EFFECT OF VIDEO-MEDIATED INSTRUCTION ON STUDENTS' MOTIVATION, ATTITUDE AND ACHIEVEMENT IN LEARNING KISWAHILI PROVERBS IN SECONDARY SCHOOLS IN NAKURU COUNTY, KENYA

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DECLARATION

This research thesis is my original work and, to the best of my knowledge, it has not been

presented for the award of a degree in any university or college.

Signed: _____ Date: _____

David Gitau Turuthi

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DEDICATION

I dedicate this work to my parents, Nehemiah Turuthi and Grace Wanjiku, who gave their all

to take me to school. Your efforts were not in vain.

ABSTRACT

Kiswahili is an important subject in Kenya's secondary school curriculum. The mean score of students in Kiswahili at KCSE has gradually declined from 46% in 2010 to 36% in 2015. This decline is a worrying trend. Proverbs, an integral part of Kiswahili, are not well taught, which partly explains the decline in performance. Video-Mediated Instructions (VMIs) are thought to be a catalyst of new pedagogical change and may help address this deficiency. The current study sought to establish the effect of VMIs on students' validated measures of motivation, attitude and achievement in learning Kiswahili proverbs in secondary schools in Nakuru County. The objectives of the study were to: Establish the effect of VMIs on various aspects of students' motivation; determine the effect of VMIs on various components of students'attitude, and examine the effect of VMIs on students' achievement in Kiswahili proverbs. The data generated from the study informs understanding on how best to improve students' performance in KCSE. A Quasi-experiment and Solomon Four Group Design were used. The studied population comprised Form Two students in extra-county single gender and boarding secondary schools in Nakuru County, Kenya. Purposive sampling was used to select eight schools (a boy and girl school in each group). A total of 436 students were studied. At the onset, a pre-test was administered to experimental Group A and control Group B. The students were taught the same sixteen proverbs. In the experimental groups A and D, VMIs was used while the teacher-centred teaching method was used in the control groups B and C for a period of eight weeks. Data was collected using a Students' Achievement Test, Student Motivation Questionnaire and Students' Attitude Questionnaire. Items in these research tools were extracted from previous studies, pilot tested in schools with similar characteristics as those of this study and their psychometric properties identified. A post-test was administered to all the four groups. Data were initially analyzed using appropriate tests of differences (parametrics and non-parametric). A GLM was used to identify the confounders. SPSS and STATA computer softwares were used to conduct analyses. Hypotheses were accepted or rejected at a significant level of $\rho < 0.05$. The study found that VMIs demonstrated a statistically significant effect on students' achievement but no demonstrable effect on different aspects of either motivation or attitude. Further, students' gender and teacher experience were important confounders of students' outcome. Teachers are advised to consider VMIs as a viable method to improve students' achievement. Teachers should take caution when considering motivation and attitude as drivers of performance in the presence of VMIs. The study recommends continuous teacher education in the face of technology.

Keywords: Video-Mediated Instruction Motivation, Attitude, Achievement, Kiswahili Proverbs, Solomon Four Design

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LIST OF ACRONYMS AND ABBREVIATIONS

BBC   -British Broadcasting Corporation

DVD   -Digital Versatile Disc

GLM   -Generalized Linear Model

ICT   -Information Communication Technology

KCSE   -Kenya Certificate of Secondary Education

KICD   -Kenya Institute for Curriculum Development

KNEC   -Kenya National Examination Council

LCD   -Liquid Crystal Display

MOEST   -Ministry of Education Science and Technology

NACOSTI   -National Commission for Science Technology and Innovation

PCA   -Principle Component Analysis

POMP   -Percentage of Maximum Possible

PRISMA   -Preferred Reporting Items for Systematic Reviews and Meta-Analysis

SAQ   -Students' Attitude Questionnaire

SAT   -Students' Achievement Test

SD   -Standard Deviation

SE   -Standard Error

SMQ   -Students' Motivation Questionnaire

SPSS   -Statistical Package for Social Sciences

UNESCO   -United Nation Educational Scientific and Cultural Organization

UNICEF   -United Nation International Children's Emergency Fund

USB   -Universal Serial Bus

VMI   -Video-Mediated Instruction

OPERATIONAL DEFINITION OF KEY TERMS

Achievement: Within the context of this study, achievement will mean the value added measure in performance Kiswahili proverbs tasks in the area of recall, comprehension, application and higher order skills. The ability was measured using 30 objective questions in the Students' Achievement Test (SAT).

Attitude: In the context of this study attitude will be defined as cognitive, affective and behavioral tendency to think, feel (like or dislike) or act positively or negatively towards learning Kiswahili proverbs. It was measured using Likert type questions in Students' Attitude Questionnaire (SAQ).

Gender In the context of this study gender will mean sex. The biological definition of boys and girls, male and female

Extra County Schools: In the context of the current study, Extra-County schools are located within Nakuru County and admit learners from within the county and 5% from all over Kenya.

Motivation: Motivation within the context of this study is defined as the stimulating force that elicits behavior actions and desires. It was measured using Students' Motivation Questionnaire (SMQ).

Proverbs: Proverbs are, in the context of this study, concise known sentences of the Swahili people which contain wisdom, morals and traditional views in a metaphorical, fixed and memorisable form and which are handed down from generation to generation.

Video-Mediated Instructions: Within the context of the current study, VMIs entails recordings using video technology; also the use of video in delivery of content.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Kiswahili language is essential for meaningful communication and, therefore, it is important to give it emphasis as a language. In the Kenyan constitution, together with English, Kiswahili is recognized as the official language of the nation, and the national language used for communication in schools and offices (Republic of Kenya, 2010). Beyond the borders, Kiswahili increasingly has a central place in the world. In fact, Kiswahili language is spoken by about 150 million people worldwide, making it the 11th most important language in the world. Kiswahili is also used in feature stories on BBC radio and Radio China (Ojwang, 2008). In addition, Kiswahili is making its presence in the world of art and is taught in universities across the world such as St. Lawrence, Harvard, Yale, Stanford, Princeton, Massachusetts, Ohio, Bayreuth and Osaka (Khamis, 2015; Walibora & Mohamed, 2007). It is also recognized in the United Nations as a language of communication (Ayo, 2011). Kiswahili's importance has also been reinforced by its recognition as the official language of the African Union apart from its being the lingua-franca throughout Eastern Africa (Momanyi, 2009). The language holds great significance in the Kenya's secondary school curriculum. Consequently, it is a compulsory subject in secondary schools in Kenya (Kenya Institute of Education, 2002). Kiswahili is also one of the six examinable languages in KCSE (Kenya National Examinations Council, 2014).

Proverbs are an integral part of the Kiswahili language. In an educational context, proverbs are described by many scholars as brief sentences which contain wisdom, truth, morals and traditional views in a metaphorical, fixed and memorisable form and which are handed down from generation to generation (Batur, 2013; Hussein, 2009; Scheven, 1981; Turuthi, 2014). In Kiswahili language, proverbs are a product of the Swahili cultural context. Culturally, they

are instrumental in the illustration of ideas, reinforcement of arguments and delivery of messages that inspire, console, celebrate and advise (Mieder, 2004). Socially, proverbs give concise illustrations for enlightening people's understanding of a particular situation (Mieder, 2008). In language learning, proverbs also occupy a central place. In the pedagogy of Kiswahili language, proverbs are elements that cut across the four learning skills (listening, speaking, reading and writing) (Moshi, 2006) that are taught in language and oral literature integratively (KIE, 2002). In order to understand Kiswahili, learners need to understand proverbs alongside other idioms. In summary, it can be argued that Kiswahili language and literature would be incomplete without proverbs and allegorical symbolism (Mogambi, 2015).

The performance of students in Kiswahili Language, especially in the proverbs section, in the Kenya Certificate of Secondary Education (KCSE) has been poor over the years. An evaluation of the performance of students in Kiswahili in Kenya Certificate of Secondary Education (KCSE) for the years 2010-2015, as shown in Table 1, shows that Kiswahili ranks lower than the other compulsory and examinable languages (Kenya National Examination Council [KNEC], 2011, 2012, 2013, 2014, 2015, 2016). The mean scores in the selected years for Kiswahili indicate a general declining trend and are all below the 50% mark. A 50% mark denotes a grade of D+, which is not commendable.

Table 1: Compulsory and Examinable Language Results in KCSE in (%)

Year	2015	2014	2013	2012	2011	2010
English	38.78	48.84	48.90	39.26	37.79	49.70
Kiswahili	35.81	48.82	43.63	38.57	37.27	45.76

This declining trend has been attributed to poor scores in KCSE questions on Kiswahili proverbs (Kenya National Examination Council [KNEC], 2011, 2012, 2013, 2014, 2015, 2016). It has further been noted from teacher experiences that students tend to avoid elective

questions involving Kiswahili proverbs, and those who attempt such questions obtain relatively low scores. It can, therefore, be argued that if students attempt and perform well in questions on proverbs, the scores in Kiswahili will be enhance.

The factors that influence students' achievement in Kiswahili in Nakuru County include the availability of language learning materials, role of language policy, Kiswahili teachers' in-service, learners and teachers' attitudes and motivation. This study isolated attitude and motivation as guides to achievement since a study by Momanyi (2009) has shown that there are enough Kiswahili learning and human resources in all the schools to which learners access equally, that all schools have a language policy in place, and teachers of Kiswahili participate in Kiswahili in-service trainings regularly.

Considerable attention has been directed at the correlates of students' outcomes in the mastery of a second language, in general, or at specific aspects of a new language. For example, past studies have investigated, among others, outcomes such as achievement scores (Eshetu, 2015), various aspects of attitude towards learning a second language (Al Kaboody, 2013) and diverse components of motives behind acquisition of a second language (Dornyei & Schmidt, 2001). Such outcomes have been studied through a host of socio-demographics, including student age and gender, teacher characteristics such as gender (Kang'ahi, 2012), age (Ndwiga, 2001), educational attainment (Hungi, 2008) and experience (Nakata, 2006) and the use of modern teaching methods such as adoption of technology in the classroom (Ambuko & Odero, 2013). The present study aims to enhance understanding of the use of Video-Mediated Instructions as a correlate of important outcomes among a sample of secondary school students in Kenya. It contributes to ongoing research in the following three ways: First, this study investigated factors that relate to a student's array of learning outcomes, as opposed to more common (or typical) levels of achievement in general scores.

Apart from achievement scores of learning a second language, other included outcomes in previous research are psychological factors, namely attitude (Ajzen, 2001) and motivation (Gardner, 2010). The study specifically focused on the mastery of Kiswahili proverbs by paying attention to achievement scores and various components of both attitude and motivation. Studying other types of outcomes is important because, as advocated in previous research (Gardner, 2010), psychographics are integral components in the mastery of a second language. For example, if attitude is the most important element in the mastery of Kiswahili proverbs, then reinforcing the liking of proverbs may be a powerful way to support learning of Kiswahili.

Second, the study tests for potential unobserved heterogeneity across the studied respondents in relation to socio-demographics and outcomes in the mastery of Kiswahili proverbs. For instance, by looking at the data through the lens of segmentation (through Generalized Linear Models), the analyses helped to clarify whether or not specific profiles of students and teachers relate to similarly or differently to the breath and level of various outcome measures.

Third, through the analysis of a dataset of Form Two secondary school students, the study increases current understanding of the role of VMIs in teaching Kiswahili proverbs in a formative age group where interventions may be meaningful. Overall, the findings reported here should help teachers, researchers and policy-makers to promote broader and greater levels of a range of outcomes in the mastery of Kiswahili proverbs.

To date, numerous studies have assessed how psychological traits relate to achievement in second language learning (Nako, 2015). The importance of psychographics has remained fairly stable over time (Ajzen, 2011), suggesting their association with achievement scores. This study focused on two psychographic processes, that is, attitudes and motivations that likely relate to any given student's superior achievement in mastery of Kiswahili proverbs

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when compared to others. A model tested in this study proposed that psychographics and socio-demographics help to explain why some students achieve better scores in Kiswahili proverbs than do others, while testing for potential (unobserved) heterogeneity among respondent groups.

Students' motivation and attitude towards Kiswahili proverbs has created a hindrance to grasping the conceptual knowledge of Kiswahili language and poor motivation and attitude towards the subject for seconday school learners (Makokha & Wanyonyi, 2015). This is especially true among students who reside in cosmopolitan areas where there is a mix of languages, cultures and perspectives of life.

The Ministry of Education has increased the content of Kiswahili which makes mastery significantly unmanageable. In addition, there are negative attitudes among the learners, teachers and authorities towards Kiswahili language. In the words of Kimaru (2013), the authorities made Kiswahili an official language in Kenya but they have done nothing to make it more attractive or to accord it some dignity.

The negative motivation and attitudes towads learning Kiswahili proverbs have been attributed to how these elements of language are taught. There is therefore concern on how to improve students' motivation and attitude towards Kiswahili proverbs to enhance the achievement of students in Kiswahili language in secondary schools. To achieve this, the method of teaching needs improvement.

Traditionally, Kiswahili proverbs have been taught using teacher-centered methods (Hussein, 2009). In instances where teachers teach some Kiswahili proverbs, they mostly explain the meaning of the proverb by elucidating the meaning of each of the words making up the proverb, without paying special attention to the cultural context that ought to help in

accessing the hidden and intended meaning. This approach has failed to put into account the fact that Kiswahili proverbs are context-specific and therefore the need to reconstruct the context.

Available evidence in the media shows that technology is fast changing how people live everywhere (Wamari, 2014). For example, Vidya (2014) views technology as a catalyst of new pedagogical change. Technology as a tool has been embraced successfully in learning in some fields of study, for example, in Biology and Mathematics (Ally, 2014; Goffe & Sosin, 2005). Across the world, VMIs have been shown to improve student motivation, attitude and achievement in other areas of learning (Kong, 2009; Youssef, 2012). At the same time in this era, videos are ubiquitous, affordable and easy to use. The 21st century teachers have no choice but to make themselves familiar with and to integrate VMIs in teaching and learning. VMIs are also known to enhance the learning experience (Salkeld, 2013a). They enhance pedagogy by enabling the learner to access knowledge through multiple processes that include audio, visual and kinaesthetic (Mayer, 2005; Morris, 2013). Such processes take care of students' diversity and multiplicity of intelligences (Morgan & Fonseca, 2004; United Nation International Children's Emergency Fund, 2000).

In spite of the stated advantages, video technology is under-utilized in the classroom in Kenya (Ambuko & Odera, 2013; Kamau, 2014). Practices in other parts of the world show that videos that are style and context specific have been used by teachers to bring realism in the classroom by showing examples of actual situations that are not normally available therefore motivating the learners (Seago, 2003). This helps to contextualize content in class and thereby aid in removing abstractness and replace it with a near representation of real objects (Turuthi, 2014). The teaching of Kiswahili proverbs can, by inference, be equally enhanced using videos.

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VMIs are known to arouse students' interests (Abdulrasool & Mishra, 2010; Gardner, 2010) and beliefs about the likely consequences and attributes of any given learning object (Crisp & Turner, 2010). Students' motivation, which is generally the reason behind their actions, desires and needs, prompts them to act in a certain way (Bedel, 2016) or at least to develop an inclination for understanding Kiswahili proverbs. In their respective aggregates, beliefs about the likely consequences and attributes produce a favourable or unfavourable attitude (Gardner & Lambert, 1972; Johnson, 2012) which leads to a learned predisposition to evaluate Kiswahili proverbs. In combination, motivation and attitude are widely considered to lead to the attainment of desired objectives or achievement (Petrides, 2006). The current understanding on the role of video technology on motivation, attitude and achievement is equivocal. The link between technology and important learning outcomes has been shown to be dependent on various factors, including students' age (Jabor, Machtmes, Kungu, Buntat, & Nordin, 2011), students' gender (Gwarjiko, 2015; Jain & Sidhu, 2013) and teacher characteristics (Bedel, 2016; Kosgei, Mise, Odero & Ayugi, 2013). Consequently, it is important to control for such variables when examining the role of VMIs in learning.

1.2 Statement of the Problem

For the years 2010-2015, a comparison of the performance of students in Kiswahili in Kenya Certificate of Secondary Education (KCSE) indicates that Kiswahili has consistently ranked lower than English language. In addition, the mean score has gradually declined from 46% in 2010 to 36% in 2015. The achievement of students in Kiswahili in Nakuru County mirrors that of the country. Anecdotal evidence shows that teachers' attitudes towards teaching Kiswahili proverbs and Kiswahli proverbs questions are negative. This has led to low motivation towards Kiswahili proverbs questions among students. The wanting performance is due to teacher attitudes and the traditional teaching methods used to teach Kiswahili proverbs. Kiswahili proverbs teaching is also characterized by teacher-centered methods

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which largely seek to elucidate ethe words that make a proverb but ignore the cultural context needed to access the hidden meaning.

There is an observation that while theoretical learning activities would be appropriate for some tasks, the pedagogy of oral literature in general and Kiswahili proverbs in particular would require a rich combination of abstract and concrete experiences which are never universal. Due to the presence of this discrepancy, there was need to improve learners' attitudes, motivation and achievement in Kiswahili proverbs among learners in Nakuru County. In the event that this discrepancy is not addressed, the low motivation and negative attitudes may trickle down to further poor achievement thereby impacting negatively on their academic and social endeavours. This study consequently sought to establish the effect of VMIs on students' motivation, attitudes and achievement in Kiswahili proverbs using a sample of secondary students in Nakuru County, Kenya.

1.3 Purpose of the Study

The purpose of this research was to determine the effect of VMIs on students' motivation, attitudes and achievement in learning Kiswahili proverbs in secondary schools in Nakuru County, Kenya.

1.4 Objectives of the Study

The objectives of this study were:

1. To establish the effect of video-mediated instruction on students' motivation towards the learning of Kiswahili proverbs in secondary schools in Nakuru County, Kenya

2. To determine the effect of video-mediated instructions on students' attitudes towards Kiswahili proverbs in secondary schools in Nakuru County, Kenya

3. To examine the effect of video-mediated instruction on students' achievement in Kiswahili proverbs in secondary schools in Nakuru County, Kenya

1.5 Hypotheses of the Study

To achieve the objectives stated above, the study tested the hypotheses that:

HO_1. Video-Mediated Instruction in teaching Kiswahili proverbs will have no statististically significant effect on students' motivation towards the learning of Kiswahili proverbs.

HO_2. Video-Mediated Instruction in teaching Kiswahili proverbs will have no statististically significant effect on students' attitude towards Kiswahili proverbs.

HO3. Video-Mediated Instruction in teaching Kiswahili proverbs will have no statististically significant effect on students' achievement.

1.5.1 Sub-Hypotheses of the Study

Further, in order to cater for the different dimensions of both the motivation and attitude concepts the study tested the sub-hypotheses that:

HO_{1a}. Video-Mediated Instruction will have no statististically significant effect on students' learning dimension of motivation to learn Kiswahili Proverbs.

HO_{1b}. Video-Mediated Instruction will have no statististically significant effect on students' emotional dimension of listening motivation during learning of Kiswahili proverbs.

HO_{1c}. Video-Mediated Instruction will have no statististically significant effect on students' instrumental dimension of listening motivation during the learning of Kiswahili proverbs.

HO_{1d}. Video-Mediated Instructions will have no statististically significant effect on the example dimension of students' motivation in learning Kiswahili proverbs.

HO_{1e}. Video-Mediated Instructions will have no statististically significant effect on the teaching aids dimension of students' motivation in learning Kiswahili proverbs.

HO$_{1f}$ Video-Mediated Instructions will have no statististically significant effect on the real objects dimension of motivation in learning Kiswahili proverbs.

HO$_{2a.}$ Video-Mediated Instructions will have no statististically significant effect on the study dimension of attitude in learning Kiswahili proverbs.

HO$_{2b.}$ Video-Mediated Instructions will have no statististically significant effect on the pedagogy dimension of attitude in learning Kiswahili proverbs.

HO$_{2c.}$ Video-Mediated Instructions will have no statististically significant effect on the time dimension of attitude in learning Kiswahili proverbs.

1.6 Significance of the Study

Understanding the impact of VMIs on students attidtues and performance can contribute towards enhancing learners' performance in Kiswahili in national examinations. Further, the research outcome contributes important knowledge to the field of video-mediated instruction. In addition, the research makes recommendations on how to increase motivation, change attitude of students in learning and improve achievement. Finally, the study suggests to Kenya Institute for Curriculum Development (KICD) that VMIs be included in Kiswahili teaching handbooks for the benefit of teachers. It is worth noting that such suggestions can enlighten policy formulation in designing instructional methods of teaching Kiswahili proverbs in secondary schools in Kenya. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method no other relevant studies were available. In conclusion, the findings of the study will hopefully form useful material for reference to other researchers and other readers in general.

1.7 Scope of the Study

The current research particularly sought to identify the effect of Video-Mediated Instructions on students' motivation, attitudes and achievement in learning Kiswahili proverbs in Nakuru County, Kenya. The study was conducted between September 2015 and March 2016. It

involved the researcher working with 436 students in eight schools, purposively selected; eight Form Two classes randomly assigned to two experiment and two control groups, and eight teachers. The social-demographic characteristics of the respondents that were examined in the study included gender and age of students and the work experience of the teachers. This quasi-experiment involved the Solomon four group design.

1.8 Limitations of the Study

The findings of the study were based on individual student responses filled on the questionnaires administered. There was a possibility that the respondents filled in what they considered socially acceptable and not what was the true nature of things. To add on that, the study outcome may be of its kind to the research context, since Form Two students enrolled in the selected schools may not reflect the realities in other counties in the country. In other words, the study may be limited to Nakuru County. This could not have been a longitudinal study due to the university calendar which requires the completion of a doctoral programme within three years. As a result, it may be difficult to tell how long the identified effect would last. This fact paves way for future studies.

1.9 Assumptions of the Study

The current study assumed that the responses by the pupils and the teachers involved were truthful. The study assumed further that the students were of similar attributes. It also assumed that VMIs had an effect on student motivation, attitudes and achievement.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature related to the current study is presented. The literature reviewed includes those on the effect of VMIs on students' motivation, attitudes and achievement in learning Kiswahili proverbs in secondary schools. In addition, the literature review focuses on methods of teaching and learning Kiswahili proverbs; the role of VMIs on students' motivation to learn and attitudes towards learning. Finally, the chapter examines the literature on the factors that influence the achievement of students in Kiswahili proverbs.

2.2 Approaches to Teaching Kiswahili

The styles of teaching and learning have changed from models that emphasize the teacher as the fountain of knowledge and the learner as a passive recipient of fully processed knowledge, to models that stress that the individual learner constructs their knowledge based on funds of knowledge that include prior knowledge and influence from the environment, the teacher and technology (Mellon, 2015). This change is a move from the emphasis on teacher directed, well structured, and organized delivery of knowledge to stress on the responsibility of the individual learner in constructing their understanding and the influence of the environment and technology in such construction (Kiboss, Wachanga & Changeiywo, 2015). The current study has a bias for emerging technologies that enable the learner to construct their knowledge, a theme that is addressed throughout the review of the literature.

2.2.1 Methods of Teaching and Learning Kiswahili Proverbs

In literature, Kiswahili proverbs have been widely discussed. To begin with, King'ei and Ndalu (2009) have compiled Kiswahili proverbs giving the meaning and use of each. Earlier on, Ali (2004) had collected proverbs printed on *Kangas* while Musau and Ngugi (1997); Nsookwa (2011) and Riungu (1985) compared Kiswahili proverbs with proverbs in Luganda,

Kikamba, and Kimeru, respectively. A close look at the works reviewed above shows that none of these studies have looked at how the use of videos affects student motivation, attitudes and achievement in Kiswahili proverbs, a gap that needs urgent attention.

To add on this, there are several well-documented methods of teaching and learning Kiswahili proverbs. They can broadly be categorized as the traditional teacher-centered methods, question and answer method and the technology-enhanced methods and models (Lasry, Charles & Whittaker, 2014). The traditional model uses teaching methods like 'question and answer' and explanations (Fleck, 2011). In a relatively more recent study, Wallah (2014) documents how Kiswahili proverbs have over time been taught using the question and answer method. It is, however, not clear whether or not this method has been effective.

The question and answer method has also been used to teach Kiswahili proverbs. A study carried in Kenya shows that ideally, the question and answer method creates teacher-learner-content engagement to enhance understanding when used to teach proverbs (Turuthi, 2014). In the same study, Turuthi states that the instructor allows the learner to interact with the content and with one another by allowing questions to go from teacher to learner, learner to teacher and learner to learner. To give an example, the teacher may ask the learner to complete a proverb. In some specific instances, the same may be done by the learners themselves. Moreover, the question and answer method helps the instructor to discover students' knowledge beyond recall and comprehension (Cotton, 1989). The stated finding happens because the question and answer approach improves students' deeper thinking beyond 'yes and no' or remembering facts. In yet another study, Mogambi (2011) is of the view that that because Kiswahili is both a language and a culture that should not, if at all

possible, end at the examination, then its pedagogy should be of a practical approach and not abstract. The effectiveness of this method largely remains undocumented in literature.

As a pedagogy, on the other hand, explanation is a procedure of delivering knowledge through words and following a plan (Kang'ahi, Indoshi, Okwach & Osodo, 2012). The inherent belief herein is that learners cannot learn without explanation and, consequently, they are likely to favour it over other methods. In explanation, 'how and why' questions are answered. Leinhardt (2010) states that this is done while accounting for the occurrence of things, describing, interpreting and giving reasons. Studies carried out recently state that an explanation is either given by the teacher or by the learners (Kang'ahi *et al*., 2012). Other scholars are of the view that the explanation given by learners helps the teacher to gain considerable insight into the learners' thinking or their grasp of a problem of the material taught in class (Hativa, 2000). In the pedagogy of proverbs, learners are made to listen as the teacher explains the meaning of a given proverb while in teaching Biology the teacher needs to apply different strategies. An earlier study by Hativa (2000) is further of the view that learners' explanation fosters learning outcomes and leads to higher problem-solving performance. In Kenya, a study has found that explanation is limited in that it encourages retention of facts as an end in themselves and is inadequate for teaching certain concepts (Wachanga, 2002). In conclusion, in the pedagogy of proverbs, explanations alone are not enough to build a lasting mental picture in a learner's mind (Mayer, 2005).

2.3 The Concept of Video-Mediated Instructions (VMIs)

In the 21st century, VMIs deliverer knowledge, skills and attitudes through auditory and ocular medium (Centre For Educational Research and Innovation [CERI], 2007). This notion implies that VMIs satisfy learners by raising their zeal to gain knowledge. Further, VMIs kindle the brain of the learners due to their use of moving images. Video-Mediated Instructions have, in addition, been thought to bring near reality to class by presenting actual

situations that are not commonly available in class thereby motivating learners by captivating them to develop positive attitude leading to positive outcomes (Trucano, 2013). The motivation brought about by VMIs is seen as the characteristic that modifies the way Kiswahili proverbs are taught (Turuthi, 2014). This motivation helps to positively affect achievement by being interesting and thereby influence learner behavior (Chin & Lin, 2016). Interestingly, views like these are supported by Laurillard (1995) who says that video technology in the classroom motivates and encourages students to become problem-solvers. It is worth noting that these video technologies are useful in the development of technology-related skills in students; a crucial factor in the 21st-century knowledge-based global economy (Wamari, 2014).

Video-based technology, as a pedagogical tool, has increased in schools over the years (Tripp & Rich, 2012) with instrutors and learners that have accepted it feeling sufficiently supported in their teaching and learning, respectively (Darling-Hammond, 1997; Harris, Mishra & Koehler, 2009). Technology that is video-based assists the learner to access knowledge through a multiplicity of processes that include among others, audio, visual and kinaesthetic (Mayer, 2005). The said multiple receptors take care of learners differences in ability and multiplicity of intelligences (United Nations International Childrens' Emergency Fund [UNICEF], 2000). Receiving instruction using this kind of method happens because students with different intelligence strengths need various learning styles to cater for individual differences among them (Morgan & Fonseca, 2004). Despite all this, it is not known if VMIs would bring new results in the field of teaching and learning of Kiswahili proverbs, especially at the secondary school level.

Documented research findings on educational applications of video technology is focused on the use of video in teaching secondary school Mathematics (Seago, 2003) and in Biology

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(Huang & Aloi, 1991), and none in Kiswahili in general or Kiswahili proverbs in particular. Furthermore, there is no research that is readily available on the effects of the use of videos in teaching Kiswahili proverbs in Kenya.

Studies that have been carried out indicate that emerging technology offer flexibility and adaptability reflective of pedagogies across various learning models (Reksten, 2000). Lately, technology as a tool in pedagogy has been embraced by digital natives who are able to traverse the virtual world ahead of their teachers (Wamari, 2014). Importantly, it is doubtless to say, therefore, that technological tools supply large amounts of information allowing teachers and learners new ways of exploring education compared to ordinary instructional tools (Desai, Hart & Richards, 2008). In a more recent study, Wamari (2014) argues that if technology is changing the ways of life everywhere, then it should change the way that teachers teach. As a matter of urgency, it is, therefore, prudent for the 21st century teacher to be familiar with and to identify and integrate technology innovatively in teaching and learning to increase motivation, improve memory retention and deepen understanding (Wheeler, 2000). Teachers have been slow in adopting emerging technologies in teaching of Kiswahili proverbs. Further studies on the effectiveness of these technologies in enhancing the performance of student are not readily available. These shortcomings limit policy design and the practices in the teaching of Kiswahili proverbs.

2.3.1 Emerging Technologies

Schooling is at the core of transformation for betterment of life everywhere. Pedagogy has over time undergone transformation to allow new discoveries in science and technology to contribute adequately to its practices and processes of teaching and learning (Ruddell & Unrau, 2004). The reason people go to school to acquire skills in literacy and numeracy is to make a positive transformation in their lives. New technologies are being discovered and perfected every day. Subsequently, the fast-advancing technologies are bringing phenomenal

change into pedagogy that can only be equated to a centenal revolution not only in teaching and learning but in other sectors as well. As a result, literacy, numeracy, teaching and learning are being redefined in the face of emerging technologies and, subsequently, teacher training must equally undergo change to prepare the teacher to acquire knowledge, skills and attitudes for using new technologies (Leu, Kinzer, Coiro & Cammack, 2004).

The trainee-teacher and the practicing teacher must be exposed sufficiently to emerging technologies that play learning games and videos (Gee, 2003). Other emerging technologies for the 21st century teacher include starting and belonging to online learning communities like Moodle and Blackboard, an activity that requires the ability to use the internet in all its entirety (Chandler-Olcott & Mahar, 2003; Jansen, Spink & Saracevic, 2000). Moreover, teacher learning and practice is frequently altered as emerging technologies bring a paradigm shift, therby opening new dimensions, potentials and promises for pedagogy, communication and information. Consequently, as many more teachers are exposed to emerging technologies, their vocabulary and practice is shaped in a fundamentally new and exciting way with different and pleasurable results.

Reading and writing has evolved from the early rubber, paper, pen, pencil, slate and book technologies to a whole range of instructional information and communication technologies (ICTs). These ICTs include 140 character tweets on Twitter, photos and comments on Instagram, blog posts, word processors, video editors Web browsers, e-mails and instant messaging like WhatsApp. Websites are available for trainee and practicing teachers to visit for blogging. Examples include WordPress.com and Blogger.com from where a written blog may be posted on Twitter or Facebook.

Other ways through which a teacher may make a presentation is via spreadsheets like Excel, presentation software like PowerPoint, plug-ins like Zotero and many others (Wamari, 2013).

Without a doubt, teacher trainees and practicing teachers have a responsibility and challenge to cautiously choose the emerging technologies they understand and use with ease in their individual places of work. Wamari (2013) states that emerging technologies are advantageous in teaching and learning because the information involved is current and easy to acquire in various forms. It is portable from one user to the other, may be duplicated, reduced or expanded in any manner desired by the individual especially if it is held under a license that is free, open and online (Salkeld, 2013). From many pieces of information, teachers and learners may come up with a completely new, integrated and advanced information.

It is notable that emerging technologies are disadvantageous in pedagogy because there exists particular course books that dictate uniformity across a geographical area. There may be challenges in evaluating the accuracy of the content covered by the teachers or the knowledge that learners have internalized. In other words, once involved, teachers and specialists with defined course books and set timelines can now be dealt with unofficially through the cumulative activities of many online sources thus exasperating institutionalized tests and evaluation methods. Controlling individual persons' rationality making has significant implications for achievement.

In this part of the world, very little is known about how new ways of teaching and learning affect achievement. Traditional research literature show that very little is actually known and most of it is from America and Europe. In addition, very little research has been conducted in the area of emerging technologies and achievement for far too long. This observation that results from various analyses of research in this area of emerging technology and achievement (Lankshear & Knobel, 2003) is the basis for this study.

2.3.2 Developing Videos for VMIs

Making a video can be a daunting task for some while to others it is may be easy. Ramsay (2014) offers some guidelines on how to develop videos. The first step involves developing a draft of the initial script. The lines should be written in an explanatory manner. The script should consist of the main message and supporting points that require organizing into a logical order or script. The script should be brief, preferably one page long. The next important step is setting and turning on the camera. The initial drafts should be split up into 1-2 sentence chunks for easy memorization. Next, it is important to read the script aloud a number of times and make sure it sounds natural. Reading the script right into the camera is essential. Lighting is an important factor for making video shots look good as experts say that lighting is better than a good camera (Ramsay, 2014). Finally, editing of the shots is usually recommended.

It is advisable that teachers follow the recommendations given and develop videos using locally available resources. Digital cameras can be used to take both still and motion pictures that are ideal for teaching and learning. Digital cameras are easy to navigate through since they have various settings that guide the user on the basic features to get one started. Further, smartphones which usually have video-enabled cameras can also allow the user to take photographs and sometimes videos. In this age, digital cameras and smartphones are ubiquitous, easy to use and efficient. For this reason, teachers can easily make teaching objects for personal use without depending on external assistance.

2.4 Relating VMIs to Motivation

Initially reviewed is literature on the first objective of the current research which was to establish the effect of video-mediated instruction on students' motivation towards the learning of Kiswahili proverbs. Linnebrink and Pintrich (2003) explain that motivation is a primary concern among teachers and that motivating students is a constant problem

throughout education requiring teachers to apply different strategies in teaching. By definition, motivation is a non-intelligent factor that influences behaviour (Gagné *et al.*, 2014; Liu, 2014). Motivation is a construct that explains people's actions, desires and needs (Johnson, 2012). Other scholars define it as the stimulating force that elicits a certain conduct or direction from an organism to satisfy the drive or seek a particular goal (Kong, 2009b; Ormrod, 2003). Moreover, motivation has been defined by Camerer, Loewenstein and Rabin (2008) as that which directs behaviour or influences a person to desire to repeat a behaviour. Other scholars such as Armstrong (2012) state that motivation energizes, directs and sustains behaviour. At the same time, other scholars are of the view that motivation gets learners moving, points them to a particular direction or goal, and keeps them going (Wiseman & Hunt, 2014). These definitions are summated by Fox and Varadarajan (2011) who define motivation as the motive which prompts a person to do things in a particular way or to develop a liking of doing things in a specific way. Teachers are always looking for what prompts their students' behaviour since this prompter (motivation) is the key to success in education.

In an earlier study, Oldham (2010) opines that motivation influences the kind of classroom material to which learners pay attention and how effectively they process, truly understand and consider to use it in their own lives. In furtherance, Oldham says that motivation can be induced by physiological drives not to mention events in the external environment. In order to make matters better, educators are called upon to increase their learners' independent motivation by providing learning activities that play to the learners' natural creativity and curiosity (Brophy, 2003). Educators are further called upon to turn on the learners' mood by making learning fun and adventurous. In order for this to be achieved, the teacher must arouse interest in the subject matter, maintaining curiosity and by using a variety of interesting presentation modes (Ormrod, 2003).

In the same study, teachers are called upon to effectively plan and execute relevant and interesting instructions to maintain student motivation (Oldham, 2010). Oldham further says that teachers who wish to increase student motivation must value and respond effectively to student learning styles, create a positive educational environment conducive to learning and keep the learners actively involved in the learning process. In the same study, the scholar states that the teachers need to concentrate on the nature of the learning environment if they wish to affect student motivation (Oldham, 2010). It is, therefore, hoped that by using video images that are attractive and appealing, teachers will be able to provide quality motivation to the learners of Kiswahili proverbs.

2.4.1 Types of Motivation

Generally, two major types of motivation, namely intrinsic and extrinsic, exist (Vallerand *et al*., 1992). The two are discussed in the sections below.

Intrinsic Motivation and VMIs

According to Gagné *et al*. (2014), intrinsic motivation is a person's inner drive to perform tasks for a goal and sustain their effort in a given direction. Ideally, intrinsic motivation is the inward force that pushes students learning Kiswahili proverbs forward. This is the self-desire to seek out new things and new challenges for example in the learning of Kiswahili proverbs. Conceptually, intrinsic motivation tries to examine a person's capacity to observe and to gain new knowledge. Learners who are intrinsically motivated will tend to perform better in classwork because they are ready and keen to learn new content. The learners' instructional experience becomes meaningful, and they delve deep in the subject-content to fully understand it (Gardner, 2010). Another scholar explains that intrinsic motivation is concerned with responses to the needs existing inside the learner. Examples of these needs are the quest to know, urge and the feelings of growth or competence (Verstuyf, Patrick, Vansteenkiste & Teixeira, 2012). In other words, learners show an inner desire to obtain knowledge that is

new and interesting with the need to quench their thirst, desire to know and feelings of growth and competence (Dornyei & Schmidt, 2001). This implies that students with intrinsic motivation have a tendency to study on their own will and mostly they have a preference for complex tasks (de Barba, Kennedy & Ainley, 2016).

In relation to the current study, intrinsic motivation has the advantage for learning important concepts such as proverbs as the inward interest makes students self-starting and maintains the motivational engine longer (Kong, 2009b). Huitt (2011) states that generally, students are said to be intrinsically motivated if they attribute their educational results to factors under their own control otherwise referred to as autonomy or internal locus of control. This observation by Huitt reiterates that learners attribute their achievements to themselves or to their own efforts. Further, learners are said to be intrinsically motivated if they believe they have the ability to reach their desired goals. Learners who are intrinsically motivated manifest interest in mastering a given topic and not merely acquiring good grades.

One advantage of intrinsic motivation is that it is long lasting and self-sustaining (Kong, 2009b). Besides, efforts to build this kind of motivation requires promotion of students' learning (Gardner, 2010). These kinds of efforts focus on the subject rather than rewards and punishment. One disadvantage of intrinsic motivation is that efforts to foster it can be slow in the way the efforts affect behavior and can require special and extensive preparation by the teacher (Dornyei & Schmidt, 2001). Learners vary and thus a mixed approach may be needed to motivate learners of different capability and perception. For the teacher, it is often helpful to show interest in the subject content, understand the learners and their interests in order to connect them with the subject matter. Further, it is known that most people from the African continent tend to attribute outcomes to an external locus of control (Vallerand *et al*., 1992). Subsequently, available evidence indicates that students in Kenya tend to attribute their

achievement to external forces (Kemboi, 2015). Therefore, it is important for the teacher of Kiswahili proverbs to be aware of such intricacies.

Extrinsic Motivation and VMIs

Extrinsic motivation refers to forces that are external to the individual and unrelated to the task in question that may include the learning process (Gagné *et al.*, 2014). Extrinsic motivation exists when a subject is influenced by an outcome that is external to the individual and is unrelated to the task in which one is involved (Gardner, 2010). For example, learning may be influenced by the wish to win the teacher's commendation or credit. Besides, the influence may be the desire to win favour from parents. It may then be concluded that the motivation involved is basically extrinsic (Verstuyf *et al.*, 2012).

Put differently, the learners' motivation to study lies principally outside themselves and the aim of learning involves the knowledge attainment but also the need for rewards. In learning Kiswahili, extrinsic motivation would take the form of commendation, gifts or punishment (Dornyei, 1994). Observations made show that the threat of punishment to deter certain tasks enhance an individual's interest in the said activity (de Barba *et al.*, 2016). Besides, the prospect of outward rewards can result to enhanced interest and attainment in the task (Kong, 2009b). Observations show that over-emphasis on gifts may result in an additional reduction in intrinsic motivation (Mao, 2011). The provision of gifts and rewards might decrease the need for a task. Conversely, the threat of punishment against performing a task has been found to increase one's intrinsic interest in that task (Gagné *et al.*, 2014).

There is a possibility to look at the reward or punishment and not the desired activity. Intrinsic and extrinsic motivations, in the words of Kong (2009), are two undividable phenomena. Not all students are automatically energized to engage in a given task or to learn a certain topic. When it comes to language learning, the two complement each other in an

actual world setting (Gardner, 2010). The risk of failing, a good grade, and sometimes praise may shift students from being passive to become active (Bedel, 2016). Extrinsic motivators are likely to increase intrinsic motivation (Dornyei & Schmidt, 2001). Although extrinsic motivators play a crucial role in pedagogy, overstressing their use has the potential to stifle intrinsic motivation. VMIs have both intrinsic and extrinsic motivation characteristics and therefore the need to try them in class (Salkeld, 2013b).

