hence affecting students' choices. Motivation increases the effort and vitality to decide whether the student will seek after a more difficult assignment with enthusiasm or dead inspiration. Concurring to Ahmet (2017), factors influencing student motivation are afield of a teacher classroom management ability and teachers' teaching strategies. This inquire about endeavours to decide the effect of using the Advance Organizers teaching approach on student achievement and motivation.

According to Kithaka (2004), as he worked on Reinforcing of Mathematics and Science in Secondary Education (SMASSE) project in Kenya, he discovered that students felt that science subjects are difficult. Agreeing to Kithaka, this feeling may be due low achievement in Exams where the expectation of negative results hinders learning and as well much theoretical educating of sciences that disheartens students. On the other hand, science instructors spend there tme with students most of the time. Subsequently, they are the foremost key specialists who impact change within the learners' motivation towards science through propelling guidelines like Progress Organizers (Shihusa & Keraro, 2009).

Research findings have proven that without students' motivation towards learning science, learners will not be well organised to secure the logical information and aptitudes vital for significant commitment to debates and choices on societal issues that have scientific introduction. In this way it impossible that such person can make any significant commitment

to societal, financial improvement. Moreover, there's a relationship between inspiration, cognitive engagement, and conceptual alter. Subsequently, a compelling educating approach ought to utilize a wide assortment of instructing strategies to upgrade learners' inspiration and actively involve them within the learning process. Expository approaches cannot stand up to the challenges of the unused requests and targets of biology education. For these reasons, this research endeavours to investigate Advance Organizers' motivation towards learning biology.

2.5 The effect of Advance Organizers on Gender

Instruction analysts have dependably found that girls have higher standards inside the classroom and assess their performance more on basic level. Girls as well outperformed boys in learning institutions, as gauged by scores of students in all disciplines and age groups (Antonio, Paul & Robert, 2001). In spite of the fact that girls do better in their studies as seen on the grade's performances list, one could envision that girls are more self-assured and have higher academic self-esteem in their learning activities. But on the contrary that is not true; incomprehensibly, girls are expected to be critical in assessing their performance in academics. Then again, boys have unreasonably high expectations of their academic performances and achievement. Girls appeared to have noteworthy interest as compared to boys. Also noted, interest in learning biology diminished with difference in age. Girls viewed biology to more critical and less troublesome as opposed to boys (Eva, Ellen & Jill, 2002).

Research carried on girls in studying mathematics and biology in Britain discovered that there are components that estrange and disallow from mathematics and science classes after the mandatory age. Their performance is comparable and there is need for agreeable learning environment, require of educators, energy in a subject though debilitating direction procedure (Isaac, 1996). Paul, C., Antonio, T. & Robert, M. (2001) Whereas considering the gender impact on studying methods and slants of therapeutic students, despite not basically diverse, the population of female students had the tendencies to have a wider range of options than the population of the male students involved a wider range of tangible methodology combinations inside their inclination profiles. Educators got to be familiar with of these contrasts and widen their run of styles of teaching fittingly. In expansion, there's creating affirmation that there are mental contrasts between genders that impact the way that guys and females

In a study conducted by Shihusa & Keraro (2009), they found out that there was a critical gender distinction in inspiration to learn science in favor of male students. Wachanga (2009) contended that instructors treat girls and boys in diverse ways and frequently are not useful to girls' inspiration and accomplishment. Puhan & Hu (2006) too found that inspiration is critical in science accomplishment than gender. According to Nimmi (2015) comparison of boys and girls in academic achievements showed that there was no critical difference between boys and girls with regard to academic achievement. Proko, Tuncer & Chuda (2007) propose that instructor's quality have an impact students' motivation towards biology. Njue (2016), while investigating the effect of using VHTA found out that there was no statistically noteworthy refinement of the scores of girls and boys who underwent the VHTA. It appears that girls and boys educated via VHTA program do better as compared to those instructed through customary teaching strategies.

According to Njue (2016), VHTA was more reasonable in updating students' achievements in science in despite of their sex on schedule guideline approaches. An additional research noted that girls are seen to defeat boys in some subjects as seen in the grades of students in the subjects of all age groups (Antonio, Paul & Robert, 2001). In spite of the reality that girls do superiorly according to the grades, an individual might imagine that girls would be more self-confident given their academic prowess and are deemed to have a better self-esteem in academics. Though building up interest and motivations of students in schools towards science (Prokop, 2007) found that science lessons were by and large well known with the foremost prominent preference among zoology- learning students.

According to Worldwide Journal of Education and Research Vol. 4 No. 10 October 2016 31 UNESCO (2013), there's no unimaginable differentiate between the accomplishment of girls and boys within the examinations done nationally. The boys appreciate affirmation and appreciation given what they have achieved, in spite of the fact that girls tend to appreciate their personality a person. An increasing number of learning institutions tend to praise boys more as compared to the girls (Eva, Ellen & Jill, 2002). Deborah (1996) inspected the forms that affect gender contrasts in access to higher learning education in Uganda. She discovered that gender gap in accomplishments brought about from a difficult and dynamic exchange of societal variables, the learning environment, and the conduct with regards to gender roles. Too, essential viewpoints such as poor learning equipment and facilities, deficiently teaching, and scheming practices that were reflected some of the conditions that will contribute to the gender disparity

in achievement. A study about drained Europe (Whyte 1986 & Whyld, 1983) as noted by Deborah, 1996 discovered the stereotyping of the activities happening within the classroom in terms of gender that institution's ability to measure the accomplishments of boys and girls in regions considered fitting either gender. Akinbobola (2008), in his research, observed that both the female and the male students perform relatively well in science in case put under comparative conditions.

2.6 Summary of Literature Review

The literature review appears that biological knowledge is principal in most viewpoints of human life and national development, for instance, in human health, food security, agriculture and medicine, and food processing industries. According to Kiboss 2000 and Tonui (2003), most guidelines strategies utilized in Kenyan classrooms are usually teacher-centered, leaving students with few openings for active cooperation. Mamalanga, Labeta, and Madau discovered that the biology's way of teaching is taught and gauged could be one factor affecting the achievement in biology in secondary schools.

According to Hudson, 2009 Advance Organizers enhance learners' motivation and enable students to be active cognitively. Instructors are the foremost critical agents that impact change within the students' inspiration towards science through fortifying and persuading techniques like Advance Organizers. Adebola (2011) suggests that targets and shapes of Advance Organizers be utilized to instruct mathematics in secondary schools. Wachanga and Mwangi (2013) found justify in utilizing an Advance Organizer's approach to improve students' accomplishment.