Technology has the ability to combine the intrinsic and extrinsic motivation. In teaching Kiswahili, this integration makes the learner desirous of learning the target language because it stresses the practical elements of learning a language. VMIs in teaching Kiswahili proverbs are captivating and persuasively tied to the importance of teaching culture in the classroom.

2.4.2 Theories of Motivation

A Two-Factor theory of motivation was proposed by Frederick Herzberg, a behavioural scientist, in 1959 (Riley, 2005). This is also known as the dual factor theory. Herzberg theorized that there are two factors that influence satisfaction motivation and hygiene. Motivating factors include enjoyment, feeling recognized and career progression. Besides, Herzberg states that motivation factors increase employee satisfaction. In the teaching of Kiswahili proverbs, in a classroom situation, the teacher would motivate the learners by giving them attention and feedback. Moreover, the teacher needs to focus on individual students since what motivates one learner might not necessarily motivate the other. In the use of VMIs, learners can construct their knowledge without wholly depending on the point of view of the teacher.

Hygiene factors are those learning factors which are necessary for the existence of motivation in the classroom. They may not lead to long-term motivation. However, their absence in the classroom would lead to dissatisfaction. In the words of McNeely (2011), hygiene factors

calm the learner and do not make them uncomfortable when in a learning environment. These factors are extrinsic to the content learned. They include the school rules, school programmes, well-maintained buildings and open spaces, desks, comfort and the relationship between learners, teachers and workers.

The implication of the Two-Factor theory, in the words of Achor (2011), is that the teachers have no choice but to stress upon ensuring the adequacy of the hygiene factors to avoid learner dissatisfaction. Besides, the teacher must make sure that the lesson is interesting and satisfying so that the learners are motivated to learn and achieve better scores. This theory emphasizes that the learners should be given tasks with difficulty commensurate with their ability to motivate them. The tasks must utilize the learners' cleverness to the maximum. By focusing on the motivational factors, the teacher can improve the quality of learning. VMIs in teaching Kiswahili proverbs are captivating and persuasively tied to the importance of teaching culture in the classroom and have the ability to combine the two-factor theories of motivation. In teaching Kiswahili proverbs, motivation factor makes learners desirous of learning because it is interesting.

2.5 Relating VMIs to Attitude

Literature has also been reviewed on the second objective of the current study which sought to determine the effect of video-mediated instructions on students' attitude towards Kiswahili proverbs. Ajzen (2007) and Ajzen and Fishbein (1980) define attitude in various ways. Initially, they define attitude as the extensive inclusive, cognitive, affective and behavioural components. Besides, attitude is defined as the mental and non-aligned states of eagerness, exerting an instructive and active influence on an individuals response to all psychological objects and situations (Schwarz & Bohner, 2001).

Conceptually, these authors suggest that attitude is the readiness of the mind to act or react in a certain way (Broekman & Broekman, 2016). Ajzen (2011) defines attitude as the affinity to think, feel, or act positively or negatively towards objects in our environment that are psychological objects. A psychological object is; a person, an idea, a thought, a physical object, group, policy or practice. The core issue in this definition is the like or dislike of any psychological object. It is, therefore, a concept that covers all aspects of human experience that is characterized by fondness or aversion of psychological objects. Jain (2014) clarifies that "attitudes are clusters of feelings, beliefs and behavior tendencies directed towards any given psychological object." Attitude can consequently be described as a summary evaluation of a psychological object.

Gardner (1985) on the other hand describes attitude as a learned predisposition that might or might not be factual. The core issue in this description is that attitude is acquired through a learning process. Prominently, this definition also points that attitude does not necessarily rely on facts. Collectively and in simple terms, attitude can, therefore, be described as judging psychological objects' favourableness or otherwise. This is the sense that the term attitude was used for this study.

Attitudes are a theoretical construct developed to account for a body of a phenomenon that revolves around likes and dislikes (Ajzen, 1991, 2007). A multitude of working definitions of attitude exists in literature. Broadly these working definitions of attitude are categorized as either direct or indirect measures (McLeod, 2009). There is one major reason why attitudes are not frequently studied. Bock and Kim (2001) explain this to be the intricacy many have in clearly identifying how they should be measured. Given that attitudes are hidden, and not visible in themselves, the teacher must identify some activity that would seem to represent the attitude in question so that this behaviour might be calculated as an indicator of the

attitude (Gable, Madaus & Stufflebeam, 2012). Put differently, attitudes are not observed directly but are largely inferred from individual self-reports and behavior (Schwarz, 2007). Ajzen (2001) is even candid in stating that there are no direct measures of attitude.

Direct measures entail the use of Likert scales and semantic differentials (Simonson & Maushak, 1996). One is allowed to assign values to individuals in a theoretically meaningful manner, such that differences in those values are thought to reflect differences in the underlying construct that is being measured by these direct measurements (Schwarz & Bohner, 2001). However, direct measures are imperfect (Eysenck, 2002). This is largely because the numerical values that are assigned contain both random and systematic errors, with the second reflecting differences in underlying constructs other than the attitude that one intended to measure. The semantic differential techniques asks a person to rate an issue or topic on a standard set of bipolar adjectives (that is with opposite meaning) (Eysenck, 2002). Problems that affect the direct measures of attitude are varied. Hewstone, Stroebe and Jonas (2015) state that the most common is that of social desirability. They explain that social desirability is the tendance for people to give responses to questionnaire items that make them seem properly adjusted, neutral, open minded and democratic (Eysenck, 2002). Additionally, Puri, Hall and Ho (2014) explain that attitudes are related to personal self-image and social acceptance. Gable *et al.* (2012) add that to protect a positive self-image, respondents' responses may be affected by social desirability. Unfortunately, this might not adequately tell about their true attitudes but respond in a socially acceptable way. Such attitude scales are not always valid. Consequently, this study rejected the direct measures of attitude.

Various indirect measures of attitude have also been used in the literature (Eysenck, 2002). Bornstein (2005) states that these measures ensure that the people are not aware of what is

being measured or they are not able to consciously affect what is being measured. Besides, Sue (2016) explain that indirect methods are physiological and disguised procedures. Typically indirect tests involve the use of a projective tests. Ideally, a projective test involves presenting a person with an indefinite or incomplete test that requires interpretation from the person. The implication here, in the opinion of Ajzen (2007), is that a person's attitude is inferred. Eysenck (2002) states that the main assumption about these measures of attitude is that individuals ought to project their views into the uncertain situations and thus revealing the attitudes they hold. Eysenck concludes by giving examples of techniques that include thematic apperception tests. Indirect attitude measures have the advantage that they are less likely to produce socially desirable responses (Smith, 2017). The indirect measures of attitude are either single-item or multi-items and were adopted in the current study.

Indirect methods have been criticized for only providing wide-ranging information and not offering a particular measurement of attitude strength since they are qualitative rather than quantitative (Eysenck, 2002). In other words, they lack objectivity and are thus considered to be unscientific. Another major concern about the indirect method of attitude measures is the ethical problem of deception as often the person does not know that their attitude is being studied (Smith, 2017). Consequently, the indirect method of attitude measures was not considered as appropriate in the current study.

By design, attitude scales offer a convincing measure of an individuals social attitude. An example of direct measures used to assess attitude are Likert and Thurstone scaling (Ajzen, 2012). Likert scales ask respondents to indicate their degree of agreement with each statement for instance on a five-point scale (Onguko, 2012). Likert scaling is appropriate when the researcher believes that the expected responses are linear (Rasmussen, 1989). Thurstone requires an additive element within each of the items assessing attitude (Bedel,

2016). For example, item one is related to the subsequent item. It is appropriate if the responses are thought to be curvilinear (Katou, 2011).

Single items are advantageous in that they are simple in their administration (Kobia & Ndiga, 2013). However, single items are disadvantageous because if a researcher asks a single item, it might show bias and it is not likely to give a fair judgement on a single item (Ajzen, 2011). Multi-items, on the other hand, are reliable due to their repeatability and have high construct validity. In other words, they measure what they are intended to measure (Jain & Sidhu, 2013). Their disadvantage is that very many questions cause respondent fatigue (Liu, 2014). For this study, a multi-item tool was selected. In the absence of an existing tool for students' attitude towards Kiswahili proverbs, an attitude questionnaire was adopted from previous works and modified before use.

2.5.1 Models of Attitude and VMIs

Conservatively, researchers of attitude focus on the development of models that can easily clarify how people measure and react to different stimuli (Fishbein & Ajzen, 2015). An emphasis on understanding the relationship between cognitive structure (that is beliefs) affect and attitude is a frequent theme in attitude research (Jain, 2014). A major debate exists in literature surrounding the relationship between these constructs. One strand of literature is of the view that cognition (beliefs) are central to the formation of attitude. Another strand argues that affect (feelings) determine attitude and yet another argues that both cognition and affect jointly influence attitude (Ajzen & Fishbein, 1980). At the same time, another major model is attributed to people's evaluations of an object which are determined by their beliefs about the object (Jain, 2014). Elsewhere, an additional important attitude model suggests that perceived usefulness and ease of use are central in the adoption of new technology (Davis, 1989, 1993 & Jain, 2014). Broadly, these three streams of literature are termed as the Tripartite Model

(ABC), Expectancy Value Model (EV) and Technology Acceptance Model (TAM) (Youssef, 2012). The three strands of literature are discussed below.

Cognitive Models and VMIs

These models hold the view that the cognitive structure, based on a person's salient beliefs, determines a person's attitude (Saadé & Bahli, 2005). The expectancy value model advocated by Fishbein and Ajzen (2015) is the most commonly known cognitive model. The Technology Acceptance Model is also based on cognitive structure and is of particular interest in the current study due to its focus on VMIs. Both are briefly discussed in the next two sub-sections.

The Expectancy Value Model and VMIs

Ajzen (2012) explains that one widely accepted theory of attitude formation describes the relation between beliefs about an object and attitude toward the object concerning an expectancy-value (EV) model. To a large extent, this evaluative reaction is thought to be based on the person's beliefs concerning the attitude object associated with the cognitive sense of most current theories in social psychology. The most detailed formulation of the EV model of attitude was proposed by Fishbein in 1963 and 1967 with several revisions (Ajzen, 2012). Here, people's attitudes towards an object are determined by their beliefs about the object, where a belief is defined as 'the subjective probability that the object has a certain attribute' (Ajzen, 2012). Ajzen rightfully states that object and attribute are terms used to refer to any discriminable aspect of an individual's world. A good example is a student who may believe that their classwork (the attitude object) requires concentration (the attribute). Every belief, therefore, associates the class work with a certain attribute. According to the expectancy-value model, a person's overall attitude towards classwork is determined by the subjective values or evaluations of the attributes associated with the classwork and by the

strength of these associations (Ajzen, 2012). Particularly, the evaluation of each attribute contributes to the attitude towards the class work in direct proportion to the student's subjective probability that the classwork possesses the attribute in question (Ajzen, 2012). Ajzen additionally, explains that this model suggests a value importance and perceived instrumentality as separate and possibly manipulable dimensions of the attitude structure. Ajzen talks about the EV model as the importance and the likelihood of attaining that given aspect of attitude. The attribute is a summation of importance and the likelihood of attaining the belief. This is one of the most significant models of attitude. It can be summarized by the formula:

$$A = \sum(ba).$$

Where: A is attitude towards a certain object

$\sum$ is the sum

b is the strength of the belief

α is the evaluation of the attribute.

Ajzen (2012) further observes that most action is not under full voluntary control of any given individual. Several hindrances like lack of knowledge, skills, resources, time, opportunities and support among others frequently stand in the way to perform any given task. In spite of these hindrances, people still form intensions to perform any given action. As a result, the theory has been widely used in many areas of social sciences including the investigation of students' attitude (Ajzen, 2012).

According to Ajzen (2012), the development of the EV model has largely helped in explaining how attitudes are formed. The significance of this effort has however been challenged by research findings that have questioned the ability of the attitude construct in explaining social behavior. Indeed, meta-analyses indicate zero to weak correlations between attitude and various indicators of performance (Ajzen, 2002). A variety of measures have been developed over the years to assess learner attitude and educational performance

(Kageni, Havice, Isbell & Smith, 2014). From a great number of studies that investigated the relation between learner attitudes and educational performance, disappointing reports showed either very low or often non-significant correlation (Wubbels & Brekelmans, 2005). Indeed, a meta-analysis showed a mean correlation of only 0.18 between learner attitude and student performance (Ajzen, 2012). These results suggest that there may be no consistency between the metaphorical attitudes and real behavior. In a review of literature on the connection between attitude and performance, Ajzen (2011) laments that it is likely that attitudes are either unrelated or only slightly related to explicit behaviors than attitudes are closely related to actions. Without a doubt, anyone disposed to depend on attitudes to forecast and explain human behavior, such low relationships may be discouraging. Attitudes have nonetheless been found to be of importance in forecasting behaviour, with the use of appropriate research methods (Fishbein & Ajzen, 2015).

Fortunately, Ajzen (2012) has devised the principle of compatibility which helps in the explanation of the nature of the relation between verbal attitudes and overt actions. Briefly, this principle holds that attitudes and behavior show a relationship with each other to the extent that they refer to the same action, target, context and time elements (Ajzen, 2011). Typically a valid measure of any given behavior involves a specific action. The action is watching a video programme, while the target is a lesson on a given Kiswahili proverb. The specific context is the coverage of Kiswahili syllabus in school and time frame is, for instance, a five-minute video clip during a single 40 minute Kiswahili lesson in a week. By way of contrast, general attitudes (for example towards Kiswahili proverbs) only identify the target; they fail to specify the action, context, or time element with certainty. Ajzen (2011) is of the view that this lack of compatibility, especially in the action element, is at the root of the low and often non-statistically significant association between general attitude and explicit behaviours.

Ajzen (2012) disagrees with the opinion that general attitudes are not relevant in behaviour prediction. This is according to the principle of compatibility which states that general attitudes foretell a wide range of patterns of behaviour. Ajzen reiterates that an average of different behaviours intended for the same target enables the researcher to get an average of activities, situations and timeframes, thereby ensuring agreeableness with a wide range of attitudes toward the target in question. Important implications of the principle of compatibility have not been explored in relation to achievement. Instead, there exists a suggestion that achievement being a wide-ranging idea, should be predictive of a wide range of actions but not of any single behavior. In this study we took the performance of learners to be a broad concept.

Technology Acceptance Model and VMIs

Technology Acceptance Model (TAM), in the words of Jain (2014), is a functional model of technology. People are inclined to use a specific technology if they find it useful and easy to use (Rampersad, Plewa & Troshani, 2012). The perception of a technology's usefulness is measured by the extent to which technology can help to improve task performance while ease of use is measured by how it is free of effort (Jain, 2014). Since the current study had a bias towards technology, this model was used to obtain the different aspects of beliefs about VMIs.

Recently, scholars have observed that positive learner attitudes are important because they impact learner achievement (Jain, 2014). They explain that this explanation is because: Learners must at times admit the reality of certain information; they are likely to remember what they learn, look for new knowledge and be inspired to study when they develop positive attitudes to the instructional methods. They stress that as much as possible, the teacher should be aware of the instructional techniques that affect student attitude so that they influence and

measure students' attitude to learn the situations that impact the learning process. Jain (2014) reiterates that the positive attitude of a student towards a medium of instruction is crucial because there exists a positive relationship between students' attitudes and students' achievement. This study investigated how videos were used to improve learner attitude and help the teaching experience.

A recent study reports that teachers have a duty to learn to select and use available tools to transform the learning environment and in the process maximize learner outcomes (Kageni *et al.*, 2014). Studies carried out slightly earlier show that learners respond positively to technology enhanced instructional methods (Thomas & Thomas, 2012). Other scholars state that this outcome thereby improves performance in examinations (House & Keely, 1996). It has almost become common knowledge that continued use of ICT-based teaching and learning tools make students develop a more positive attitude (Makini, 2014). As a result of these positive attitudes, learners will want to prolong the use of the tool, become creative and yearn to take charge of their learning process as a consequence (Hiebert & Stigler, 2000). Initial studies carried out indicated that video-mediated instruction affects attitude by exposing learners to new methods of instruction to influence their behaviour towards learning (Simonson & Maushak, 1996). This implies that video images that are attractive and appealing may cause learners to have a positive attitude towards Kiswahili proverbs. These arguments motivated the conduct of the current study.

Combination of Affective, Behavioural and Cognitive Aspects of Attitude and VMIs

Although a large body of literature has emphasized the centrality of cognitions as determinants of attitude, another growing strand of literature demonstrates the individual impacts of affect and behaviour on attitude. An important debate also exists in literature around the relationship between these three constructs (Jain, 2014).

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The most acknowledged view of attitude assumes that evaluations are influenced by cognition, affect and behaviour, a conceptualization widely termed as the ABC model (Jain, 2014). An alternative research strand suggests that attitude consists of both affective and cognitive components, which has largely been described as the vector model. In other words, both beliefs and feelings regarding an object are central determinants of attitude. Both these understandings of the combination of the different aspects of attitude and their implications on VMIs are briefly described below.

The Tripartite Model and VMIs

The Tripartite Model is also referred to as the ABC model (Jain, 2014). Jain explains that affective represents emotions which represent verbal statements or feelings while behavioural includes an individual's overt actions or verbal statements about intended behaviour and cognitive represents verbal statements of some given beliefs (Liu, 2014). However, the assessment system in Kenya does not pay much attention to emotions and attitudes of learners in the summative examination and, therefore, the unsuitability of this model in the current study.

Vector Model and VMIs

Vector model, on the other hand, is a two-dimensional structure of attitudes (Calder & Lutz, 1972; Green, 1973; Jain, 2014). The first dimension represents an affective component (liking or favorableness) while the second represents a cognitive component (likely or probable). Any belief an individual possesses about a product is characterized by a value on each of these dimensions (Jain, 2014), that is, as a set of coordinates in the cognitive. Consequently, a value in each of these dimensions portray any belief that a person has (Jain, 2014). The empirical support for the vector model has not been adequately examined since the claim of Calder and Lutz (1972). Therefore, there is need to determine the validity of this claim. This was not, however, examined in this study due to the complex nature of the study

design utilized. VMIs do not necessarily depend on the belief of the person concerned which was, therefore, not examined in the current study.

2.5.2 Determinants of Attitude and VMIs

Literature suggests that there are at least two central determinants of attitude (Golub, Gilbert & Wilson, 2009; Jain, 2014). The first is the cognitive structure based on a person's belief and use of expectancy-value model (Ajzen, 2012; Goles *et al*., 2005). This theory states that a person's beliefs determine attitude. The second determinant states that the non-cognitive factors (affect) and cognitive factors lead to attitude. These results suggest that cognition may not always be a central determinant of attitude. The determinants of attitude may, therefore, include an individual's morals; usefulness; awareness of laws and regulations and self-identity (Ajzen, 2012; Goles *et al.*, 2005). There is need for further systematic examination of the relations between the constructs believed to influence attitude.

Analyses of combined results from multiple studies have shown that "non-cognitive measures provide approximately 20% improvement over cognitive ability measures in predicting positive attitude" (Kyllonen, 2005). Rosen, Glennie, Dalton, Lennon and Bozick (2010) explain that non-cognitive traits such as effort which stands for persistence, motivation, self-control and aspects of conscientiousness, resilience or tenacity, collegiality or teamwork, communication and enthusiasm affect attitude.

On the other hand, Lennartsson (2008) elucidates on the social factors that affect attitude such as age, gender, social class, ethnicity, social-cultural factors and second language. The teacher factor and the external pressure they exert according to Al Kaboody (2013) is an extrinsic motivator. The factors that influence attitude are internal and external. The internal include among others age, aptitude, motivation, personality and gender. The external factors, on the other hand, include teachers teaching and learning contexts and technology (Jain,

2014). For example boys generally, express more self-confidence in academic areas involving technology (Gurian & Stevens, 2004; Pajares, Miller & Johnson, 1999). A study carried out in the United States of America showed a difference in male-female beliefs about their ability to acquire a new language and technology use in the classroom (Bernat & Lloyd, 2007). Gurian and Stevens (2004) in another study revealed that empowerment is an important factor that motivates students in technology-mediated classes. It is not known if the same is true of video-mediated learning in the Kenyan scenario due to lack of information.

Ushida (2005) demonstrates that students may be familiar with the use of technology yet they do not always transfer their technology skills to the learning environment. The responsibility of the instructor remains crucial even in technology-enhanced instructions. Ushida concludes that more research is required to understand better how technology-based language courses may be implemented most effectively.

2.6 Relating VMIs to Achievement

Literature was subsequently reviewed on the third objective of the current study which was to examine the effect of video-mediated instruction on students' achievement in Kiswahili proverbs. Altinok (2013) states that achievement has no unique definition. It can be understood as accomplishing results attained from given activities (value created). Achievement may also refer to how an activity is carried out (the process of creation of value) (Jabbarifar, 2009). It it can also be defined as the ability to achieve results (the potential to create value) (Kurgat & Gordon, 2014). In short, achievement may be looked at as the end, the process and the potential (Makini, 2014).

Traditionally, actualized results have been the main focus of attention (Altinok, 2013). This is quite evident in education where marks attained are the most frequent measures used for achievement. The reason for this is that actual results are deemed more important relative to

the distant in rewarding, difficult to measure and uncertain process or potential for achieving results. Jabor *et al.* (2011) argue that a balanced view of achievement should pay attention to actual results and operational factors (process factors), efficiency and quality in the production process. These factors affect future results, such as research and development (RD) and the development of key competences. This is relevant in education where some situations cannot be confined in only one of these three views of achievement. For example, Nako (2015), Shah and Khan (2015) provide evidence which shows that some aspects of education such as variety, learning while doing and autonomy make students satisfied. The current study is concerned with the immediate outcomes. As a result, a holistic view of achievement was considered in this study.

2.6.1 Models of Achievement

Achievement covers aspects related to the accomplishment of goals (outcomes); resource acquisition (process); the absence of internal strain and force – capacity (Giulio Marchesini, 2010). Several models in literature attempt to capture the richness of the concept of achievement (Kosgei *et al.*, 2013). This can be explained by the nature of the concept especially in the sense that it has unspecified boundaries and the different conceptualization of the term (Kurgat & Gordon, 2014). Initially, the concept achievement focused on the attainment of goals (goals models). It then gradually considered the resources and processes necessary to attain these goals (systems models). In addition, competing values models currently the absence of ineffectiveness factors is widely considered. Finally, Fuller (1987) and Fuller and Dellagnelo (1999) explain how the powerful constituencies gravitating around a given institution. These strategic constituent models are also known as the powerful others or the values on which the evaluation of effectiveness are grounded upon.

2.6.2 Potential to Create Value

Potential to Create Value is a widely neglected view of achievement. Broadly, it envisages the presumed capacity of students to achieve (Eshetu, 2015). It may include the type of training; experience, exposure, certification and awards. It is suggested that the highly unequal distribution of such signs among students results in the situation where a few of them make considerable gains in academic achievement (Brown, 2010). It has also been suggested that linkages; social networks have an effect on achievement (formal and informal linkages). New forms of linkages through technology are also thought to improve students' academic performance (Kang'ahi *et al.*, 2012). These new technologies have potential to improve communication and keep students informed about the latest ideas. When used wisely, electronic systems provide students with the opportunity to search the entire globe, access diverse services, identify cultural opportunities and conduct transactions among many other things (Shah & Khan, 2015). Having regular contact with linkages can, therefore, result in a healthy exchange of approaches and resources – including knowledge and expertise (Kurgat & Gordon, 2014).

2.6.3 The Process of Creating Value

For education facilities (systems of creating value) include structural characteristic such as infrastructure: Studio, laboratory, certification, technologies and policies and procedures (Altinok, 2013). Deficiencies in any of these should be considered as an issue in performance. The main focus of facilities to any researcher is the identification of factors that inhibit or enhance performance (Eshetu, 2015). Facilities should be conceived as a form of internal strain, problems and fault (Hungi, Ngware & Abuya, 2014). Achievement is consequently defined as the absence of ineffectiveness factors.

The technological resources in teaching include equipment, machinery, manpower and systems such as the library, information system hardware and software (Shah & Khan, 2015).

Shah and Khan reiterate that any school that can offer a harmonious, efficient internal environment is considered as an effective and efficient school. This approach emphasizes the internal logic and consistency among the inputs in an organization. This study, therefore, sought to find out if there was a flow between inputs and the product.

2.6.4 Creation of Value

The creation of value approach measured achievement regarding attainment of some goals. Usually, the goals are defined – goals model (Singh & Choudhary, 2015). The focus is exclusively on the ends. Here, the outcomes are compared with the targets. Achievement mainly was measured by use of previous literature, curriculum standards, or statistical measures. In the current study, the marks were earned out of thirty (x/30). The marks earned was later transformed to between 0-1.00 as the measure of value.

2.6.5 Combining the Three Approaches

This is possible using at least three models, namely systems approach, competing values models and the stakeholder approach. The systems approach model emphasizes the need to achieve specific ends regarding inputs, acquisition of resources and processes (Kang'ahi *et al.*, 2012).

The conception of an institution is grounded in the open systems approach whereby the inputs' transformational processes and outputs are considered part of a whole (Shimada, 2010). This approach suggests that the values of an institution drive achievement (Nako, 2015). Nako states that these values influence the strategy, the objectives and stakeholder priorities. This model views achievement as influenced by three sets of values: The means-end which roughly refers to the goals and systems model; the internal-external which refers to the different stakeholder needs and the control-flexibility. Based on these three competing values, four models of effectiveness can be discerned (identified). They are rational goals,

internal processes, open systems and human relations. Stakeholders are groups or individuals inside or outside the school that have an influence or a stake in its performance (Lucas & Mbiti, 2011).

There are five types of stakeholders (Singh & Choudhary, 2015). Singh and Choudhary classify stakeholders as shareholders or owners; students or customers; communities or external stakeholders. It is they that define the external expectation of a school's achievement. The other two notably suppliers and employees participate in the school to plan, design implement and deliver the schools products and services. Another set of stakeholders include the expectations of various powerful interest groups that gravitate around the school. Thus a school is perceived as a set of internal and external constituencies that negotiate a complex set of constraints, goals and referents (Fuller, 1987; Fuller & Dellagnelo, 1999).

2.7 Other Factors that Affect Important Students Outcomes

Literature shows that there are other factors than those tested that affect the outcomes of students after they are exposed to an experiment. These factors include among others, students' age, students' gender and the experience of the teacher. These factors are discussed in the following section.

2.7.1 Students' Gender

The gender theory suggests that male and female enter the education system with different sets of behavior, attitudes and values (Frei & Leowinata, 2014). Studies assert that gender has a significant impact on how students learn any given language (Jain & Sidhu, 2013). Other studies suggest that girls have a higher reading achievement when compared with boys (Malmberg & Sumra, 2001; Mutwiri, Okoth & Onyango, 2014). In a study carried out on gender and education, it was observed that girls and boys do not develop at the same biological and cognitive rate (UNESCO, 2009). Other studies have asserted that since girls

mature earlier than boys, their superior early reading skill is in part a biological factor (Jabor *et al.*, 2011). Consequently, their ability to learn and use any second language has a female advantage from early in life. Other research has shown that the performance of both males and females tend to be similar (Eshetu, 2015; Musa, 2013). Gwarjiko (2015), in yet another study, has shown that the achievement of both males and females tend to be similar. Other studies have shown for instance that the average gap is not statistically significant (Jabor *et al.*, 2011). This finding has been replicated using the KCSE examination in Kenya (Kenya National Examination Council, 2014). Further, a study in Kenya indicated that there is no statistically significant difference in the performance of Kiswahili language among girls and boys in KCSE (Kang'ahi, Indoshi, Okwach & Osodo, 2012).

The gender differences in achievement of questions in Kiswahili proverbs is largely unknown. There is, however, some understanding that the achievement of Kiswahili language is poor largely because of limitations with proverbs especially at the secondary school level where extensive explanations are required unlike in primary examination (KCPE) where objective type questions are asked (KNEC, 2013). Identifying whether there are gender differences in the performance of Kiswahili proverbs has both theoretical and pedagogical implications in the learning of Kiswahili language (Kang'ahi, Indoshi, Okwach & Osodo, 2012; Kang'ahi *et al.*, 2012).

It is, however, argued that time and maturation have affected learners acquisition of knowledge (Rosen *et al.*, 2010). In language learning, girls start at an advantage, but somewhere in life the boy picks up and ends up at par with the girl (Ogero, 2012). These theories support gender differences that manifest themselves in life and school. At the same time, there is growing empirical evidence supporting the gender gap (Zilimu, 2014). Traditionally girls and women have been associated with lower levels of education and

consequently limited exposure to paid employment (Eshetu, 2015). Eshetu further opines that women have fewer opportunities to gain relevant knowledge and have greater difficulties in assembling resources. It may, therefore, be expected that women may not be in a position to cope better or have the necessary resources to access key services such as education, health and others. In contrast, the feminist literature suggests that women have developed effective mechanisms for coping up with their presumed limitations. Following this observation, girls are expected to have coping mechanisms that are equal to if not superior to those of boys. In education, women tend to excel in the humanities and languages when compared to men. In contrast, boys tend to outperform girls in technology, mathematics and sciences. Early studies by UNESCO (2003) indicate that boys may be assumed to be better at mathematics, science and technology while girls are better at speaking and reading. In the same study it is indicated that teachers consciously or unconsciously, falsely communicate that boys are less able to learn language, or that girls are less capable of mathematics and science.

Interestingly in the same study, teachers demonstrate through their comments and interactions that they believe boys are naturally superior to girls; boys perform better than girls and girls should not challenge boys. The study summarizes that this leads to the students' loss of self-confidence and interest in such subjects (UNESCO, 2014). This observation is socially valued. For men, it denotes virility while for women, it is a sign of humbleness. Studies on gender implicitly or explicitly depart from the idea that behavior not only depends on one's knowledge, will and capacity but also on the position they occupy in society. Following these opinions, we would expect that girls will tend to perform better in subjects that are considered humble such as languages and Kiswahili proverbs.

2.7.2 Students' Age

Age is an important aspect of human capital (Hungi *et al.*, 2014). Broadly, human capital comprises cognitive characteristics of individuals, achieved attributes and accumulated habits and experience that may have a positive cognitive effect in productivity (achievements) (Dyer & Reeves, 1994). Dyer and Reeve further state that individuals develop their human capital over time which can then determine the extent to which resources necessary for the choice of effect behaviours can be accessed and leveraged. Age is further broadly correlated with experience, therefore, age can be thought to foster the development of appropriate skills and attitudes. Previous experience translates into variable episodic knowledge and is thus considered as a direct source of knowledge (Ushida, 2005). Previous experience with for instance Kiswahili proverbs provides individuals with a variety of resources that can be utilized in managing subsequent needs. Previous experience can also be used to enhance individual skills and reputations which can ultimately help to influence the reallocation of resources for future needs. Therefore, greater age should be expected to lead to the mastery of Kiswahili proverbs.

A growing body of literature suggests that effect of age on achievement is not linear. This means that the effects of age increase up to a certain time when diminishing effects set in (Jabor *et al.*, 2011). The study conclusively suggests that students who are older than their classmates have a declining average score which continues to decrease as they get older. This research suggests that older students are more likely to drop out of school. That brings about the need for this study to work with a homogenous group regarding age.

A longitudinal study carried out by the Norwegian Ministry of Children and Equality (2008) shows that new technologies may have a bigger effect on boys than on girls when it comes to the effort and time they put into studies and work. This longitudinal study further shows that boys with access to video game systems were seen to score lower in reading and writing than

other boys. Interestingly, it is reported in the same study that teachers have indicated that boys do not pay attention in class, but if they are given a computer, they turn into attentive learners. It was under this backdrop that this study seeks to find out if the same will be replicated when VMIs are used to teach Kiswahili proverbs in Nakuru, Kenya.

2.7.3 Teacher Characteristics

The production function theory in its simplest formulation suggests that output or productivity (Q) is a function (f) of both labour (K) and capital (L) (Tchombe & Therese, 2011). This theory can be represented as:

$$Q = f(K, L)$$

In the school context, we should expect teachers (labour) to be vital ingredients in the achievement of students' output (Kosgei *et al.*, 2013). A large amount of empirical literature supports this opinion by showing that the quality of the teacher influences student performance (Brown, 2010; Center for Public Education, 2005; Darling-Hammond, 2000). In developed countries, for instance, it has been shown that the quality of the teacher accounts for between 40-60% of students' achievement (Bedel, 2016; Pacific Policy Research Center, 2010; Zilimu, 2014). Mostly, ineffective teachers have also been shown to cost students' achievement by at least one grade when compared to effective teachers. Several characteristics of the teacher are usually assessed in literature including; age, gender, race, qualification, experience, attitude, personality and teaching style (Commonwealth of Learning, 2012).

Conventionally, an advanced degree in a specific teaching subject (content knowledge) has been associated with higher achievement (Warutere, 2013). In-service training has also been shown to be positively associated with effectiveness in classroom teaching (Commonwealth of Learning, 2012). Uncertified teachers have been shown to underperform when compared

to certified teachers (Kosgei *et al.*, 2013). They reiterate that the school of education that one attended has been shown to influence student achievement (Nako, 2015). More years of teaching experience consistently translate into higher student test scores. Teaching experience typically of five years or more produces higher students' results (Center for Public Education, 2005). In this study trained teachers with more than five years experience were selected to work with to minimize teacher factors in the study outcomes.

The attitude of the teacher significantly contributes to students' attention in class (Warutere, 2013). Warutere further states that the attitude of the student has been shown to be associated with the teacher's attitude. Personality otherwise referred to as the cognitive abilities of the teacher has been shown to be associated with better student achievement (Bedel, 2016). Teachers with stronger academic skills have been shown to perform better when measured by such scores. Further, an overall positive relationship between a teacher's verbal abilities and student performance has been demonstrated. A growing body of literature does not support the above opinion that relates stronger teacher characteristics to better students' attainment (Kosgei *et al.*, 2013). Studies, particularly in developing countries, have not been able to demonstrate the positive relationship between teacher characteristics and students academic performance (Pacific Policy Research Center, 2010). Tellingly, one study in Kenya found no significant relationship between teacher qualification and students academic achievement in Kiswahili (Kemboi, 2015).

In contrast, the same study demonstrated that teaching experience was significantly associated with better achievement in Kiswahili. There are wide differences in opinion and the evidence gained from different studies is contradictory (Bedel, 2015, 2016; Kemboi, 2015; Pacific Policy Research Center, 2010; Warutere, 2013). This may be attributed mainly to the methods used to collect data, the different contexts wherefrom data was collected, the

subject area, measures and operationalization of variables. The difference in opinion calls for the development of a unified framework for analyzing the link between teacher characteristics and students' achievement (theoretical and empirical) tools used in measuring. This study attempts to analyze this link through robustification.

Video-mediated instruction is thought to foster greater flexibility in teaching allowing students to use deep learning strategies – thinking and discussing and constructing own knowledge (Nicholson & Nicholson, 2010; Salkeld, 2013; Van Laarhoven, Kraus, Karpman, Nizzi & Valentino, 2010).

Here in Kenya, a study done by (Chemwei, Koech & Lang'at, 2013) indicates that there is no parity in the use of ICT by teachers in schools. In the same study, they found out that females used ICT equipment rarely in comparison with males. At the end of the study, Chemwei *et al*. concluded that teacher-educators of the female gender are slightly behind their male counterparts in their levels of ICT integration into instruction. Since the days that the study was undertaken: majority of teachers who were and are still active in the teaching service have been taken through training by the Teachers' Service Commission (2013) to use new technologies in pedagogy and therefore the need to see if this training will post positive results by using Video-Mediated Instructions to teach Kiswahili proverbs in selected schools in Nakuru County, Kenya.

2.8 The Knowledge Gap

Studies have been carried out all over the world to show the effect of VMIs on teaching while others have used Solomon Four Group Design. Laherto and Laherto (2018) carried out a study on video-mediated physics instruction from preservice teachers to elementary students: experiences and reflections. Yamauchi (2008) examined the effects of multimedia instructional material on students' learning and their perceptions of the instruction. Alabi (2014) carried out a study on effects of video-tape mediated instruction on secondary school

students' achievement and retention in social studies. Ominowa and Bamidele (2016) studied the effectiveness of video-mediated instruction on teaching secondary school practical Chemistry in Akure South Local Government Area of Ondo State, Nigeria.

In Ohio America, Yamauchi (2008) examined the effects of multimedia instructional material on students' learning and their perceptions of the instruction. This study by Yamauchi was a between-group quasi-experiment study design. Two cohorts of 100 learners in a Quantity Food Production laboratory university course class in two consecutive semesters were placed in either treatment or control group. The experiment and control groups received traditional lecturer-led induction classes about table service and beverage preparation processes.

On one hand, the treatment group was permitted to use new instructional materials presented on DVD only. Data was collected using a set of pre-test and post-test. Gain scores were used compare students' learning outcomes between the experiment and control groups. This study measured students' perceptions and opinions of instruction which is different from the current study which measures effect of VMIs on students motivation, attitude and achievement in learning Kiswahili proverbs. The research was carried out in America by Americans unlike this current study that was carried out in Nakuru County, Kenya. Results of independent samples were derived from *t*-tests unlike those of the current study which were derived from Mann Whitney U test because of the distribution of the scores that were skewed.

In Africa, a study was carried out by Alabi (2014) in Niger. The study explored the effects of videotape mediated instruction on secondary school students' achievement and retention in social studies. This study by Alabi was a quasi experiment with a pre-test, post-test with a control group design. The study further had a sample of 200 secondary school students from Niger, randomnly assigned to either the treatment or control group. The findings of the study were that the videotape mediated instruction package tested were effective in the learning of

Social Studies and had great improvement on the student's performance after exposed to video tapes in learning instructions.

Olatayo and Omiola (2017) investigated if learners taught indices and logarithms concepts using VMIs as an advanced organizer would get better academic scores than those given instructions using conventional method at 0.05 alpha level. The study was a quasi experiment two group design. The two major findings of Olatayo and Omiola were that the use of VMIs as advanced organizers was effective in mathematics concepts. The second finding was that girls' outcome was higher than that of boys after being exposed to video-mediated instruction.

In yet another study carried out in Nigeria, Ominowa and Bamidele (2016) examined the relative effectiveness of Video-Mediated Instruction (VMI) and Classroom Demonstration Technique (CDT) on the performance of students in practical Chemistry. The study further determined the effectiveness of the said methods of instructions on the retention ability of the learners. The study was a pre-test, post-test control group design involving a population of senior secondary students. In the study, 88 students were randomnly assigned to either treatment or control group. The study was a comparison between the treatment group which was taught with Video-Mediated Instruction (VMI), while the control group was taught with the Classroom Demonstration Technique (CDT). In the study, a pre-test was given before the intervention to find out the entry level of the students in the two groups. After the intervention, a post test was given followed by analysis of data using t-test statistics. Results from the study showed that there was a remarkable difference in the performance of students in the two groups. Learners taught using VMI had significantly higher scores than their counterparts in the control group. A major recommendation of the study was that teachers should try to get video tapes for instructions in order to make their classroom teaching much

more effective than they are currently. This study was different from the current study in that, students were randomnly assigned to either the treatment or the control group unlike the current study where it is the schools that were assigned and not the individual students. In addition the current study adopted intact classes for use in the experiment and control. Further, the unit of analysis was the class and not the individual learners.

In Kenya, a study was carried out by Nyabiosi, Wachanga and Buliba (2016) on the effects of cooperative learning approach on secondary school students' achievement in Kiswahili language comprehension in Kisii Central Sub-County. In the Solomon Four group design, the t-test, ANOVA and ANCOVA statistical tests of significance were employed. In contrast, the current study used non parametric tests namely, Mann-Whitney U test, Kruskal Wallis and Generalized Linear Model. The findings of the study showed that the Cooperative Learning Approach significantly improved the learners' achievement in the learning of Kiswahili Language. This study dealt with Kiswahili language comprehension achievement and did no touch on Kiswahili proverbs. In addition, the study did not touch on attitude and motivation.

Most of the reviewed studies have exhibited lack of superior, in-depth analyses of the effect of VMIs on students' motivation, attitude and achievement in learning Kiswahili proverbs. Particularly, none of the studies cited in this section were carried out in Nakuru County. Conseuently, the purpose of the current research was on the effect of Video-Mediated Instructions on students' motivation, attitude and achievement in learning Kiswahili proverbs in Secondary schools in Nakuru County, Kenya.

2.9 Conceptual Framework

Creswell (2013) defines a conceptual framework as a graphic presentation of relationships between variables in the study shown illustratively. The conceptual framework is portrayed by a diagram in Figure 1. The current study was based on the hypothesis that VMIs have no significant effect on students' motivation, attitude and achievement in Kiswahili proverbs. In

the current study, Video-Mediated Instructions is the independent variable while student motivation, student attitude and student achievement are the dependent variables. Student and teacher attributes are the intervening variables. The figure shows the relationship between VMIs (the independent variable), motivation, attitude and achievement (the dependent variables) and (student and teacher attributes) the intervening variables.