According to Mohammad, graphic organizers generated in 2010 help include diverse learners' styles. Lead to significant learning and promote comprehension literature reading than regular teaching methods. Inspiration characterizes the reason behind people's conduct and decides why they carry on in a specific way (Omiiyan, 2006). According to Charles and Haffiet (2007), motivation is a fundamental recipe for academic success, and learning does not happen unless consistent inspiration is given for students. According to Anton and Robert (2001), girls have a better standard within the classroom and evaluate their performance more basically than boys.

2.7 Theoretical Framework

Two theories guided this study; The Constructivist Theory of Learning and the Self-Determination Theory of Motivation.

2.7.1 Constructivist Theory

Deweys (1938) states that students learn by constructing their understanding and knowledge of the world through varied experiences. A constructivist approach to students' education is based on the understanding that students construct knowledge instead of being transferred or transmitted to them (Miller, 2004). In this theory, students are regarded as theory builders and intellectual explorers. Learners can construct knowledge when they try to explain things they do not adequately understand when engaged in active learning (Colburn, 2007).

The study was guided by Piaget's (1970) constructivist theory of learning, which emphasizes the significance of engagement with course materials individually through, problem-based learning, active learning, and making lessons formatively fitting. Constructivists state that we learn through a nonstop process of constructing, translating, and adjusting our representations of reality based on our encounters with reality (Relan, 1992). This is done in ways that leave the input to further processing and possible reconstruction. Furthermore, constructivists hold that learning is an active process where students are effectively included in significant reconstruction instead of having an educator as a sole giver of facts and lower cognitive information. (Cooper & Robinson, 2002).

In addition, biology students' instruction does not mean that the learner only attends to information presented but must interpret and integrate it into the existing knowledge base (Okere, 1996). To acquire knowledge, the learner must perceive, classify, evaluate, manipulate presented information and apply it in scientific problem-solving. When Advance organizers are provided to the students, they can construct knowledge from them and connect to the existing cognitive structures, hence faster concept acquisition and retention. This underlies two principles, namely, the concept of acquisition and the rule of application (Kiboss, 1997). Depending on the type of advance organizer incorporated in the advance organizer teaching approach, these principles revolve around the use of prior knowledge, defining and exemplifying concepts, and application in scientific problem-solving.

2.7.2 Self-Determination Theory of Motivation

This theory will also be guided by Deci and Ryan's (1985), self-determination theory. This macro hypothesis of human motivation and character that concerns people's natural improvement affinities and natural mental needs. Self-determination theory centers on the degree to which an individual's is self-motivated and self-determined. That a teacher should provide circumstances to students which will lead to optimal results by satisfying their psychological needs. Deci and Ryan's (2006), afterward expanded on the early work differentiating between intrinsic and extrinsic inspiration and proposed three primary intrinsic needs included in self-determination. According to Deci and Ryan, the three psychological needs persuade self-concept and indicate nutriments that are basic for psychological and scholarly being of an person. They are said to be universal, innate and psychological. They include the needs for competence, autonomy and psychological relatedness. Autonomy; individuals have a ought to feel that they are the masters of their claim fate which they have at slightest a control over their life's. Most critically, individuals have a need that they are in control of their own conduct. Competence concerns our accomplishments, information and skills; individuals have should construct their competence and create dominance over tasks that are imperative to them. Relatedness; individuals ought to have a sense of having a place and connectedness with others. Each of us needs other individuals to some degree.

The importance of Deci and Ryan's theory to this study is that a student learns by doing things on their own, through manipulation of objects in the environment. This theory used to anchor the study to the motivation of students and optimal functioning of students since through Advance Organizers the students gain competence, autonomy and relatedness. This because Advance Organizers involves engagement, explanation exploration, elaboration and evaluation in order to understand the concept. Once the student is engaged in the activities of the advance organizers, they are in control of their own destiny they feel secure. This makes the students both intrinsically and extrinsically motivated hence higher achievement. The role of the teachers is just to facilitate the student and his peers systematically construct their own

2.8 Conceptual Framework

Conceptual framework of this study is based on the system theory developed by (Ayot & Patel ,1987) that showed the learning and teaching process as dynamic with input and output, with the assumption that the learning methods that involves student cooperation in constructivism

and problem solving will lead to a worthwhile learning (Hantahan, 1998). Learning outcomes depend on the teaching strategies the teacher uses. In this study conventional teaching method and use of Advance Organizers teaching approach formed the independent variables on which the learning outcomes depend.

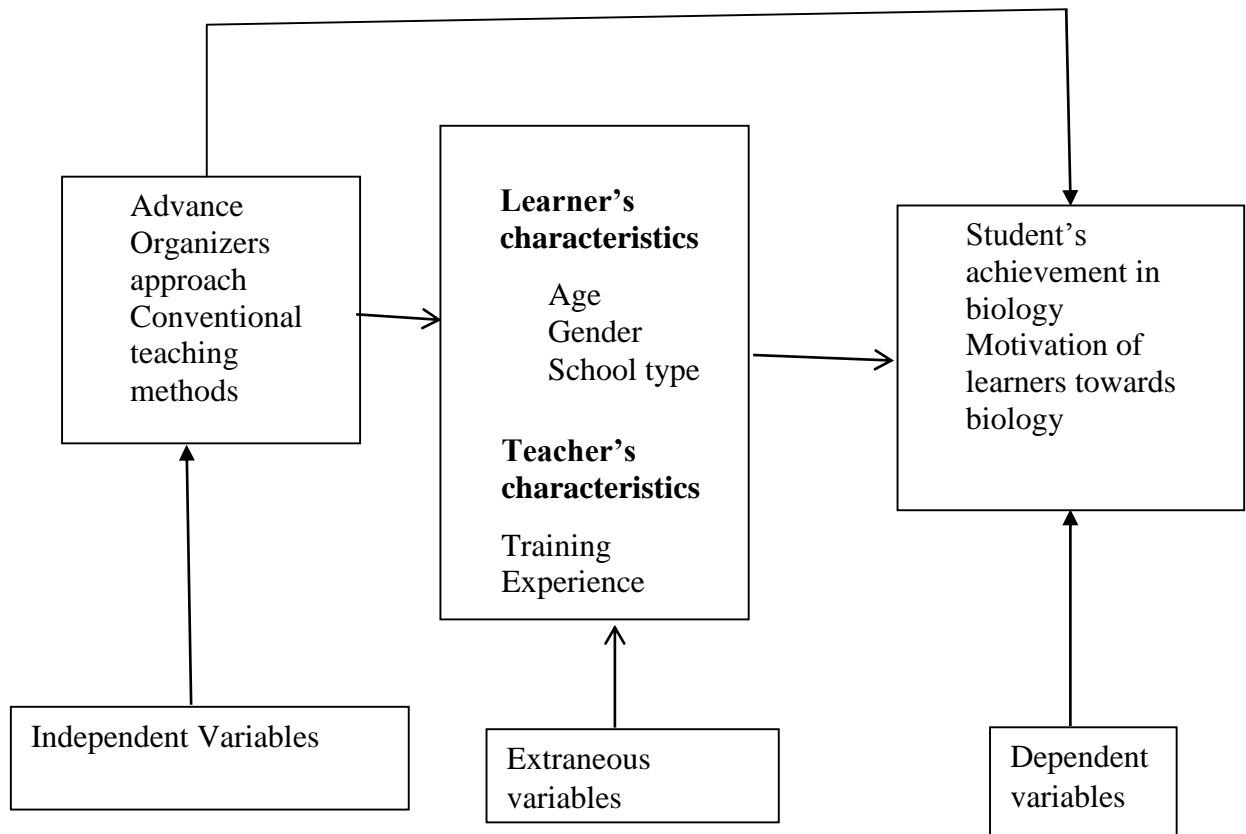


Figure 1: Conceptual Framework on Advance Organizers Approach

The dependent variables are also influenced by other factors forming the extraneous variables. The age of the student also determines the prior experience learners have about learning biology. The teacher's training and experience determined their effectiveness in teaching by the use of Advance Organizers

Figure 1 gives the conceptual representation of relationship of the variable of study. The teacher variables were controlled by involving teachers who were trained and had at least three years teaching experience. The researcher also trained the teachers in the use of Advance Organizers approach. The students' age was to be controlled by including Form threes only with approximately of the same age and same entry behaviour.

CHAPTER THREE

3.0 Research methodology

3.1 Introduction

This chapter centers on information description, processing and analysis strategies. It is showing the research design and legitimization for its application, depicts the target population, displays the sampling frame, the sample size and the sampling methods will moreover be examined. The instruments of data collection will be given in this chapter. This chapter will too display information of data collection strategy, describes how the instrument will be guided including a brief depiction of how to test the reliability and validity of instruments of research. Finally presents data examination methods and presentation.

3.2 Research Design

Research design is the in general framework or plan for examination and coherent model of prove that guides the researcher within the different stages of research. It is conceptual structure inside which the inquire about is done. Subsequently, the research plan consists of the blue print for collection, estimation and examination of data (Ghauri and Gronhaug, 2005). The study included Quasi-experimental research where analyst utilized Solomon's four-group, non-equivalent control bunch plan. The design gives the researcher confidence in the significance of the study results since it guards against both threat of external and internal validity (Coolican, 1994). Solomon's 4-group enabled the researcher to carry out a complex cause-assessment of the change in the dependent variable. Then note whether variations in the dependent variables are caused by the interactions of pre-test and treatment.

		pre-test	treatment	post-test
Group I Experimental	E1	O ₁	X	O ₂

Group II Control	C1	O ₃	-	O ₄

Group III Experimental	E2		X	O ₅

Group IV Control	C2		-	O ₆

Figure 2 Solomon's Four Non-Equivalent Control Group Design

In Solomon's Four Non-Equivalent Control Group Design the dotted lines signify that the four groups are non-equivalent. X is the treatment that involved students instructed through Advance Organizers Approach. O₁ and O₃ are pre-tests while O₂, O₄, O₅, O₆ are post-tests. Group I is the experimental group E1, received the pre-test, the treatment and the post test. Group II is the control group C1, which received a pre-test followed by the control condition and finally post-test. Experimental group E2 Group III is the group that received X-treatment and a post test, it was not pretested. Group IV is a control group C2 that received post-test only. The students were taught by their respective teachers and were not aware of the experimentation. The experimental and control group formed different schools to avoid interaction of subjects.

3.3 Location of study

The study was carried out in Kitui county, Kitui central sub- county. The kitui central sub county is located 160 km east of Nairobi. In the north of it borders Embu County, in the east bordered by Tharaka Nithi in the south it is bordered by Tana River County and in the west Machakos County and Makueni. Kitui central sub county has a total of 42 secondary.

3.4 Target Population of the study

The target population is the total set of portions for which the study information uses to form inductions; hence, the target population characterizes those portions for which outcomes of the study are implied to generalize (Sarason, 2013). The target population of the study involves 3260 form three students from 28 district schools within the entire kitui county. The accessible populace was 320 form three students in 8 county schools in Kitui central Sub County.

3.5 Sample Size and sampling procedure

Sampling procedure is how cases are to be chosen for observation. Eight schools were identified through simple random sampling technique which ensured that equal chance was accorded to sampling frame of 28 county schools in Kitui County. For schools' category and, the class level that formed the study population purposeful sampling was used. Simple random sampling was used to draw 8 schools out of 28 county secondary schools for the study. Form Three students from each of the 8 chosen schools shaped the four bunches of study, two exploratory and two control bunches. For those schools with more than one stream all the streams were subjected to

the treatment but only one stream drawn through random sampling was considered for analysis. Table 2 below shows the group composition.

Table 2 Summary of the Sample Size

Group	Experimental/ Control	No. of students
I	Experimental	98
II	Control	30
III	Experimental	62
IV	Control	62
Total		252

3.6 Research Instruments

The instruments used were Biology Achievement Test (BAT) and Students Motivational Questionnaire (SMQ).

3.6.1 Biology Achievement Test (BAT)

A Biology Achievement Test (BAT) was developed and used in this study. The BAT contained 15 Short answer questions with a score of 30 marks from topic.

3.6.2 Students Motivation Questionnaire (SMQ)

Students Motivation Questionnaire (SMQ) was outlined to evaluate student's motivation towards learning of biology. It contained 26 things of five-point Likert scale for testing the student's levels of motivation with five Likert-type alternatives. A five-point scale utilized was ranged from SD= Strongly Disagree, D= Disagree, QA= not sure, and A=Agree to SA= Strongly Agree. The overall score for each motivation category shown the level of positive motivation in that category. Six of the twenty-six items are related to willingness, six are related to perseverance and eight are related to self-confidence.

3.7 Validity

Validity is the meaningfulness and accuracy of deductions which are based on the study result. In substance this implies the extent to which results gotten from the evaluation will represent the idea being examined (Mugenda and Mugenda, 2012). According to Patton (2002) validity is the

quality of conclusions, inductions or propositions. It is the leading available approximation to the truth or misrepresentation of a given inference. Face validity of BAT was achieved through review by experts from the Educational management and planning Department to ascertain whether the test showed the relationship between the construct and predicted outcome for recommendation. To achieve content validity, BAT was presented to a Head of Department of Biology in a secondary school to judge the extent to which the test items presented a representative sample of the universe of the content that the test was designed to measure then gave recommendations. The Questionnaire was appraised by experts who were lecturers at South Eastern University department of education.