Video		Students' Motivation
Mediated		-Learning
Instruction		-Emotional Listening
		-Instrumental Listening
		-Examples
		-Teaching Aids
		-Real Objects

Students' Achievement

Teacher Characteristics

-Experience

Learner Characteristics

-Age

-Gender

Students' Attitude

-Study

-Pedagogy

-Time

Independent Variables   Intervening Variables   Dependent Variables
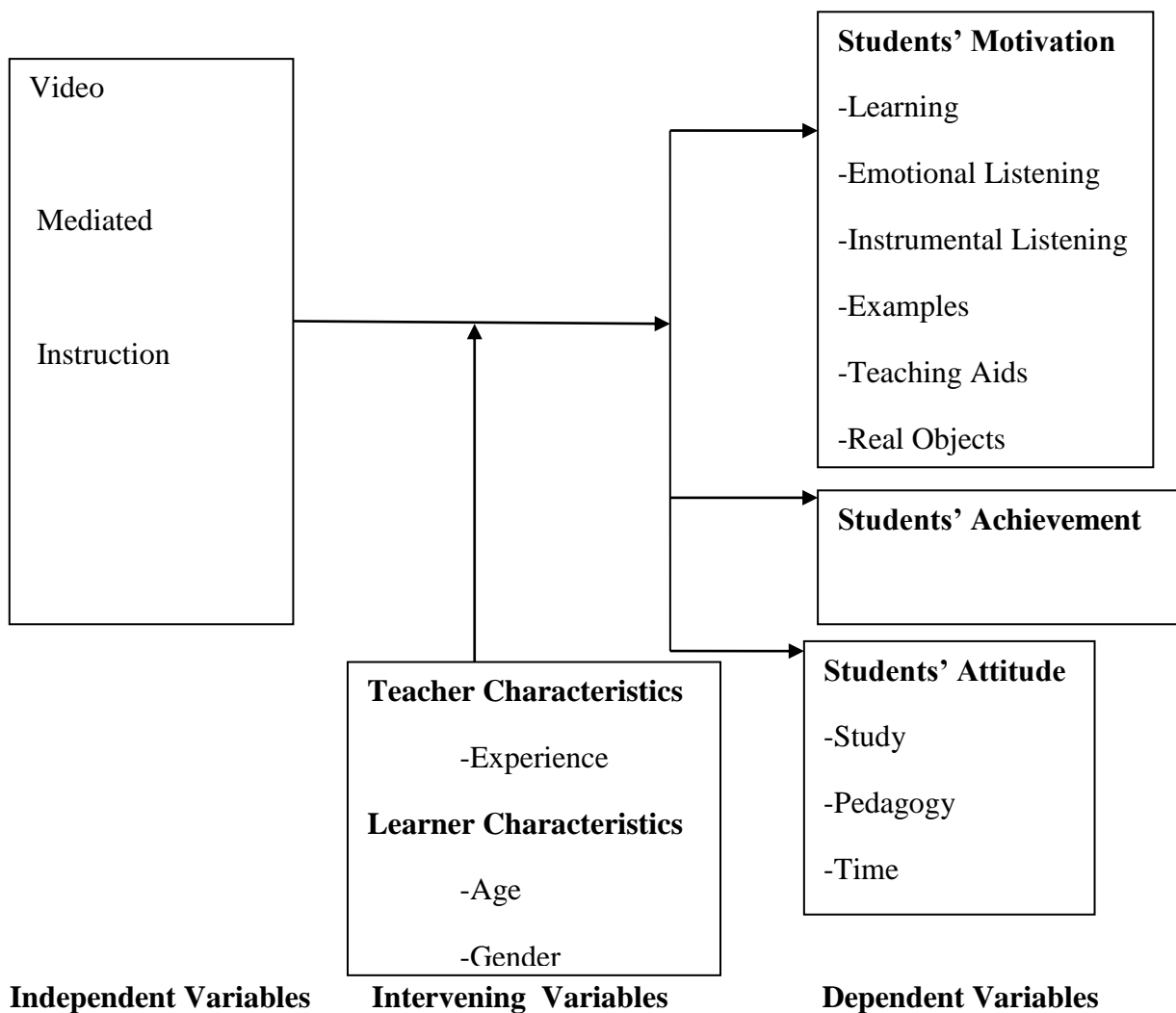
Figure 1: Conceptual Framework showing relationship between variables. An adoption
from Oso and Onen (2009)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The research methodology used in the current study is presented in this chapter. The chapter presents a detailed explanation of the research design, location of the study, population, sampling procedures, sample size, study procedure, pilot testing, instrumentation, process of creating and editing videos, data collection procedure, analytical framework, data management and analysis and finally, ethical considerations.

3.2 Research Design

This study was Quasi-Experimental because it did not randomly assign the individual students into groups but adopted intact classes already constituted (Gribbons & Herman, 1997). White and Sabarwal (2014) further state that a quasi-experiment by definition lacks random assignment.

In the current study the Solomon Four Group Design was used. This is one of the most rigorous designs that can be used in quantitative studies (Symmons, 2013). This design helped minimize the threats to internal validity that are common in other research designs. In its simplest form, the Solomon Four Group Design has four groups A,B,C and D (Kumari, 2013). Two of these groups (A and D) received the treatment while the other two (B and C) did not. Within each treatment condition one of the groups (A) was pre-tested and the other (D) was not. In addition, one of the control groups (B) received a pretest and one (C) did not. The four groups (A,B,C and D) received a post-test. The notations for the Solomon Four Group Design are shown in Table 2.

Table 2: Solomon Four Group Design Notation

Group	Pre-Test	Treatment	Post-Test
A	O_1	X	O_2
B	O_3		O_4
C			O_5
D		X	O_6

Key: O outcome, X Treatment

3.3 Location of the Study

The current study was carried out in Nakuru County, a county in the central Rift Valley and one of the 47 counties in Kenya (APPENDIX E). Nakuru County is situated at 0.001 S to 0.982 S latitude and 35.631 E to 36.586 E longitude. It covers 1.29% of the total land mass of Kenya. The county's population makes up 4.15% of the population of the country. The county was adequately represented in the sample. The county population is predominantly youthful with about 51.87% aged below 20 years. It was selected because it is one of the most cosmopolitan counties in terms of language groups (Kamau, Indire, Ombongi & Rutere, 2009). The County is largely a cosmopolitan area wth a mix of languages, cultures and perspectives of life which may have varying influences in achievement, motivation and attitude towards learning a second language and specifically Kiswahili proverbs. The County has a different context with that in which Kiswahili originated and thus students may expericne difficulties comprehending terms and concepts that are distant to them.

3.4. Population of the Study

The population of the study was all the students in 311 public secondary schools in Nakuru County, Kenya. The target population was Form Two students in Nakuru County, Kenya. The accessible population was Form Two students in extra-county boarding secondary schools in Nakuru County. An important inclusion criterion was Form Two students in single

gender schools. The rationale for selecting single gender schools was based on the observation that girls' performance is relatively lower than that of boys in co-educational secondary schools (Hungi et al., 2014; Kang'ahi, Indoshi, Okwach & Osodo, 2012c; Mellon, 2015b; Wanzare, 2012). A further criterion was possession of an LCD projector by the school. Consequently, the exclusion criterion was all Form 2 students in co-educational schools. Also excluded were day schools without a functioning LCD projector. The reason for this requirement is because Kiswahili proverbs VMIs required a study site with a source of electric power, an LCD projector and a video player.

Form Two class was selected because: they have been in secondary school for a while and have been introduced to proverbs (Ambuko & Odero, 2013). Form One was excluded because they are relatively new in secondary school and have not covered substantial content in Kiswahili proverbs (Kenya Institute of Education, 2002). Form Three and four were excluded because as senior classes in secondary school, they are treated as examination classes and are taught differently (Kemboi, 2015).

The rationale for selecting extra-county boarding schools and excluding day schools was that they admit students from across the country giving the study a national outlook (Ajayi, 2014; Saitoti, 2007). All the eight extra-county, boarding, single gender schools were included in the sample. The schools: Four girls' schools and four boys' schools sampled gave an apparent equal number of boys and girls in the study. A total of 436 Form Two students participated in the study. The distribution of the students among the four study groups was such that Group A had 23%, Group B had 25 % Group C had 30%. and Group D had 22%. In this study, eight teachers were used, one from each of the eight schools.

3.5 Sampling Procedures and Sample Size

The Sampling Frame included all the Extra-County Secondary Schools in Nakuru County. The current research work used purposive sampling which means that it approached the sampling problem with a specific plan in mind (Creswell, 2013). In purposive sampling , Creswell states that an assumption is made that one is able to select schools that represent a 'typical sample' from the appropriate target population. In the current study, the unit of sampling was the secondary school and not the individual learners (Ary, Jacobs, Razavieh & Sorensen, 2006a). This is because secondary school classes in Kenya exist as intact groups (Chemwei, Kiboss & Cheruiyot, 2013; Kiboss, 1997, 2000; Kiboss *et al.*, 2015). In this study, two schools, a boys' and a girls', that were randomly matched were considered as one Group and given pseudonyms (Table 3).

Table 3: A List of the Sampled Schools using Pseudonyms

Group	School	Gender	Constituency	Number of Students	Percent
A	Ahadi	Girls	Naivasha	43	
	Amani	Boys	Gilgil	60	23
B	Bidii	Boys	Kuresoi South	53	
	Baraka	Girls	Molo	56	25
C	Chuma	Girls	Rongai	67	
	Chuo	Boys	Bahati	62	30
D	Daima	Girls	Subukia	45	
	Duara	Boys	Njoro	50	22
Total				**436**	**100**

3.6 Study Procedure

On various dates, the researcher visited the schools to find out if they had the basic requirements for this study. These basics included electricity, video player and an LCD projector. The researcher informed the principal about the purpose, nature and procedure of

the research using Information Sheet for the Principal, APPENDIX G1. The researcher collected data on teacher characteristics using the School Data Form APPENDIX D in order to select teachers who had the right training and experience. The researcher further took the teachers through five two-hour sessions on how to teach the selected Kiswahili proverbs. Groups A and B were supplied with the pre-test using APPENDICES A, B and C. All the four groups were supplied with a uniform lesson plan APPENDIX R. After the pre-test was administered, the researcher supplied Group A and D with video clips. The researcher took the teachers of Group A and D through the process of integrating VMIs in teaching Kiswahili proverbs. The researcher frequently visited the schools to monitor the progress, oversee the process and deal with any emerging issues. On the eighth week, a post-test was administered to groups A, B, C and D. This process used the post-test tools namely Students' Motivation Questionnaire (SMQ), Students' Attitude Questionnaire (SAQ) and Students' Achievement Test (SAT) as in APPENDICES N, P and Q. Afterwards, a data analysis procedure was undertaken.

3.7 Pilot-testing

In order to tailor the study to the Nakuru context, and to make sure that the language questions and responses were clearly formulated and perceived as unambiguous by the target audience, the survey was pilot-tested first using both teachers and students. The questions were validated by two professional teachers with experience of marking Lugha ya Kiswahili in Kenya Certificate of Secondary Education (KCSE). The moderated questions were further pilot tested using 40 students of equal ability with but not in the sample. One issue that cropped up during the pilot-testing was the length of the assessment which was eventually reduced to a maximum of 30 minutes. Other issues included the initial list of the potential items on attitude and motivation which did not encompass some important aspects of both concepts which were pointed out by the two validators. For instance, the item 'learning

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Kiswahili proverbs is time wasting' was deemed an important aspect in student motivation. Results from the pilot-test were used to refine and finalize the questionnaires.

The SMQ and SAQ instruments were pilot-tested to determine their reliability. Factor analysis procedures were used to uncover the latent structure (dimensions) of the various sets of variables (items) that were used to measure the multi-attribute concepts – motivation and attitude. Initially, the factorability of the items used to measure both concepts was examined. Several well recognized criteria for the factorability of a correlation were used. First, items that correlated with each other with a coefficient of at least 0.3 were considered to have reasonable factorability. As a second step, the Kaiser-Meyer-Olkin measure of sampling adequacy of above the appropriate value of 0.6 was used. Further a statistically significant Bartlett test of sphericity of $\rho < 0.05$ significant level was taken into account. The diagonal of the anti-image correlation matrix that were above 0.5 supported the inclusion of each item in the factor analysis. Finally, communalities above 0.3 were used to confirm that each item shared some common variance with other items.

Principle Component Analysis (PCA) was employed in the data reduction procedure since the primary purpose was to identify and compute composite scores for factors underlying the scales used to measure both motivation and attitude. Both Varimax and Oblimin rotations were used to extract the number of dimensions of the measures of both motivation and attitude. The Varimax rotation was examined since it was not clear at the onset of the study whether the dimensions of both attitude and motivation were correlated. The Oblimin rotation allowed the factors to be correlated. The rotation method that provided the best defined factor structure was adopted for further analysis. These rotations served to make the output more understandable and they facilitated the interpretation of the emergent factors. A Scree-Plot

was also used to visually investigate the number of items to extract. Further the Kaisser criterion was used to select only the dimensions with Eigen-Values of greater than one. During several steps in the factor-analysis procedure, items that did not contribute to a simple structure and failed to meet a minimum criterion of having a primary factor loading of 0.4 or above and no cross-loading of 0.3 and above were eliminated. In addition, items that had a floor-effect with most of the students reporting it were considered for elimination.

Each of the dimensions that emerged from the factor analysis was subjected to reliability analysis. The coefficient alpha method was used to obtain 0.70 reliability of both the motivation and attitude instruments. This method is particularly suitable when test items involve the use of Likert-type scales (Caldwell, 2009). The Cronbach Alpha formula (Cronbach, 1951; Panayides, 2013) was utilized. The formula is illustrated in the equation hereunder.

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum_i V_i}{V_t}\right) \quad \text{(Cronbach, 1951, p. 299)}$$

In the formula, α refers to the Cronbach alpha, n is the number of items on a given test, V_i is the variance of the item scores and V_t is the variance of the total scores. By definition, α is the average value of the reliability coefficients one would obtain for all possible combinations of items when split into two half-tests (Schmitt, 1996). It is advantageous as a test reliability technique since it requires the administration of only a single test to provide a unique estimate of the reliability for any given test. This advantage made the current study adopt this measure considering that the study adopted a Solomon Four research design which is deemed rather complex (Kumari, 2013).

Initially, for inclusion in the reliability analysis, any given item had to have significant correlation coefficient of above 0.2. Further, for any item to be included in the final composite score, it had to have an item-total correlation of above 0.2. In addition, any item that significantly distorted the reliability structure of any identified factor was eliminated in the calculation of a composite score. The internal consistence for each of the scales was examined using Cronbach's alpha. No substantial increases in alpha for any of the scales could have been achieved by eliminating more items. Composite scores were created for each of the factors based on the mean of the items which had the primary loadings on factor.

3.8 Instrumentation

The instruments used in the current study included: one that assessed motivation namely, Students' Motivation Questionnaires (SMQ), one that assessed attitude namely Students' Attitude Questionnaires (SAQ) and one that assessed achievement, namely Students' Achievement Tests (SAT) on Kiswahili proverbs. The SMQ and SAQ measured students' motivation and attitude respectively. The instrument SAT comprised 30 objective questions developed by the researcher using proverbs questions in KNEC past papers. A school data form was used to obtain the characteristics of the sampled school (APPENDIX D). This included school type, number of students in Form 2 and teacher characteristics.

The SMQ used for assessment of students' motivation was a modification of an instrument that had previously been used by Wachanga (2002). Since the Students' Motivation Questionnaire was adopted from previous work, this study deemed the instruments to be valid. The SMQ measured students' motivation using Likert-type scale with options ranging from: 1. Strongly Disagree; 2. Disagree; 3. Undecided; 4. Agree and 5. Strongly Agree. An initial instrument with 43 items that described students' drive to learn Kiswahili proverbs was constructed and pilot-tested.

Psychometric analyses (both factor analysis and reliability analysis) in the pilot-test indicated that the SMQ instrument measured a multi-dimensional concept. Six dimensions emerged, namely: Learning dimension of Motivation; Emotional dimension of Listening Motivation; Instrumental dimension of Listening Motivation; Example dimension of Motivation; Teaching Aids dimension of Motivation and Real Objects dimension of Motivation. The Learning dimension of Motivation had a good reliability α = 0.88 (95% Confidence Interval: 0.86- 0.90). It had 8 items that assessed the motivation for learning Kiswahili Proverbs. Consequently, a composite score was created by adding all the 8 items which had a mean of 0.38 (SD = 0.24). This composite score had significant positive skewness (KS = 0.14, df = 215, ρ = 0.000) suggesting that non-parametric tests may be more appropriate. Ary, Jacobs, Razavieh and Sorensen (2006) state that if a t statistic is being used to conduct a hypothesis test about a population mean, the assumption is that the data being analyzed are randomly selected from a normaly distributed population. This was not the case.

Factor analysis helped to identify a two-factor solution to the listening motivation to explanations of the meanings of proverbs. These were labelled as Emotional dimension of Listening Motivation and Instrumental dimension of Listening Motivation respectively. Three of the twelve items were dropped due to low factor scores and cross-loading. The first dimension of Listening Motivation had 6 items suggestive of an emotional motivation aspect of listening to explanations. This scale of this Emotional dimension of listening motivation had adequate reliability α = 0.82 (95% Confidence Interval: 0.79 - 0.85). Summing up the six items created a composite score with a mean of 0.75 (SD = 0.2). The histogram of this score showed significant negative skew which was suggestive of the use of the mean being inappropriate.

The second dimension of Listening Motivation comprised 3 items that suggested an Instrumental aspect of motivation that is Usefulness and Excitement. The scale reliability of this Instrumental dimension of listening was $\alpha = 0.75$ (95% Confidence Interval: 0.72- 0.78). A composite score for this dimension was created by summing up the three items and a mean of 0.61 (SD = 0.23) obtained. Examination of the histogram of this score suggested considerable negative score. The median was, therefore, considered to be a better score.

The Example dimension of Motivation had satisfactory reliability $\alpha = 0.86$ (95% Confidence Interval: 0.84- 0.88). The Example dimension of Motivation was a 9 item dimension that assessed motivation gained from the use of Examples in teaching Kiswahili Proverbs. A composite score was created by adding up the nine items. This score had some considerable variability (CV = 29.2%) with a median of 0.78 (25th percentile = 0.64; 75th percentile = 0.86). The variability in this scale is indicative of the need to apply non-parametric tests.

The Teaching Aids dimension of Motivation was a 5-item concept that assessed motivation derived from the use of Teaching Aids. Summing the five items produced a negatively skewed composite score (KS = 0.193, $\rho = 0.000$). The median of this scale was 0.80 (25th percentile = 0.60; 75th percentile = 0.90). The Teaching Aids dimension of Motivation had impressive reliability $\alpha = 0.85$ (95% Confidence Interval: 0.83- 0.87). The negative skew of the scale necessitated the use of a non-parametric test in the main study.

The Real Object dimension of Motivation was a 9 item dimension that was used to assess the motivation gained from the use of Real Objects. It was created through summation of the nine items. The median of this scale was 0.78 (25th percentile = 0.67; 75th percentile = 0.89). The Real Objects dimension of Motivation had a good reliability $\alpha = 0.88$ (95% Confidence Interval: 0.85- 0.89). The scale had wide variability with a considerable interquartile range of 22 percentage points which suggested the appropriateness of use of non-parametric test in the

main study. Ary *et al.* (2006) state that the assumption is that the data being analyzed are randomly selected from a normaly distributed population if a t statistic is being used to conduct a hypothesis test about a population mean. Again, this was not the case.

The SAQ was a modification of an instrument used by Potvin and Hasni (2014). Since the SAQ was adopted from previous work, this study deemed the instruments to be valid. The SAQ measured students' attitude using Likert-type scale with options ranging from: 1. Strongly Disagree; 2. Disagree; 3. Undecided; 4. Agree and 5. Strongly Agree. An initial instrument with 17 items that described students' liking or dislike of Kiswahili proverbs was constructed and pilot-tested.

Factor analytic procedures helped in extraction of three factors. The first dimension, labelled the Study dimension of Attitude, had a Cronbach's $\alpha = 0.73$ (95% confidence interval: 0.69 to 0.77). This dimension consisted of 4 items involving the liking or disliking studying of proverbs. Summing the four items produced a negatively skewed composite score. The median of this scale was 0.75 (25th percentile = 0.56; 75th percentile = 0.94), a relatively large variability. In order to use a parametric test, the data has to be randomly selected from a normaly distributed population (Mugenda & Mugenda, 2003). Consequently, non-parametric tests were used in the main study.

The second dimension, labelled Pedagogy dimension of Attitude (teaching and learning proverbs), posted a Cronbach's $\alpha = 0.71$ (95% confidence interval: 0.70 to 0.71). It comprised 4 items on the favourableness of teaching and learning (pedagogy) which were added up to create a composite score. The median score for this composite score was 0.75 (25th percentile = 0.56 ; 75th percentile = 0.86). The considerable variability in this score suggests it is negatively skewed and thus non-parametric tests were deemed appropriate in the main study.

The third dimension, labelled Time dimension of Attitude, had a reliability of $\alpha = 0.72$ (95% confidence interval: 0.69 to 0.73). It was composed of 3 items capturing the liking or dislike of time given to study proverbs which were summed up to create a composite score. The mean of this scale was 0.57 (SD = 0.25). Examination of its histogram showed that it did not significantly violate the assumption of a normal distribution showcasing that parametric tests may be used. The description of the measures of variables used in this study is offered in Table 4.

Table 4: Description and Operationalization of Measures

Variable	Definition	Operationalization	Questions
Post-Mark	Students'scores	Test scores	30 Objective type questions
Pre-Mark	Students' scores in the pre-Test	Test scores	30 Objective type questions
Gender	Biological definition of females and males.	Males 1 Female 0	Nominal item
Group	Two intervention groups A and D	A - Experiment with Pre-Test D - Experiment no Pre-Test	
	Two control groups B and C	B - Control with Pre-Test C - Control no Pre-Test	
Age	Chronological age	2016 less Year of Birth	Date of birth
Real-Object dimension of Motivation	Use of real objects to teach proverbs	Confident, Eager, Doubt ability, Apply knowledge, Happy, Excited, wasting time, Frustrated, Unhappy	Nine Likert type questions
Teaching Aids dimension of Motivation	Use of Teaching Aids to teach proverbs	Appreciate, Dislike, Interested, Scared, Like	Five Likert type Questions
Example dimension of motivation	Use of examples to teach proverbs	Confident, Eager, Doubt ability. Apply knowledge. Happy, Excited, wasting time, Frustrated, Unhappy	Nine Likert Type questions
Instrumental dimension of Listening motivation	Instrumental motivation	Demanding, rewarding, time wasting, useful, interesting, boring	Six Likert type questions
Emotional dimension of Listening motivation	Emotional motivation	Anxiety, fearful, exciting	Three Likert type questions
Learning dimension of motivation	Learn motivation	Fun, Satisfying, Informative, Useful, Boring, Frustrating, Hard, Challenging,	Eight Likert type questions

Study dimension of Attitude	Attitude towards the study of proverbs	Remove proverbs; Retain proverbs; Would not study proverbs; do not read on my own	Four Likert type questions
Pedagogy dimension of Attitude	Attitude towards pedagogy	Attend all classes; teaching methods adequate; testing styles not encouraging; methods make me think ahead	Four Likert type questions
Time dimension of Attitude	Attitude towards adequacy of time to learn proverbs	Time enough; not adequate	Two Likert type questions
Teacher characteristics	Experience of the teacher	Teaching experience in years	Number of years taught

3.9 The Process of Creating the Videos

The researcher created own videos that were content, accent, style and context-specific to the needs of the learners in Form Two. Some videos on proverbs are available on YouTube but not all are specifically made for educational purposes. The researcher selected proverbs that demonstrate common social cultural activities and captured them on camera because this was the tool the researcher planned to use. From a list of 30 Kiswahili proverbs in Form 2 Textbook (Kenya Literature Bureau, 2011), the researcher selected sixteen proverbs on common human activities so that two proverbs would be taught per week for eight weeks. The proverbs are shown in APPENDIX T. Sixteen two-minute long video-clips were developed and saved in DVD with the intention of constructing contexts of selected proverbs and bringing them to class.

The researcher identified an appropriate location where the context of each of the proverbs could be clearly captured. Once that was done, for each of the proverbs, the researcher wrote down a storyboard. A storyboard is a script or a starting point in film that is usually rehearsed to anticipate movements. This was followed an experiment with shooting angles, lighting and focusing. The equipment used by the researcher included a simple Sony AVC high definition (HD) digital video camera. The researcher recited the words in the storyboard and simultaneously captured the images. The recording and transfer process took three simple steps:

a. The first step was pressing the 'on' button, followed by the 'record' button.

b. The second step was stopping the recording once the motions were through and the words in the storyboard were over.

c. The third step was connecting the camera to the computer through the USB port.

Once the three steps were over, the processes were repeated to the researcher's satisfaction. Finally, the best edition of each video was later uploaded to the computer for editing.

3.9.1 Video Editing Steps

The process of video editing involved installing the 'Movie Maker' software in the computer from Microsoft essentials, starting the 'Movie Maker' software in windows. This was followed by clicking 'add videos and pictures' and the file manager would pop up, selecting the video(s) to be edited, waiting for Movie Maker to load the videos as the status bar showed at the bottom left of the screen; after selecting the video, playing it to see what is desired to be trimmed or retained. If one wanted to remove a certain part: clicking on the video section and selecting edit, clicking on'trim' and dragging the cursor on the bottom left of the video to the part where the video is to start, playing the video and pausing to the desired starting position, click 'set start point' at the menu at the top left of the screen. When done, clicking 'set end point' and then 'save trim', adding another potion of the video by selecting add another video and doing the same as in step one. When done, dragging the video parts to the desired position, i.e. the last part to appear on the video to be dragged to the end and so on. To add a caption: selecting caption on the menu and typing the wording of your liking. Editting the size, font and color of the text using the options provided and use transitions moving from one section of a video to the next by clicking the second part and selecting the 'animation' option and selecting the desired transition type. Change the time it takes for a transition by the option provided (best time is 1 sec). Add the 'directed by credits' and other different options provided. At the end of it all, enough copies of the video clips had been made in DVD for use in class during the experiment segment of the research.

3.10 Data Collection Procedure

The current study had a pre-test in which Groups A and B were supplied with the pre-test questionnaires using APPENDICES A, B and C, an intervention (VMIs) using video clips and a

post-test. The pre-test was carried out in the month of November 2015. The intervention took eight weeks between January and March 2016 after which the post-test was administered at the end of March 2016. A student test and questionnaires were used as the main tools for collecting data. The learners took a validated 30 item test on Kiswahili proverbs. Further, the students filled in a questionnaire administered by the researcher using the paper and pencil technique in the context of a classroom. Another tool used was a self-administered teacher questionnaire. The students took 30 minutes to complete the survey while the teachers took five minutes.

The selection of these tools was guided by the nature of the data collected, the time available and by the objectives of the study. The purpose of the research was to find out the effect of VMIs on students' motivation, attitude and achievement in learning Kiswahili proverbs. The researcher was mainly concerned with students' scores in motivation, attitude and achievement. The study also collected data on students' gender and age and the experience of the teacher. The number of respondents was also quite large (436) and therefore questionnaires were the ideal tool for collecting data. The respondents were literate and were unlikely to have difficulties responding to questionnaire items.

3.10.1 Summary of Methods used to Test Hypotheses

Methods used to test hypotheses in this study are summarized in Table 5. To test differences in the scores of the study groups, appropriate test of differences were used depending on whether the data was normally distributed or not. To examine the role of mediating factors, a GLM with a logit link function and a binomial distribution family was estimated using the Maximum Likelihood Method.

Table 5: Methods used to Test Hypotheses

Hypothesis	Independent	Dependent	Sub-Hypothesis	Statistical Methods	Statistical Test
HO_1	VMIs	Motivation	HO_{1a} Learning dimension	2 Group Difference	
			HO_{1b} Emotional dimension of Listening	Median	Mann-Whitney U Test
			HO_{1c} Instrumental dimension of Listening		
			HO_{1d} Example dimension		
			HO_{1e} Teaching Aids dimension		
			HO_{1f} Real Objects dimension		
HO_2		Attitude	HO_{2a} Study dimension		
			HO_{2b} Pedagogy dimension		
			HO_{2c} Time dimension		
HO_3		Achievement			
				4 Group Differece	Kruskal Wallis Test
				Gender difference	Chi-Square
				Association between Achievement, Age and Teacher Experience	Spearman's correlation
Confounders	Students' age and gender and teacher characteristics.			GLM with Logit Link Function and Binomial Distribution Family	Maximum Likelihood Estimation

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3.11 Analytical Framework

The analytical framework (Figure 2) demonstrates how the final pre and post-test results were compared between groups A, B, C and D (Kumari, 2013). The assessment of the effectiveness of the intervention between Group A and B post-test is marked by line 'c'. With the help of median test for the skewed data the study observed how both groups A and B changed from pre-test to post-test, whether one, both or neither improved over time. Should Group B also show a statistically significant improvement denoted by line 'a1', then the study must try to explain the confounders. To ensure that the groups were equal or not before treatment a pre-test was conducted on Group A and B and the comparison is denoted by line 'b'.

An assessment of the post-test scores of Group C and D marked by line'd', enabled the study to determine whether the act of pre-testing influenced the results. A comparison of Group B and C post-test marked by line 'g' allows the researcher to ascertain if any confounders could have caused a temporal alteration which was not incorporated in the present study. Ideally, it illustrates if anything else could have caused the results shown and is a check upon causality.

Additionally, the comparison between Group A post-test and Group D post-test marked by line 'f' helps the current study to determine the effect that the pre-test had on the intervention. In the event that the post-test results for these two groups are different, then the pre-test has had some effect on the treatment. Finally the comparison between Group B post-test and Group C post-test shows if the pre-test itself had effect on outcome, independent of the intervention. Should the test scores be statistically significantly different, then the act of pre-testing has had influence on the overall results. In addition, the comparison between the Control with pre-test Group B pretest and the Experiment with no pre-test Group D post-test scores allows the researcher to find out if any external factors had caused a temporal distortion which was not included in present study.

For example, it shows if anything else could have caused the results shown and is a check upon causality.

Similarly, the comparison between Experiment with pre-test Group A posttest scores and the Control with no pre-test Group C posttest scores helps the researcher to determine the effect that the pretest has had upon the treatment. In the event that the posttest results for these two groups are not similar, then the pretest has had some effect upon the treatment and the experiment is flawed. Eventually, the comparison between the Control with pre-test Group B posttest scores and the Experiment with no pretest Group D posttest scores shows if the pretest itself has affected behavior, independently of the treatment. If the results are statistically significantly different, then the act of pretesting has influenced the overall results and is in need of improvement.
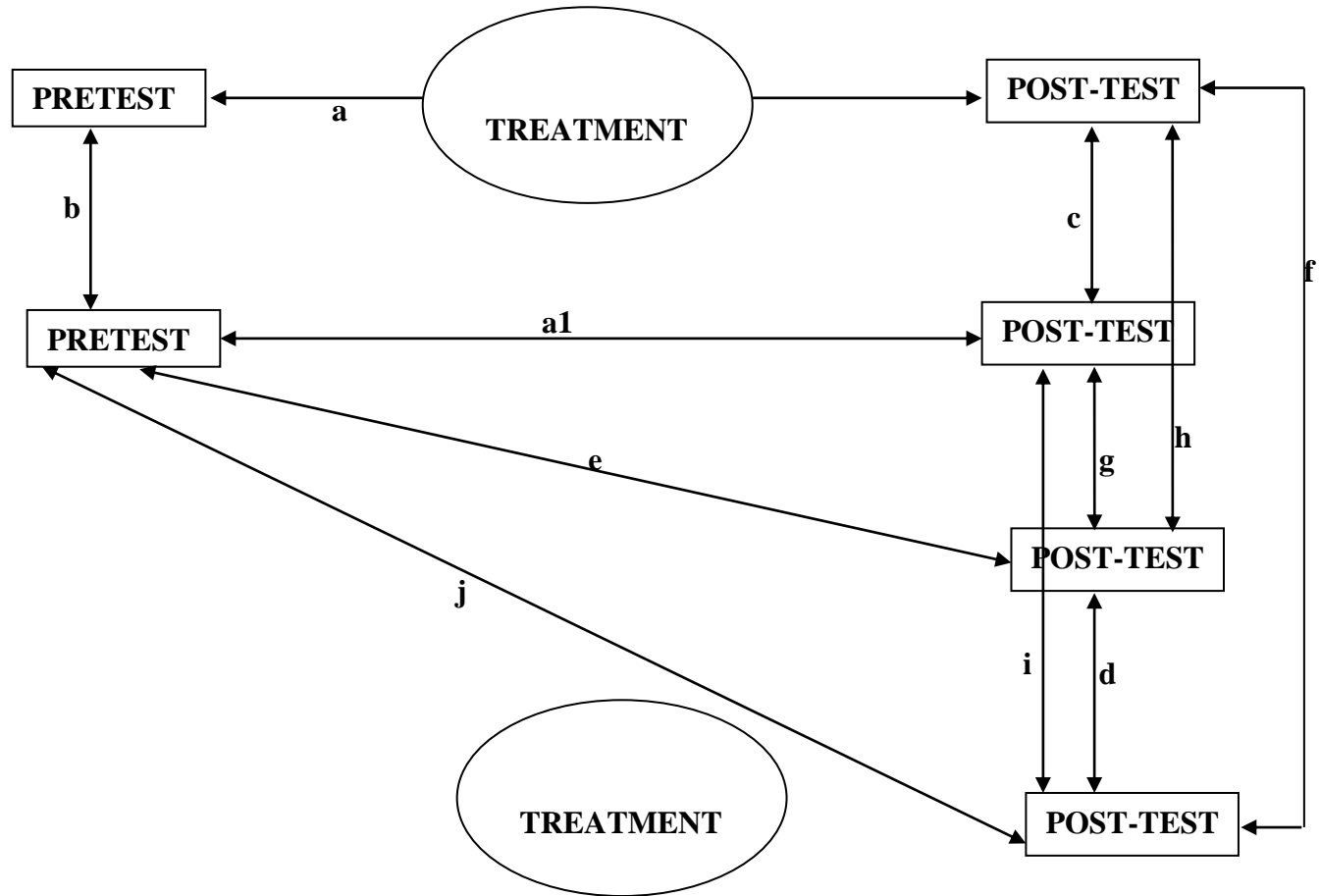
Figure 2: Analytical Framework
Source: Kumari (2013)

3.12 Data Management and Analysis

In this section, methods used in handling missing data and exploratory analyses are discussed first. Then methods used to summarize and present the data are described. Finally, tests of differences and the GLM used to test the study hypotheses are discussed.

3.12.1 Handling Missing and Spurious Data

Data was initially cleaned, counter-checked for accuracy and was then entered into a computer using Microsoft Excel. Data was entered twice using a data entry program to check that exactly the same data was entered as in the first time. Missing and spurious data was imputed automatically. Exploratory analysis was further conducted in order to verify that it did not grossly violate the assumptions of a normal distribution. Initially, a visual inspection of Box-Plots and histograms was used to assess the distribution of numerical variables. Further, the mean, standard deviation, skewness and Kurtosis were calculated in order to attest further on the normality of the data. More conclusively, the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality were conducted.

Data on categorical variables was initially summarized as frequencies and percentages. Continuous data was summarized using the mean ($\pm$ SD) if it was normally distributed otherwise, the median together with the interquartile range were used to summarize skewed data. The data was presented using graphs and tables.

3.12.2 Statistical Analysis of Effect of VMIs on Students' Motivation Towards Kiswahili Proverbs

The statistical analysis of the effects of VMIs on student motivation involved two steps. Step one compared the median scores of the intervention group (O_1) with the control group (O_3) before the experiment on all the six dimensions of motivation using t-test for normally distributed data. If the assumptions of normality were violated, a Mann-Whitney U test was applied to compare the median ranks of the two groups. Further bivariate analyses were used

to compare the groups regarding baseline characteristics. The Chi-Square (χ^2) test was used to identify whether there were any gender differences between the pre-intervention groups. After the experiment, the Kruskal-Wallis test was used to identify the effects of VMIs on student motivation and also to rule out any testing threat. Statistical analyses were performed using the SPSS version 20 and STATA version 11 statistical software.

The second step involved the estimation of a Generalized Linear Model (GLM) using the maximum likelihood method. This allowed for the adjustment of possible confounders when investigating the effects of VMIs on motivation. The investigated confounders included student age and gender and teacher experience. The estimated model took the form $y = f(x_i)$.

An initial exploration of the correlation coefficient of the dependent variable (y) and the independent variables (x_i) was conducted. This served two purposes. The first was to identify factors showing an association of $\rho < 0.20$ with the dependent variable y. The second was to rule out multi-collineality with the recommended criterion of an association of beyond 0.70 considered to be a source of problems in the modeling. Forward stepwise regression was also used to prevent the problem of multi-collineality. The search process entered the variables one at a time and compared the new variables to those in the solution. If a new variable and the z values on old variables became non-significant, the old variables were dropped out of the solution. The estimated linear version of this model was $y = \alpha + \beta_i x_i + e_i$ where y represents each of the six dimensions of motivation, α is a constant (intercept), β_i are the effects of each of the independent variables and e_i are the errors of estimation. The x_i included the intervention, student age, gender and teacher experience. In the GLM, the link function was taken to be a logit and the binomial distribution family was adopted. To help with the interpretation of the resultant odds ratios, the effects of the independent variables (β_i) were converted into percentage points. The results were considered as significant if ρ was less than 0.05, two-tailed. The corresponding 95% confidence intervals (CI) for the effects of the β_i

were also presented. Consequently, six independent models were constructed to study respectively baseline variables (student age, gender and teacher experience) and the intervention (VMIs) and each of the six dimensions of motivation. These analyses were performed using SPSS version 20 and STATA version 11 statistical software.

3.12.3 Statistical Analysis of Effect of VMIs on Students' Attitude Towards Kiswahili Proverbs

A two-steps procedure was used in the statistical analysis of the effects of VMIs on students' attitude. The first step compared the median scores of the intervention Group A with the control Group B before the experiment on the three dimensions of attitude. Since the assumptions of normality were violated in the pre-test, a Mann-Whitney U test was used in the comparison of the two groups. Further, since the data failed the normality test in the post-test, the Kruskal-Wallis test was used in the comparison between four groups. The SPSS version 20 and STATA version 11 were used to conduct these statistical analyses.

Secondly, Generalized Linear Models (GLM) were estimated using the maximum likelihood method of all the study variables with each of the three attitude dimensions simultaneously entered into individual models. The intervention was entered as the main predictor. Further, teacher experience, student age and gender were included in all the three models as potential confounders.

Initial exploration of the correlations between the three dimensions of attitude and baseline factors was performed. This served firstly to identify factors showing an association of $\rho < 0.20$ with each of the three dimensions of attitude. It also helped to rule out multi-collinearity with the usual criterion of an association of beyond 0.70 being applied. Consequently, a forward stepwise regression was used to control the problem of multi-collinearity. In the three models each variable was entered separately and compared with the variables already in

the model. If the variables already in the model became non-significant, the old variables were dropped out of the model.

The estimated linear version of this model was $y = \alpha + \beta_1*group + \beta_2*age + \beta_3*gender + \beta_4$ teacher experience $+ e_i$ where y represents each of the three dimensions of attitude, α is a constant (intercept), β_i are the effects of each of the independent variables and e_i are the errors of estimation. In the estimated GLM, a logit link function with a binomial distribution family was used. The effects of the independent variables (β_i) were converted into percentage points in order to aid in the interpretation of the calculated odds ratios. A criterion of $\rho < 0.05$, for a two-tailed test was used to identify significant variables. The corresponding 95% confidence intervals (CI) for the effects of the β_i were also obtained.

3.12.4 Statistical Analysis of Effect of VMIs on Students' Achievement in Kiswahili Proverbs

The statistical analysis of the effects of VMIs on student achievement involved two steps. Step one compared the median scores of the intervention group (O_1) with the control group (O_3) before the experiment on thirty objective questions on Kiswahili proverbs. Since the assumptions of normality were violated, a Mann-Whitney U test was applied to compare the median ranks of the two pre-test groups. Further analysis involved examining the associations between students' achievement, students' age and teacher experience in experiment with pre-test Group A and control no pre-test Group B. After the experiment, since the data failed the normality test, the Kruskal-Wallis test was used to identify the effects of VMIs on student achievement and also to rule out the testing threat. Statistical analyses were performed using the SPSS version 20 and STATA.

The second step involved the estimation of a Generalized Linear Model (GLM) using the maximum likelihood method. This allowed for the investigation of the effects of VMIs on achievement while adjusting for possible confounders.