3.8 Reliability

Reliability is the degree of the extent to which instruments of research provide consistent data or results trials done repeatedly (Mugenda & Mugenda, 1999). To estimate for the reliability of the research instruments, piloting was carried out in one secondary school in Kitui central Sub County that will not be included in the study but with comparable characteristics as examined schools. Unwavering quality coefficient of BAT will be computed using Kuder-Richardson method, particularly Formula K.R 21. Reliability of SMQ was estimated utilizing the Cronbach's coefficient alpha which is considered appropriate because it determines the reliability of instruments using a single administration. A reliability coefficient of 0.82 was obtained, this shows that the reliability of the instrument was suitable as recommended by Tavakol & Denick (2011).

3.9 Data Collection Procedure

The researcher sought for a research permit from the Directorate of Post graduate studies of South Eastern Kenya University and there after the National Council for Science and Technology to conduct the study. Principals and teachers of sampled schools were consulted in advance to seek consent in carrying out the study and informing them of the role to play. The researcher trained all the teachers teaching Biology in form three in the experimental groups on the use of Advance Organizer using training manual for teachers, a pre-test (BAT) was administered to group one and two to determine the entry behaviour of the students before use of Advance Organizers Approach manual. Treatment and data collection took five weeks of lessons allocation in the school timetable. The post-test BAT was administered to all the four

bunches at the conclusion of treatment by the instructors. The analyst directed the instructing and scoring of the pre-test and post-test.

3.10 Ethical Considerations

Ethical issues in research in the educational field guarantee that the welfare and rights of the communities and persons who are the study subjects are guarded and protected. The main purpose of the research was outlined and explained to the participating biology teachers and head of institutions involved. Consent for the study to go forward was accorded and full cooperation assured. The research objectives were critical in the selection of the methodology used in the research and the data collected was interpreted following the general methodological standards. The responses of the questionnaire and BAT from the subjects were treated with confidentiality and information and data was collected in accordance to accepted standards which ensured a true report of the findings was published.

3.11 Data Analysis

Mugenda & Mugenda (1999) define data analysis as an instrument for lessening and organizing data to produce findings that require interpretation by the analyst. The information collected was quantitative and was analysed utilizing both descriptive and inferential statistics. Descriptive statistics of means, standard deviation and percentages were utilized to examine raw data. The inferential statistics of Analysis of Variance (ANOVA) t-test was utilized to list factually critical differentiate inside and among suggests inside the post-test scores for the bunches exposed to Advance Organizers teaching approach and those exposed to conventional teaching strategies. t-test was utilized to compare means of two bunches. ANOVA was utilized to compare means of four groups. Hypothesis were tested at alpha value $\alpha = 0.05$ level of significance. A computer package, Statistical Package for Social Sciences (SPSS) Version 21 for Windows will be utilized to do analysis.

CHAPTER FOUR

4.0 Results and Discussion

4.1 Introduction

This research focused the effectiveness of Advance Organizers on students' Biology achievements and motivations. This chapter presents the results of the study. Results are presented using tables and their implications are discussed.

4.2 Demographic characteristics of respondents

A total 252 students sampled from Kitui central sub county participated in the study. 130 boys and 122 girls participated in the study as indicated in table 3 below.

Table 3 Gender of The Student

	Frequency	Percent	Valid Percent	Cumulative Percent
FEMALE	122	48.4	48.4	48.4
MALE	130	51.6	51.6	100.0
Total	252	100.0	100.0	

All the participants were randomly allotted to the four groups of study as indicated in table 4 below. Groups 1 and 3 were given treatment using Advance Organizers Teaching Approach whereas groups 2 and 4 were control groups, they were instructed utilizing routine strategy of instructing. composition of groups is shown in the table below.

Table 4 Composition of groups

Group	Nature	Frequency
1	EXPERIMENTAL1	98
2	CONTROL1	30
3	EXPERIMENTAL2	62
4	CONTROL2	62
Total		252

4.3 Results of the Pre-test

The researcher managed a BAT pre-test to 2 set of groups included within the research. The goal of the pre-test was to show if the students chosen to take part in this study had comparable characteristics prior to the intervention. The outcomes are displayed in Table 5 below.

Table 5: Independent Sample Test of The Pre-Test Scores On BAT.

Variable	Group	Mean	Std. Dev.	t-value	p-value
BAT	1N = 98	18	9.4	1.83	0.075*
	2N = 30	13.8	4.08		

As indicated in Table 5, the pre-test mean score in groups 1 was 18 which of group 2 was 13.8. Group 1 had a high mean score than assemble 2. Advance investigation of these results was done to decide whether the mean scores were measurably differing at $\alpha = 0.05$ centrality level. The t-test outcomes investigation reveals that the pre-test mean scores for group1 and 2 were not statistically significant ($t(1,83) = 1.83$., $p > 0.05$), this suggests that the groups of study had homogeneous characteristics before administration of treatment. Table 5 presents the pre-test mean scores.

4.4 Results of the post-test

The four groups involved in the study were exposed to a post test at the end of the 5-week instructional period. The data collected was analysed separately for each objective.

4.4.1 Effects of Advance Organizers on Students Achievements in Biology

To establish the effect of Advance Organizers on achievement of students in science the examination of BAT post test scores was done. Hypotheses one, H01 of the study looked to determine if there was statistically significant difference in accomplishment between students exposed to AO and those exposed to CTA. Table 6 presents the expressive of post test scores from the four bunches of study on BAT.

Table 6: Descriptives of post test

Group of students	Mean	Std Deviation
EXPERIMENTAL1	52.47	12.672
CONTROL1	28.97	5.928
EXPERIMENTAL2	59.48	7.548
CONTROL2	27.62	10.236
Total	45.40	16.839

The results in table 6 above reveals that experimental groups performed better than control groups, however, to establish whether the mean difference was significant, a one-way ANOVA was conducted. Table 7 below represents the results of the ANOVA of Post-test mean scores.

Table 7: Results of The ANOVA Of Post-Test Mean Scores

	Sum Squares	of df	Mean Square	F	Sig.
Between Groups	10477.654	3	3492.551	56.979	.000
Within Groups	8090.986	132	61.295		
Total	18568.640	135			

Results in Table 7 above reveals that the contrasts in achievement within the four bunches were critical ($F(3,162) = 69.92, P < 0.05$). Hypotheses one, H01 of the study looked to discover whether there was statistically critical difference between students exposed to Advance Organizers and those exposed to CTA in learning biology. To determine where the differences existed a Least Significant Difference (LSD) *post hoc comparisons was utilized*. SD *post hoc* is preferred over other means separation statistics because of its ability to establish whether there was statistically distinction in accomplishment between students instructed through AO and Regular instructional methods.

Table 8: Post-Hoc Analysis of Post Test Scores

(I)Group of the Student	(J) Group of the student	Mean Difference(I-J)	Std. Error	Sig.
Experimental 1	Control 1	15.86323*	1.87458	.000
	Experimental 2	-4.25801*	1.89967	.027
	Control 2	14.09775*	1.95824	.000
Control 1	Experimental 1	-15.86323*	1.87458	.000
	Experimental 2	-20.12124*	1.84606	.000
	Control 2	-1.76548	1.90628	.356
Experimental 2	Experimental 1	4.25801*	1.89967	.027
	Control 1	20.12124*	1.84606	.000
	Control 2	18.35576*	1.93095	.000
Control 2	Experimental 1	-14.09775*	1.95824	.000
	Control 1	1.76548	1.90628	.356
	Experimental 2	-18.35576*	1.93095	.000

The outcomes in Table 8 show that the sets of BAT mean scores of group1 and 2, 1 and 4, 2 and 3 and 3 and 4 were statistically significant at $\alpha=0.05$ level. The mean scores difference for group 1 and 3 and control group 1 and 4 were not factually critical. In reference to this results the null hypothesis H_0 is rejected.

4.4.2 Effects of Advance Organizers on students' motivation

To decide the impact of Advance Organizers on students' motivation towards learning of biology analysis of SMQ scores was carried out. To test Hypotheses two, the problem-solving skills of students in experimental and control groups were established before the test procedure to evaluate whether or not there was critical contrast within the motivation of students towards biology before exposing them to Advance Organizers and Conventional Teaching Approach. Objective two of this study was to explore the difference in adequacy of the use of Advance Organizer Teaching Approach on students' motivation towards biology compared to Conventional Teaching Approaches. Table 8 present the motivation mean scores and standard deviation for the two groups.

Table 9: Mean Scores and Standard Deviation of The Pre-Test Scores.

Group	N	Mean	SD
Experimental	160	3.02	1.241
Control	92	3.01	1.191

Table 9 above shows that the scores of motivation questionnaire was 3.02 and 3.01 for experimental and control groups respectively based on Likert scale grading of 1 to 5. This shows that minimal contrast between experimental and control groups. However, it was essential to find out if statistically critical contrast in motivation mean scores existed between experimental and control groups existed. This analysis is represented in Table 9 above

Table10: ANOVA of Scores to Motivation Scale Of Experimental And Control Groups

Source of Variation	SS	Df	Mean SQ	F	Sig
Between groups	10.05	3	3.35	14.46	0.00
Within groups	840.85	251			
Total	850.90	254			

The results in Table 10 above shows that the motivation mean scores were significantly different (3,251) = 14.46, $P \leq 0.00$. To establish where difference occurred, it was necessary to run Scheffe's *post hoc*. The *post hoc* results are presented in Table 11

Table 11; Scheffe'S *Post Hoc* ANOVA Test for The Motivation Scores.

(I) Group of the student	(J) Group of the student	Mean Difference (I-J)	Std. Error	Sig.
Experimental 1	Control 1	20.87379*	1.53414	.000
	Experimental 2	2.71000	1.54537	.381
	Control 2	21.20213*	1.56972	.000
Control 1	Experimental 1	-20.87379*	1.53414	.000
	Experimental 2	-18.16379*	1.53022	.000
	Control 2	.32834	1.55480	.998
Experimental 2	Experimental 1	-2.71000	1.54537	.381
	Control 1	18.16379*	1.53022	.000
	Control 2	18.49213*	1.56589	.000
Control 2	Experimental 1	-21.20213*	1.56972	.000
	Control 1	-.32834	1.55480	.998
	Experimental 2	-18.49213*	1.56589	.000

*=The mean difference is significant at the 0.05 level

The results in Table 11 appear that the Scheffe's pairs of SAQ scores of groups 1 and 2, 1 and 4, 2 and 3 and 3 and 4 were factually distinctive at $\alpha=0.05$ level. In any case, the mean scores

for test gather 1 and 3 and control group 1 and 4 were not measurably critical. In the view of these discoveries the null hypothesis, H02 which recommended that there's no statistically significant distinction in motivation towards biology of students exposed to Advance Organizers and those exposed to CTA is rejected.

4.3.3 Effects of Advance Organizers on the Achievements of Boys and Girls

The third objective of this study looked for to establish whether there's any measurably noteworthy distinction in Accomplishment of students who were instructed through Advance Organizers based on gender. Table 11 presents the scores of the post-test BAT outcomes by boys and young girls within the exploratory groups of consider.

Table 12: Descriptives of the Post-Test Scores Based on Students' Gender.

Gender of the student	N	Mean	Std. Deviation	Std. Error Mean
Male	40	43.054	11.07	1.286
Female	43	43.048	12.56	1.595

An evaluation of the outcomes in Table 12 over above shows that Advance Organizers post-test mean score for the boys was 43.05 and that of girls was 43.04. A further analysis was necessary in order to establish whether the mean scores were statistically different at $\alpha = 0.05$ level of significance.

Table 13: Independent Sample T-Test for Post- Test Results Based On Gender.

Gender	N	Mean	T	Sig
F	43	43.04	1.59	0.12
M	40	43.05		

The t-test results in table 13 over demonstrate that the contrasts in BAT post- test means scores of boys and girls are not measurably noteworthy ($t(1, 82) = 1.59, p > 0.05$). Within the light of this, the null hypothesis H03 which expressed that there's no statistically significant difference in accomplishment of students exposed to Advance Organizers based on gender is accepted.

CHAPTER 5

5.0 Discussion

Null hypothesis, Ho1 which suggested that there is no statistically significant difference between achievement scores of students who are exposed to Advance Organizers and those who are not exposed to it is rejected. The finding of this study illustrates that the utilize of Advance Organizers brought positive and valuable change inside the learning achievements of students. Students instructed through Advance Organizers performed better than those instructed through standard strategies. This suggests that Advance Organizers strategy improved students' achievements than regular instructing strategies by cultivating high retention of biology concepts thus high scores.

The Advance Organizers highly emphasized the application of science process skills on major concepts of topics taught. Extensive use of the skills is attributed to higher achievements amongst students in experimental groups. The discoveries of this study agree with that of Muiruri (2016) on impacts of Advance Organizers instructing methodology on primary school pupils' accomplishment in poetry in Nakuru North Sub County. It realized that advance organizers have great impacts on accomplishment of secondary school students A research by Korur, Toker and Eryilmaz (2016) discovered that the utilization of online advance organizers increases accomplishment scores of students. The discoveries of this research are moreover in agreement with those of Kapri (2017) and Muiruri, Wambugu and Wamukuru (2016) who set up that Advance Organizers made strides in achievement of students. Student centered and participatory procedures move forward students' accomplishment towards biology.