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An initial exploration of the correlation coefficient of the dependent variable (y) and the independent variables (x_i) was conducted which served two purposes. The first was to identify factors showing an association of $\rho < 0.20$ with the dependent variable y. The second was to rule out multi-collinearity with the recommended criterion of an association of beyond 0.70 considered to be a source of problems in the modeling. Forward stepwise regression was also used to prevent the problem of multi-collinearity. The search process entered the variables one at a time and compared the new variables to those in the solution. If a new variable and the z values on old variables became non-significant, the old variables were dropped out of the solution.

The estimated linear version of the model was achievement = α + β_1*group + β_2 *age + β_3*gender +β_4 teacher experience + e_i where α is a constant (intercept), β_i are the effects of each of the independent variables and e_i are the errors of estimation. In the GLM, the link function was taken to be a logit and the binomial distribution family was adopted. To help with the interpretation of the resultant odds ratios, the effects of the independent variables (β_i) were converted into percentage points. The results were considered as significant if ρ was less than 0.05, two-tailed. The corresponding 95% confidence intervals (CI) for the effects of the β_i were also presented.

3.12.5 Statistical Analysis of Other Factors that Affect Important Students' Outcomes

The statistical analysis of the other factors that affect students' outcomes involved the estimation of a Generalized Linear Model (GLM) using the maximum likelihood method. The estimated linear version of this model was y = α + β_i x_i + e_i where y represents important learning outcomes, α is a constant (intercept), β_i are the effects of each of the independent variables and e_i are the errors of estimation. The x_i included the intervention, student age, gender and teacher experience. In the GLM, the link function was taken to be a logit and the binomial distribution family was adopted. To help with the interpretation of the resultant odds

ratios, the effects of the independent variables (β_i) were converted into percentage points. The results were considered as significant if ρ was less than 0.05, two-tailed. In total ten models were estimated, six for each dimension of motivation, three for the attitude dimensions and one for achievement.

3.13 Ethical Consideration

In the process of data collection, analysis, presentation and reporting, this study followed due process, informed consent, confidentiality and anonymity of participants.The researcher applied for approval from the Institute of Graduate Studies, Kabarak University (APPENDIX H). The researcher then applied for a research permit from the National Commission for Science Technology and Innovation (NACOSTI) of the Government of Kenya (APPENDIX I) and a research authorization letter (APPENDIX J). After acquiring the permit from NACOSTI, the researcher later looked for research authorization from the County Commissioner, Nakuru County (APPENDIX K). Further, school entry approvals were sought from the County Director of Education, Nakuru County (APPENDIX L).

The research site were the schools wherein the researcher informed the Principals about the nature of the study using the Information Sheet for the Principals (APPENDIX G1). In the schools, the participant who were teachers were informed by the researcher about the nature, objectives and the procedure of the study through the Participant Information Sheet (APPENDIX G2). Similarly, the Form Two students and teachers of Kiswahili participated in the study through a voluntary process (Shamim & Rashida, 2013). To seek the teachers' approval, they were requested to read and sign Consent Forms (APPENDIX M).

The schools and the participant teachers were assigned pseudonyms to protect their identity (Shamim & Rashida, 2013). Throughout the study process the information gathered was kept in a locked place away from possible access by a third party. Information that was in soft

copy was guarded using access passwords known only by the researcher. The information was used for purposes of the research only.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

The findings of this study are presented and discussed in this chapter. The first part of this chapter presents a description of the study subjects. Then a presentation on the findings and discussion from the three objectives follows.

4.2 Social-Demographic Characteristics of the Sample

A total of 436 Form Two students in eight Extra County Secondary Schools in Nakuru County were surveyed. The distribution of the students among the four study groups was such that Group A had 23%, Group B had 25%, Group C had 30% and Group D had 22%.

4.2.1 Student Characteristics

The average age of the surveyed students was 15.99 years (SD = 0.89). The distribution of the surveyed students was nearly equal among gender (Table 6). There were no age differences identified between boys and girls (t = 0.59, $\rho > 0.05$).

Table 6: Age of Respondents

Gender	Frequency (%)	Mean age in years (± SD)
Girls (48.8%)	182 (43)	15.96 (0.91)
Boys (51.2%)	245 (57)	16.01 (0.89)

The studied students were in their mid teenage. Presumably, these students had completed eight years of primary school education and were now in the second year of a four year secondary school course that would lead to Kenya Certificate of Secondary Education (KCSE) examination. This reported age largely reflects the education policy in Kenya which requires learners to join primary school after they attain six years of age (Government of Kenya, 2013) and as a consequence, learners are expected to be approximately 16 years while in Form Two. In conformity with the secondary school syllabus for Kiswahili, learners are

required to acquire mastery of Kiswahili proverbs across all classes in secondary school (Kenya Institute of Education, 2002). This finding is comparable to sixteen year old learners in other countries studying languages. For example in Sweden, learners in the age range of 16-19 years are in upper secondary school (Adbo & Taber, 2009). This characteristic is also similar to that of students in Australian high schools who fall in the age range of 12-17 years (Dawson, 2007). In mid teenage, learners are capable of assimilating the grammar and the deeper meaning inherent in proverbs. Overall, the existing literature suggests that appropriate age is an important element in the learners process of acquiring new knowledge and concepts such as a second language. Since the students appreciated the intervension, it seems therefore that teenage is an appropriate age to introduce VMIs in teaching Kiswahili proverbs.

A nearly equal distribution of the studied boys and girls was observed. This finding is in agreement with the education policy in Kenya that provides equal opportunity for boys and girls (Government of Kenya, 2013; Republic of Kenya, 2010). It is noteworthy that the study was conducted in Nakuru County which is broadly considered as cosmopolitan and thus, cultural practices that hold back educating the girl child may not necessarily apply. This finding may also be a reflection of the many efforts to keep the girl child in school (Ouma, 2013). Since literature indicates that teacher attributes influence performance, teacher characteristics were collected.

4.2.2 Teachers' Characteristics

Out of the eight teachers included in this study, four were female and four were male. As illustrated in Table 7, two teachers, one female and one male, were in the age range of 20-29; two teachers, both female were in the age range of 30-39; two teachers one female and one male were in the age range of 40-49 and two teachers, both male, were in the age range of 50-59. The teachers had an average teaching experience of 16.63 years. Further, the eight

teachers indicated a wide range in experience in teaching Kiswahili that spanned from 5-25 years.

Table 7: Teachers' Characteristics

Group	School	Teacher	Gender	Age Range	Experience
A	Ahadi	Katana	Female	40-49	20
	Amani	Cheru	Male	20-29	6
B	Bidii	Kini	Male	50-59	25
	Busara	Turu	Female	30-39	14
C	Chuma	Waru	Female	30-39	14
	Chuo	Nguni	Male	50-59	25
D	Daima	Mwani	Male	40-49	24
	Dunia	Tero	Female	20-29	5

The eight surveyed teachers had gone through teacher training. The eight teachers indicated that they had at least received pedagogical training to teach Lugha ya Kiswahili. This seemingly high level of qualification is an emerging phenomenon which largely can be explained by the recent policy of expansion of tertiary education that aims to benefit as many people as possible (Blom, Raza, Kiamba, Bayusuf & Adil, 2016). It has been noted that teachers have taken up the opportunities brought about by this policy. Being degree holders, the interviewed teachers were presumed to have been adequately prepared intellectually to teach the Kiswahili language.

A wide range of work experience was reported among the teachers. This can be largely explained by the recent extension of the retirement age of teachers to reach 60 years (Government of Kenya, 2016). It can also be explained by the current employment policy which focuses mainly on replacement of teachers who have left service (Government of Kenya, 2016). This wide variation in teaching experiene could largely explain the varied uptake of emerging technology.

4.3 Effect of VMIs on Student Motivation in Learning Kiswahili Proverbs

The first objective of the study was to find out if VMIs had any significant effect on motivation in learning Kiswahili proverbs. Motivation is a multi-dimensional concept and, as such, the section presents and discusses the six dimensions, namely: Learning dimension of motivation, Emotional dimension of listening motivation, Instrumental dimension of listening motivation, Example dimension of motivation, Teaching Aids dimension of motivation and Real Object dimension of motivation to learn Kiswahili proverbs. For each dimension, a presentation and discussion of the descriptive statistics of the items that were used to assess students' motivation is made initially. Finally, a comparison of the study groups before and after the intervention is made.

4.3.1 Learning Dimension of Motivation for Learning Kiswahili Proverbs

The distribution of the scores in motivation for learning Kiswahili proverbs in Group A and B before the VMIs intervention were not normally distributed. An observation of the histogram of the data showed that it was positively skewed (Figure 3). Most of the students registered low scores on the learning dimension of motivation aspect before the VMIs intervention.
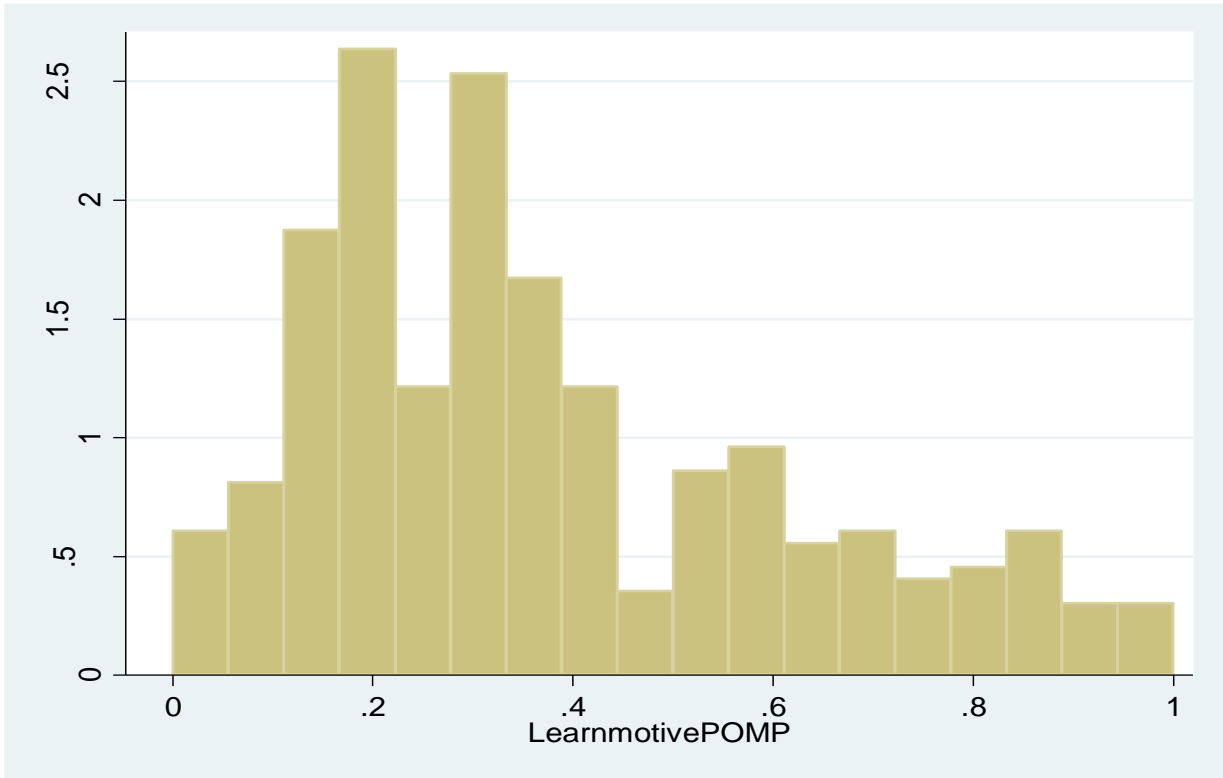
Figure 3: The Distribution of Learning Dimension of Motivation Scores.

The descriptive statistics of post-test scores on the learning dimension of motivation to learn Kiswahili Proverbs are presented in Table 8. The median score for Control with pretest Group B in the learning dimension of motivation to learn Kiswahili proverbs was the highest while all the other study groups had a low and identical score. A comparison of percentiles indicates some variation in the median scores of the learning dimension of motivation in each of the four study groups. Control with pre-test Group B had the widest interquartile range while Control with no pretest Group C had the lowest. This might be suggestive of differences in the distribution of scores on the learning dimension of motivation among the four study groups. This indicates that non-parametric tests of comparison are most appropriate.

Table 8: Descriptive Statistics of post-test on Learn Motive

	Mean	SD	SE	Median	Percentiles		Interquartile Range
					25th	75th	
A	0.347	0.232	0.024	0.281	0.188	0.469	0.281
B	0.590	0.236	0.027	0.625	0.406	0.781	0.375
C	0.312	0.196	0.019	0.281	0.188	0.375	0.188
D	0.296	0.180	0.020	0.281	0.156	0.375	0.219

The graphical presentation of the median scores of the four study groups before and after the intervention on the learning dimension of motivation is presented in Figure 4. The median scores on the learning dimension of motivation to learn Kiswahili proverbs for the Experiment with pre-test Group A dropped by a statistically significant 10 percentage points from 0.38 to 0.28 (Mann-Whitney U test, $z = 2.071$, $\rho = 0.0384$). This is suggestive of the absence of a treatment effect. The Control with pre-test Group B improved more than twofold from 0.25 to 0.63 (Mann-Whitney U test, $z = 7.786$, $\rho = 0.000$). This is is indicative of the role of confounders in the results. The need to control for the confounders is therefore imperative.

The scores for the treatment groups A and D were equal in the learning dimension of motivation. In other words the treatment groups had similar post test scores in the learning dimension of motivation. This rules out the effects of the pre-test on the VMIs intervention in the learning dimension of motivation. The control groups, however, had different post-test scores, with Control with pre-test Group B posting higher scores relative to Control with no pre-test Group C. This is suggestive that other confounders not controlled in the study may have caused the differences in the learning dimension of motivation scores. As such, no VMI effect was observed in this study on the learn motive.
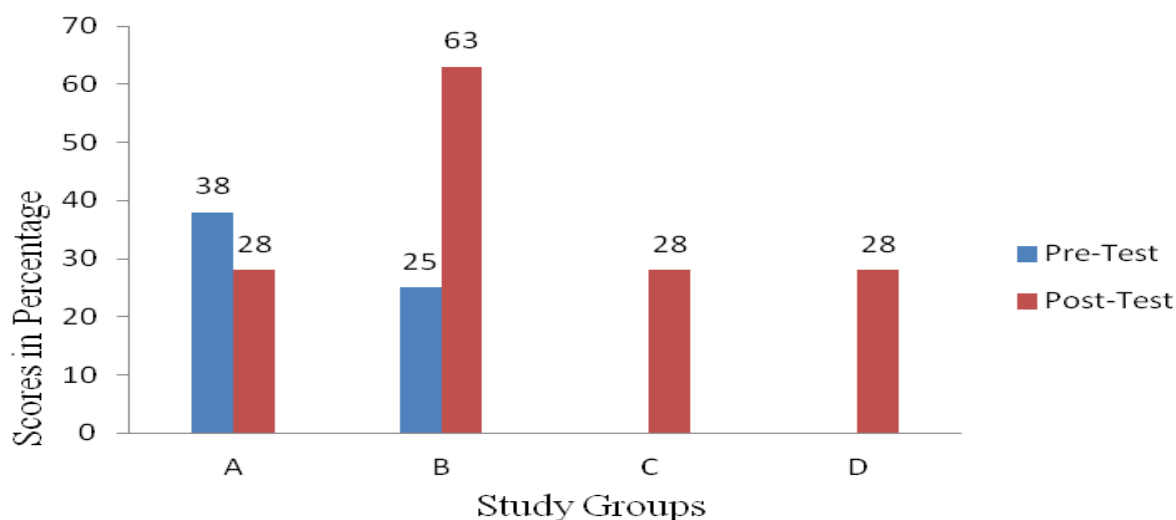
Figure 4: Comparison Between Pre and Post-Test Scores in Learn-Motivation

Further analyses show that the distribution of the scores on the learning dimension of motivation to learn Kiswahili proverbs after the intervention among the four study groups were statistically different (Kruskal Wallis test, χ^2 = 65.311, 3 d.f. ρ = 0.000). Control with pre-test Group B posted the highest score while Experiment with no pre-test Group D posted the lowest in the learn-motivation score (Table 9). This significant difference, however, does not indicate clearly whether a treatment effect or a pretest effect or the role of confounders influenced the results. Therefore, there is need to conduct further analyses of the data in order to undoutedly identify such effects.

Table 9: Comparison between Groups on the Learning dimension of motivation using Kruskal-Wallis Equality-of-Populations Rank Test

Group	Observations	Rank Sum
A	90	14719.00
B	75	19683.00
C	109	16731.00
D	81	12057.00

The data tentatively suggests that when compared with the traditional teacher-centred methods, VMIs had no demonstratable effect on the learning dimension of motivation to learn Kiswahili proverbs of the studied students. Therefore, VMIs seemed to have a negative effect on the learning dimension of motivation to learn Kiswahili proverbs when compared to control with pre-test.

Further, the results of this study did not demonstrate any statistically significant VMI effect on the learning dimension of motivation to learn Kiswahili proverbs score after the intervention even after controlling for students' gender, and the experience of the teacher (Table 10). After the intervention, girls had a 15 percentage points drop in the learning dimension of motivation to learn Kiswahili proverbs score when compared to boys. Students' age had no statistically significant effect on the learning dimension of motivation. The experience of the teacher in years showed a significant negative non-linear relationship with the motivation to learn Kiswahili proverbs score.

Table 10: Comparison Between Group A[†] and B, C, D; Gender, Age and Teacher Experience in the Learning Dimension of Motivation

Variable	Coefficient	SE	z	p-value	(95% Confidence Interval)	
Gender (girls)*	-0.153	0.029	-5.2	0.000	-0.210	-0.095
Age	0.002	0.012	0.15	0.877	-0.022	0.026
Teacher Experience*	0.044	0.012	3.65	0.000	0.020	0.068
Teacher Experience^2*	-0.001	0.000	-3.54	0.000	-0.002	-0.001
Group B*	0.165	0.035	4.76	0.000	0.097	0.232
Group C*	-0.070	0.031	-2.28	0.022	-0.131	-0.010
Group D	-0.066	0.038	-1.73	0.083	-0.141	0.009

*Effects significant at 0.05 level. † Group A held as the reference

Relative to Experiment with pre-test Group A, Control with pre-test Group B had 17 more significant percentage points in the motivation to learn Kiswahili proverbs score after

controlling for confounders (students age, gender and teacher experience). This is an indication of the ineffectiveness of the VMIs effect in the presence of a pre-test.

The Experiment no pre-test Group D had a 7 non-significant percentage points disadvantage when compared to experiment with pre-test Group A in the learning dimension of motivation to learn Kiswahili proverbs score. This indicates absence of pre-test effect on the learning dimension of motivation with the VMIs intervention. Control with pre-test Group B outperformed Control no pre-test Group C (Table 11) in the learning dimension of motivation. This was indicative of the role of confounders.

Table 11. Comparison Between Group B† and C and D; Gender, Age and Teacher Experience in the learning dimension of motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.001915	0.030299	0.06	0.95	-0.05747	0.061299
Experience^2	-0.00126	0.000861	-1.46	0.144	-0.00294	0.000431
Experience	0.044031	0.029126	1.51	0.131	-0.01306	0.101117
Group A*	-0.16458	0.080493	-2.04	0.041	-0.32235	-0.00682
Group C	-0.23505	0.064467	-3.65	0.000	-0.3614	-0.10869
Group D*	-0.23052	0.111296	-2.07	0.038	-0.44866	-0.01239
Gender (Boys)*	0.152671	0.067556	2.26	0.024	0.020264	0.285077

*Effects significant at 0.05 level. † Group B held as the reference

Experiment with no pre-test Group D did not demonstrate any significant differences from Control no pre-test Group C in the learning dimension of motivation to learn Kiswahili proverbs score (Table 12). This is indicative of lack of a treatment effect independent of pre-test.

Table 12: Comparison Between Group C[†] and D; Gender, Age and Teacher Experience in the learning dimension of motivation

	Coefficients	SE	z	ρ	[95% Confidence Interval]	
Age	0.001915	0.030299	0.06	0.95	-0.05747	0.061299
Experience^2	-0.00126	0.000861	-1.46	0.144	-0.00294	0.000431
Experience	0.044031	0.029126	1.51	0.131	-0.01306	0.101117
A	0.070461	0.077174	0.91	0.361	-0.0808	0.22172
B*	0.235046	0.064467	3.65	0.000	0.108693	0.361398
C	0.004523	0.109656	0.04	0.967	-0.2104	0.219445
Gender*(Boys)	0.152671	0.067556	2.26	0.024	0.020264	0.285077

*Effects significant at 0.05 level. † Group C taken as the reference

The treatment effect was not realized in the learning dimension of motivation scores. Further, pre-test effects on the learning dimension of motivation were not evident in the current study. The obtained results were robust even after controlling for pretest effects. This is in contrast with earlier studies that show that when pretest sensitization occurs, participants' scores on a posttest are influenced (Navarro & Siegel, 2018). In addition this finding is contrary to literature which states that emerging technologies in teaching have a positive influence on various aspects of motivation (Salkeld, 2013). This is a new finding since literature is largely silent on the effect of VMIs on the learning dimension of motivation after controlling for students and teacher attributes. Thus the lack of the effect of VMIs on the learning dimension of motivation can largely be explained by the presence of confounding factors.

Further, the presence of confounders may have affected the effect of VMIs on the learning dimension of motivation. Girls were outperformed by the boys while the experience of the teacher had a significant negative non-linear relationship with pre-learn motivation scores. This adds to previous literature which states that positive motivation to language learning may be associated to external factors (Uribe, Gutiérrez & Madrid, 2011). This finding does not support existing literature which states that technology in general and videos in particular

help in improving the learning experience (Salkeld, 2013a). This finding is also contrary to the findings of King (2000) who states that videos that have voice improve the motivation of students towards listening. Overall, the effect of the VMIs on the learning dimension of motivation was not demonstrated in the current study even after controlling for student age, gender and teacher experience as confounders. Therefore, the sub-hypothesis $HO_{1a,}$ which stated that VMIs will have no statistically significant effect on the learning dimension of motivation, was upheld.

4.3.2 Emotional Dimension of Listening to Teacher Explaining the Meaning of Proverb

Before the intervention, the Emotional dimension of listening motivation scores were positively skewed (KS score = 0.162, df = 432, ρ = 0.000). In addition, the scores of the Emotional dimension of listening motivation after the intervention were negatively skewed (KS score = 0.193, df = 324, ρ = 0.000). An observation of the histogram of the data showed that it was negatively skewed (Figure 5). This necessitated the use of non-parametric tests in analysis.
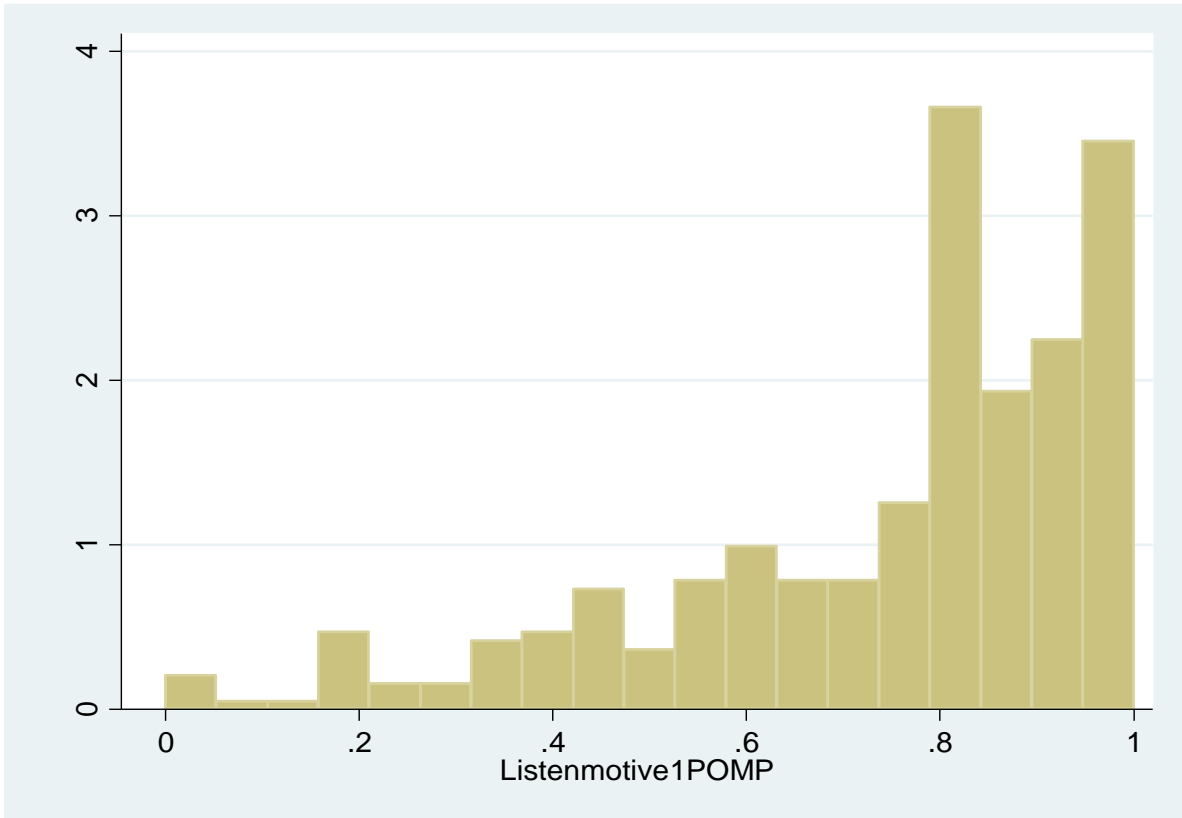
Figure 5: The Distribution of Emotional Dimension of Listening Motivation Scores

The descriptive statistics of post-test scores on Emotional dimensions of listening motivation of Kiswahili Proverbs are presented in Table 13. The median score for Control with pretest Group B in the Emotional dimension of Listening motivation was the lowest while Group C and D had the highest and identical scores. A comparison of percentiles indicate some variation in the median scores of the Emotional dimension of Listening motivation in each of the four study groups. Control with pre-test Group B had the widest interquartile range while Control with no pretest Group C had the lowest. This might be suggestive of differences in the distribution of scores on the Emotional dimension of Listening motivation among the four study groups.

Table 13: Descriptive Statistics of Post-test Scores on Emotional Dimension of Listening

Group	Mean	SD	SE	p25	p75	p50	IQ
A	0.718	0.246	0.025	0.583	0.917	0.791	0.333
B	0.680	0.235	0.027	0.521	0.875	0.75	0.354
C	0.786	0.209	0.020	0.750	0.917	0.833	0.167
D	0.800	0.187	0.021	0.708	0.958	0.833	0.250

The graphical presentation of the median scores of the four study groups before and after the intervention on Emotional dimension of listening motivation is presented in Figure 6. The score for Experiment with pre-test Group A improved by 4 statistically non-significant percentage points from 0.75 to 0.79 (Mann-Whitney U test, z = -0.896, ρ = 0.3700). This is indicative of the absence of a treatment effect. The scores on the Emotional dimension of listening motivation for Control with pre-test Group B dropped significantly from 0.88 to 0.75 (Mann-Whitney U test, z = 4.259, ρ = 0.000). This decrease is an indication of a presence of confounders (Kumari, 2013). This implied that, in the words of Kumari (2013), other confounders could have caused a temporal alteration which was not incorporated in the present study. Ideally, it illustrates that something else could have caused the results shown and is a check upon causality.
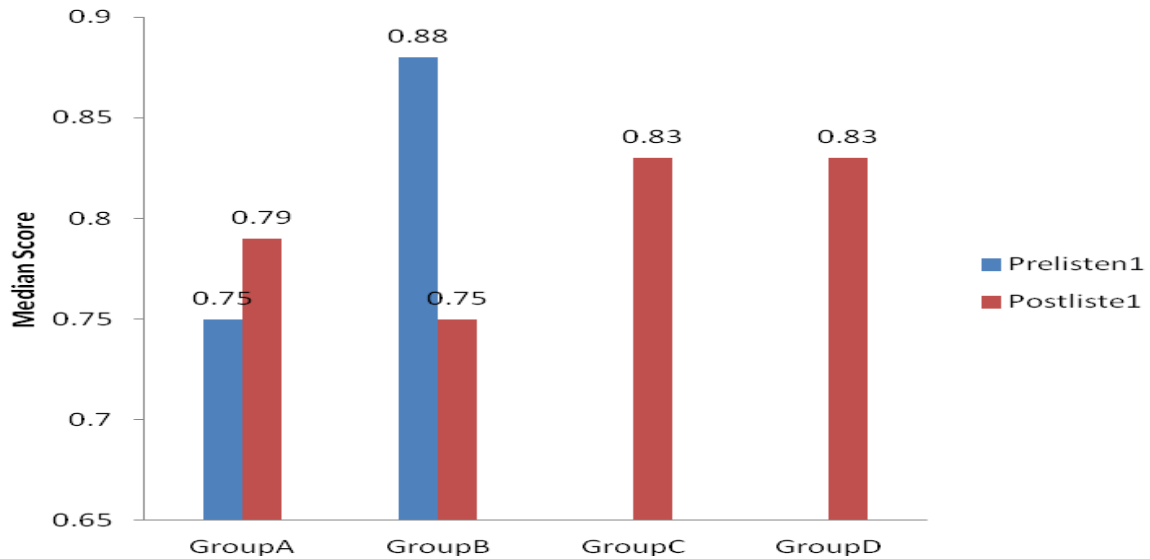
Figure 6: Effect of VMIs on the Emotional Dimension of Listening Motivation

The data further indicates that the four study groups were statistically different (Kruskal Wallis test, $\chi^2 = 16.89$, df = 3, $\rho = 0.007$) in the Emotional dimension of the listening motivation. Control with no pre-test Group C had the highest rank sum while control with pre-test Group B had the lowest rank sum (Table 14). The difference though does not indicate if a treatment or pretest effect or the role of confounders influenced the results. As such, there is a need to conduct further analyses of the data in order to undoutedly identify such effects. As a result, a GLM was used.

Table 14: Non parametric comparison between Groups on Emotional Dimension of the Listening Motivation

Group	Observations	Rank Sum
A	94	15982
B	76	11132
C	111	22218.5
D	82	16733.5

Further, the effectiveness of VMIs on the Emotional dimension of listening motivation was not evident. There is no readily available comparative literature on the effects of emerging technologies on the Emotional dimension of listening motivation. Largely, the lack of effect

on VMIs on the Emotional dimension of listening motivation is attributable to the observed presence of pre-test effects independent of the treatment as illustrated by Kumari (2013). Other literature indicates that a pre-test can prejudice data integrity when participants, in either the experiment or the control groups, may have attempted to answer questions in an identical manner as the pre-test (Navarro & Siegel, 2018). This could have impacted the treatment outcome on the Emotional dimension of listening motivation scores.

With the introduction of confounders (student age and sex and teacher experience), Experiment with pre-test Group A were not statistically different from those of either Group B, C or D in the the Emotional dimension of listening motivation (Table 15). The reported data showed a non-significant reduced effect of approximately 0.06 percentage points in Control with pre-test Group B when compared to Experiment with pre-test Group A after controlling for age, gender, and teacher experience in the Emotional dimension of the listening motivation. The reported data therefore demonstrated that Experiment with pre-test Group A did not show any significant treatment effect when compared to Control with pre-test Group B on the Emotional dimension of listening motivation scores.

Further, the results indicated that Control with no pre-test Group C and Experiment with no pre-test Group D had 5 and 14 statistically insignificant percentage points, respectively, higher when compared to Experiment with pre-test Group A in the Emotional dimension of listening motivation scores. In effect, the data demonstrates that Experiment with pre-test Group A had a statistically insignificant difference on the Emotional dimension of listening motivation when compared to either Control with pre-test Group B, Control with no pre-test Group C and Experiment with no pre-test Group D and thus raising questions about the expected role of VMIs on the Emotional dimension of listening motivation. Overall, the

reported data does not support the opinion that VMIs demonstrate any significant positive effects on the Emotional dimension of listening motivation.

Table 15: Comparison Between Group A[†] and B, C and D on the Emotional Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Conf indence Interval]	
Age	-0.00971	0.027753	-0.35	0.726	-0.0641	0.044685
Experience^2	-0.00149	0.000765	-1.95	0.051	-0.00299	8.52E-06
Experience	0.045224	0.026045	1.74	0.082	-0.00582	0.09627
Group B	-0.05908	0.075972	-0.78	0.437	-0.20798	0.089824
Group C	0.051122	0.076855	0.67	0.506	-0.09951	0.201754
Group D	0.147459	0.090145	1.64	0.102	-0.02922	0.32414
Gender (Boys)	-0.03795	0.063595	-0.6	0.551	-0.1626	0.086692

*Effects significant at 0.05 level. † Group A taken as the reference

For each increase in age by one year, the mean score for the Emotional dimension of listening motivation decreased by around 0.09 non-significant percentage points. Girls had approximately 4 statiscally insignificant percentage points more in the Emotional dimension of listening motivation score when compared to boys. An increase in the experience of teachers had a statistically insignificant negative non-linear relationship with the Emotional dimension of listening motivation scores.

Control with pre-test Group B had no demonstrable effect on the Emotional dimension of listening motivation when compared to Experiment with no pre-test Group D after controlling for student age, gender and experience of the teacher (Table 16). There were statistically different effects on Control with pretest Group B and Control with no pre-test Group D had a 21 percentage point significant advantage when compared with control with pre-test Group B. Control with pre-test Group B had statistically similar scores with Control no pre-test Group C after controlling for some select student and teacher attributes. This was indicative

of lack of the role of confounders with the introduction of VMIs in the Emotional dimension of listening motivation.

Table 16: Comparison Between Group B[†] and C and D on the Emotional Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-0.00971	0.027753	-0.35	0.726	-0.0641	0.044685
Experience^2	-0.00149	0.000765	-1.95	0.051	-0.00299	8.52E-06
Experience	0.045224	0.026045	1.74	0.082	-0.00582	0.09627
Group A	0.059079	0.075972	0.78	0.437	-0.08982	0.207981
Group C	0.110201	0.062602	1.76	0.078	-0.0125	0.232898
Group D*	0.206538	0.104561	1.98	0.048	0.001603	0.411474
Gender (Boys)	-0.03795	0.063595	-0.6	0.551	-0.1626	0.086692

*Effects significant at 0.05 level. † Group B taken as the reference

There were no significant differences in the Emotional dimension of listening motivation mean scores between Experiment with no pre-test Group D and Control with no pre-test Group C (Table 17). Thus both groups had similar post-test scores on the emotional aspects of listen motive. This finding suggests that there was no treatment effect in the absence of pre-test.

Table 17: Comparison Between Group C[†] and D on the Emotional Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-0.00971	0.027753	-0.35	0.726	-0.0641	0.044685
Experience^2	-0.00149	0.000765	-1.95	0.051	-0.00299	8.52E-06
Experience	0.045224	0.026045	1.74	0.082	-0.00582	0.09627
Group A	-0.05112	0.076855	-0.67	0.506	-0.20175	0.09951
Group B	-0.1102	0.062602	-1.76	0.078	-0.2329	0.012496
Group D	0.096337	0.105472	0.91	0.361	-0.11038	0.303058
Gender (Boys)	-0.03795	0.063595	-0.6	0.551	-0.1626	0.086692

*Effects significant at 0.05 level. † Group C taken as the reference

The reported data does not therefore demonstrate any treatment effect of VMIs on the Emotional dimension of listening motivation even after pre-test conditions were taken into account. The results were robust even after controlling for confounders. This implies that there was no treatment effect on the Emotional dimension of listen motivation scores. There is no readily available comparative literature on the effects of emerging technologies on the Emotional dimension of listening motivation. Largely, the lack of effect on VMIs on the Emotional dimension of listening motivation is attributable to the observed presence of pre-test effects independent of the treatment. This is an indication that the placement policy was limited to marks alone as indicated a previous study carried out by Mbuthi (2015).

Girls did not outperform boys in the Emotional dimension of listening motivation. This finding is in disagreement with literature which states that girls have a higher reading achievement when compared to boys of the same age (Ogero, 2012). Therefore, it can be concluded that there are no gender differences in the Emotional dimension of listening motivation.

The teaching experience of the teacher had a significant negative non-linear relationship with Emotional dimension of listening motivation scores. This was also a new finding in literature since existing literature suggests that there is a linear relationship between years of teaching experience and higher students scores (Center for Public Education, 2005). Additionally, literature is largely silent on the Emotional dimension of the Listening Motivation.

The finding on the effects of gender and teacher characteristics on the Emotional dimension of listening motivation was not radically new. Some studies have found that girls outperform boys in the Emotional dimension of listening motivation to learn second languages while others did not find any statistically significant difference (Heinzmann, 2009). The relationship between teacher experience and student motivation to learn a second language

has also been controversial with studies showing positive, negative or no relationship (Koca, 2016). The results reported in this study, however, constituteda more detailed addition to previous literature which states that positive motivation to language learning may be associated to external factors (Uribe *et al.*, 2011). Further, the findings were obtained in the context of a developing country namely Kenya, unlike what is reported in literature. The sub-hypothesis HO_{1b}, which stated that VMIs will have no effect on the Emotional dimension of listening motivation, was therefore upheld.

On the post-test, both the treatment groups did not outscore both controls. The Control with pre-test Group B had a high median score in the motivation to learn Kiswahili proverbs after the intervention when compared with either Group A, C or D which had similar post-test scores. Looking at the post-test values, there appeared to be no difference between the treatment groups, even though one got a pretest (Group A) and the other did not (Group D). Further, both treatment groups did not outscore both controls. Therefore, there was no main effect for the VMIs treatment. Each treatment group did not outscore its comparable control group in the Emotional dimension of listening motivation to learn Kiswahili proverbs after the intervention. The Experiment with pre-test Group A was outperformed by the Control with pre-test Group B on post-test score in the Emotional dimension of listening motivation to learn Kiswahili proverbs. Moreover, the Experiment with no pre-test Group D had a similar score with the Control with no pre-test Group C in the Emotional dimension of listening motivation to learn Kiswahili proverbs after the intervention. These results further indicated that there was no treatment effect.

There was a maturation effect on the post-test scores on the Emotional dimension of listening motivation for learning Kiswahili Proverbs using traditional teaching methods. The two control groups had different post-test scores, with Group B outperforming Group C in the Emotional dimension of the motivation to listen during learning of Kiswahili Proverbs. This

indicated that there was a testing effect on the post-test scores on the Emotional dimension of listening motivation for learning Kiswahili Proverbs using traditional teaching methods. Consequently, the pre-test appeared to affect the post-test scores for the Emotional dimension of listening motivation for learning Kiswahili proverbs using traditional teaching methods. This observation was in agreement with what Navarro and Siegel (2018) state, that the Solomon 4 approach enables researchers to acquire the benefits of using a pre-test, while also allowing an assessment of pretest sensitization.

In contrast, no testing effect was found in the post-test scores on the Emotional dimension of listening motivation for learning Kiswahili Proverbs using the VMIs methods in the presence of confounders. Both groups that had the pre-test did not outscore their comparable non-pretest group in the emotional dimension of motivation. Group A underperformed when compared to Group B on this dimension. This was evidence for lack of support for the effectiveness of the VMIs method relative to the traditional teaching method in the presence pre-test. It also meant that there was a testing threat. The post-test scores of Control with no pre-test Group C were similar to those of Experiment with no pre-test Group D. This means that no testing threat was found in the use of the VMIs method relative traditional teaching method in the emotional dimension of the listening motivation. This finding was in agreement with literature which states that the pre-test can have an effect by itself by decreasing or increasing the scores in the words of Navarro and Siegel (2018) of the Emotional dimension of listening motivation. As such, the sub-hypothesis, that no statististically significant effect of VMIs on students' emotional dimension of motivation to listen during learning of Kiswahili proverbs, was upheld.

Overall the results indicate that VMIs had no significant effects on the emotional dimension of motivation. Following this finding, the sub-hypothesis HO_{1b}, that VMIs will have no

statististically significant effect on students' emotional dimension of the motivation to listen during learning of Kiswahili proverbs, was upheld.