Essentially, studies show that there was increment in accomplishment levels of students at the conclusion of SPS training done on science courses by Ardac & Mugaloglu (2002), laboratory and computer helped training done based on SPS training in chemistry course (Turpin, 2000). Another research study, Roehrig et al. (2001) recommended the Advance Organizers as a substitute evaluation tool in comparison to the traditional laboratory reports. The Advance Organizers was evaluated and outlined under 6 different dimensions: Events, Focus question, Data and analysis, Word list, Concept map, and Conclusions. The study mainly targeted on why and how to use Advance Organizers. The discoveries of this study further agree with the discoveries of the research by Wachanga, Arimba and Mbugua (2013) on the impacts of

Advance Organizers educating approach on accomplishment of secondary school students in chemistry in Maara area in Kenya.

Also, these findings agree with Omondi, Keraro and Anditi (2018) who researched on impacts of advance organizers on students' accomplishment in biology in secondary schools in Kilifi Province, Kenya. They concluded that the utilize of advance organizers in educating science leads to higher student accomplishment in science compared to the ordinary instructing strategies. Advance organizers can be utilized to tackle the problem of poor performance. Luft et al., (2001) discovered that students utilizing the Advance Organizers were more successful in such processes as analysing and generalizing the data, organizing the experiment, thinking and learning, and stating the results clearly. The outcomes of this study concur with the findings of this study. In a related study, Tsai et al (2001), carried out an examination on how students did their homework utilizing the Advance Organizers as the primary activity. The researcher also examined how they tackled their homework together in class. In conclusion, the researchers found that an evaluation tool which was from the Advance Organizers was a beneficial method for pre-service teachers in helping them in preparation for scientific activities.

Cömlekoglu and Gür (2002), recommended that all the elements of the Advance Organizers should be in a well-prepared information structure. The study findings concur with Meric, (2003) who insisted that Advance Organizers could be used as the only instruction and evaluation tool which could also eliminate the boring lesson hours and which could bring about meaningful learning. Ahlberg et al. (2005), in their 4-year action research which focused on the development of the curriculum in pre-service teacher training program for the course of home economics, utilized Advance Organizers and concept maps for the planning, evaluation and execution of the research process. Consequently, the researchers discovered that these were all influential on their thinking and also teacher candidates' professional development.

Calais (2009) explored the use of Advance Organizers in other areas other than mathematics and science. As a result of the applications, the researcher pointed out that Advance Organizers not only helped students to understand and exchange the information but also gave teachers practical benefits. In line with qualitative data gotten in a study done by Afamasaga-Fuat'i (2011), the researcher discovered that students' use of such strategies as Advance Organizers in learning mathematics, in building up reason-result relationships and in tackling problems driven to critical cognitive development. These discoveries illustrated that Advance Organizers could be applied in secondary and elementary school mathematic courses.

Further, Osguthorpe & Graham (2010) found that mixed instruction strategies progress instructional method, increase access knowledge, cultivate interaction socially, improve the level of educator presence amid learning, better cost-effectiveness and upgraded ease of revision. In conclusion, the findings of this study show that more opportunities should be given to discussion, problem solving, creating solutions and working the peers. The findings of this study reveal that students in experimental group 1 and 3 showed the ability of problems and were able to think of possible solutions. They were able to evaluate experimental procedures, making fallacious arguments while noting the sources of errors. This was absent in control groups. The experimental classes showed a great ability to produce a variety of ideas. They were flexible and adaptive. The students showed exceptionally strong feelings to find order where none existed. They were able to recognize relations between concepts alongside ability to plan for practical investigation. This confirms a high level of motivation amongst students exposed to Advance Organizers as opposed to those in control groups. The outcomes of this research showed that Advance Organizers posted positive effects on students' motivation in biology.

In related studies, Aksoy (2005) discovered that science education, which is based on science process skills increased students' motivation level, improved academic performance and advanced students' motivation towards lessons taught. Cheng (2004) displayed a comprehensive technique for promoting creative learning in physics. In another study, Siti (2008) while measuring levels of motivation of students within the science program at the faculty of education, University of Teknologi Malaysia found a low level of inspiration among students in science program. While establishing the science student's motivation and innovation in implementation of final year project Noradilah (2009), found a less motivation and innovations implementing the project. Panagiotis et al. (2009) found that instructors have a narrow view on inspiration and less emphasis on inventive educating practices. A similar situation was observed by Cheng (2011) who established that instructors in Hong Kong found that science educational modules is too dense for a few students; they cannot apply creativity to make inspiration in class but just focus on content. This contradicts the findings of this study which established that teachers play crucial role in fostering motivation among the students.

Findings of this study also concur with study conducted by Kamisah and Maria (2010) who concluded that students exposed to assortments of exercises that can improve inspiration and flexibility to investigate in their learning process had increased in their motivation. This is also in consistent with discoveries by Randler & Hulde (2007) who discovered that students that

were instructed through the means of interest in activities appeared greatly interested in their learning. The outcomes of the research have displayed no critical distinction between the accomplishment scores of girls and boys who are put through Advance Organizers. They moreover portray that girls and boys instructed through Advance Organizers perform better as a whole than those instructed through customary instructing approaches. Subsequently, Advance Organizers is more viable in increasing students' accomplishments in science irrespective of their sex than other conventional instructing approaches. This is in agreement with the findings of Wachanga et al. (2013) that sex has no critical impact on accomplishment when students are instructed utilizing advance organizers.

A research by Nyabwa and Githua (2008) on the effects of Advance Organizers strategy through exposure to instruction on secondary school students' achievement in mathematics realized that the utilization of Advance Organizers made strides in female and male students similarly. Advance Organizers can be utilized to decrease gender dissimilarity in science accomplishment at the KCSE level. These findings in addition agree with the discoveries of Akinbobola (2008) who noted that both the female and male students perform well in science if they are exposed to comparative conditions. The discoveries of this research are additionally in affirmation with Omotade (2016) study that female and male students educated utilizing Advance Organizers did not vary significantly in achievements.

In a different study girls performed better than boys in various institutions as seen in grades of students in all the subjects and in all ages (Antonio, Robert & Paul, 2001). In spite of the fact that young girls perform better in school (as seen in their grades) one could envision that young girls would be self-confident around their educational works and distant better, a much better self-esteem in academics. While setting up attitudes and interest of students in schools towards science. Prokop (2007) discovered that science lessons were modestly predominant with most conspicuous preference realized amongst students that are learning zoology. Concurring to UNESCO (2013) there's no incredible differences between the achievement of boys and young girls within the national examinations. Boys appreciate affirmation for their fulfilment, while young girls like to induce more on affirmation for who they are individually. Many schools commend boys covertly (Ellen, Eva and Jill, 2002).

Whereas looking at the forms that influence sex contrasts in getting to various institutions after secondary in Uganda, Deborah (1996), discovered that any gap in terms of gender in

accomplishments resulted from a sophisticated and exuberant exchange between the school environment, societal factors, and gender part conduct that basic aspect such as poor equipment and facilities, insufficient teaching and tricky practices were as well as signs which will lead to gender gap in accomplishment. Studies which have been carried out in Europe (Whyte 1986 & Whyld 1983 as reported by Deborah 1996) discovered that stereotyping of parts and exercises in terms of gender at the school and inside the classroom act to reduce the accomplishments of boys and young girls in zones considered sensible for opposite sex. This certifies the significance of utilizing metacognitive approaches of guidelines in classrooms such as Advance Organizers, which advances social forms in lesson.

CHAPTER SIX

6.0 Conclusions, and Recommendations

6.1 Introduction

This chapter entails the summary of the research discoveries, conclusions reached and suggestions/ recommendations based on results of the study. The suggestions are talked about in details and recommendations made on the possible areas for further research.

6.2 Summary of the findings

There were three hypotheses for this study. The findings of this study affirmed the critical impacts of Advance Organizers. Findings of this study are in support of the students exposed to Advance Organizers.

Inferential statistics show that there were differences between the mean score obtained by students in Advance Organizers treatment groups (1&3) and those in control groups (2&4) that were statistically significant. Advance Organizers has been a big success in attaining the objective of this study.

Use of Advance Organizers in teaching and learning the topic “ecology enabled the learners to acquire the knowledge concept and skills. It was established that Advance Organizers increased the understanding of subject matter of the topic as a whole. This is evident from the higher mean score obtained on all the dependent measures by students exposed to Advance Organizers as compared to those not so exposed.

6.3 Conclusions

The following conclusions have been drawn from the results of the study.

There were significant learning gains that is positive effect obtained by students exposed to advance organizers teaching strategy as compared to those gains obtained by those students not exposed to Advance Organizers treatment. Therefore, Advance Organizers facilitates students’ learning in biology better than regular teaching strategy. The use of advance organizers as a tool of teaching did show significant influence on students’ motivation towards biology. Analysis of SMQ scores did show significant effect on students’ motivation in experimental groups than control groups. The effects of gender did not show any significant influence on students’

achievement in the topic of the ecology. The analysis of boys' and girls' achievements in BAT. Gender does not affect the students' achievement in chemistry when they are taught through Advance Organizers teaching Strategy.

6.4 Implications of the findings

Research recommends that advance organizers educating is an effective way to teach. It empowers dynamic and significant learning and advances responsibility and autonomy. Since a broad use of advance organizers teaching is useful in accomplishing desirable educational objectives for students, it is critical for instructors to develop professionally towards Advance Organizers teaching approach practice.

These discoveries have implications for the way Advance Organizer and standard curricula are executed. They affirm that the obligation for the professional improvement of instructors fall generally on the instructors themselves. This concept is by and large recognized by instructors; however, the incentive to seek after personal professional improvement over the course of one's career is frequently missing in teachers. For example, the significance of collegial sharing and support is broadly acknowledged however occasionally practiced except informally.

Considering the constructivist nature of numerous modern curricula, it is critical that the hypothesis and concepts of normal and advance organizer teaching be communicated to administrators as well as teachers and student-teachers of all grades and disciplines through on going, strong professional advancement exercises. The significance of administrative support for instructors attempting normal and constructivist techniques which entails the AO must be communicated to school administrators through professional literature and professional in-service.

University instructors in education colleges ought to model constructivist practices and give supportive assistance to reserves and in-service instructors as they deal with the practices in their practicum and internships. Constructivist and regular practices may be modelled, and advance organizers exercises and techniques may be shared with teachers in workshops and teacher in-services. An explanation of the consequences of such practices for students and teachers needs to be part of the in-services.

Resource information about the philosophy of constructivist and the practices written in a non-threatening method that respect the current personal and knowledge where AO belongs would

maybe make professional and personal development towards a constructivist practice more appealing. A more creative and friendly presented information can motivate teachers to take on their own improvement professionally and also encourage them to be less reluctant on risking innovative activities. This can lead to a development change process. The outcome of this study is that change is a process in practices precede theory and teachers, motivated by attempt constructivist practices and to be incentive by the prior success of the practices, may in time, acquire the philosophy that the practised is based on.

6.5 Recommendations

i) To Biology teachers, Advance Organizers module enabled students to interact freely in the construction of knowledge. This enabled creation of a conducive atmosphere for effective learning. It is important therefore for science teachers to make use of Advance Organizers in their teaching and also put in consideration the learners' prior knowledge so as to build on it in the subsequent learning activity.

Driver (1989) suggests that learners' prior knowledge is an important factor in their understanding of school science. On this note Advance Organizers is an effective teaching approach in the learning of ecology in Biology. Teachers should therefore take into consideration the learners' prior ideas on given topic before introducing complex aspects of the topic in biology instruction.

ii) To developers of curriculum, Advance Organizers participating in these study discovered that coverage of constructivist lessons was a little longer than the normal conventional lessons. This necessitates more time for the class to happen to come up with challenging activities which will improve effective and efficient acquisition of information by the learners. Teachers of biology and department heads are advised to embrace it improving the students' motivation towards the subject study revealed a positive impact on motivation of the students towards biology.

iii) Policy maker, the study suggests possibilities for enhancing educational practice in biology and some questions on the manner in which professional development has been conventionally delivered and also on the new curricula implementations. New curricula encourage a holistic and constructivist rationale, and its implementation of require that teachers make critical changes in their teaching methods. Additionally, to understanding the philosophy of constructivist upon which Advance Organizers, administrators, teachers and others involved in

the implementation of these new curricula are to understand the type of changes teacher are required to make as the transition to constructivist strategies and also how they can make the changes. In general, curriculum and professional development is personal and evolving process that is also constructivist.

6.6 Suggestions for further research.

1. The findings of this research can only be generalized to form three students of district secondary schools' category in Kitui central. For the results to be generalized to all schools, further research including students from other school categories in the country should be carried out.
2. The study was only focused on Advance Organizers effect in learning ecological concept. However, more studies should be undertaken involving other aspects of biology subjects for instance chemicals of life.
3. A study should be carried out to determine the effects of using Advance Organizers module on students' conceptualization of concepts and construction of knowledge in other topics in biology in lower classes and also in other disciplines offered in our school and college curriculum.