4.3.3 Instrumental Dimension of Listening to the Teacher Explaining the Meaning of a Proverb

The descriptive statistics for all groups in the Instrumental dimension of listening motivation shows that before the intervention, the scores were skewed (KS score = 0.162, df = 432, ρ = 0.000). Similarly, after the intervention, the scores were skewed (KS score = 0.139, df = 700, ρ = 0.000). This necessitated the use of a non-parametric test. An observation of the Box-Plot of the data showed that it was negatively skewed (Figure 7).
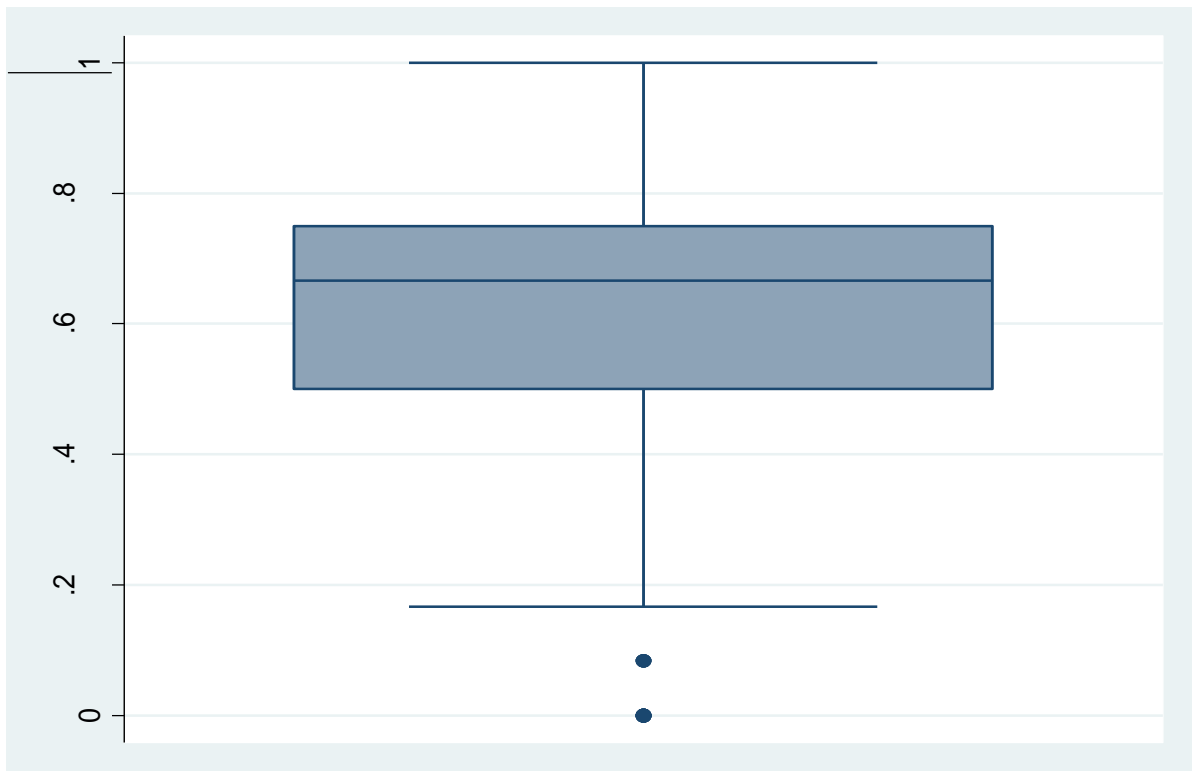
Figure 7: The Distribution of Instrumental Dimension of Listening Motivation Scores.

Before the intervention, experiment with pre-test Group A and control with pre-test Group B had no statistically significant difference in the Instrumental dimension of listening motivation mean scores. Neither of the groups had a significantly larger rank sum scores than the other (Mann Whitney U test, z = -0.550, z = 0.524). The groups, therefore, were similar

before the intervention on the instrumental dimension of listening motivation. The reported finding conforms with the ideal requirement of the Solomon Four research design where the pre-test groups are supposed to be equal (Kumari, 2013). This is a reflection of the placement policy which states that schools of equal rank should admit student of comparable ability (Mbuthi, 2015; Saitoti, 2007). The results indicated that the randomization process for placement of schools to either Group A, B, C or D was effective.

Table 18 presents detailed descriptive statistics of post-test scores on Instrumental dimensions of learning Kiswahili proverbs. The median score for Experiment with no pre-test Group D in the Instrumental dimension of listening was the lowest while Group A, B and C had the highest and identical scores. A comparison of percentiles indicates some variation in the median scores of the Instrumental dimension of listening in each of the four study groups. Control with pre-test Group B had the widest interquartile range while Control with no pretest Group C had the lowest. This might be suggestive of differences in the distribution of scores on the Instrumental dimension of the listening motivation among the four study groups. There is need to use non-parametric tests in subsequent analyses.

Table 18: Descriptive Statistics of Post-test on the Instrumental Dimension of the Listening Motivation

Group	Mean	SD	SE	p25	p75	p50	IQ
A	0.586	0.228	0.024	0.500	0.750	0.667	0.250
B	0.638	0.272	0.031	0.417	0.833	0.667	0.417
C	0.622	0.199	0.019	0.500	0.750	0.667	0.250
D	0.580	0.206	0.024	0.500	0.750	0.583	0.250

The scores on the Instrumental dimension of listening motivation for the Experiment with pre-test Group A as presented in Figure 8 increased by 9 statistically non-significant percentage points from 0.58 to 0.67 (Mann Whitney U test, $z = -0.642$, $z = 0.5212$). This is an indication of lack of a treatment effect. Control with pre-test Group B also increased by 9

statistically non-significant percentage points (Mann Whitney U test, z = -1.669, z = 0.0951).

These result is further suggestive of the absence of a pre-test effect.
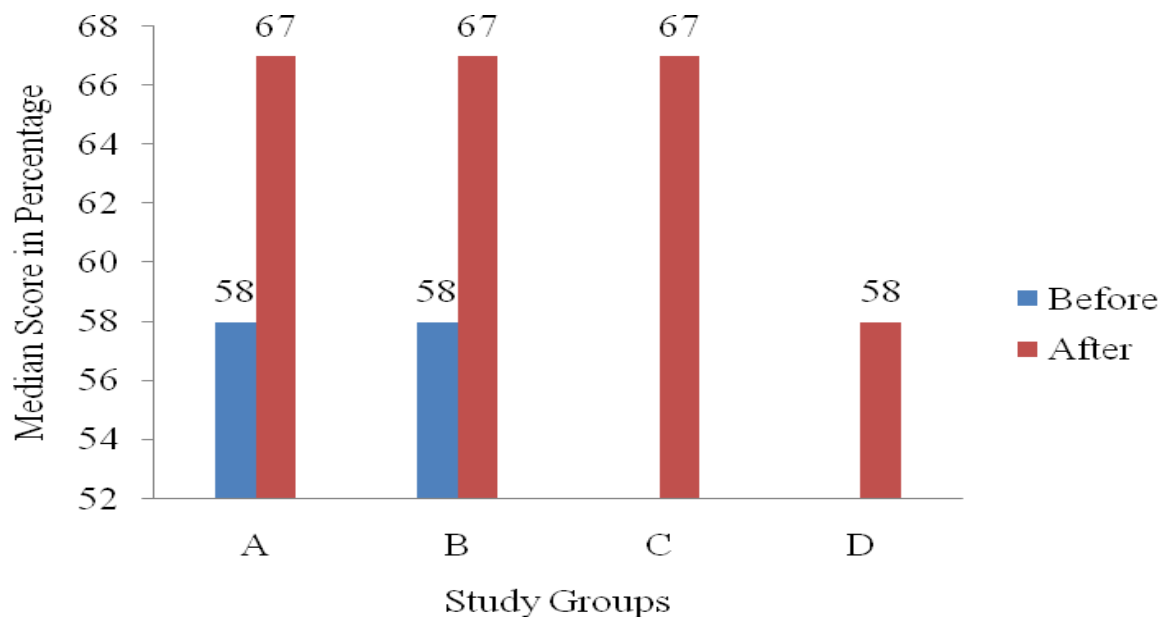
Figure 8: Comparison Between pre- and post-test scores in instrumentl dimension of listening motivation

Without confounders, the four study groups did not significantly differ from each other in the Instrumental dimension of listening motivation post-test scores. The rank sums were statistically identical (Kruskal Wallis test, $\chi 2 = 5.268$, df = 3, $\rho = 0.1532$). This suggested that none of the study groups had statistically superior scores than the others (Table 19). This indicated that the VMIs treatment effect was not evident in the instrumental dimension of listening motivation.

Table 19: Non Parametric Comparison between Groups on Instrumental Dimension of the Listening Motivation

Group	Observations	Rank Sum
A	93	15599
B	75	14695.5
C	107	19070
D	75	12060.5

There was no treatment effect observed between VMIs and the Instrumental dimension of Listening motivation. Further, the effectiveness of VMIs on the Instrumental dimension of listening motivation was not evident. Comparative literature on the effects of emerging technologies on the instrumental aspect of the motivation to listen is not readily available. Largely, the lack of effect on VMIs on the Instrumental aspect of listening motivation is attributable to the observed presence of pre-test effects. Navarro and Siegel (2018) state that the implementation of the pre-test leads participants to respond to the treatment and or the post-test examination differently than they would have otherwise. This is an indication that the pre-test groups A and D could have responded to the post-test differently leading to the absence of the treatment effect.

The data further demonstrated that the mean score in the Instrumental dimension of listening motivation of Experiment with pre-test Group A was not statistically different from that of Control with pre-test Group B after controlling for students' gender, age and the experience of the teacher as confounders (Table 20). Compared to Experiment with pre-test Group A, Control with pre-test Group B had roughly 3 reduced but non-significant percentage points on the Instrumental dimension of listening motivation scores even after controlling for age, gender and teacher experience. This implied that there was no treatment effect on the Instrumental dimension of listening motivation scores.

Table 20: Comparison Between Group A[†] and B, C, D in the Instrumental Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.00696	0.031093	0.22	0.823	-0.05398	0.0679
Experience^2*	-0.00278	0.000894	-3.11	0.002	-0.00453	-0.00102
Experience*	0.09021	0.030146	2.99	0.003	0.031126	0.149295
Group B	-0.02735	0.087466	-0.31	0.755	-0.19878	0.14408
Group C	-0.02924	0.078443	-0.37	0.709	-0.18299	0.124503
Group D	0.122794	0.095899	1.28	0.2	-0.06516	0.310751
Gender (Boys)*	0.166178	0.072789	2.28	0.022	0.023515	0.308841

*Effects significant at 0.05 level. † Group A taken as the reference

No statistical differences were observed in the median scores between the Instrumental dimension of listening motivation of experiment with pre-test Group A and control with pre-test Group B in the presense of the pre-test. Therefore, a VMIs treatment effect was not evident in the instrumental dimension of listening motivation. Further, no statistical differences were observed between the median scores in the Instrumental dimension of listening motivation of experiment with pre-test Group A and control with no pre-test Group D. The pretest effect was thus not evident. The results, on overall, indicated the absence of a treatment and pre-test effect in the Instrumental dimension of listening motivation.

Further, the reported results showed that students' age had statistically non-significant associations with the Instrumental dimension of listening motivation. This finding contradicted what other studies have demonstrated that individuals develop their human capital over time (Dyer & Reeves, 1994) and that previous experience translates into variable episodic knowledge and therefore considered as direct sources of knowledge (Usida, 2005).

Teacher experience had a statistically significant negative non-linear relationship with the Instrumental dimension of the listening motivation scores. This finding was novel since

existing literature reports a linear relationship between teacher experience and students' motivation (Bedel, 2016).

Boys outperformed girls in the Instrumental dimension of listening motivation by approximately 17 statistically significant percentage points. This finding disagreed with thos from earlier literature which states that the ability of girls to learn and use any second language is higher than that of boys (UNESCO, 2014).

Control with pre-test Group B posted statistically equal scores to both Control with no pre-test Group C in the Instrumental dimension of listening motivation (Table 21). This was an indication of the absence of any other confounder which may have otherwise caused a temporal alteration as described in Kumari (2013).

Table 21: Comparison Between Group B[†] and C and D in the Instrumental Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.00696	0.031093	0.22	0.823	-0.05398	0.0679
Experience^2*	-0.00278	0.000894	-3.11	0.002	-0.00453	-0.00102
Experience*	0.09021	0.030146	2.99	0.003	0.031126	0.149295
Group A	0.02735	0.087466	0.31	0.755	-0.14408	0.19878
Group C	-0.00189	0.074934	-0.03	0.98	-0.14876	0.144976
Group D	0.150144	0.113086	1.33	0.184	-0.0715	0.371788
Gender (Boys)*	0.166178	0.072789	2.28	0.022	0.023515	0.308841

*Effects significant at 0.05 level. † Group B taken as the reference

Finally, Control with no pre-test Group C posted statistically similar scores with Experiment with no control Group D in the Instrumental dimension of listening motivation. The results indicated lack of a treatment effect independent of pretest (Table 22). This finding disagreed

with those from past literature which states that if students in the two experiment and two control groups learn the responses to the post-test as a result of the pre-test, any possible differences between groups caused by the VMIs intervention will be interfered with as, due to the pre-test, both the treatment condition and the control condition will have high scores on the posttest (Navarro & Siegel, 2018).

Table 22: Comparison Between Group C[†] and D in the Instrumental Dimension of Listening Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.00696	0.031093	0.22	0.823	-0.05398	0.0679
Experience^2*	-0.00278	0.000894	-3.11	0.002	-0.00453	-0.00102
Experience*	0.09021	0.030146	2.99	0.003	0.031126	0.149295
Group A	0.029242	0.078443	0.37	0.709	-0.1245	0.182988
Group B	0.001893	0.074934	0.03	0.980	-0.14498	0.148761
Group D	0.152036	0.106455	1.43	0.153	-0.05661	0.360684
Gender (Boys)*	0.166178	0.072789	2.28	0.022	0.023515	0.308841

*Effects significant at 0.05 level. † Group C taken as the reference

Largely, the lack of effect on VMIs on the Instrumental dimension of listening motivation, as was reported in this study, is attributable to the observed presence of pre-test effects. Therefore, the sub-hypothesis HO_{1c}, which stated that VMIs will have no statististically significant effect on students' instrumental dimension of listening motivation, was upheld.

4.3.4 Examples Dimension of Motivation

The descriptive statistics of the Example dimension of motivation before and after the intervention suggested that the scores on the Example dimension of motivation before the intervention was skewed (KS score = 0.088, df = 428, ρ = 0.000). After the intervention, the distribution of the Example dimension of motivation scores were likewise skewed (KS score = 0.14, df = 700, ρ = 0.000). Therefore, there was need to use non-parametric tests. An observation of the histogram of the data showed that it was negatively skewed (Figure 9).
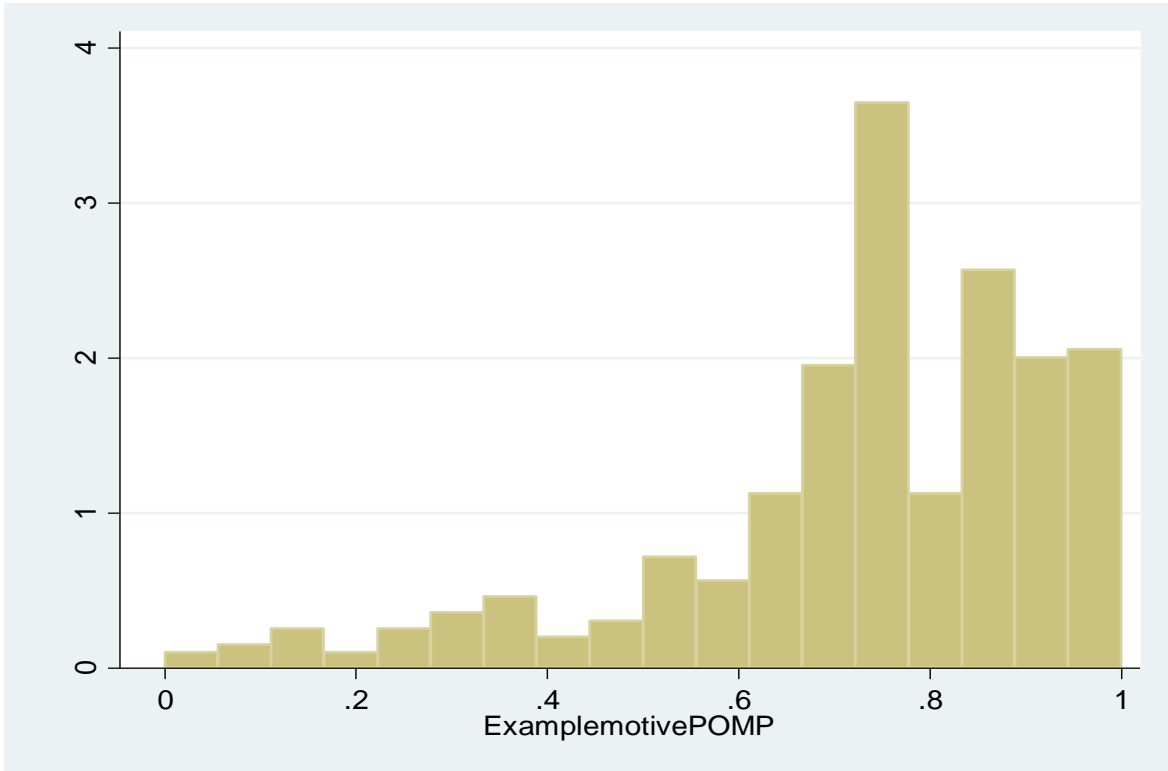
Figure 9: The Distribution of Example Dimension of Motivation Scores.

The descriptive statistics of post-test scores on the Example dimension of motivation to learn Kiswahili proverbs were as presented in Table 23. The median score for Control with no pre-test Group C and Experiment with no pre-test Group D in the Example dimension of motivation had the highest and identical scores while Experiment with pre-test Group A had the lowest score. A comparison of percentiles indicated some variation in the median scores of the Example dimension of motivation in each of the four study groups. Experiment with pre-test Group A had the widest interquartile range while Control with no pretest Group C had the lowest. This might be suggestive of differences in the distribution of scores on the Example dimension of motivation among the four study groups.

Table 23: Descriptive Statistics of Post-test on the Example Dimension of Motivation

Group	Mean	SD	SE	p25	p75	p50	IQ
A	0.688	0.227	0.024	0.583	0.847	0.722	0.264
B	0.690	0.234	0.028	0.611	0.861	0.750	0.250
C	0.743	0.199	0.019	0.681	0.875	0.778	0.194
D	0.753	0.163	0.018	0.667	0.875	0.778	0.208
Total	0.721	0.208	0.011	0.639	0.861	0.778	0.222

In the post-test (Figure 10) the median score for Experiment with pre-test Group A improved from 0.64 in the pre-test to 0.72 (Mann-Whitney U test, z = -2.885, ρ = 0.0039). That is, before the intervention, the median score of Experiment with pre-test Group A in the Example dimension of motivation scores improved by 8 statistically significant percentage points. This result whereby the post-test score improves above pre-test scores is an indication of a treatment effect. Kumari (2013) states that should Experiment with pre-test Group A post-test show increase above the pre-test, then a treatment effect is realized. In contrast, Control with pre-test Group B post-test scores dropped statistically non-significantly from 0.81 to 0.75 in the example motivation (Mann-Whitney U test, z = 1.252, ρ = 0.2106). This is indicative of the presence of confounders.
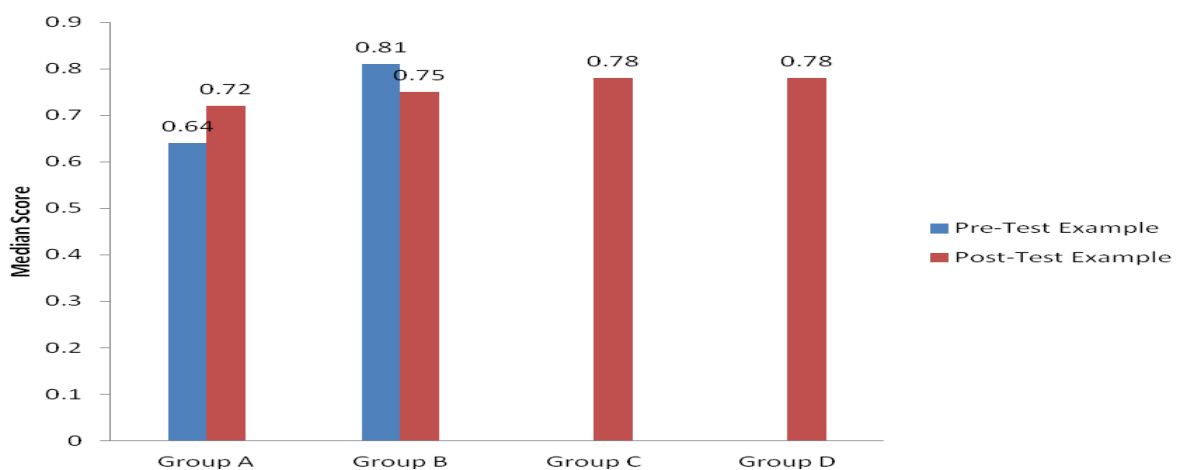
Figure 10: Pre and Post Median Scores in ExampleMotivation

There was a tentative treatment effect on the Example dimension of motivation. There is no readily available comparative literature on the effects of emerging technologies on the Example dimension of motivation. Largely, the presence of effect on VMIs on the Example dimension of motivation is attributable to the observed presence of pre-test effects. This finding was in agreement with literature that shows that due to the pre-test, both the treatment condition and the control condition may have high scores on the posttest (Frey, 2018). Another possibile explanation is that the students may have focused only on the aspects of the VMIs intervention that were covered on the pretest, thus resulting in scores that they would not have received if they did not have prior knowledge of questions on the posttest. The pre-test could have made the participants aware of outcomes. Moreover, the differential selection of participants could explain the lack of a treatment effect.

The post-test score for the four study groups were significantly similar to each other in the Example dimension of motivation (Kruskal Wallis test, χ^2 = 5.937, df = 3, ρ = 0.1147). The rank sums of the four groups were statistically similar (Table 24). Therefore, none of the study groups was different from the other in the Example dimension of motivation. This result further showed the possible role of confounders. As such, there was need to carry out further statistical anayses in order to determine the possible role of confounders, namely student age, gender and the experience of the teacher, had in the experiment.

Table 24: Non-parametric Comparison between Groups on Example Dimension of Motivation

Group	Observations	Rank Sum
A	88	13958
B	70	11510.5
C	112	21127.5
D	80	14829

There were no statistically significant differences between Experiment with pre-test Group A and either Control with pre-test Group B, Control with no pre-test Group C or Experiment with no pre-test Group D on the Example dimension of motivation results after introducing confounders namely student age and gender and teacher experience (Table 25). The data showed that with the introduction of confounders, the scores for Experiment with pre-test Group A were statistically similar to those of Control with pre-test Group B on the Example dimension of motivation. Specifically, Group A scored nearly three non-significant points above those of Group B. This was indicative of no VMIs treatment effect in the presence of pre-test.

In addition, Experiment with pre-test Group A posted statistically similar scores compared to Experiment with no pre-test Group D in the Example dimension of motivation. This was suggestive of lack of a pre-test effect.

Table 25: Group A[†] Versus B, C and D and Confounders on Example Dimension of Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.003074	0.029147	0.11	0.916	-0.05405	0.0602
Experience[2]	-0.00155	0.000835	-1.85	0.064	-0.00318	9.16E-05
Experience	0.047182	0.028363	1.66	0.096	-0.00841	0.102771
Group B	-0.02527	0.081224	-0.31	0.756	-0.18446	0.133929
Group C	0.030821	0.07613	0.4	0.686	-0.11839	0.180033
Group D	0.151587	0.092618	1.64	0.102	-0.02994	0.333115
Gender (Boys)	0.004832	0.067553	0.07	0.943	-0.12757	0.137234

*Effects significant at 0.05 level. † Group A taken as the reference

Further analysis of the scores indicated that Control with pre-test Group B posted statistically similar scores when compared to Control with no pre-test Group C in the Example dimension of motivation (Table 26). Control with pre-test Group B had approximately six non-significant percentage points below those of Control with no pre-test Group C. This finding,

in the words of Kumari (2013), failed to ascertain any other confounders that may have caused a temporal alteration and is largely reflective of lack of causality.

Table 26: Group B† Versus C and D and Controls on Example dimension of motivation

	Coefficient	SE	z	ρ	[95% Conf.	Interval]
Age	0.003074	0.029147	0.11	0.916	-0.05405	0.0602
experience^2	-0.00155	0.000835	-1.85	0.064	-0.00318	9.16E-05
Experience	0.047182	0.028363	1.66	0.096	-0.00841	0.102771
Group A	0.025268	0.081224	0.31	0.756	-0.13393	0.184465
Group C	0.056089	0.067242	0.83	0.404	-0.0757	0.18788
Group D	0.176855	0.108059	1.64	0.102	-0.03494	0.388647
Gender (Boys)	0.004832	0.067553	0.07	0.943	-0.12757	0.137234

*Effects significant at 0.05 level. † Group B taken as the reference

Finally, Control with no pre-test Group C posted statistically similar scores with Experiment with no pre-test Group D in the Example dimension of motivation (Table 27). Specifically, Experiment with no pre-test Group D recorded 12 positive but non-significant percentage points when compared to those of Control with no pre-test Group C in the Example dimension of motivation. This was suggestive of lack of VMIs effect in the absence of pre-test.

Table 27: Group C† Versus D and Confounders on Example dimension of motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.003074	0.029147	0.11	0.916	-0.05405	0.0602
Experience^2	-0.00155	0.000835	-1.85	0.064	-0.00318	9.16E-05
Experience	0.047182	0.028363	1.66	0.096	-0.00841	0.102771
Group A	-0.03082	0.07613	-0.4	0.686	-0.18003	0.118391
Group B	-0.05609	0.067242	-0.83	0.404	-0.18788	0.075702
Group D	0.120766	0.104323	1.16	0.247	-0.0837	0.325235
Gender (Boys)	0.004832	0.067553	0.07	0.943	-0.12757	0.137234

*Effects significant at 0.05 level. † Group C taken as the reference

For the confounders, boys posted statistically similar scores to that of girls in the Example dimension of motivation. This finding was contrary to popular opinion which states that girls have superior skills for the acquisition of any second language (Jabor *et al*., 2011). An increase in the Experience of the teacher had no statistically significant relationship with the Example dimension of motivation scores. This finding was in discord with the position held in literature which states that there is a linear relationship between the experience of the teacher and students' achievement (Pacific Policy Research Center, 2010). No age differences among the students were noted on the Example dimension of motivation scores.

The data did not show any statistically significant differences in age among the students in the Example dimension of motivation scores. This finding disagreed with those of Ushida (2005) that age is correlated with experience leading to the development of appropriate skills and attitudes. Further, boys had a statistically insignificant 0.4 percentage point advantage in the Example dimension of motivation scores when compared to girls. This finding also contradicted the view that girls get higher scores in language when compared to boys of the same age (UNESCO, 2009). Teacher experience was not statistically associated with the Example dimension of motivation scores.

The finding that the effects of gender and teacher characteristics on the Example dimension of motivation was not entirely new. However, it was a good addition to previous literature which has found that positive motivation to language learning may be associated to external factors (Uribe *et al*., 2011). Further, the findings of the current study were obtained in the context of a developing country, namely Kenya.

Overall, the data suggested that VMIs did not have a significant effect on the Example dimension of motivation scores in the presence of the pre-test. The results were robust even after taking care of students and teacher attributes. Further, the data did not demonstrate any

significant effect of VMIs on the scores on the Examples dimension of motivation in the absence of pre-tests.

Overall, the study did not support the sub-hypothesis HO_{1d}, which stated that Video-Mediated Instruction in teaching Kiswahili proverbs will have no statististically significant effect on the example dimension of motivation.

4.3.5 Teaching Aids Dimension of Motivation to Teach Kiswahili Proverbs

The data suggested that the scores on the teaching aids dimension of motivation before the intervention were skewed (KS score = 0.111, df = 217, ρ = 0.000). After the intervention, the distribution of teaching aids dimension of motivation scores were likewise skewed (KS score = 0.188, df = 358, ρ = 0.000). An observation of the histogram of the data showed that it was negatively skewed (Figure 11). This necessitated the use of non-parametric tests in subsequent analyses.
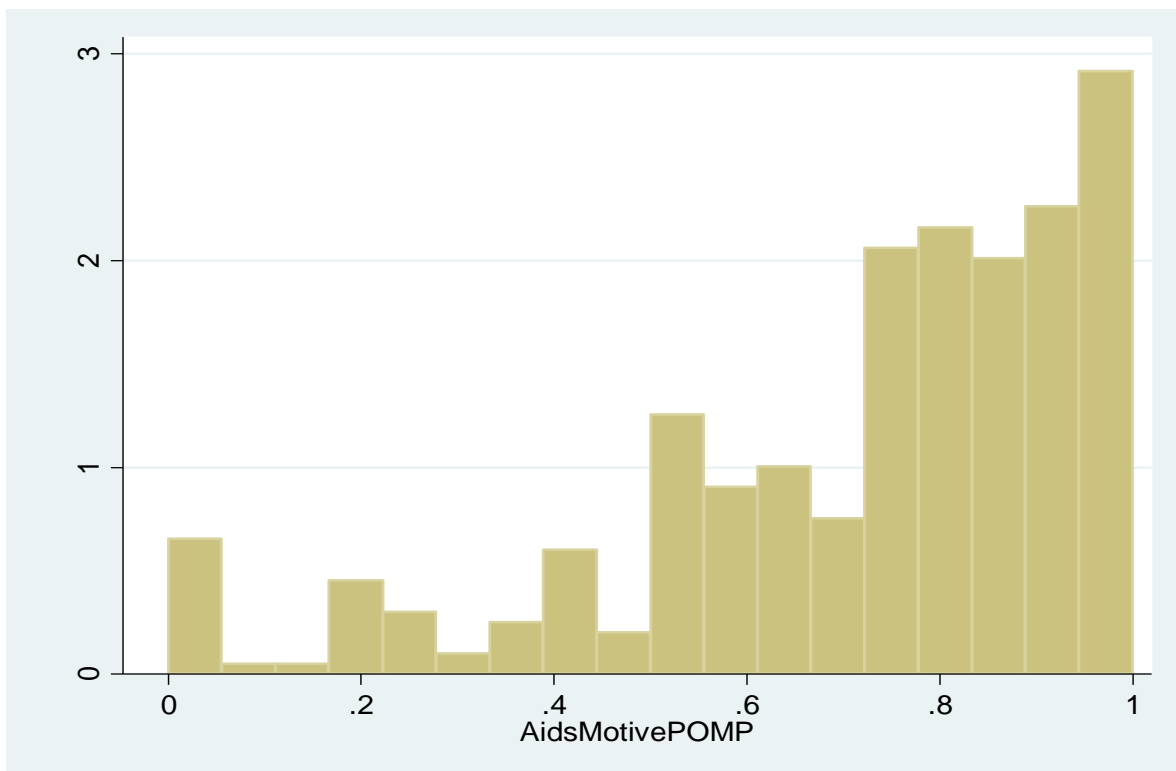
Figure 11: The Distribution of Teaching Aids Dimension of Motivation Scores.

The descriptive statistics derived from the teaching aids dimension of motivation before and after the intervention were as shown in Table 28. The median scores for Group C and D were highest and identical while those of Group A and B were lowest and identical. A comparison of percentiles indicated some variation in the median scores of the teaching aids dimension of motivation scores. Experiment with pre-test Group A had the highest interquatile range while Control with no pre-test Group C and Experiment with no pre-test Group D had the lowest and identical interquartile range. This may be suggestive of differences in the distribution of scores on the teaching aids dimension of motivation among the four study groups. These results further pointed to the appropriateness of the use of non-parametric tests in subsequent analyses.

Table 28: Descriptive Statistics of Post-test on the Teaching Aids dimension motivation

Group	Mean	SD	SE	p25	p75	p50	IQ
A	0.652	0.275	0.029	0.450	0.850	0.750	0.400
B	0.724	0.213	0.025	0.600	0.900	0.750	0.300
C	0.743	0.241	0.023	0.650	0.900	0.800	0.250
D	0.747	0.225	0.025	0.650	0.900	0.800	0.250
Total	0.717	0.243	0.013	0.600	0.900	0.800	0.300

The median score in Figure 12 for Experiment with pre-test Group A in teaching aids dimension of motivation improved statisticatly significantly from 0.55 in the pre-test to 0.75 in the post-test (Mann-Whitney U test, $z = -2.574$. $\rho = 0.010$). This result was a tentative indication of a treatment effect on the teaching aids dimension of motivation. In contrast, Control with pre-test Group B post-test scores dropped with 5 non-statistically significant percentage points from 0.80 to 0.75 in the teaching aids dimension of motivation (Mann-Whitney U test, $z = 0.910$. $\rho = 0.3630$). There seemed to be a pre-test effect in the teaching aids dimension of motivation.
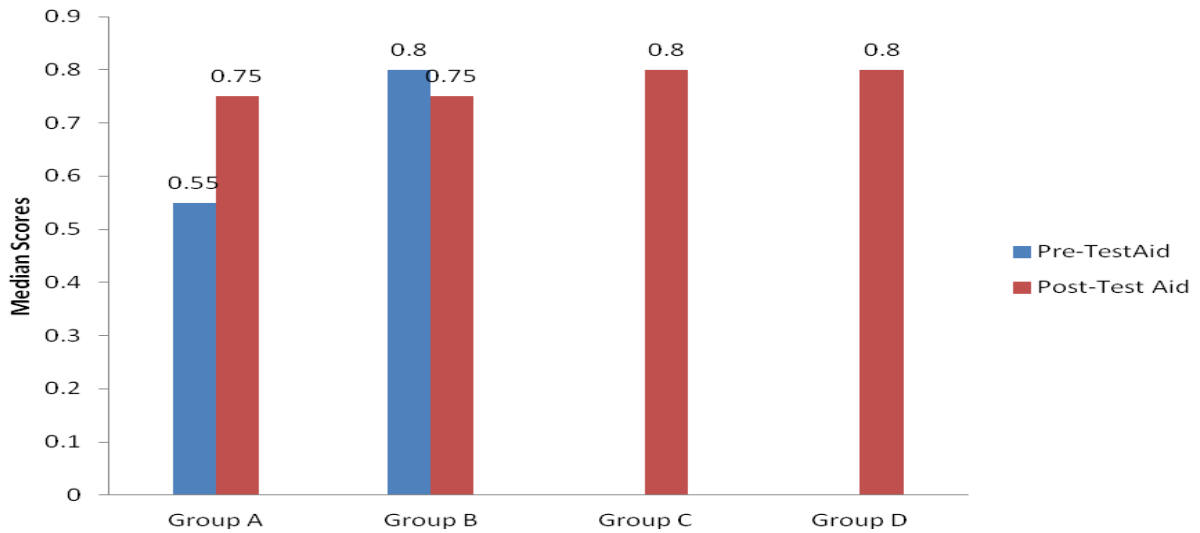
Figure 12: Pre and Post TeachingAidsMotivation Scores

The post-test score for the four study groups were significantly different from each other in the Teaching Aids dimension of motivation (Kruskal Wallis test, $\chi^2 = 8.433$, df = 3, $\rho = 0.0379$). Control with no pre-test Group C had the highest rank score while Control with pre-test Group B had the lowest rank score (Table 29). This result does not however show which of the four study groups was significantly different from the other. Thus there was need to carry out further statistical anayses in order to unveil differences among the four study groups.

Table 29: Comparison between Groups on Teaching Aids Motivation using Kruskal-Wallis Equality-of-Populations Rank Test

Group	Observations	Rank Sum
A	91	14096.5
B	75	13153.5
C	113	21882.5
D	79	15128.5

The data from the GLM estimation exercise demonstrated that with the introduction of confounders, there were no statistically significant differences in the teaching aids dimension scores between Experiment with pre-test Group A and each of the other study groups (Table

30). Specifically, Control with pre-test Group B had nearly 6 positive but statistically insignificant percentage points when compared to those of Experiment with pre-test Group A. This demonstrates the absence of a treatment effect. Further, the result was an indicator of the ineffectiveness of the intervention when controls are taken into account.

Table 30: Group A versus BCD and Controls in Teaching Aids dimension of Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.00741	0.02933	0.25	0.801	-0.05008	0.064896
Experience^2	-0.00117	0.00084	-1.39	0.163	-0.00282	0.000475
Experience	0.033937	0.028369	1.2	0.232	-0.02166	0.089538
Group B	0.057107	0.07987	0.71	0.475	-0.09944	0.21365
Group C	0.07764	0.074409	1.04	0.297	-0.0682	0.223479
Group D	0.153	0.090663	1.69	0.091	-0.0247	0.330696
Gender (Boys)	-0.02696	0.068023	-0.4	0.692	-0.16028	0.106364

*Effects significant at 0.05 level. † Group A taken as the reference

Control with pre-test B had statistically similar scores with Control with no pre-test Group C in the teaching aids dimension of motivation (Table 31). This results ruled out the role of confounders. Kumari (2013) states that a comparison between Group B and C post-test allows the researcher to ascertain if any confounders could have caused a temporal alteration which was not incorporated in the present study. Ideally, it illustrates if anything else could have caused the results shown and is a major check upon causality.

Table 31: Group B versus C and D and Controls in Teaching Aids Motivation

	Coeefficient	SE	z	ρ	[95% Conf.	Interval]
Age	0.00741	0.02933	0.25	0.801	-0.05008	0.064896
Experience^2	-0.00117	0.00084	-1.39	0.163	-0.00282	0.000475
Experience	0.033937	0.028369	1.2	0.232	-0.02166	0.089538
Group A	-0.05711	0.07987	-0.71	0.475	-0.21365	0.099436
Group C	0.020533	0.06799	0.3	0.763	-0.11272	0.153791
Group D	0.095893	0.108141	0.89	0.375	-0.11606	0.307846
Gender (Boys)	-0.02696	0.068023	-0.4	0.692	-0.16028	0.106364

*Effects significant at 0.05 level. † Group B taken as the reference

Further analysis of the data indicated that boys posted statistically similar scores to that of girls in the teaching aids dimension of motivation scores. An increase in the experience of the teacher had no statistically significant relationship with the teaching aids dimension of motivation score. No age differences among the students were noted on the teaching aids dimension of motivation scores. The experience of the teacher had non-significant statistical relationships with the teaching aids scores as a motivation for learning Kiswahili proverbs. These results offered further evidence that confounders had no relationship with the teaching aids scores as a motivation for learning Kiswahili proverbs.

Girls did not outperform boys in the teaching aids dimension of motivation scores for learning Kiswahili Proverbs. This was a new finding since existing literature is largely silent on this aspect of motivation. It was, therefore, concluded that there are no gender differences in the teaching aids dimension of motivation scores for learning Kiswahili proverbs. The experience of the teacher had no statistical association with teaching aids dimension of motivation. This was also a new finding in literature since existing literature shows a linear relationship betweenthe experience of the teacher and students achievement (Center for Public Education, 2005). This observation is however a detailed addition to previous literature which states that positive motivation to language learning may be associated to

external factors (Uribe *et al.*, 2011). Further, the findings were obtained in the context of a developing country namely Kenya.

Control with no pre-test Group C and Experiment with no pre-test Group D had identical median scores. Further analysis of the data indicated that Experiment no pre-test Group D did not differ significantly with Control no pre-test Group C with the introduction of students' and teacher characteristics as controls (Table 32). The presented data showed that Experiment no pre-test Group D had a non-significant 1 percentage point edge over Control no pre-test Group C in the Teaching Aids dimension of motivation used to teach Kiswahili proverbs. The treatment effect was not evident in the absence of the pre-test. This suggested that the act of pre-testing did not influence the results.

Table 32: Group C† versus D and Controls in Teaching Aids Motivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.00741	0.02933	0.25	0.801	-0.05008	0.064896
Experience^2	-0.00117	0.00084	-1.39	0.163	-0.00282	0.000475
Experience	0.033937	0.028369	1.2	0.232	-0.02166	0.089538
Group A	-0.07764	0.074409	-1.04	0.297	-0.22348	0.068199
Group B	-0.02053	0.06799	-0.3	0.763	-0.15379	0.112725
Group D	0.07536	0.103262	0.73	0.466	-0.12703	0.27775
Gender (Boys)	-0.02696	0.068023	-0.4	0.692	-0.16028	0.106364

*Effects significant at 0.05 level. † Group C taken as the reference

In summary, the findings showed that VMIs had no effect on the teaching aids dimension of motivation for Kiswahili proverbs. Maturation effect seemed to partly explain this observation. Further, teacher experience, student age and gender were found not to be important confounders of the relationship between VMIs and teaching aids motivation. The

sub-hypothesis HO_{1e}, which stated that VMIs had no effect on teaching aids dimension of motivation, was upheld.

4.3.6 Real Objects Dimension of Motivation of Used to Teach Kiswahili Proverbs

The data suggested that the scores on Real Object dimension of motivation before the intervention was skewed (KS score = 0.085, df = 430, ρ = 0.000). After the intervention, the distribution of Real Objects dimension of motivation scores were skewed (KS score = 0.142, df = 343, ρ = 0.000). An observation of the histogram of the data showed that it was negatively skewed (Figure 13). These results pointed to the appropriateness of the use of non-parametric tests in subsequent analyses.
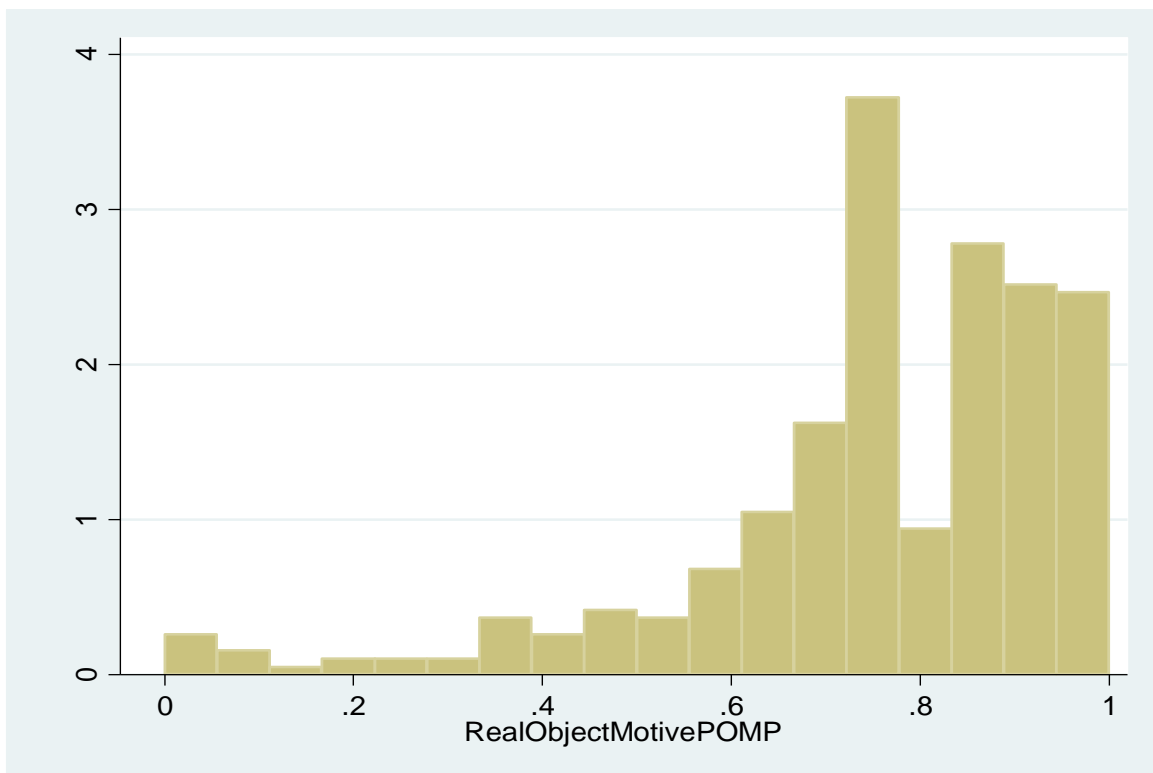
Figure 13: The Distribution of Real Objects Dimension of Motivation Scores.

The descriptive statistics of the post-test scores on the Real Objects dimension of motivation were as shown in Table 33. The median scores for Control with no pre-test Group C and Experiment with no pre-test Gropu D were the highest and identical while Experiment with

pre-test Group a were the lowest. A comparison of the percentiles indicates some variation in the median scores of the Real Object dimension of motivation scores in each of the four study groups. Experiment with pre-test Group A had the widest interquartile range while Control with pre-test Group B, Control with no pre-test Group C and Experiment with no pre-test Group D had the lowest and identical interquartile range. This might be suggestive of differences in the distribution of scoreson the Real Objects dimension of motivation among the four study groups. This indicates that non-parametric tests of comparison were most appropriate in subsequent analyses.

Table 33: Descriptive Statistics of Post-test on the Real Objects Dimension of Motivation

Group	Mean	SD	SE	p25	p75	p50	IQ
A	0.721	0.232	0.024	0.639	0.889	0.750	0.250
B	0.731	0.197	0.023	0.667	0.861	0.778	0.194
C	0.761	0.204	0.020	0.694	0.889	0.806	0.194
D	0.777	0.157	0.018	0.694	0.889	0.806	0.194
Total	**0.748**	**0.201**	**0.011**	**0.667**	**0.889**	**0.778**	**0.222**

The median score for Experiment with pre-test Group A on the Real Objects dimension of motivation improved by 19 statistically significant percentage points from 0.56 before to 0.75 after the intervention (Mann-Whitney U test, $z = -8.001$, $\rho = 0.000$). These changes suggest that there was a treatment effect on the Real objects dimension of motivation scores. Kumari (2013) state that if the post-test score is higher than the pre-test score in Experiment with pre-test Group A, then a treatment effect is evident. As demonstrated in Figure 14, Control with pre-test Group B median score decreased by 5 non-significant percentage points from 0.83 before to 0.78 after the intervention (Mann-Whitney U test, $z = 1.466$, $\rho = 0.1428$). Therefore, there was no pre-test effect. This finding was in agreement with literature which states that a pretest can also prejudice data integrity when participants, in either the treatment or the

comparison condition, attempt to answer questions in an identical manner as the pretest. If this occurs, the impact of the treatment on the outcome of interest could be obfuscated (Navarro & Siegel, 2018).

The effectiveness of VMIs on the Real Objects dimension of motivation used by the teacher could not be determined unequivocally. There was no comparative literature on the effects of emerging technologies on the real objects used by the teacher as motivators. Largely, the lack of effect on VMIs on the real objects used by the teacher was attributable to the observed presence of pre-test effects.
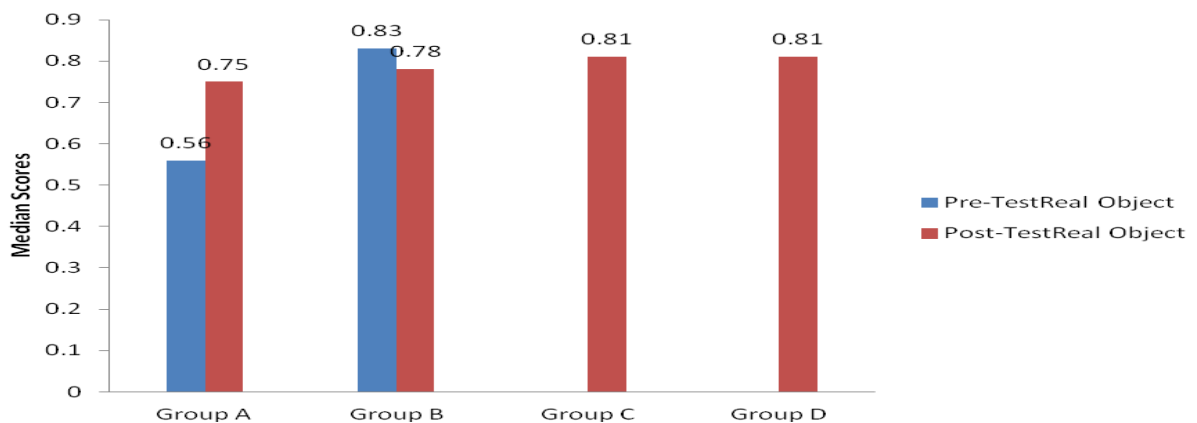
Figure 14: Comparison between pre and post median scores in real object motivation

The post-test score for the four study groups were not significantly different from each other in the Real Object dimension motivation (Kruskal Wallis test, $\chi^2 = 3.047$, df = 3, $\rho = 0.329$). This meant that the four study groups had statistically similar rank sums (Table 34). This result further suggested that none of the study groups had statistically superior scores than the others. Therefore, there was need to carry out further statistical anayses in order to unveil if confounders had any effect in the experiment.

Table 34: Non-parametric Comparison between Groups on Real Objects Dimension of Motivation

Group	Observations	Rank Sum
A	90	14653
B	71	11448
C	106	19259
D	76	13636

With the introduction of confounders, Experiment with pre-test Group A score on the Real Object dimension of motivation were statistically not different from those of either Group B, Group C and Group D (Table 35). With the introduction of confounders the scores for the Experiment with pre-test Group A were not statistically different from those of Control with pre-test Group B in the scores for Real Object dimension of motivation. The reported data thus suggested that VMIs had no demonstratable effect on the Real Objects dimension of motivation used to teach Kiswahili proverbs. This finding further cast doubt on the effectiveness of the intervention in as far as the Real Object dimension of motivation was concerned.

Table 35: Comparison Between Group A[†] and B, C and D while Controlling for Age, Gender and Teacher Experience on RealObjectMotivation

Variable	Coefficients	SE	z	ρ	[95% Confidence Interval]	
Age	0.000873	0.028758	0.03	0.976	-0.05549	0.057237
Experience^2	-0.00122	0.000811	-1.51	0.132	-0.00281	0.000368
Experience	0.036342	0.02744	1.32	0.185	-0.01744	0.090124
Group B	-0.00847	0.078288	-0.11	0.914	-0.16192	0.144966
Group C	0.026954	0.074623	0.36	0.718	-0.11931	0.173213
Group D	0.123103	0.090352	1.36	0.173	-0.05398	0.30019
Gender (Boys)	-0.02761	0.066063	-0.42	0.676	-0.15709	0.101872

*Effects significant at 0.05 level. † Group A taken as the reference

When confounders were controlled for, the Experiment with pre-test Group A had 12 statistically insignificant percentage points lower than Experiment with no pre-test Group D. This implied that there were no effects of the pre-test on the intervention. This finding contradicted those of existing literature which states that a pretest can impair data integrity when participants, in either the treatment or the control condition, attempt to answer questions in an identical manner as the pretest. In the instance that such a scenario may have occurred, the impact of the treatment on the outcome of interest could have been obfuscated (Navarro & Siegel, 2018).

With the introduction of confounders, Control with pre-test Group B had no statistically significant differences with Control with no pre-test Group C (Table 36). This finding indicated that pre-test itself did not have any effect on the outcome independent of the intervention. This further failed to ascertain the existence of any confounders that may affect the temporal determinants of VMIs and Real Object dimension of motivation scores. This result meant that neither the pre-test nor the treatment conditions influenced real object

motivation outcome. This finding was against the opinion that administration of a pre-test can impair the integrity of data (Navarro & Siegel, 2018).

Table 36: Comparison Between Group B† and C and D while Controlling for Age, Gender and Teacher Experience on Real Object dimension of Motivation

	Coefficients	SE	z	ρ	[95% Confidence Interval]	
Age	0.000873	0.028758	0.03	0.976	-0.05549	0.057237
Experience^2	-0.00122	0.000811	-1.51	0.132	-0.00281	0.000368
Experience	0.036342	0.02744	1.32	0.185	-0.01744	0.090124
Group A	0.008475	0.078288	0.11	0.914	-0.14497	0.161916
Group C	0.035428	0.065998	0.54	0.591	-0.09392	0.164782
Group D	0.131577	0.10642	1.24	0.216	-0.077	0.340156
Gender (Boys)	-0.02761	0.066063	-0.42	0.676	-0.15709	0.101872

*Effects significant at 0.05 level. † Group B taken as the reference

For the confounders, boys posted statistically similar scores to those of girls in the Real Object dimension of motivation to teach Kiswahili proverbs. This finding reiterated those in literature which states that the performance of both males and females tend to be similar in second language learning (Gwarjiko, 2015). However, the finding did not concur with the position of an earlier study by UNESCO (2009) that girls mature earlier than boys and thus, their superior early reading skills is in part a biological factor.

An increase in the experience of teachers had no statistically significant relationship with the Real Object dimension motivation to teach Kiswahili proverbs. This finding was against the view in literature that more years of teaching experience consistently translate into higher students' test scores (Center for Public Education, 2005).

No age differences among the students were noted on scores in the Real Object dimension of motivation to teach Kiswahili proverbs. This finding opposed the position that age is correlated with experience and therefore, can foster the development of appropriate skills.

Previous experience has been known to translate into variable episodic knowledge and is thus considered as a direct source of knowledge (Ushida, 2005).

Moreover, the scores of Control with no pre-test Group C were not statistically different from those of Experiment with no pre-test Group D. The implication here was that there was no treatment effect independent of the pre-test (Table 37).

Table 37: Comparison Between Group C† and D while Controlling for Age, Gender and Teacher Experience on RealObjectMotivation

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.000873	0.028758	0.03	0.976	-0.05549	0.057237
Experience^2	-0.00122	0.000811	-1.51	0.132	-0.00281	0.000368
Experience	0.036342	0.02744	1.32	0.185	-0.01744	0.090124
Group A	-0.02695	0.074623	-0.36	0.718	-0.17321	0.119305
Group B	-0.03543	0.065998	-0.54	0.591	-0.16478	0.093925
Group D	0.096149	0.102927	0.93	0.350	-0.10559	0.297883
Gender (Boys)	-0.02761	0.066063	-0.42	0.676	-0.15709	0.101872

*Effects significant at 0.05 level. † Group C taken as the reference

On the post-test, both the treatment groups did not outscore both controls in the Real Object dimension of motivation. Control with pre-test Group B had a high median score in the motivation to learn Kiswahili proverbs after the intervention when compared with either Group A, C or D which had similar post-test scores in the Real Object dimension of motivation. Looking at the posttest values, there appeared to be no difference between the treatment groups, even though one got a pretest (Group A) and the other did not (Group D). Further, both treatment groups did not outscore both controls in the real object dimension of motivation. There was, therefore, no main effect for the VMIs treatment. Each treatment group did not outscore its comparable control group in the motivation to learn Kiswahili proverbs after the intervention. The Experiment with pre-test (Group A) was not outperformed by the Control with pre-test (Group B) on post-test score in the in the real

object dimension of motivation to learn Kiswahili proverbs. Moreover, the Experiment with no treatment (Group D) had a similar score with Control with no pre-test (Group C) in the motivation to learn Kiswahili proverbs after the intervention. These results indicated further that there was no treatment effect.

Overall, the reported results do not support the existence of a treatment effect in the presence of confounding variables in the real object dimension of motivation. Further, support for pre-test effect was not observed. The demographic characteristics of students and teachers did not seem to constitute important explanations for the scores in Real Object dimension of motivation. The sub-hypothesis HO_{1f}, which stated that VMIs will have no effect on real object dimension of motivation, was, therefore, upheld.

4.4 VMIs' Effect on Student Attitude in Learning Kiswahili Proverbs

The second objective of the study was to find out if VMIs had any statistically significant effect on students' attitudes towards Kiswahili proverbs. Attitude is a multi-dimensional concept. Consequently, the section presents and discusses the three dimensions, namely study of proverbs (Study dimension), teaching and learning of proverbs (Pedagogy dimension) and time allocated to study proverbs (Time dimension). For each dimension, a presentation and discussion of the descriptive statistics of the items that were used to assess students' attitude is initially made. Finally, a comparison of the study groups before and after the intervention is made.

4.4.1 Effect of VMIs on the Study Dimension of Students'Attitudes Towards Kiswahili Proverbs

The distribution of the scores on the Study dimension of attitude before the intervention were skewed (KS score = 0.144, df = 820, ρ = 0.000). Examination of the scores using a Box-Plot showed that the data was negatively skewed (Figure 15). After the intervention, the distribution of the scores for the Study dimension of attitude were likewise negatively skewed

(KS score = 0.137, df = 427, ρ = 0.000). These results pointed to the appropriateness of the use of non-parametric tests in subsequent analyses.
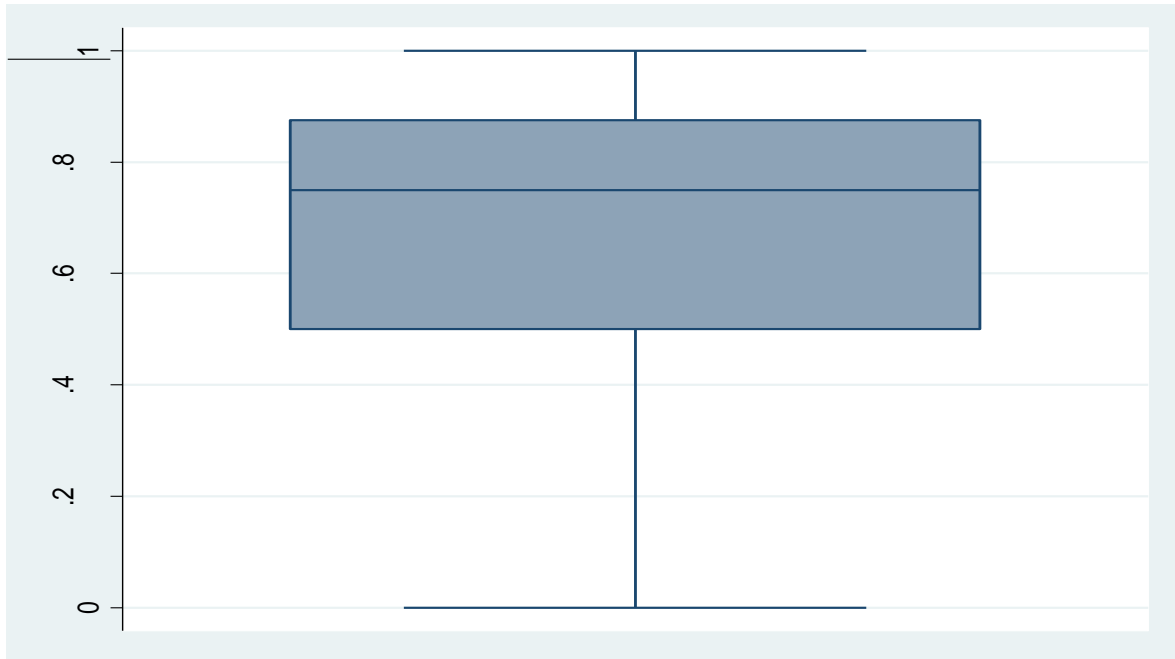
Figure 15: The Distribution of the Scores for the Study Dimension of Attitude

Table 38 presents detailed descriptive statistics of post-test scores on the Study dimension of attitude. In the post-test, the median scores of Study dimension of attitude on the four groups A, B, C and D ranged from a low of 0.688 to a high of 0.750. The median score for Control with pre-test Group B in the Study dimension of attitude was the lowest while Experiment with pre-test Group A, Experiment with no pre-test Group D and Control with no pre-test Group C had a high and identical median score.

Table 38: Descriptive Statistics of Post-Test Scores on Study Dimension of Attitude

Group	Mean	SE	SD	Median	Percentiles		IQ
					25th	**75th**	
A	0.653	0.028	0.279	0.750	.50	.88	0.38
B	0.661	0.030	0.268	0.688	.44	.88	0.44
C	0.720	0.022	0.240	0.750	.63	.88	0.25
D	0.683	0.027	0.250	0.750	.44	.88	0.44
Total	**0.681**	**0.013**	**0.259**	**0.750**	**.50**	**.88**	**0.38**

The graphical presentation of the median scores of the four study groups before and after the intervention on the Study dimension of attitude is presented in Figure 16. The median score for Experiment with pre-test Group A in the Study dimension of attitude towards Kiswahili proverbs remained significantly the same in the the pre and post-test periods (Mann-Whitney U test, $z = 0.196$, $\rho = 0.844$). This was an indication of lack of a treatment effect. In contrast, Control with pre-test Group B post-test scores dropped by 12 statistically significant percentage points from 0.81 to 0.69 in the Study dimension of attitude (Mann-Whitney U test, $z = 2.980$, $\rho = 0.0029$). This meant that some confounders came into play.

The post-test median score for Experiment with pre-test Group A, Control with no pre-test Group C and Experiment with no pre-test Group D were equal in the Study dimension of attitude. As shown in the graph, Control with pre-test Group B had the lowest median score in the Study dimension of attitude after the intervention when compared with Group A, C and D which had similar scores.
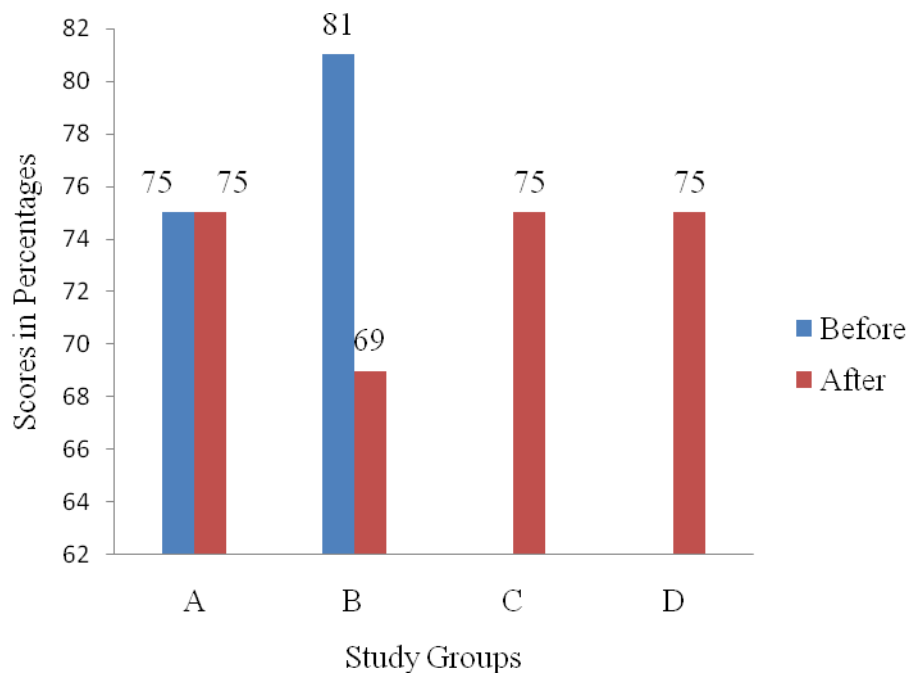
Figure 16: Comparison Between Pre and Post-Test Scores in the Study Dimension of Attitude

The four study groups did not significantly differ from each other in the post-test score of the Study dimension of attitude. The rank sums were statistically identical (Kruskal Wallis Test, $\chi^2 = 3.611$, df = 3, $\rho = 0.3067$). This suggested that none of the groups had statistically superior post-test scores than the other in the Study dimension of attitude (Table 39). Thus the effectiveness of VMIs on the Study dimension of attitude was not evident.

Table 39: Comparison between Groups on Study dimension of Attitude

Group	Observations	Rank Sum
A	102	18757.5
B	81	15073.5
C	116	24370.5
D	89	17264.5

There was no comparative literature on the effects of emerging technologies on the Study dimension of attitude. Largely, the lack of effect on VMIs on the Study dimension of attitude was attributable to other factors since the threat of pre-testing was not evident. The

differential selection of participants could partly explain the lack of a treatment effect. Further, the role of confounders could not be ruled out since some select students and teacher characteristics were associated with the Study dimension of attitude. Consequently, there was need to carry out further statistical anayses in order to establish if confounders had any effect in the experiment.

In the GLM analysis, the scores for Experiment with pre-test Group A were statistically similar to those of Control with pre-test Group B on the Study dimension of attitude (Table 40). The data specifically showed that the post-test scores of Experiment with pre-test Group A on the Study dimension of attitude were approximately 3 non-significant percentage points above those of Control with pre-test Group B. This implied that there was no treatment effect. The result was also suggestive of a lack of effectiveness of the treatment.

Table 40: Comparison Between Group A[†] and B, C and D with Controls in Study Dimension of Attitude

Variable	Coefficients	SE	z	ρ	[95% Confidence Interval]	
Age	0.001453	0.029367	0.05	0.961	-0.05611	0.059012
Experience^2	-0.0016	0.000819	-1.95	0.051	-0.0032	7.13E-06
Experience	0.050806	0.027645	1.84	0.066	-0.00338	0.104989
Group B	-0.03232	0.078084	-0.41	0.679	-0.18536	0.120722
Group C	0.031018	0.072144	0.43	0.667	-0.11038	0.172417
Group D	0.103397	0.088933	1.16	0.245	-0.07091	0.277702
Gender (Boys)	0.1144	0.067058	1.71	0.088	-0.01703	0.245831

*Effects significant at 0.05 level. † Group A taken as the reference

Further, Experiment with pre-test Group A posted statistically similar scored as those of Experiment with no pre-test Group D in the Study dimension of attitude. The score for Experiment with no pre-test Group D was 10 positive but statistically insignificant

percentage points when compared to those of Experiment with pre-test Group A. This indicates the non-existence of pre-test effect.

Further analysis of the scores indicated that Control with pre-test Group B posted statistically similar scores when compared to Control with no pre-test Group C in the Study dimension of attitude (Table 41). With the introduction of confounders, Control with pre-test Group B had 6 non-significant percentage points below Control with no pre-test Group C. This result failed to demonstrate a temporal alteration in the Study dimension of attitude that may be attributed to other confounders. Kumari (2013) states that a comparison of Control with pre-test Group B and Control with no pre-test Group C post-test helps to ascertain if any confounders could have caused a temporal alteration which was not incorporated in the study.

Table 41: Comparison Between Group B† and C and D with Controls in Study Dimension of Attitude

Variable	Coefficient	SE	z	ρ	[95% Confidence	Interval]
Age	0.001453	0.029367	0.05	0.961	-0.05611	0.059012
Experience2	-0.0016	0.000819	-1.95	0.051	-0.0032	7.13E-06
Experience	0.050806	0.027645	1.84	0.066	-0.00338	0.104989
Group A	0.03232	0.078084	0.41	0.679	-0.12072	0.185361
Group C	0.063338	0.067703	0.94	0.350	-0.06936	0.196034
Group D	0.135717	0.10327	1.31	0.189	-0.06669	0.338122
Gender (Boys)	0.1144	0.067058	1.71	0.088	-0.01703	0.245831

*Effects significant at 0.05 level. † Group B taken as the reference

For the confounders, boys posted statistically similar scores to those of girls in the Study Dimension of Attitude towards Kiswahili Proverbs. An increase in the experience of teachers had no statistically significant relationship with the Study Dimension of attitude towards Kiswahili proverbs. No age differences among the students were noted on scores in the Study Dimension of attitude towards Kiswahili proverbs.

Finally, Control with no pre-test Group C posted statistically similar scores with Experiment with no pre-test Group D in the Study dimension of attitude. In addition, Experiment no pre-test Group D students reported 7 non-significant percentage points when compared to those reported by students in Control no pre-test Group C. This implied that there was no treatment effect in the absence of a pre-test (Table 42).

Table 42: Comparison Between Group C[†] and D with Controls in Study Dimension of Attitude

Variable	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	0.001453	0.029367	0.05	0.961	-0.05611	0.059012
Experience^2	-0.0016	0.000819	-1.95	0.051	-0.0032	7.13E-06
Experience	0.050806	0.027645	1.84	0.066	-0.00338	0.104989
Group A	-0.03102	0.072144	-0.43	0.667	-0.17242	0.110381
Group B	-0.06334	0.067703	-0.94	0.350	-0.19603	0.069358
Group D	0.072379	0.099721	0.73	0.468	-0.12307	0.267829
Gender (Boys)	0.1144	0.067058	1.71	0.088	-0.01703	0.245831

*Effects significant at 0.05 level. † Group C taken as the reference

With the introduction of confounders, girls posted statistically similar scores when compared to boys in the Study dimension of attitude. This finding was in agreement with other literature which suggests that girls have a higher reading achievement when compared with boys (Malmberg & Sumra, 2001; Mutwiri *et al*., 2014). This adds to the existing understanding that boys generally express more self-confidence in academic areas involving technology (Pajares, Miller & Johnson, 1999). It further adds details from a new context to the observation in the USA that there are differences in male-female beliefs about their ability to acquire a new language (Bernat & Lloyd, 2007). It was, therefore, concluded that there are no gender diffences in the study dimension of attitude. However, these results were in disagreement with the idea that gender has a significant impact on how students learn any given language (Jain & Sidhu, 2013). They were also at variance with literature which

observes that girls and boys do not develop at the same biological and cognitive rate (UNESCO, 2009).

An increase in the experience of teachers had no statistically significant relationship with the Study dimension of attitude. This was contrary to earlier findings that widely argues that there is a positive linear relationship between teacher experience and achievement (Kosgei *et al*., 2013). The finding was also negation of the observation that the teacher factor and the external pressure they wield helps shape the attitude of the students (Al Kaboody, 2013).

Overall, the reported results indicated that there was no treatment effect. Pre-test effects were further not evident. There was evidence of a maturation effect. Insightfully, teacher experience and student age and gender seemed not to explain the Study dimension of attitude. These reported findings were not entirely new. On this particular finding, the novelty of this study lay in its addition of detailed and context-specific information to existing literature. The sub-hypothesis HO_{2a}, which stated that VMIs will have no effect on study dimension of attitude, was upheld.

4.4.2 Effect of VMIs on the Pedagogy Dimension of Students' Attitudes towards Kiswahili Proverbs

The descriptive statistics of the Pedagogy dimension of students' attitude towards Kiswahili poverbs before the intervention was skewed (KS score = 109, df = 820, ρ = 0.000). An observation of the Box-Plot of the data further showed that the distribution of the Pedagogy dimension of Attitude scores before the intervention were negatively skewed (Figure 17). These results pointed to the appropriateness of the use of non-parametric tests in subsequent analyses.
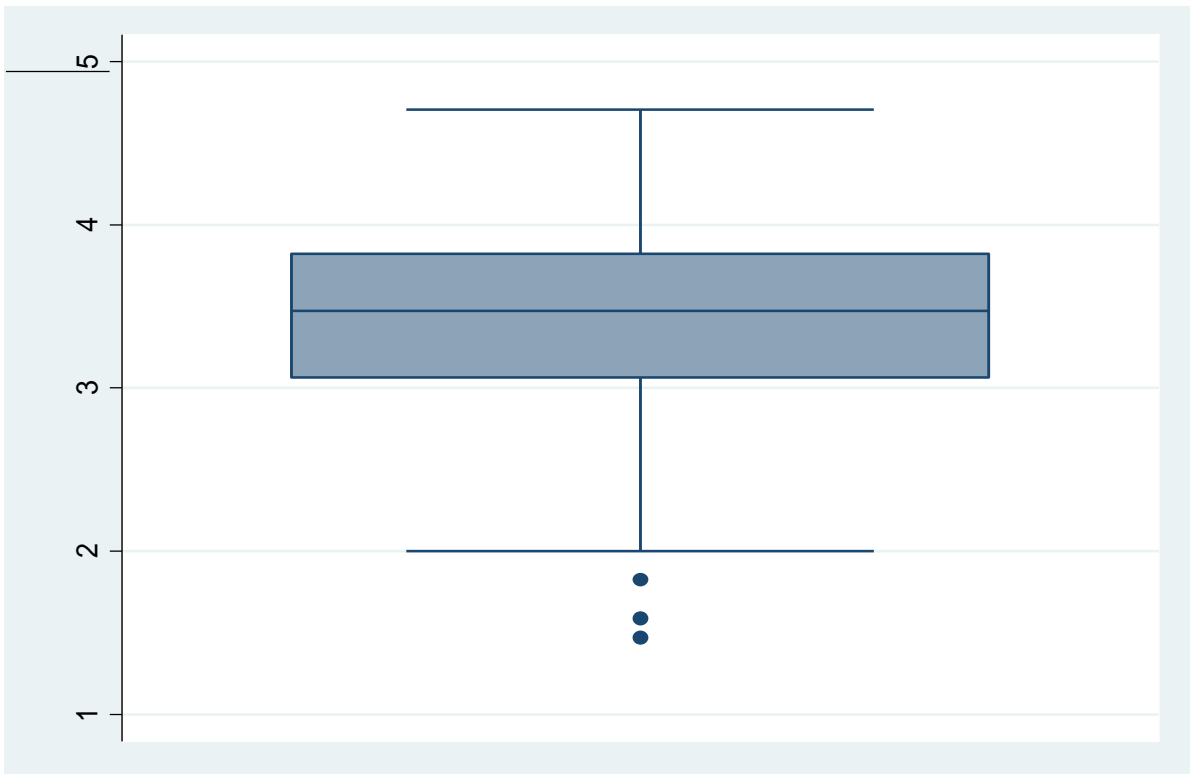
Figure 17: Distribution of the Pedagogy Dimension of Attitude scores before Intervention

The distribution of the pre-test scores on the Pedagogy dimension of attitude between Experiment with pre-test Group A and Control with pre-test Group B were similar (Table 43). The data specifically showed that the distribution of the scores for Experiment with pre-test Group A and Control with pre-test Group B before the intervention on the Pedagogy dimension of attitude were statistically the same (Mann-Whitney U test, $z = -0.586$, $\rho = 0.558$). The implication here was that, before the intervention, the groups were equal in the Pedagogy dimension of attitude. This was in comformity with an earlier recommendation that groups should be similar at the start of a quasi-experimental program (White & Sabarwal, 2014) using the Solomon Four study design (Kumari, 2013). It was further in line with the placement policy which states that schools of equal status should admit student of similar ability (Mbiti, 2007). Overall, the reported result indicated that the randomization process was effective in the Pedagogy dimension of attitude.

Table 43: Distribution of Pre-Test Scores on Pedagogy Dimension of Attitude

Group	Mean	S E	SD	Median	Percentiles 25th	75th	IQ
A	.691	.022	.228	.750	.500	.875	0.375
B	.718	.019	.199	.750	.594	.875	0.281

After the intervention, the distribution of the scores for the Pedagogy dimension of attitude were skewed (KS score = 0.111, df = 429, ρ = 0.000). An observation of the Box-Plot of the data further showed that the distribution of the Pedagogy dimension of Attitude scores was negatively skewed (Figure 18). These results point to the appropriateness of the use of non-parametric tests in subsequent analyses.
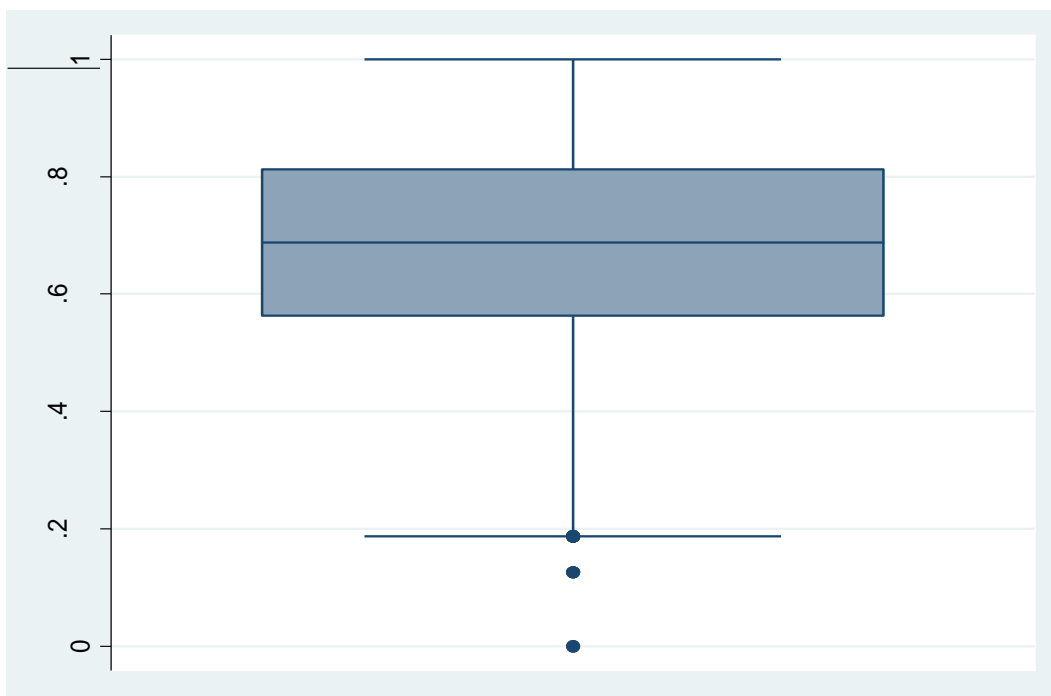
Figure 18: Distribution of the Pedagogy dimension of Attitude scores

The descriptive statistics for the four study groups on scores on the Pedagogy dimension of attitude after the VMIs intervention are presented in Table 44. The data indicated that the post intervention median scores of the Pedagogy dimension of attitude ranged from 0.66 in Control with pre-test Group B to 0.75 in Control with no pre-test Group C. A comparison of

percentiles indicates some variation in the median scores of the Pedagogy dimension of attitude in each of the four study groups. Experiment with pre-test Group A and Control with pre-test Group B had the highest while Control with no pre-test Group C and Experiment with no pre-test group D had the lowest interquartile range. This might be suggestive of differences in the distribution of scores on the Pedagogy dimension of Listening motivation among the four study groups. It further indicated that non-parametric tests of comparison were most appropriate in subsequent analyses.

Table 44: Descriptive Statistics of Post-Test Scores on Pedagogy Dimension of Attitude

Group	Mean	SE	SD	Median	Percentiles		IQ
					25th	75th	
A	0.681	0.021	0.214	0.688	.500	.875	.375
B	0.632	0.024	0.224	0.656	.438	.813	.375
C	0.725	0.019	0.203	0.750	.625	.875	.250
D	0.685	0.019	0.178	0.688	.563	.813	.250
Total	**0.685**	**0.010**	**0.207**	**0.688**	**.563**	**.875**	**.312**

A graphical comparison of the pre- and post-test median scores in all the four study groups revealed some patterns of interest (Figure 19). The median score for Experiment with pre-test Group A in the Pedagogy dimension of attitude decreased by 6 non-statistically significant percentage points from 0.75 in the pre-test to 0.69 (Mann-Whitney U test, $z = 0.484$, $\rho = 0.6283$). This was an indication of lack of a treatment effect. In contrast, Control with pre-test Group B post-test scores dropped by 9 statistically significant percentage points from 0.75 to 0.66 in the Pedagogy dimension of attitude (Mann-Whitney U test, $z = 2.570$, $\rho = 0.0102$). This was indicative of the presence of some confounders which needed to be explained.
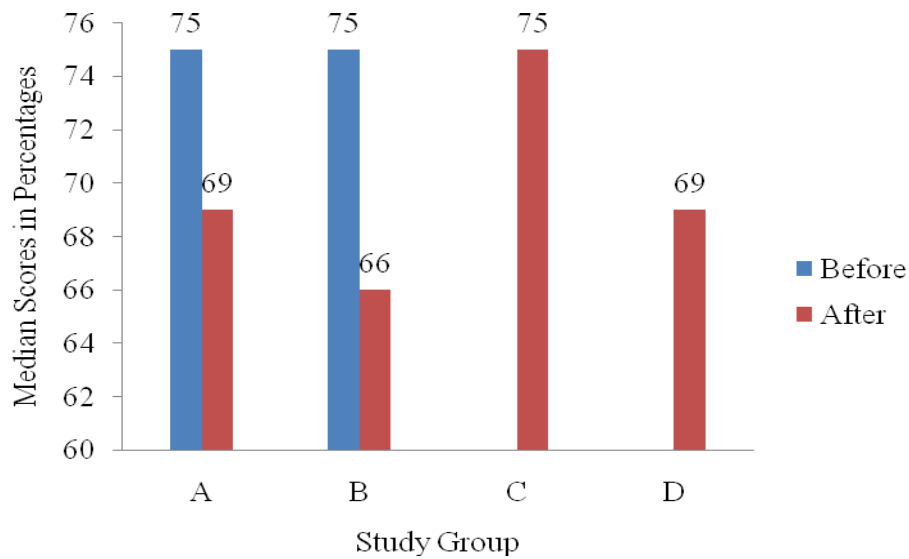
Figure 19: Comparison Between Pre and Post-Test Scores in the Pedagogy Dimension of

Attitude

Additional analysis of post-test scores for the Pedagogy dimension of attitude showed that the study groups differed (Kruskal Wallis Test, $\chi^2 = 9.514$, df = 3, $\rho = 0.0232$). Control with no pre-test Group C had the highest rank sum scores while Control with pre-test Group B had the lowest scores in the Pedagogy dimension of attitude (Table 45). This result did not, however, show which of the four study groups was significantly different from the other. Consequently, there was need to carry out further statistical anayses in order to unveil differences among the four study groups. It was further necessary to carry out additional statistical anayses in order to unveil if confounders had any effect on the experiment.

Table 45: Non-parametric Comparison between Groups on Pedagogy Dimension of Attitude

Group	Observations	Rank Sum
A	101	19599.5
B	84	14264
C	116	25429.5
D	90	17343

The results of the GLM estimation which allow for the control of confounders are illustrated in Table 46. The scores for Experiment with pre-test Group A were not statistically higher than those of Control with pre-test Group B on the Pedagogy dimension of attitude. The data specifically indicated that Experiment with pre-test Group A had 7 positive but statistically insignificant percentage points when compared to those of control with pre-test Group B in the post-test scores in the Pedagogy dimension of aattitude. This indicates that there was no treatment effect. The result was further suggestive of the ineffectiveness of the VMIs intervention.

Table 46: Multiple Comparison of Group A[†] and B, C and D, Age Gender and Teacher Experience on Pedagogy Dimension of Attitude

Variables	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-3.8E-05	0.029066	0	0.999	-0.05701	0.05693
Experience[2]*	-0.00169	0.000793	-2.13	0.033	-0.00324	-0.00013
Experience	0.051306	0.026924	1.91	0.057	-0.00146	0.104076
Group B	-0.0719	0.076975	-0.93	0.350	-0.22277	0.078969
Group C	0.036029	0.073901	0.49	0.626	-0.10882	0.180873
Group D	0.093865	0.088401	1.06	0.288	-0.0794	0.267129
Gender (Boys)	0.056378	0.065884	0.86	0.392	-0.07275	0.185509

*Effects significant at 0.05 level. † Group A taken as the reference

Experiment with pre-test Group A posted statistically similar scores when compared with Experiment with no pre-test Group D in the Pedagogy dimension of attitude. Further, the data showed that Experiment with pre-test Group A had approximately 9 statistically insignificant percentage points when compared with Experiment with no pre-test Group D. This was indicative of the absence of a pre-test effect on the VMIs intervention.