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TIMEFRAME

BUDGET

Activity	time	Nov- Dec	Jan-mar	Apr-oct	nov	dec		Jan-feb	Mar	april	ma y	jun e	Jan- july
	month	2018	2019						2020			2021	
Search for a topic													
Literature review and Theoretical study search													
Proposal development and submission													
Proposal presentation													
Correction of proposal as pointed													
Development and piloting of instrument													
Data collection													
Data analysis													
Writing the final project report													
Defence of results													
Corrections on the report as pointed.													
Submission of project to the supervisor													

ITEM	ITEM DESCRIPTION	UNIT COST KSH	BUDGET
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Topic choice	laptop,	1 @35,000	35,000
	airtime	200	200
	clerical work	1,000	1,000
	bundles	2,000	2,000
	printing expenses	1,000	1,000
	travelling	1,000	1,000
SUB TOTAL			40,500
Proposal writing	Printing	3,000	3,000
	photocopying travelling,	3,000	3,000
	Consultation	3,000	3,000
		2,000	2,000
			11,000
Defense of proposal	Airtime for consultation,	1,000	1,000
	Printing	10,000	1,000
			2000
Data collection	questionnaires printing,	5,000	5,000
	travelling expenses,	50,000	50,000
	photocopying	10,000	10,000
			65,000
Data analysis and report writing	Typing,	20,000	20,000
	printing,	20,000	20,000
	airtime	1,000	1,000
			41,000
Presentation of report	Photocopying,	5,000	5,000
	binding of final report	5,000	5,000
			10,000
Contingency	Miscellaneous	10,000	10,000
GRAND TOTAL			179,500

APPENDICES

APPENDIX I: BIOLOGY ACHIEVEMENT TEST

Form 3

Time; 40 minutes

1. Define the following terms 2marks

i) Ecology.....
.....
.....

ii) Ecosystem.....
.....
.....

2. With an example differentiate between Endoparasite and Ectoparasite 2marks

.....

3.Explain the symbiotic relationship between the following.....
.....

a) *Rhizobium bacteria* and Leguminous plants. 2marks

.....
..... *E*

schierichia coli bacteria in animal caecum. 2marks

.....
.....

4. a) what are saprophytes. 1mark

.....
.....

b) Explain the importance of saprophytes to our environment. 2marks

5. State three adaptations of hydrophytes. 3 marks)

.....
.....
.....

6. Explain the following as used by ecologists. 3marks)

i) Eutrophication.....

ii) Greenhouse effect

.....
.....

iii) Bio magnification

.....
.....

7) Below are the study carried out in certain habitat

i) Extract two food chains that do not involve snakes where mongoose is in the fourth trophic level. 2 marks)

.....
.....

ii) Identify the type of habitat in which the study was made from. 1mark

.....
.....

8) I) Define the term pollution. 1 mark)

.....
.....

ii) Explain two causes of water pollution. (2marks)

.....
.....

9) Explain two effects of *Ascaris lumbricoides* on the host. 2marks

.....
.....

10) State the function of the following organisms in a nitrogen cycle. 2marks

i) Nitrogen fixing bacteria.

.....
.....

ii) Nitrifying bacteria

.....
.....

11) Distinguish between interspecific and intra-specific competition. 2marks

.....
.....

12) Explain how temperature affects the distribution of living organisms. 1mark

.....
.....
.....

APPENDIX II: BIOLOGY STUDENTS QUESTIONNAIRE

To what extent do you agree with the following statements on the level of learning in Biology?

Please put a tick () in the box provided against the statement

Key (SA) –STRONGLY AGREE (A)-AGREE (NS)-NOT SURE (D)-DISAGREE (SD)-STRONGLY DISAGREE


Please put one tick as appropriate


	Statement on motivation of students	SA	A	NS	D	SD
1	Through use of Advance Organizers, I am motivated to participate more in class activities for challenge curiosity and mastery.					
2	When am taught using Advance Organizers approach am highly motivated than when am taught using regular teaching methods.					
3	Technologybased activities are inherently motivating and make learning interesting					
4	I am poor achiever in science related conception because I lack motivation					
5	The usefulness of Advance Organizers through which students are allowed to link the known to unknown has positive effect on learners.					
6	When am motivated am able to perceive the relevance and purpose for learning activities?					
7	Motivation builds interest and encourages cooperation in self-directed learning.					
8	Lack of motivation leads to poor performance in biology because I become a passive learner and loaded					

	with information and cannot be involved in creative activities.					
9	Motivation is a strong desire or passion in a person that encourages a person to try and do something in order to succeed					
10	I get motivated when once I achieved good results					
11	Use of Advance Organizers enhances my motivation to the extent that i develop intrinsic goal orientation.					
12	Use Advance Organizers prepares me for involvement in community participation					
13	Use of Advance Organizers is more effective in developing my motivation and academic achievements than regular teaching methods					
14	Use of Advance Organizers enables me to focus on a given content and use opportunity to maximize achievements due to the intrinsic drive of motivation					
15	Motivation is the key determiner for performance in biology					
16	I am successive student because am highly motivated					
17	My motivation is derived from my interest in subjects and positive motivation					
18	A good instructional method motivates me and I understand the content I am exposed to.					
20	Demonstration of moderation in instruction motivates me and exposes me to new discoveries.					

21	The teacher plays a key roles in motivating students to develop interest in biology and physics and mathematics as in all other subjects					
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APPENDIX III: RESEARCH LICENSE


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **205339** Date of Issue: **28/March/2020**

RESEARCH LICENSE




This is to Certify that Ms. EUNICE nyakenyanya KOMENDA of South Eastern Kenya University, has been licensed to conduct research in Kitui on the topic: EFFECT OF ADVANCE ORGANIZERS TEACHING APPROACH ON STUDENT'S ACHIEVEMENT AND MOTIVATION IN BIOLOGY IN PUBLIC COUNTY SECONDARY SCHOOLS IN KITUI CENTRAL SUB- COUNTY, KITUI COUNTY KENYA for the period ending : 28/March/2021.


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APPENDIX IV: TRANSIMITAL LETTER

Eunice Nyakenyanya Komenda

P.O Box 113-90200,

KITUI.

To all respondents

KITUI CENTRAL SUB-COUNTY

Dear respondents,

REF: INTRODUCTORY LETTER

My name is **Eunice Nyakenyanya Komenda**, a post graduate student at **South Eastern Kenya University (SEKU)** REG, NO. **E55/KIT/20667/2013** pursuing **Master of Education (MED)** in curriculum studies. Am conducting a study on **The effect of advance organizers on students' achievement and motivation in biology in Kitui central sub- county, Kitui county, Kenya**. You are selected to take part in the study and I am taking this time to congratulate you for this selection. I am kindly requesting you to cooperate and assist in correctly filling this questionnaire. Any information that you give will be confidential and will strictly be for the aforementioned purposes only. Your identification will also remain anonymous. I am also grateful for your support.

Thank you.

Yours faithfully

Eunice Nyakenyanya Komenda