Further, analysis of data showed that Control with pre-test Group B posted no statistically significant differences with either Control with no pre-test Group C or Experiment with no pre-test Group D in the Pedagogy dimension of attitude (Table 47). A further analysis of the

scores also indicated that Control with pre-test Group B posted statistically insignificant scores when compared to Control with no pre-test Group C in the Pedagogy dimension of attitude. This lack of statistical significance did not ascertain that confounders played a role in the reported results. Kumari (2013) is of the view that a comparison between post-test scores of Control with pre-test Group B and Control with no pre-test Group C helps to ascertain if any confounders could have caused a temporal alteration which was not incorporated in the study and therefore a check upon causality.

Table 47: Multiple Comparison of Group B[†], C and D, Age Gender and Teacher Experience on Pedagogy Dimension of Attitude

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-3.8E-05	0.029066	0	0.999	-0.05701	0.05693
Experience[2]*	-0.00169	0.000793	-2.13	0.033	-0.00324	-0.00013
Experience	0.051306	0.026924	1.91	0.057	-0.00146	0.104076
Group A	0.071898	0.076975	0.93	0.350	-0.07897	0.222766
Group C	0.107927	0.065183	1.66	0.098	-0.01983	0.235684
Group D	0.165764	0.101901	1.63	0.104	-0.03396	0.365486
Gender2	0.056378	0.065884	0.86	0.392	-0.07275	0.185509

*Effects significant at 0.05 level. † Group B taken as the reference

For the confounders, boys posted statistically similar scores to those of girls in the Pedagogy dimension of attitude towards Kiswahili Proverbs. No age differences among the students were noted on scores in the Pedagogy dimension of attitude. A statistically significant negative non-linear relationship was observed between the teachers' experience and post-test scores on the pedagogy dimension of attitude. Therefore, teacher experience seemed to account for variations in the scores on the pedagogy dimension of attitude.

Finally, Control with no pre-test Group C posted statistically similar scores with Experiment with no pre-test Group D in the Pedagogy dimension of attitude (Table 48). Experiment no pre-test Group D had a non-significant 7 percentage points above those of Control no pre-test

Group C. This was indicative that there was a maturation effect that affected the results. Kumari (2013) states that an assessment of the scores for Control with no pre-test Group C and Experiment with no pre-test Group D helps to determine if the act of maturation influences the results.

Table 48: Multiple Comparison of Group C[†] and D, Age Gender and Teacher Experience on Pedagogy Dimension of Attitude

	Coefficients	Std. Err.	z	ρ	[95% Confidence Interval]	
Age	-3.8E-05	0.029066	0	0.999	-0.05701	0.05693
Experience2*	-0.00169	0.000793	-2.13	0.033	-0.00324	-0.00013
Experience	0.051306	0.026924	1.91	0.057	-0.00146	0.104076
Group A	-0.03603	0.073901	-0.49	0.626	-0.18087	0.108815
Group B	-0.10793	0.065183	-1.66	0.098	-0.23568	0.019829
Group D	0.057836	0.099752	0.58	0.562	-0.13767	0.253347
Gender (Boys)	0.056378	0.065884	0.86	0.392	-0.07275	0.185509

*Effects significant at 0.05 level. † Group C taken as the reference

No statistically significant gender differences were observed in the Pedagogy dimension of attitude. This adds to the existing understanding that boys generally express more self confidence in academic areas involving technology (Pajares, Miller & Johnson, 1999). It contradicts an observation in the USA that there are differences in male-female beliefs about their ability to acquire a new language (Bernat & Lloyd, 2007). It was, therefore, concluded that there were no gender diffences in the scores on the pedagogy dimension of attitude.

No age differences were observed in the pedagogy dimension of attitude. This result was at variance with the obseravation that learning of a second language is associated with maturity (Osterhout *et al.*, 2008); that is, the older a learner is the more advanced the mastery of a second language. The differences observed in the current study were due to the small variance in the age variable among the studied students.

A statistically significant negative non-linear relationship was observed between the teachers' experience and post-test scores on Pedagogy dimension of attitude. This was an important addition to the observation that the teacher factor and the external pressure they exert helps shape the attitude of the students (Al Kaboody, 2013). The finding that teacher characteristics influence students in various dimensions of attitude was not entirely new. The finding, however, makes an important addition of detailed and context-specific information to existing literature; which may be of immediate relevance to Kenya.

The results of this study broadly indicated that there was no treatment effect on the Pedagogy dimension of attitude. The effectiveness of VMIs on the Pedagogy dimension of attitude could not, therefore, be forthrightly determined. Further, the lack of VMIs effects on the Pedagogy dimension of attitude could not be attributed to the threat of pre-testing. Further, the role of confounders could not be ruled out since teacher experience was statistically associated with the pedagogy dimension of attitude. Cosequently, the sub-hypothesis HO_{2b}, which stated that VMIs will have no effect on students' attitudes, was upheld.

4.4.3 Effect of VMIs on the Time Dimension of Students'Attitude Towards Kiswahili Proverbs

The distribution of the scores of the Time dimension of students attitude towards Kiswahili Poverbs before the intervention suggests that they were skewed (KS score = 102, df = 820, ρ = 0.000). An examination of the scores using the Box-Plot further showed that the data was negatively skewed (Figure 20). This outcome pointed to the appropriateness of the use of non-parametric tests in subsequent analyses.
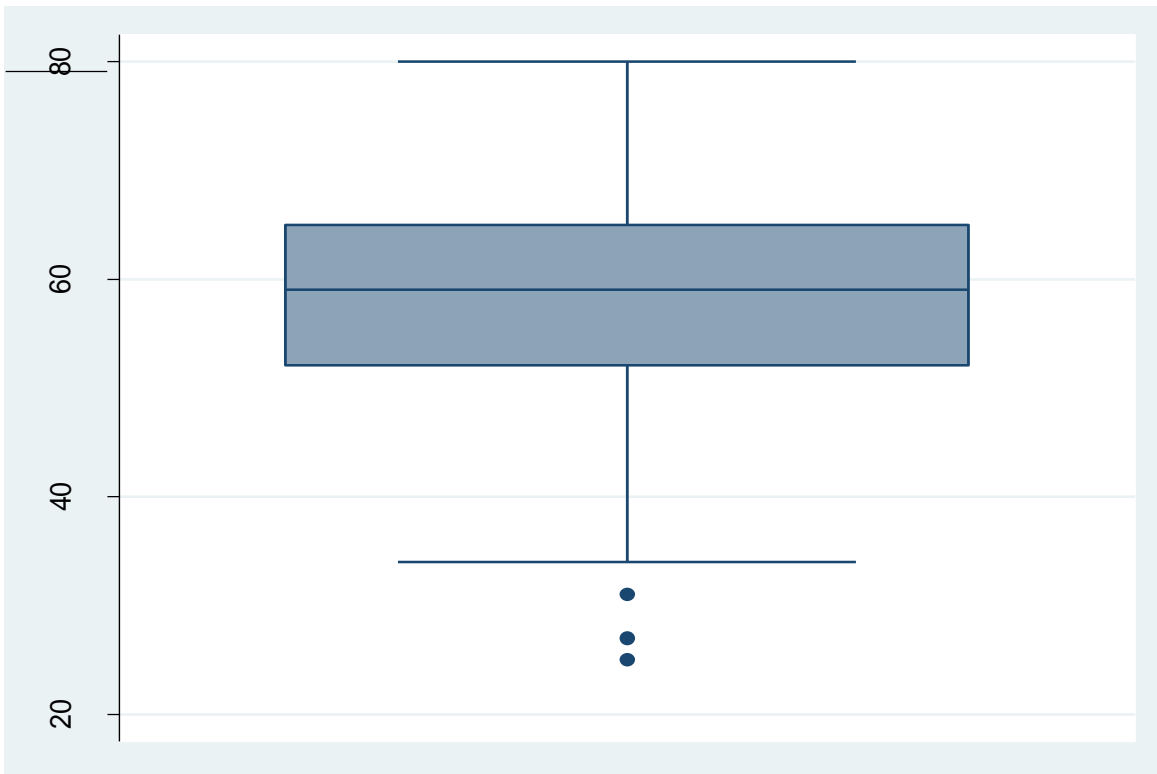
Figure 20: Distribution of the Pre-test Scores of the Time dimension using Box-Plot

After the intervention, the distribution of the scores for the Time dimension of attitude were positively skewed (KS score = 0.100, df = 419, ρ = 0.000). Examination of the Box-Plot further showed that the data was positively skewed (Figure 21). These results pointed to the appropriateness of the use of non-parametric tests in subsequent analysis.
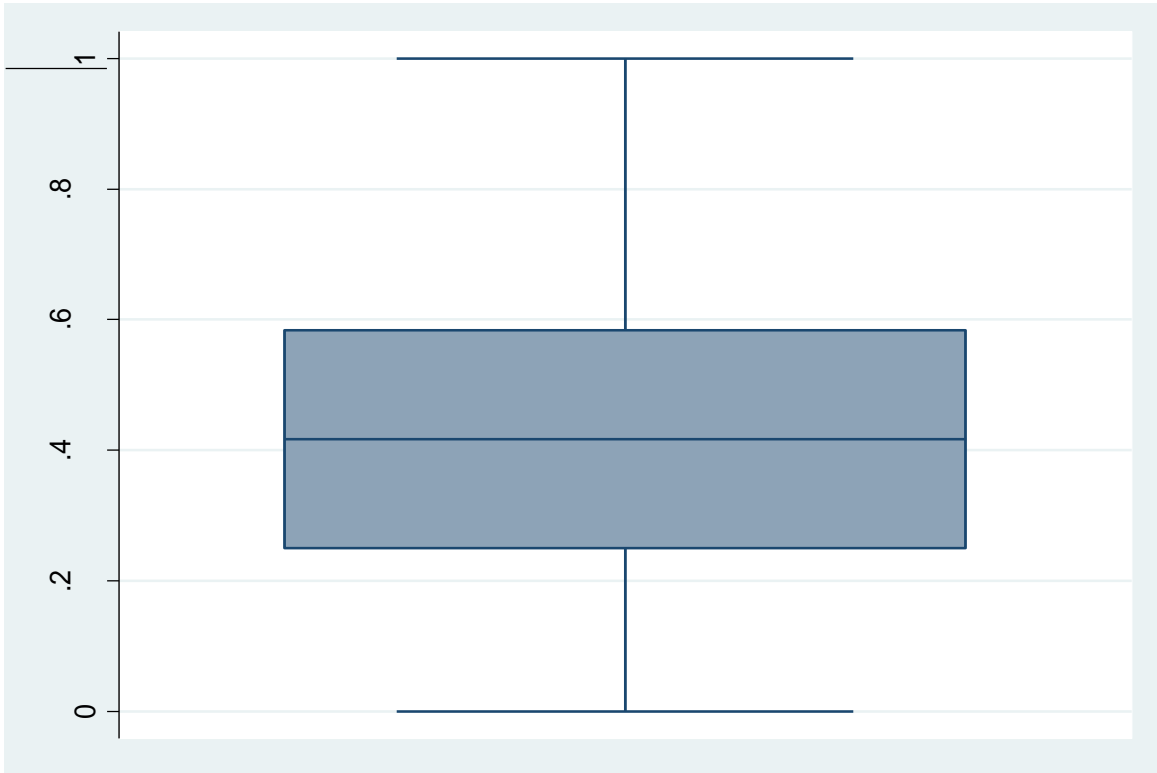
Figure 21: The Distribution of the Post-test Scores of Time Dimension of Attitude

The descriptive statistics of the post-test scores of the Time dimension of attitude are provided in Table 49. The data indicates that the post intervention median scores of the Time dimension of attitude ranged from 0.66 in Control with pre-test Group B to 0.75 in Control with no pre-test Group C. A comparison of percentiles indicates some variation in the median scores of the time dimension of attitude in each of the four study. Control with pre-test Group B had the lowest interquartile range while experiment with pretest Group A had the highest. This may be suggestive of differences in scores on the time dimension of attitude among the four study groups. This further indicated that non-parametric tests of comparison are appropriate in subsequent analyses.

Table 49: Post-Test Mean and Median Scores on Time Dimension of Attitude

Group	Mean	SE	SD	Median	Percentiles 25th	75th	IQ
A	0.41	0.027	0.268	0.42	0.17	0.63	0.46
B	0.38	0.024	0.219	0.42	0.25	0.50	0.25
C	0.42	0.022	0.235	0.42	0.25	0.58	0.33
D	0.42	0.026	0.245	0.42	0.25	0.58	0.33
Total	0.41	0.012	0.243	0.42	0.25	0.58	0.33

A graphical comparison of the pre- and post-test median scores in all the four study groups revealed some patterns of inerest (Figure 22). The median score for Experiment with pre-test Group A in the Time dimension of attitude decreased statistically significantly by 16 percentage points from 0.58 in the pre-test to 0.42 in the post-test (Mann-Whitney U test, $z = 4.122$, $\rho = 0.000$). This is indicative that VMIs had no effect. Similarly, Control with pre-test Group B post-test scores dropped by 16 statistically significant percentage points from 0.58 to 0.42 in the Time dimension of attitude (Mann-Whitney U test, $z = 4.965$, $\rho = 0.000$). This was indicative of the presence of confounders in the study.
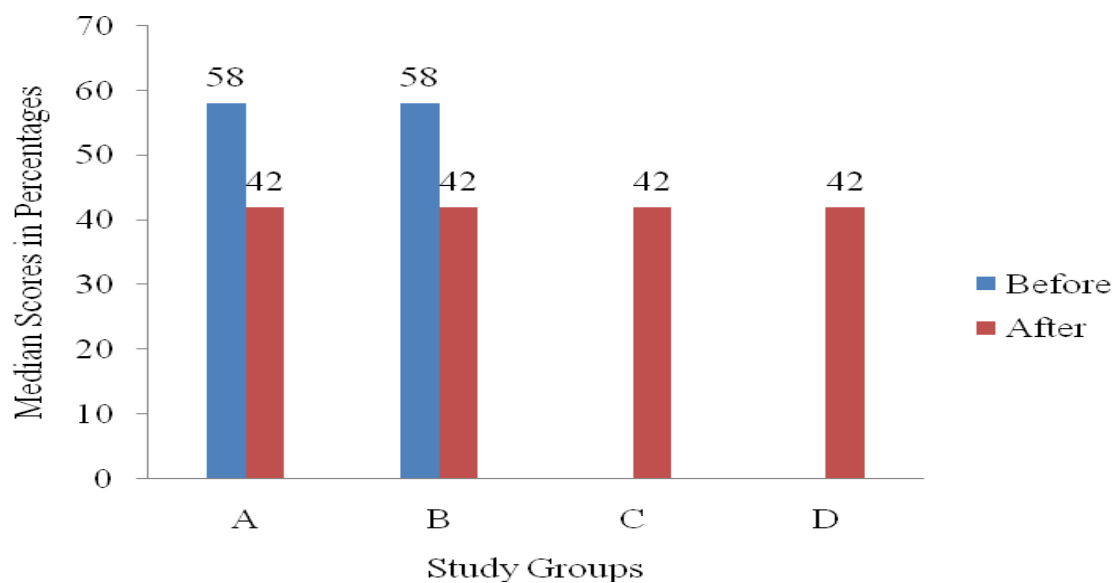
Figure 22: Comparison Between Pre and Post-Test Scores in the Time Dimension of Attitude

Additional analysis of post-test scores for the Time dimension of attitude showed that the four study groups did not statistically differ from each other (Kruskal Wallis Test, $\chi^2 = 1.32$, df = 3, $\rho = 0.7244$). The result further showed statistically similar Rank Sum Scores in the Time dimension of attitude among the four study groups (Table 50). Therefore, there was need to carry out further statistical anayses in order to unveil if confounders had any effect in the experiment.

Table 50: Non Parametric Comparisons between Study Groups on the Time Dimension of Attitude

Group	Observations	Rank Sum
A	100	19225
B	82	14670
C	113	22135.5
D	86	16740.5

The introduction of controls in the GLM analysis demonstrates statistically insignificant differences between experiment with pre-test Group A and either control with pre-test Group B, not control with no pre-test Group C or experiment no pre-test Group D (Table 51). The scores for experiment with pre-test Group A were statistically similar to those of control with pre-test Group B on the Time dimension of attitude. The data especially indicated that experiment with pre-test Group A had 13 none statistically significant percentage points above those of control with pre-test Group B in the post test scores on the time dimension of attitude. This was suggestive of a lack of a treatment effect. It was further an indication of the ineffectiveness of the VMIs intervention. Largely, the lack of effect on VMIs on the Time dimension of attitude was attributable to the threat of pre-testing. Further, the role of confounders could not be ruled out since some select students and teacher characteristics were associated with the Time dimension of attitude.

Table 51: Multiple Comparison of Group A[†] and B, C D, Gender, Age and Teacher Experience on Time Dimension of Attitude

Variable	Coefficients	SE	z	ρ	[95% Confidence Interval]	
Age	-0.00689	0.031536	-0.22	0.827	-0.0687	0.054918
Experience2*	-0.00256	0.000927	-2.76	0.006	-0.00437	-0.00074
Experience*	0.082491	0.031098	2.65	0.008	0.02154	0.143442
Group B	-0.13225	0.090734	-1.46	0.145	-0.31009	0.045581
Group C	-0.05146	0.075382	-0.68	0.495	-0.19921	0.096283
Group D	0.080925	0.094534	0.86	0.392	-0.10436	0.266208
Gender (Boys)	0.137211	0.076011	1.81	0.071	-0.01177	0.28619

*Effects significant at 0.05 level. † Group A taken as the reference

In addition, experiment with pre-test Group A posted statistically equal scores when compared to experiment no pre-test Group D in the time dimension of attitude. That is Group D had 8 nonstatistically significant points when compared to Group A. This suggests that the groups were equal and thus a pre-test effect could not be established.

Further analysis of the scores indicated that control with pre-test Group B posted statistically similar scores when compared to either control with no pre-test Group C in the Time dimension of attitude (Table 52). Control with pre-test Group B posted at least 8 statistically insignificant percentage scores when compared to control with no pre-test Group C in the time dimension of attitude. This meant that some confounders may have accounted for the differences on the scores on the Time dimension of attitude in this study. This was indicative that other factors could not have caused the reported results and is a check of cause effect. Kumari (2013) is of the opinion that a comparison between Control with pre-test Group B and Control with no pre-test Group C allows the researcher to ascertain if any confounders could have caused a temporal alteration which was not incorporated in the study.

Table 52: Comparison Between Group B[†] and C and D while controlling for Age, Gender and Teacher Experience on Time Dimension

	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-0.00689	0.031536	-0.22	0.827	-0.0687	0.054918
Experience2*	-0.00256	0.000927	-2.76	0.006	-0.00437	-0.00074
Experience*	0.082491	0.031098	2.65	0.008	0.02154	0.143442
Group A	0.132254	0.090734	1.46	0.145	-0.04558	0.310089
Group C	0.08079	0.076895	1.05	0.293	-0.06992	0.231502
Group D	0.213179	0.121172	1.76	0.079	-0.02431	0.450672
Gender (Boys)	0.137211	0.076011	1.81	0.071	-0.01177	0.28619

*Effects significant at 0.05 level. † Group B taken as the reference

With the introduction of confounders, no gender differences in the Time dimension of attitude were detected. Girls posted statistically similar scores when compared to boys in the time dimension of attitude.

No significant age effects on the Time dimension of attitude were observed. An increase in age by one year among the students was associated with a statistically non-significant decrease in the scores on time dimension of attitude of nearly single percentage point.

A statistically significant negative non-linear relationship was observed between the teachers' experience and the post-test scores on the time dimension of attitude. An increase in the experience of teachers had a significant negative non-linear relationship with the Time dimension of attitude.

Finally, control with no pre-test Group C posted statistically similar scores in comparison to experiment with no pre-test Group D in the time dimension of attitude (Table 53). This lack of differences in the two groups is an indication that the act of pretesting did not influence the results.

Table 53: Comparison of Group C and D, Students' Gender, Age and Experience of the Teacher on Time Dimension of Attitude

Variable	Coefficient	SE	z	ρ	[95% Confidence Interval]	
Age	-0.00689	0.031536	-0.22	0.827	-0.0687	0.054918
Experience^2*	-0.00256	0.000927	-2.76	0.006	-0.00437	-0.00074
Experience*	0.082491	0.031098	2.65	0.008	0.02154	0.143442
Group A	0.051464	0.075382	0.68	0.495	-0.09628	0.19921
Group B	-0.08079	0.076895	-1.05	0.293	-0.2315	0.069922
Group D	0.132389	0.104667	1.26	0.206	-0.07276	0.337533
Gender (Boys)	0.137211	0.076011	1.81	0.071	-0.01177	0.28619

*Effects significant at 0.05 level. † Group C taken as the reference

No gender differences were observed in the scores on the time dimension of attitude. It contradicts the observation in the USA that there are differences in male-female beliefs about their ability to acquire a new language (Bernat & Lloyd, 2007) by offering detailed information in a new context. This result adds to the existing understanding that boys generally express more self confidence in academic areas involving technology (Pajares *et al.*, 1999). It can therefore be concluded that there were no gender diffences in the Time dimension of attitude.

No age differences were observed in the time dimension of attitude. This result was at variance with existing studies (Osterhout *et al.*, 2008). The lack of age effects in this study on the Time dimension of attitude may be explained by the limited range of age in the student students.

The experience of teachers was shown to have a statistically significant negative non-linear relationship with the Time dimension of attitude. This was an important addition to the observation that the teacher factor and the external pressure they exert helps shape the attitude of the students (Al Kaboody, 2013). The finding on a relationship between teacher experience and various aspects of attitude is not entirely new. Its novelty lies in its addition

of detailed and context-specific information to existing literature. The modelling of the curvilinear relationship between teacher experience and Time dimension of attitude is of considerable academic and practical interest.

A VMIs treatment effect was not evident from the reported data. This finding was further not confounded by pre-test effects. The role of the experience of the teacher was, however, found to be an important influence on the time dimension of attitude among students. The sub-hypothesis HO_{2c}, which stated that VMIs will have no effect on time dimension of attitude, was rejected.

4.5 Effect of VMIs on Student Achievement in Learning Kiswahili Proverbs

This section presents the results on students' achievement on tests taken on Kiswahili proverbs. It is divided into four sub-sections. The first covers descriptive statistics of scores obtained before the intervention; the second covers similar statistics after the intervention while the third one offers results of the comparisons of test scores between the pre-test groups and post test groups. The fourth section attempts to isolate any possible confounders of the differences in tests scores.

4.5.1 Descriptive Statistics of the Pre-Test Scores on Achievement

Before the intervention, the students had a median score of 0.58 (25th percentile = 0.55; 75th percentile = 0.66) on a scale of 0-1. Further examination of the data indicated that the pre-test scores on achievement violated the assumptions of normality (KS Score = 0.112, df = 221, ρ = 0.000). A detailed presentation of the descriptive statistics of the pre-test marks is made in Table 54. The presented results suggest that the pre-test marks were negatively skewed.

Table 54: Description Statistics of Achievement before the Intervention

Pre-Mark		Statistic	Std. Error
Mean		0.611	0.007
Median		0.586	
Std. Deviation		0.105	
Maximum		0.862	
Range		0.586	
Skewness*		-0.008	0.164
Kurtosis		0.141	0.326
Percentiles	25	0.550	
	75	0.660	

*Kolmogorov-Smirnov (KS) score = 0.112, df = 221, ρ = 0.000

A further examination of the distribution of the pre-test marks using a box-plot confirmed the negative skew of the pre-test scores (Figure 23). This signified the need to consider using non-parametric tests for further analyses of the data.
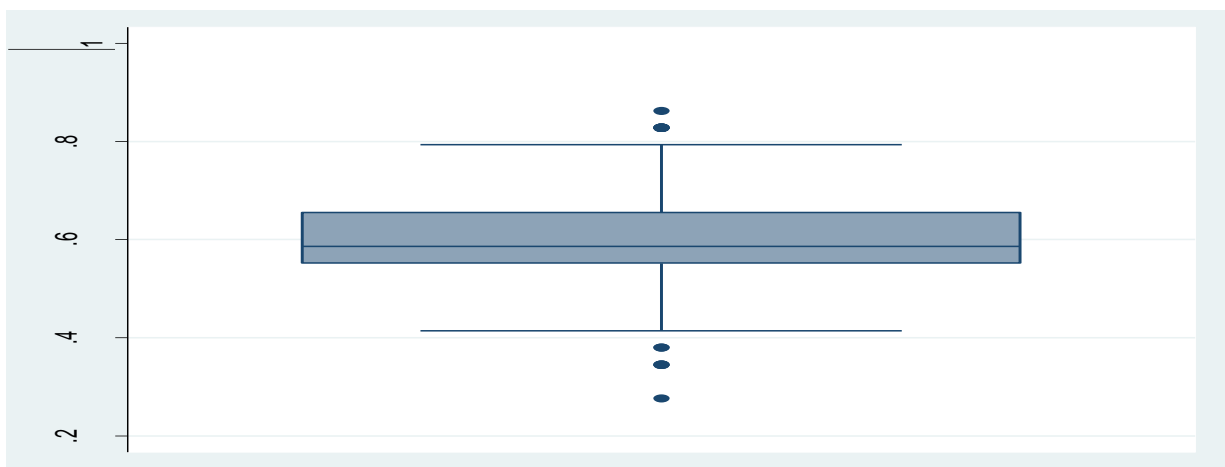
Figure 23: Box-Plot Showing the Distribution of Pre-Test Marks

4.5.2 Descriptive Statistics of Post-Test marks on Achievement

Overall, the presented data shows that the students had a median score of 0.76 (25th percentile = 0.55, 75th percentile = 0.83) on a scale of 0-1. The data showed that the median post-test score was greater than the mean post-test score. Further examination of the data indicated that

the post-test scores on achievement violated the assumptions of normality. In Table 55, a presentation of the descriptive statistics of the post-test marks is made.

Table 55: Descriptive Statistics of Post-Test Scores on Achievement

Post-Test Mark		Statistics	Std. Error
Mean		0.700	0.008
Median		0.759	
Std. Deviation		0.149	
Skewness*		-0.265	0.128
Kurtosis		-1.561	0.255
Percentiles	25	0.552	
	75	0.828	

*Kolmogorov-Smirnov (KS) score = 0.215, df = 365, ρ = 0.000

A further examination of the distribution of the post-test marks using a Box-Plot indicated that they were negatively skewed (Figure 24). This signifies the need for any subsequent analyses of the data to take into account the shape of such data.
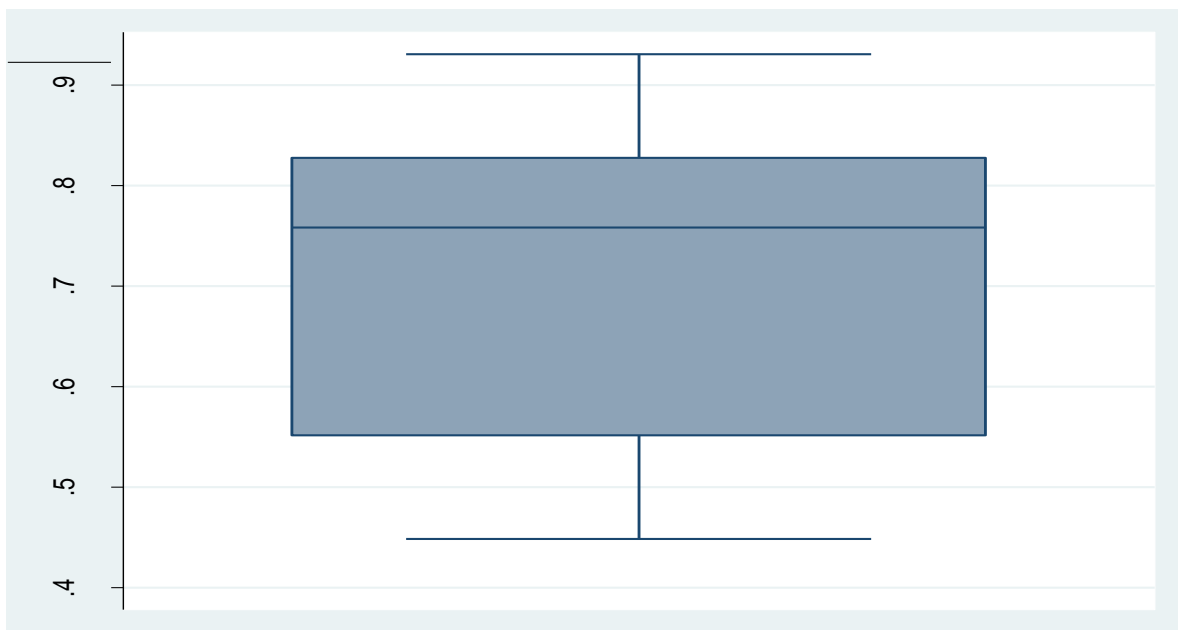
Figure 24: Post-Test Scores in Achievement Distribution

4.5.3 Effect of Video-Mediated Instruction on Students' Achievement in Kiswahili Proverbs

In this section the hypothesis that stated that the use of VMIs in teaching Kiswahili proverbs would have no significant effect on students' achievement is tested under this objective. This hypothesis was initially tested using Kruskal-Wallis test. The role of widely discussed students' and teacher attributes in achievement are then examined. Subsequently, a GLM was estimated in order to take into account the role of students and teacher attributes as possible confounders of the effects of VMIs on achievement. The results of these analyses are presented in the sub-sections that follow.

Exploratory analysis of the pre-test marks indicated that the scores on achievement before the intervention was skewed (KS score = 0.112, df = 221, ρ = 0.000). In Table 56 is a presentation of the descriptive statistics of the pre-test mark for Group A and B.

Table 56: Descriptive Statistics of Pre-Test Marks for Group A and B

Group	Mean	SD	SE	Median	Percentile		IQ
					25	75	
A	0.623	0.120	0.011	0.621	0.552	0.690	0.138
B	0.596	0.086	0.008	0.586	0.552	0.655	0.103

Exploratory analysis of the post-test achievement scores show that the data violated the assumptions of a normal distribution (KS score = 0.215, df = 365, ρ = 0.000). The median post test achievement score after the intervention was 0.76 (Percentile 25th = 0.55, 75th = 0.83).

The descriptive statistics for the post-test achievement marks of the four study groups are offered in Table 57. The lowest median score of 0.52 was recorded by Group C while the highest score of 0.83 was recorded by both Group A and D.

Table 57: Descriptive Statistics for Post-Test Marks on Achievement

Group	Mean	SD	SE	Median	Percentile		IQ
					25th	75th	
A	0.828	0.0434	0.004	0.828	0.793	0.862	0.069
B	0.627	0.0589	0.008	0.621	0.586	0.69	0.104
C	0.515	0.0339	0.003	0.517	0.483	0.552	0.069
D	0.824	0.0433	0.004	0.828	0.793	0.862	0.069

A graphical comparison of the pre and post test median scores in all the four study groups revealed some patterns of inerest (Figure 25). The median score for experiment with pre-test Group A in achievement statistically significantly improved by 21 percentage points from 0.62 in the pre-test to 0.83 in the post-test (Mann-Whitney U test, $z = -11.575$, $\rho = 0.000$). This is indicative of a treatment effect. Similarly, control with pre-test Group B post-test scores increased from 0.59 to 0.62 in the achievement scores, a 3% statistically significant change (Mann-Whitney U test, $z = -3.239$, $\rho = 0.0012$). This is indicative of the presence of confounders which need to be explained.

The considerable difference in improvement scores between the two groups is indicative of the effectiveness of the intervention. Students' achievement was determined by conducting a median gain analysis on students' post test scores on achievement. The initial purpose of these gain analysis was to determine which of the two pre-test groups gained more during the post-test. There was a treatment effect in the achievement scores.
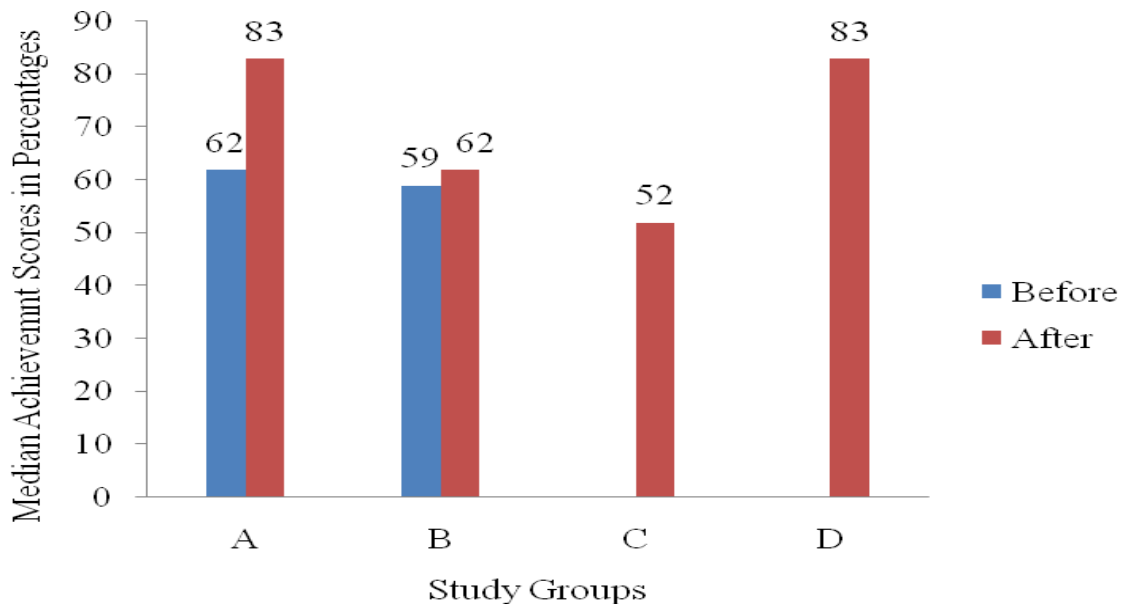
Figure 25: Comparison Between Pre and Post-Test Scores in Achievement

The results showed that the differences in achievement after the intervention among the four groups were statistically significant (Kruskal Wallis test, χ^2 = 288.69, df = 3, ρ = 0.0001). After the intervention, the data shows that Group A had the highest post-test rank sum marks while Group B pre-test group had the lowest (Table 58). This finding is tentatively indicative of a treatment effect in the presence of pre-test. This result does not however show which of the four study groups was significantly different from the other. Thus there was need to carry out further statistical anayses in order to unveil differences among the four study groups. It was further necessary to carry out additional statistical anayses in order to unveil if confounders had any effect in the experiment.

Table 58: Non-Parametric Comparisons between Study Groups on Achievement

Group	Observation	Rank Sum
A	104	27924
B	51	6937
C	116	7098
D	94	24835

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This finding is in partial agreement with results reported in existing literature which show that emerging technologies influence achievement favourably in diverse subjects (Lankshear & Knobel, 2003). The increase in achievement test-scores through the use of VMIs may be explicated to a large extent by the observation that emerging technologies make it possible for learners to acquire knowledge through a multiplicity of processes that include audio, visual and kinaesthetic (Mayer, 2005). These many receivers take care of learners' diverse funds of intelligecies (UNICEF, 2000e). The finding was reflective of the observation that watching a video is an activity that involves a variety of senses (Tripp & Rich, 2012). This finding is further in agreement with Dale (1946), who graphically demonstrates the levels of retention of knowledge when various modes of delivery are engaged. Dale in his cone of experience states that learners remember 50% of what they hear and watch on video. This percentage is higher than the 10% that they remember when they read text combined with the 20% they would remember from the teacher's explanation. Salkeld (2013) recommends the use of videos stating that they are the next best mode of presenting a situation after realia. It is therefore concluded that VMIs had a significant effect on student achievement.

The positive effect of VMIs can also be explained through their ability to raise the zeal of learners to gain new knowledge. Further, VMIs bring near reality to class which is otherwise unavailable in the class (Trucano, 2013). Further, the role of confounders cannot be ruled out since some select students and teacher characteristics were associated with the achievement scores.

The differences in achievement scores observed in this study could be due to factors other than the use of VMIs such as student or teacher attributes. Bivariate analyses were conducted in order to identify whether students gender and age and teacher experience were significantly associated with achievement scores.

Before the intervention, as indicated in Figure 26, girls had a significantly higher mean score than the boys (MannWhitney U test z = 4.92, ρ = 0.000). After the intervention, no significant differences were observed in the mean scores of the boys and the girls (MannWhitney U test z = 1.614; ρ = 0.1064).
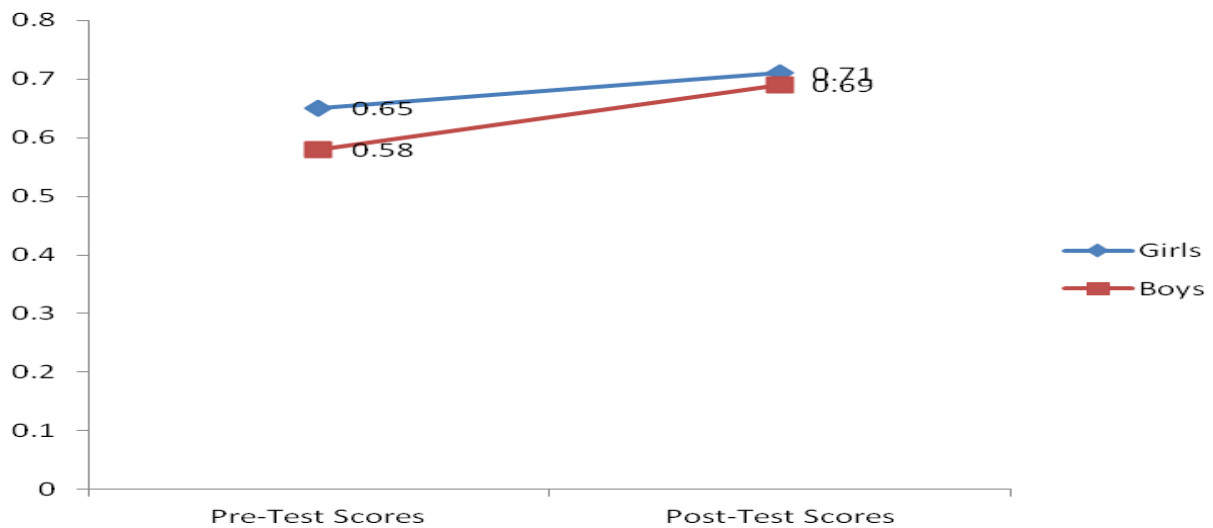
Figure 26: Pre- and Post-test Scores of Boys and Girls

Thus VMIs appear to have a larger significant effect among the boys than on the girls. The reported outcome agrees with an earlier study carried out in Norway that indicates that technologies that are emerging in pedagogy may manifest larger effect on boys relative to girls (Norwegian Ministry of Children and Equality, 2008). This is largely attributable to the fact that boys put extra effort and time into their studies in the presence of new technology. It can also be explained that boys become more attentive learners when taught using emerging technologies. Other studies have also shown that the achievement of both girls and boys tend to be similar but they are largely silent on the role of emerging technologies (Eshetu, 2015). In the same vein, Mutwiri *et al*. (2014) have specifically noted that the performance of boys and girls in Kiswahili language at KCSE is similar. These results are in contrast to findings in studies that show that girls have a higher reading achievement when compared to boys (Malmberg & Sumra, 2001; Zilimu, 2014). Largely the female advantage in the mastery of a

second language has been attributed to the quick maturity of girls relative to boys (UNESCO, 2009). In language learning, girls start at an advantage but somewhere in life, boys end up at par with girls (Ogero, 2012). The current study demonstrates that this maturation effect can be drastically fast-tracked by the use emerging technologies. Overall, the results suggest that gender has a significant impact on how students learn any given language. The major contribution of the current study is on documenting the effect of VMIs on achievement and specifically in learning Kiswahili proverbs.

The presented results did not reveal any association between age and achievement (Table 59). The age of the students was not significantly associated with the pre-test score marks. Further, no significant relationship was observed between age and the post-test mark.

Table 59: Correlation* between Pre- and Post-test Marks and Age of Students

		1	2	3
1	Age	1.000		
2	Pre-Test Mark	-.055	1.000	
3	Post Test Mark	.042		1.000

*Spearman's Correlation Coefficient.

This is not surprising since the time difference between the pre-test and the post-test was approximately eight weeks. The study found out that age was not associated with achievement scores. This is in contrast to existing literature which suggests that age has a profound effect on the mastery of a second language (Jabor *et al.*, 2011). The differences in findings are largely attributable to the limited variation in age in the current study unlike in existing literature. Consequently, age effects on achievement should not be expected.

The experience of teachers in years had a significant negative non-linear relation with the post test mark scores (Spearman's rho = -0.264, ρ = 0.000). Further examination of the data shows a cubic relationship between the teachers' experience and the post test mark scores

(Figure 27). Initially, the post test mark scores decreased gradually with the experience of the teacher up to around ten years. The post-mark scores then increased as the experience of the teacher grew to around twenty years. Finally, the post-mark scores dropped as the experience of the teacher increase above twenty years. The data, therefore, indicate a complex relationship between teacher experience and achievement in the midst of VMIs. Below ten years experience and above twenty years, suggest areas of concern with students' achievement in Kiswahili proverbs.
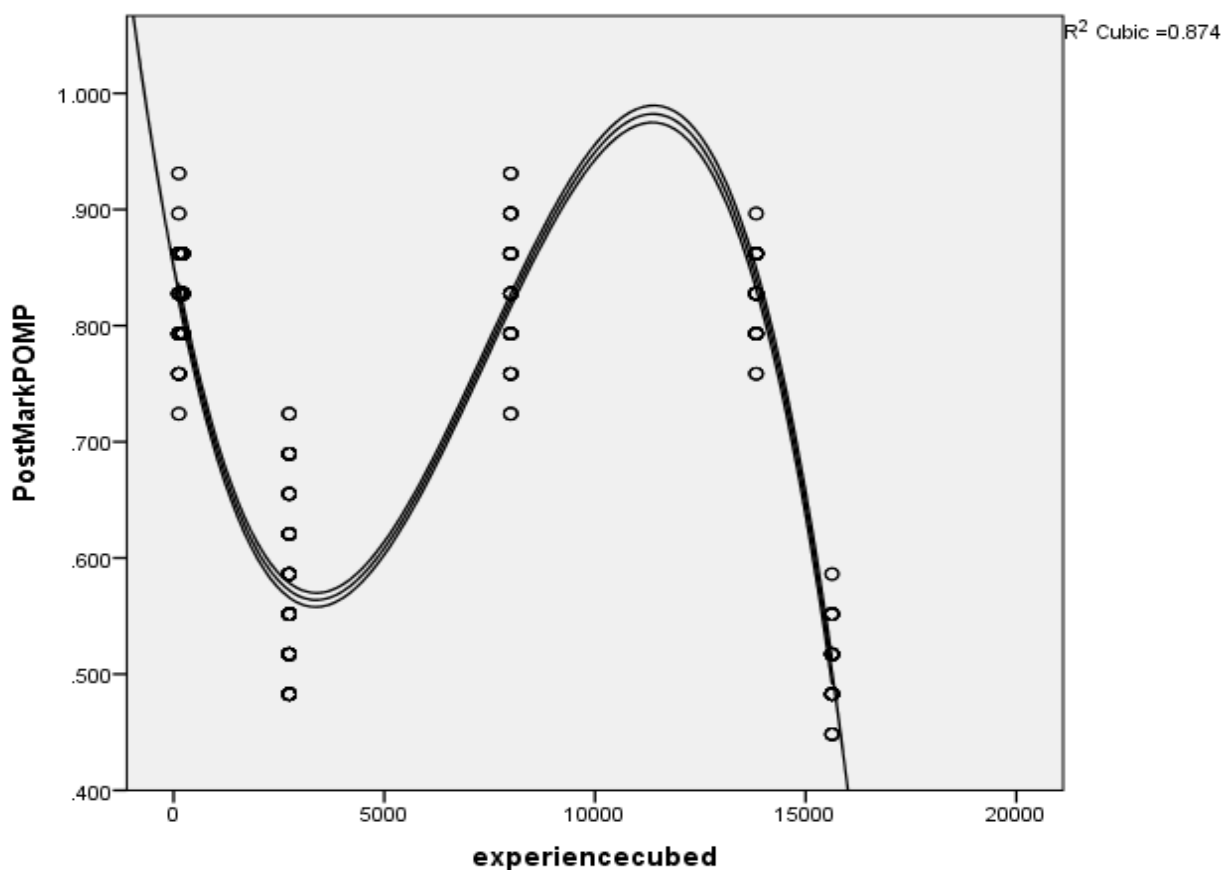

Figure 27: The Relationship between Teachers' Experience and Post Mark

A similarly wide variation in the experience of teachers has been reported in literature (Kosgei *et al.*, 2013). At the moment, it is not clear from the available data why these two groups of teachers had problems in attaining set goals when VMIs is introduced to Form 2 students.

In bivariate analysis, a cubic relationship was observed between the experience of the teacher and the student achievement after the introduction of VMIs. The observed results showed that the achievement of students drops with the experience of teachers up to around ten years and rises dramatically to around twenty years and then drops significantly with increased experience. This result is in contrast with the literature that claims that the relation among these variables is positive (Darling-Hammond, 2000). It is also at variance with existing literature that posits a positive relationship between experience and achievement up to around five years and no further statistical significance thereafter (Darling-Hammond, 1997). The differences can largely be explained on how the relationship between teacher experience and achievement is specified. Previous literature largely specifies this relationship as linear. In the current study, however, exploratory data analysis indicated that the relationship is non-linear. The differences therefore seem to be a reflection of the method used to analyse the relationship between student achievement and teacher experience. The finding that teacher experience has a complex role in student achievement is especially relevant in teaching of Kiswahili in general and Kiswahili proverbs in particular. The finding is moreso pertinent because apprehension has been raised concerning the performance of Kiswahili at the Form Four level (KNEC, 2008, 2009, 2010, 2011, 2012, 2013). This important finding reflects not only on the need for continuous teacher education but also to correctly specify the relationship between teacher experience and achievement.

Overall, the results showed that the association between teacher experience and student achievement is a complex and culvilinear one. Students taught by teachers with experience below ten years and those whose experience was above twenty years returned relatively lower marks than their counterparts taught by instructors with experience between ten and twenty years. This finding is contrary to observations in extant literature which identifies a linear relationship between teacher experience and students' achievement (Wayne & Youngs,

2003). Difference in opinion in literature seems to appear from the modelling of the relationship between experience and achievement. Further, the study may also not rule out directly the impact of technology on this relationship.

4.5.4 Effect of VMIs on Student Achievement in Kiswahili Proverbs with Confounders

The second purpose of the gain analysis tested differences between all the four study groups while controlling for possible confounders. A GLM was used to examine the differences. The problem of multicollinearity that arises in multiple regression analysis was examined initially using a correlation matrix (Table 60). The Example dimension of Motivation emerged to be highly correlated with the Teaching Aids dimension of Motivation, Emotional dimension of Listen motivation and the Real Object dimension of motivation. It also had a small non-significant correlation with the PostMark score. The Example dimension of motivation was consequently dropped from further analysis. Therefore, it became more difficult for the problem of multi-collinearity to affect the regression exercise.

Table 60: Correlation Coefficients of Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1 PostMark	1.000											
2 Age	.042	1.000										
3 Experience2	-.264*	.094	1.000									
4 Learning Motivation	-.063	-.009	.067	1.000								
5 Emotional Listening Motivation	-.040	-.139*	-.136*	-.513*	1.000							
6 InstrumentalListening Motivation	-.139*	-.104	-.065	-.082	.279*	1.000						
7 ExampleMotivation	-.100	-.084	-.124*	-.412*	.632*	.317*	1.000					
8 TeachingAidsMotivation	-.119*	-.053	-.125*	-.440*	.579*	.292*	.693*	1.000				
9 RealObjectMotivation	-.095	-.093	-.111*	-.387*	.542*	.288*	.724*	.647*	1.000			
10 Study dimension Attitude	-.105*	-.029	-.085	-.255*	.361*	.315*	.330*	.314*	.303*	1.000		
11 Pedagogy dimension Attitude	-.131*	-.122*	-.193*	-.312*	.364*	.310*	.410*	.385*	.392*	.397*	1.000	
12 Time dimension PostAttitude	.005	-.118*	-.163*	-.072	.146*	.131*	.125*	.182*	.139*	.138*	.346*	1.000

*Correlation significant at 0.05 α level

The GLM estimates of the achievement scores are presented in Table 61. The model estimates demonstrated that the scores on mean test score of Control with pre-test Group B was a non-significant 17 percentage points less than that of Experiment with pre-test Group A with the presence of confounders. This meant there was no treatment effect in the presence of pre-test.

Table 61: Factors Associated with Post-Test Scores

	Coefficient	SE	z	ρ	95% CI	
Age	0.00603	0.033	0.180	0.856	-0.059	0.071
Gender (Male)	0.02044	0.077	0.270	0.790	-0.130	0.171
Experience^2	-0.00001	0.000	-0.080	0.937	0.000	0.000
GroupB	-0.17637	0.129	-1.370	0.172	-0.429	0.076
GroupC*	-0.30429	0.077	-3.930	0.000	-0.456	-0.153
GroupD	-0.01170	0.119	-0.100	0.922	-0.245	0.222
Learning Motivation	-0.03975	0.179	-0.220	0.825	-0.391	0.312
Emotional Listening Motivation	0.01628	0.225	0.070	0.942	-0.425	0.457
InstrumentalListening Motivation	-0.03953	0.178	-0.220	0.825	-0.389	0.310
Example dimension of Motivation	-0.00021	0.304	0.000	0.999	-0.596	0.596
Teaching Aids dimension Motivation	0.01482	0.204	0.070	0.942	-0.384	0.414
RealObject dimension of motivation	-0.05339	0.260	-0.210	0.837	-0.563	0.456
Study dimension of Attitude	0.00244	0.146	0.020	0.987	-0.283	0.288
Pedagogy dimesion ofAttitude	-0.02096	0.200	-0.110	0.916	-0.412	0.370
Time dimension of Attitude	0.01389	0.137	0.100	0.919	-0.254	0.282

* Relationships significant at 0.05 α level

Further results of the analysis of the data showed that Experiment with no pre-test Group D had a non-significant one percentage point less than Experiment with pre-test Group A. The lack of differences in the achievement scores between Experiment with pre-test Group A and

Experiment with no pre-test Group D helped to rule out any testing threats. This finding was in disagreement with literature which states that any differences the researcher may find between the pre-test and post-test marks are sometimes (at least partially) associated to a testing effect. Anytime learners take a test for the first time, they acquire experience that may influence their scores on the next test (Navarro & Siegel, 2018).

Further analyses showed that no statistically significant differences existed between Control with pre-test Group B and Control no pre-test Group C (Table 62). The results posited that control with pre-test Group B had 13 percent non-significant points lower than Group C. This result indicated that confounders had no influence on achievement.

Table 62: Difference between Group B,C and D

	Coefficient	SE	z	p-value	95% CI	
Age	0.0060269	0.033	0.180	0.856	-0.059	0.071
Gender (Male)	0.0204389	0.077	0.270	0.790	-0.130	0.171
Experience2	-0.0000128	0.000	-0.080	0.937	0.000	0.000
GroupA	0.1763661	0.129	1.370	0.172	-0.076	0.429
GroupC	-0.1279205	0.127	-1.010	0.313	-0.377	0.121
GroupD	0.1646639	0.153	1.080	0.281	-0.135	0.464
Learning dimension of Motivation	-0.0397522	0.179	-0.220	0.825	-0.391	0.312
Emotional dimension of Listening Motivation	0.0162763	0.225	0.070	0.942	-0.425	0.457
Instrumental dimension of Listening Motivation2	-0.0395309	0.178	-0.220	0.825	-0.389	0.310
Example dimension of Motivation	-0.0002094	0.304	0.000	0.999	-0.596	0.596
Teaching Aids dimension of Motivation	0.0148202	0.204	0.070	0.942	-0.384	0.414
Real Object dimension of Motivation	-0.0533938	0.260	-0.210	0.837	-0.563	0.456
Study dimension of Attitude	0.002444	0.146	0.020	0.987	-0.283	0.288
Pedagogy dimension of Attitude	-0.0209614	0.200	-0.110	0.916	-0.412	0.370
Time dimension of Attitude	0.0138863	0.137	0.100	0.919	-0.254	0.282

The model estimates further demonstrated that students and teacher attributes had non-significant associations with the post test score. The reported data also showed that an increase in age by one year was associated with a non-significant 0.006 percentage point increase in the post-test score. Boys had approximately 2 percentage non-significant points less than girls in the post-test mark scores. The experience of the teachers in years had a statistically negligible negative association with post-test marks. The role of VMIs in enhancing student achievement in Kiswahili proverbs was, therefore, not evident after adjusting for student and teacher attributes.

Among the items assessing the motivation for learning Kiswahili proverbs, the Emotional dimension of attitude and Teaching Aids dimension of motivation had negative and statistically insignificant associations with the post-test marks. Similarly, the Learning dimension of Motivation, the Instrumental dimension of attitude, Example dimension of motivation and the Real object dimension of motivation had negative and statistically non-significant associations with post-test scores.

A further analysis of the data showed that the post-test achievement scores for Control with no pre-test Group C was statistically different from those of Experiment with no pre-test Group D (Table 63). Group D had a 29 percent statistically significant points advantage over the scores of Group C. This result suggested that there was a treatment effect independent of the pre-test. The comparison between the posttest results of groups C and D allowed the determination of whether the actual act of pretesting influenced the study results. Kumari (2013) states that an assessment of the post-test scores of Control with no pre-test Group C and Experiment with no pre-test Group D enabled the study to determine whether the act ofpre-testing influenced the results.

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Table 63: Comparison between Group C and D

	Coefficient	SE	z	p-value	95% CI	
Age	0.0060269	0.033	0.180	0.856	-0.059	0.071
Gender(Male)	0.0204389	0.077	0.270	0.790	-0.130	0.171
Experience^2	-0.0000128	0.000	-0.080	0.937	0.000	0.000
GroupA*	0.3042866	0.077	3.930	0.000	0.153	0.456
GroupB	0.1279204	0.127	1.010	0.313	-0.121	0.377
GroupD*	0.2925844	0.101	2.890	0.004	0.094	0.491
Learning dimension of Motivation	-0.0397521	0.179	-0.220	0.825	-0.391	0.312
Emotional dimension of Listening Motivation	0.0162763	0.225	0.070	0.942	-0.425	0.457
Instrumental dimension of Listening Motivation	-0.0395309	0.178	-0.220	0.825	-0.389	0.310
Example dimension of Motivation	-0.0002094	0.304	0.000	0.999	-0.596	0.596
Teaching Aids dimension of Motivation	0.0148202	0.204	0.070	0.942	-0.384	0.414
Real Objects dimension of Motivation	-0.0533938	0.260	-0.210	0.837	-0.563	0.456
Study dimension of Attitude	0.002444	0.146	0.020	0.987	-0.283	0.288
Pedagogy dimension of Attitude	-0.0209614	0.200	-0.110	0.916	-0.412	0.370
Time dimension of Attitude	0.0138863	0.137	0.100	0.919	-0.254	0.282

* Relationships significant at 0.05 level

No differences in gender, age and teacher experience were observed in the achievement scores. These findings were contrary to observations in literature which suggest that diverse student and teacher characteristics influence achievement (Jabor *et al.*, 2011; Kosgei *et al.*, 2013; Malmberg & Sumra, 2001; Mellon, 2015; Nako, 2015; Zilimu, 2014). Further, the various dimensions of both motivation and attitude were not associated with achievenment scores. This was contrary to the commonly held opinion that attitude and motivation influence performance (Fishbein & Ajzen, 2015). The differences in the findings were probably due to the observation that attitudes are either unrelated or only slightly related to overt behaviors than attitudes are related to actions (Ajzen, 2011). In addition, the contradicting findings between motivation, on the one hand, and achievement, on the other, can be explained by lack of compatibility – a very broad concept – and the more specific achievement criteria. Overall, these findings largely ruled out the effects of confounders in the presence of VMIs on achievement.

The results of this study broadly indicated that there was a treatment effect on Achievement. The effectiveness of VMIs on Achievement was therefore evident. Further, the VMIs effects on the Achievement could not be attributed to the threat of pre-testing. Additionally, the role of confounders was not evident in Achievement. Cosequently, the third hypothesis Ho$_3$, which stated that VMIs will have no effect on students' achievement, was rejected.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter a presentation is made on the summary of the findings, the conclusions, recommendations and suggestions for further research. The first part summarizes key insights from the data analyses, followed by a presentation of the conclusions, then the recommendations of the study and the final part gives suggestions for further research.

5.2 Summary

The broad objective of this research was to find out the effect of Video-Mediated Instructions on students' motivation, attitudes and achievement in the learning of Kiswahili proverbs in secondary schools in Nakuru County, Kenya. The research applied a Quasi-experimental and Solomon Four Group Design. The target population comprised all secondary school students in Nakuru County. The accessible population was Form Two students in extra-county single gender and boarding secondary schools. Purposive sampling was used to select eight schools (a boy and girl school per Group A, B, C and D). Each school provided one Form Two class, hence 436 students were involved. At the onset of the study, and to find out the entry behaviour of the groups, a pre-test was administered to experimental Group A and control Group B. In the experimental groups A and D, VMIs were used while the teacher-centred teaching methods were used in the control groups B and C for a period of eight weeks. The students were taught the sixteen proverbs that were selected from the secondary school syllabus. Data was collected using a Students' Achievement Test, Student Motivation Questionnaire and Students' Attitude Questionnaire. Items in these research tools were extracted from previous studies and pilot-tested

in schools with similar characteristics as those of this study. After a period of eight weeks, a post-test was given to groups A, B, C and D. Data were initially analyzed using appropriate tests of differences (parametrics and non-parametric). A GLM was further used to identify the role of confounders. After data analysis for each variable, hypotheses were deemed significant at 0.05 level and, therefore, accepted or rejected. Based on the objectives of the study, below is a summary of the major findings.

5.2.1 Determining the Effect of VMIs on Students' Motivation Towards Kiswahili Proverbs
The first specific objective of the study was to establish the effect of VMIs on students' motivation towards the learning of Kiswahili proverbs. The study established that motivation towards learning Kiswahili proverbs is a multi-dimensional concept. Six dimensions were identified in the pilot phase of this study. The dimensions were: 'Learning dimension of Motivation', 'Emotiomal dimension of Listening', Instrumental dimension of Listening', 'Example dimension of Motivation', 'Teaching Aids dimension of Motivation' and 'Real Objects dimension Motivation'. These six dimensions were examined in the main study.

The median score for Control with pretest Group B in the Learning dimension of motivation to learn Kiswahili proverbs was the highest while all the other study groups had a low and identical score after the VMIs intervention. Further analyses showed that the distribution of the scores on the Learning dimension of motivation to learn Kiswahili proverbs among the four study groups were statistically different after the VMIs intervention (Kruskal Wallis test, $\chi^2 = 65.311$, 3 d.f. $\rho = 0.0001$). This statistically significant difference did not indicate clearly whether a pretest effect or the role of confounders influenced the results.

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The data collected in this study found no VMIs effect in the 'Learning dimension of Motivation' of students to learn Kiswahili proverbs, even after controlling for student and teacher characteristics. Group B had statistically superior scores when compared to Group A (β = 0.165, SE = 0.035, ρ = 0.000), implying that there was no treatment effect in Learning dimension of Motivation. Experiment with no pre-test Group D did not demonstrate any significant differences from Control no pre-test Group C in the learning dimension of motivation to learn Kiswahili proverbs score (β = 0.0045523, SE = 0.109656, ρ = 0.967). This was indicative of lack of a treatment effect independent of pre-test. Thus, a pre-test effect was not evident with or without a pretest. Group A and D had similar post-test scores after controlling for confounders (β = -0.066, SE = 0.038, ρ = 0.083). There was no pre-test effect. Group B and C had dissimilar post-test scores (β = -0.23505, SE = 0.064467, ρ = 0.000) which is indicative of the presence of confounders in the results.

Girls underperformed compared to boys (β = -0.153, SE = 0.029, ρ = 0. 000) and the experience of the teacher affected the outcome (β = -0.,001 SE = 0.000, ρ = 0. 000). Therefore, students and teacher attributes were significant confounders. As such, there was no VMIs effect and no pre-test effect in the 'Learning dimension of Motivation' of students to learn Kiswahili proverbs even though student and teacher attributes were significant confounders of the results. Overall, no VMIs effect were observed in this study in the presence of confounders.

On students' motivation to listen to the teacher teaching Kiswahili proverbs, two dimensions, namely 'Emotional dimension of Listening' and 'Instrumental dimension of Listening', were found. The data indicated that the four study groups were statistically different (Kruskal Wallis

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test, χ^2 = 16.89, df = 3, ρ = 0.007) in the Emotional dimension of the listening motivation. Control with no pre-test Group C had the highest rank sum while control with pre-test Group B had the lowest rank sum. Further, the research results demonstrated that VMIs had no significant effect on the Emotional dimension of listening motivation even after controlling for the students' and teacher characteristics (β = -0.05908, SE = 0.075972, ρ = 0.437) in the presence of a pre-test. This implied that there was no treatment effect on the Emotional dimension of listening motivation scores. Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the Emotional dimension of listening motivation to learn Kiswahili proverbs score (β = 0.096337, SE = 0.105472, ρ = 0.361). This was indicative of lack of a treatment effect independent of pre-test. Experiment with pre-test Group A and experiment with no pre-test Group D were statistically similar in the emotional dimension of listening motivation in GLM analyses (β = -0.147459, SE = 0.090145, ρ = 0.102). This was proof of absence of a pre-test effect. Control with pre-test Group B and Control with no pre-test Group C had statistically similar scores (β = 0.110201, SE = 0.062602, ρ = 0.078). This was indicative of the absence of the role of confounders. There were neither age (β = -0.00971, SE = 0.027753, ρ = 0.726) nor gender differences (β = -0.3795, SE = 0.063595, ρ = 0.051) among the surveyed students. Additionally, the experience of the teachers did not influence outcomes on the Emotional dimension of listening motivation (β = -0.00149, SE = 0.000765, ρ = 0.051). Therefore, VMIs effects, pre-test effects and confounders had no influence on the Emotional dimension of listening motivation.

The presented data suggested that there was no VMI effect on the Intrumental dimension of listening motivation after the intervention (Kruskal Wallis test, $\chi 2 = 5.268$, df = 3, $\rho = 0.1532$). The effect was not evident even after controlling for student and teacher characteristics ($\beta = -0.02735$, SE = 0.087466, $\rho = 0.755$). Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the Emotional dimension of listening motivation to learn Kiswahili proverbs score ($\beta = 0.152036$, SE = 0.106455, $\rho = 0.153$). This was indicative of lack of a treatment effect independent of pre-test. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically equal in the Instrumental dimension of listening motivation ($\beta = 0.122794$, SE = 0.095899, $\rho = 0.200$). This was indicative of the absence of a pre-test effect. Control with pretest Group B and Control with no pre-test Group C were statistically similar in the Instrumental dimension of listening motivation ($\beta = -0.00189$, SE = 0.074934, $\rho = 0.98$). This also indicated no pre-test effect in the absence of treatment. Further, the students' gender and the experience of the teacher affected the outcome.

Boys outperformed girls in the Intrumental dimension of listening motivation after the intervention ($\beta = 0.166178$, SE = 0.072789, $\rho = 0.022$). The experience of teachers had a negative curvilinear association with Intrumental dimension of listening motivation after the intervention ($\beta = -0.00278$, SE = 0.000894, $\rho = 0.002$). Consequently, there was no VMIs effect, pre-test effect in the 'Instrumental dimension of Listening Motivation' of students to learn Kiswahili proverbs, even though students and teacher attributes were significant confounders of the results.

The data provided in this study further demonstrated that there was no VMI treatment effect on the Example dimension of motivation after the intervention (Kruskal Wallis test, χ^2 = 5.937, df = 3, ρ = 0.1147). The results were not upheld after controlling for student and teacher characteristics. The scores on the Example dimension of motivation between Experiment with pre-test Group A and Control with pre-test Group B were statistically similar after the intervention in GLM analyes (β = -0.02527, SE = 0.081224, ρ = 0.756). This was evidence of lack of a treatment effect after the VMIs intervention in the presence of pre-test. Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the Example dimension of motivation to learn Kiswahili proverbs score (β = 0.1120766, SE = 0.104323, ρ = 0.247). This further evidenced a lack of treatment effect in the absence of a pre-test. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically similar (β = 0.151587, SE = 0.092618, ρ = 0.102). This proved the absence of a pre-test effect. Control with pre-test Group B and Control with no pre-test Group C were similar (β = -0.056089, SE = 0.067242, ρ = 0.404). This indicated a lack of the role of confounders. Student age (β = 0.003074, SE = 0.029147, ρ = 0.916), boy gender (β = 0.004832, SE = 0.067553, ρ = 0.943) and teacher experience (β = -0.00155, SE = 0.000835, ρ = 0.064) were not statistically associated with the Example dimension of motivation. The role of confounders wasre, therefore, not evident in the Example dimension of motivation. The VMIs effect and pre-test effects were not established in this study. Further, the selected student and teacher attributes did not influence the scores in the Example dimension of motivation.

The post-test scores for the four study groups were significantly different from each other in the Teaching aids dimension of motivation (Kruskal Wallis test, χ^2 = 8.433, df = 3, ρ = 0.0379). Control with no pre-test Group C had the highest rank score while Control with pre-test Group B had the lowest rank score. Additional analyses of the data, however, did not demonstrate a VMI treatment effect on the Teaching Aids dimension of motivation after the intervention with the introduction of confounders. Experiment with pre-test Group A had a statistically identical median score when compared to Control with pretest Group B in the Teaching Aids dimension of motivation scores after the intervention after controlling for student and teacher attributes (β = 0.057107, SE = 0.07987, ρ = 0.475). This indicated that there was no treatment effect.

Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the Teaching Aids dimension of motivation to learn Kiswahili proverbs score (β = 0.07536, SE = 0.103262, ρ = 0.466). This was further evidence of lack of a treatment effect in the absence of a pre-test on the teaching aids dimension of motivation. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically similar in the Teaching Aids dimension of motivation (β = 0.153, SE = 0.090663, ρ = 0.091). This indicated that there was no pre-test effect. Control with pre-test Group B and Control with no pre-test Group C were statistically identical (β = -0.020533, SE = 0.06799, ρ = 0.763). This finding implied the absence of confounders in the Teaching Aids dimension of motivation. The effect of the Teaching Aids dimension of motivation was not evident even after controlling for student age (β = 0.00741, SE = 0.02933, ρ = 0.801), gender (β = -0.02696, SE = 0.068023, ρ = 0.692) and teacher characteristics (β = - 0.00117, SE = 0.00084, ρ = 0.163). The

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effect of maturation was felt in the outcome. A VMIs treatment effect, pre-test effect were, therefore, not evident in the Teaching Aids dimension of motivation and no confounders were evident.

The post-test score for the four study groups were not significantly different from each other in the Real Object motivation (Kruskal Wallis test, $\chi^2 = 3.047$, df = 3, $\rho = 0.329$). This meant that the four study groups had statistically similar scores in the Real Objects dimension of motivation after the intervention of VMIs. This result was suggestive of lack of a treatment effect of VMIs. Experiment with pre-test Group A had a statistically identical median score when compared to Control with pretest Group B in the Real Objects dimension of motivation in the post-test scores after controlling for student and teacher attributes ($\beta = 0.00847$, SE = 0.078288, $\rho = 0.914$). This was evidence of lack of a treatment effect on the Real Object dimension of motivation. Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the Real Object dimension of motivation to learn Kiswahili proverbs score ($\beta = 0.096149$, SE = 0.102927, $\rho = 0.35$). This was further evidence of lack of a treatment effect in the absence of a pre-test on the Real Objects dimension of motivation. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically identical ($\beta = 0.123103$, SE = 0.090352, $\rho = 0.173$). This finding ruled out the presence of a pre-test effect. Control with pre-test Group B and Control with no pre-test Group C were statistically identical ($\beta = 0.035428$, SE = 0.065998, $\rho = 0.591$). This was indicative of the absence of the role of confounders in the Real Object dimension of motivation scores. Moreover, a treatment effect was not evident after controlling for student age ($\beta = 0.000873$, SE = 0.028758, $\rho = 0.976$),

gender (β = -0.02761, SE = 0.066063, ρ = 0.676) and teacher characteristics (β = - 0.00122, SE = 0.000811, ρ = 0.132). A treatment effect of VMIs was, therefore, not evident on Real Objects dimension of motivation in this study. The effect of VMIs and pre-test effect on the Real Objects dimension of motivation were not evident even after controlling for student and teacher characteristics.

For the first objective, the overall result was suhc that the hypothesis HO$_1$, that the use of VMIs in teaching Kiswahili proverbs will have no significant effect on students' motivation towards the learning of Kiswahili proverbs, was upheld.

5.2.2 Determining the Effect of VMIs on Students' Attitude Towards Kiswahili Proverbs.

The next particular objective of the research was to find out the effect of VMIs on students' attitudes towards Kiswahili proverbs. The study established that attitude towards learning Kiswahili proverbs is a multi-dimensional concept. Three dimensions were identified in the pilot phase of the study, namely 'Study', 'Pedagogy' and 'Time'.

On the 'Study dimension of attitude', the data collected demonstrated that there was no VMI treatment effect. The four study groups did not significantly differ from each other in the post-test score of the Study dimension of attitude (Kruskal Wallis Test, χ^2 = 3.611, df = 3, ρ = 0.3067). This meant that the four study groups had statistically similar scores in the Study dimension of attitude after the intervention of VMIs. A treatment effect of VMIs was, therefore, not evident on the Study dimension of attitude in this study. Experiment with pre-test Group A had a statistically identical median score when compared to Control with pretest Group B in the Study dimension of attitude scores after the intervention after controlling for student and teacher

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attributes. Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the score on Study Dimension of attitude to learn Kiswahili proverbs ($\beta = 0.072379$, SE $= 0.099721$, $\rho = 0.468$). This implied a lack of a treatment effect independent of pre-test on Study Dimension of attitude. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically identical ($\beta = 0.103397$, SE $= 0.088933$, $\rho = 0.245$). This was indicative of the absence of a pre-test effect of the Study dimension of attitude. Control with pre-test Group B and Control with no pre-test Group C were statistically identical ($\beta = 0.063338$, SE $= 0.067703$, $\rho = 0.35$). This indicated the absence of the role of confounders in the Study dimension of attitude scores. This effect was not evident even after controlling for student age ($\beta = 0.001453$, SE $= 0.029367$, $\rho = 0.961$) and gender ($\beta = 0.1144$, SE $= 0.067058$, $\rho = 0.088$) and teacher characteristics ($\beta = - 0.0016$, SE $= 0.000819$, $\rho = 0.051$). The VMIs and pre-test effect were not evident even after controlling for student and teacher characteristics.

The data indicated that the post-intervention median scores of the Pedagogy dimension of attitude ranged from 0.66 in Control with pre-test Group B to 0.75 in Control with no pre-test Group C. A comparison of the data indicated some variation in the median scores of the Pedagogy dimension of attitude in each of the four study groups after the intervention (Kruskal Wallis Test, $\chi^2 = 9.514$, df $= 3$, $\rho = 0.0232$). This Control with no pretest Group C score had the highest while Control with pre-test Group B had the lowest score. Experiment with pre-test Group A pre- and post-test scores were statistically similar, implying the absence of a treatment effect.

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The lack of a treatment effect on the Pedagogy dimension of attitude was not evident even after controlling for student and teacher attributes (β = -0.0719, SE = 0.076975, ρ = 0.35). Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the score on Pedagogy Dimension of attitude to learn Kiswahili proverbs (β = 0.057836, SE = 0.99752, ρ = 0.562). This was indicative of lack of a treatment effect independent of pre-test on Pedagogy Dimension of attitude. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically similar after taking care of the controls in the Pedagogy dimension of Attitude (β = 0.093865, SE = 0.088401, ρ = 0.288). This was proof of the absence of a pre-test effect. Control with pre-test Group B and Control with no pre-test Group C were statistically similar (β = -0.107927, SE = 0.065183, ρ = 0.098). This was an indication of absence of the role of confounders. The student gender (β = 0.056378, SE = 0.065884, ρ = 0.392) and age (β = -3.8E-05, SE = 0.029066, ρ = 0.999) were not associated with scores in the Pedagogy dimension of attitude. Teacher experience was, however, associated with the Pedagogy dimension of Attitude (β = - 0.00169, SE = 0.000793, ρ = 0.033). A treatment effect of VMIs was, therefore, not evident on the Pedagogy dimension of attitude in this study. The effect was not evident even after even controlling for student and teacher characteristics. Therefore, on the Pedagogy' dimension of attitude, the data collected in the study indicated that there was no VMI treatment effect. There was no pre-test effect.

A comparison of the data on the Time dimension of attitude indicated that there was no variation in the median scores of the Time dimension of attitude in each of the four study groups after the intervention (Kruskal Wallis Test, χ^2 = 1.32, df = 3, ρ = 0.7244). This was an indication of no

treatment effect after the intervention. Control with no pre-test Group C did not demonstrate any significant differences from Experiment with no pre-test Group D in the score on Time dimension of attitude to learn Kiswahili proverbs ($\beta = 0.132389$, SE $= 0.104667$, $\rho = 0.206$). This meant a lack of a treatment effect independent of pre-test on Time dimension of attitude. Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically identical in the Time dimension of attitude scores ($\beta = 0.080925$, SE $= 0.094534$, $\rho = 0.392$). This attested to the absenceof a pre-test effect. Control with pre-test Group B and Control with no pre-test Group C were statistically identical in the Time dimension of attitude ($\beta = 0.08079$, SE $= 0.076895$, $\rho = 0.293$). This was indicative of absence of the role of confounders in the Time dimension of attitude scores. The lack of a treatment effect on the Time dimension of attitude was not evident ($\beta = -0.13225$, SE $= 0.090734$, $\rho = 0.145$), even after controlling for student age ($\beta = -0.00689$, SE $= 0.0311536$, $\rho = 0.827$), gender ($\beta = 0.137211$, SE $= 0.076011$, $\rho = 0.071$) and teacher characteristics ($\beta = -0.00256$, SE $= 0.000927$, $\rho = 0.060$). A treatment effect of VMIs was, therefore, not evident on the Time dimension of attitude in this study. Subsequently, the treatment effect was not evident even after controlling for student and teacher characteristics. The experience of the teacher had a negative curvilinier relationship with the Time dimension of attitude. As such, on the Time dimension of attitude, the data collected in the study indicated that there was no VMI treatment effect. There was no pre-test effect. This finding was also evident after controlling for student and teacher characteristics. The experience of the teacher, however, affected the outcome.

Overall, the second hypothesis of the study HO_2, which stated that VMIs will have no significant effect on students attitude towards learning Kiswahili proverbs, was upheld.

5.2.3 Determining the Effect of VMIs on Students' Achievement Towards Kiswahili Proverbs

Overall, the presented data shows that the students had a median score of 0.76 on a scale of 0-1 on achievement in Kiswahili proverbs. The median score for Experiment with pre-test Group A in achievement statistically significantly improved by 21 percentage points from 0.62 in the pre-test to 0.83 in the post-test (Mann-Whitney U test, $z = -11.575$, $\rho = 0.000$). This was indicative of a treatment effect. Similarly, control with pre-test Group B post-test scores increased from 0.59 to 0.62 in the achievement scores, a 3% statistically significant change (Mann-Whitney U test, $z = -3.239$, $\rho = 0.0012$). This implied the presence of confounders which needed to be explained.

A comparison of the data indicated a variation in the median scores of the achievement in each of the four study groups after the intervention (Kruskal Wallis test, $\chi^2 = 288.69$, df = 3, $\rho = 0.0001$). Experiment with pre-test Group A and Experiment with no pre-test Group D were statistically similar ($\beta = -0.01170$, SE = 0.119, $\rho = 0.922$). This was indicative of absence of a pre-test effect. Control with pre-test group B and Control with no pre-test Group C were statistically similar ($\beta = -0.1279205$, SE = 0.127, $\rho = 0.313$). This indicated the absence of the role of confounders in Achievement scores. In addition, Experiment with no pre-test Group D statistically outperformed Control with no pretest Group C ($\beta = 0.2925844$, SE = 0.101, $\rho = 0.004$). These results suggested that there was a treatment effect in the absence of a pre-test on achievement even after controlling for student age ($\beta = -0.00603$, SE = 0.033, $\rho = 0.856$), gender ($\beta = 0.02044$, SE = 0.077, $\rho = 0.790$) and teacher experience ($\beta = - 0.00001$, SE = 0.000, $\rho =$

0.937). A treatment effect of VMIs was, therefore, evident on achievement in this study after controlling for confounders. Student and teacher characteristics did not confound the treatment effects of VMIs on achievement scores in Kiswahili Proverbs.

The third specific objective of this study was to examine the effect of VMIs on students' achievement in Kiswahili proverbs. The data from the study suggests that there was a VMI treatment effect on achievement before controlling for confounders. This finding was upheld after controlling for pre-test effects and both student and teacher characteristics. The third hypothesis HO$_3$, which stated that VMIs will have no significant effect on students' achievement, was thus rejected.

5.3 Conclusions of the Study

The first objective of the research sought to find out the effect of VMIs on students' motivation towards learning Kiswahili proverbs. From the research findings, six dimensions of motivation emerged leading to subsequent conclusions. Evidently, there is no VMIs treatment effect on the learning dimension of motivation. This lack of a treatment effect is evident even after controlling for the confounders. The effects of gender differences, teacher experience and pre-test are notable. There is no VMIs treatment effect on the Emotional dimension of listening motivation even after controlling for the confounders. The effects of maturation is, however, notable. There is no VMIs treatment effect on the Instrumental dimension of listening motivation even after controlling for the confounders. The effects of gender differences, teacher experience and pre-test also exist. There is no VMIs treatment effect on the Example dimension of motivation. After controlling for the confounders, VMIs treatment is also not realized. Student and teacher

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attributes seem to have no influence on the Example dimension of motivation. There is no VMIs treatment effect on the Teaching Aids dimension of motivation even after controlling for confounders. There is no VMIs treatment effect on the Real Object dimension of motivation even after controlling for the confounders.

The second objective of the research sought to find out the effect of VMIs on students' attitude towards learning Kiswahili proverbs. Fromt the findings, three attitude dimensions, namely Study, Pedagogy and Time with satisfactory psychometric properties, were identified. There is no treatment effect on the Study dimension of motivation. The treatment effect is not evident even after controlling for confounders. There is no VMIs treatment effect on the Pedagogy dimension of attitude. The effect of maturation and the experience of the teacher is notable confounders. There is no treatment effect on the Time dimension of attitude. The experience of the teacher is, however, a notable confounder.

The third primary objective of the study sought to examine the effect of VMIs on students' achievement in Kiswahili proverbs. A treatment effect of VMIs on achievement scores was identified even after controlling for the confounders.

5.4 Recommendations
On the basis of the findings of the study, the researcher makes the following recommendations to the Government of Kenya and other stakeholders.

5.4.1 Policy Recommendation
i. Since none of the dimensions of motivation and attitude were found to be associated with VMIs effect, policy makers are advised to be aware of this observation. Subsequently,

they should help educationists to take care of the introduction of VMIs in schools. In particular, a blanket approach in the introduction of VMIs is not advisable.

ii. There is need to conduct continuous teacher education to update them with the requisite competences to use emerging technologes. Such training should particularly focus on novice teachers and more experienced teachers.

iii. Policy makers need to keep in mind the complex nature of the relationship between teacher characteristics and student achievement and consequently develop appropriate interventions.

5.4.2 Recommendation for Practice

i. Teachers are advised to note that motivation is a multi-dimensional concept. As such, they should carefully consider motivation when introducing VMIs in teaching.

ii. Additionally, teachers should note that attitude is multi-dimensional. Therefore, they must consider the different aspects of attitude carefully when introducing VMIs in teaching.

iii. Since videos are the next best medium of presentation after realia, teachers are encouraged to use VMIs more to improve students' achievement.

iv. The presumed advantage of girls over boys in the intake of a new language may be bridged by introducing information technology tools. Teachers should, therefore, consider introducing VMIs in teaching if they hope to bridge the gender gap in acquisition of a new language.

v.   Since novice teachers and those with higher experience were found to be associated with underperformance in the achievement scores of Kiswahili proverbs, there is need to offer this cohort of instructors refresher courses.

5.4.3 Recommendations for Further Research

i.   It is recommended that further research be conducted to carefully examine the role of attitude and motivation since the duo had disappointing effects on student achievement in the current study. The findings of the current study sharply contrasted the expectation, an issue that warrants special attention in future studies.

ii. A point of concern with the finding of a favourable effect of VMIs on achievement is that the scores had a wider variation after compared to before the intervention. This is an issue of practical interest that deserves further investigation.

iii. There is need to carry out further studies into the contribution of additional attributes on students and teachers on achievement in the face of VMIs. Research focusing on attributes of novice teachers and more experienced teachers to determine why their students underperform is imperative.

iv. Future researchers need to keep in mind the complex nature of the relationship between student and teacher attributes, VMIs and student achievement. Researchers should, therefore, consider more rigorous modelling of this relationship.

v.   Future studies should examine whether or not the results obtained in this study can be sustained over time using a longitudinal method.