INTELLIGENCE BELIEFS AND TASK VALUE PREDICTION OF FORM THREE STUDENTS' ACADEMIC ACHIEVEMENT, MEDIATED BY ACADEMIC ENGAGEMENT, IN MERU COUNTY, KENYA

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DECLARATION

I declare that this research thesis is my original work and has not been presented in any other university for consideration of any certification. This research thesis has been complimented by referenced sources duly acknowledged. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited using the current APA system, and in accordance with the anti-plagiarism policies.

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This proposal has been submitted for appraisal with our approval as the university supervisors.

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DEDICATION

To my husband Dr. Shadrack Munanu, my daughter Sophie Kinya, my son Barnabas Mwenda, my late daughter Sharon Kendi (R. I. P. my lovely daughter), and my Mum Jane Kaloki, who have since shown profound support and encouragement.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

AA	Academic Achievement
AE	Academic Engagement
ANOVA	Analysis of Variance
APA	American Psychological Association
BAS	Basis for Admission Score
BD	Behavioural Disengagement
BE	Behavioral Engagement
ED	Emotional Disengagement
EDL– SR	Engagement versus Disaffection with Learning – Student Report
EE	Emotional Engagement
EVT	Expectancy-Value Theory
FIB	Fixed Intelligence Beliefs
GPA	Grade Point Average
IB	Intelligence Beliefs
IIB	Incremental Intelligence Beliefs
ISIS	Implicit Self-theories of Intelligence Scale
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
KNEC	Kenya National Examination Council
MOEST	Ministry of Education Science and Technology
NACOSTI	National Commission for Science, Technology and Innovations
OECD	Organisation for Economic Cooperation and Development
PE	Physical Education
PISA	Program for International Students Assessment
SD-GSS	Social Desirability-Gamma Short Scale
SEM	School Engagement Measure

STEM	Science, Technology, Engineering and Mathematics
TSC	Teachers Service Commission
TV	Task Value
UNESCO	United Nations Scientific and Cultural Organization
U. S.	United States

ABSTRACT

Academic achievement which is shown by the grades achieved in the examinations, is the most critical outcome of any education system. The research problem of the current study is the declining academic achievement in Meru Count, Kenya. The current study aimed at establishing, prediction of academic achievement by intelligence beliefs and task value, mediated by academic engagement. Implicit theories of intelligence and expectancy-value theories were used to understand the predictions. The research design was convergent parallel mixed methods. The sample was 813 students from 15 public secondary schools. Multistage sampling – purposive, cluster, and random sampling – were used. Collection of quantitative data was done using implicit self-theories scale, task value scale and Engagement versus Disaffection with Learning– Student Report. Qualitative data were collected using focus group interview guide. The researcher sought approval for data collection from Kenyatta University Graduate School, National Commission for Science, Technology and Innovations, and The County Director of Education office Meru County. The researcher liaised with respective principals, and the class teachers who assisted seeking consent of the students and data collection. Data were collected, coded, fed into the computer, and analyzed using SPSS version 25. Regression analysis was used to test the hypotheses. Intelligence beliefs and task value had positive statistically significant prediction on academic engagement and on academic achievement. Academic engagement strongly correlated with academic achievement. Exploratory analysis using independent sample t-test, Analysis of Variance, and post hoc analysis revealed gender differences with regard to all the study variables in favour of males. Differences among the variables by school type in favour of the national schools, the second being extra-county, while county and sub-county schools held third and last position respectively. There were age differences in all the study variables in favour of the youngest category. The study recorded strong mediational role of academic engagement in the prediction of academic achievement. The level of significance was $\alpha < .05$. The quantitative findings were presented in tables, while qualitative data were analyzed thematically. Interpretation and discussions of the results were made, followed by conclusions and recommendations. The recommendation were that all stakeholders in education should promote positive intelligence beliefs and task value in effort to increase students' academic engagement of secondary school students which would in
turn enhance their academic achievement.

CHAPTER ONE

INTRODUCTION AND CONTEXTUALIZATION OF THE STUDY

1.1 Introduction

This chapter begins with the background to the study followed by the statement of the problem, purpose of the study and objectives of the study. In addition, research questions, significance of the study and the assumptions of the study are presented. The chapter ends with the theoretical and conceptual framework, and the operational definition of terms.

1.2 The Background to the Study

The success of any education system world over is seen in the academic achievement. Lei et al. (2018) asserts that academic achievement is one of the greatest outcomes for any education system. Academic achievement measures how far the academic goals are realized and it is mainly expressed in terms of the examination grades. Examination grades are used as the indicators of the amount of learning that took place. Education stakeholders utilize these academic grades for many purposes that include placement of students into higher institutions of learning and selection of careers. Education stakeholders globally are therefore concerned if students are not meeting their academic achievement expectations. The concern is genuine because of the utility value and the importance of academic achievement world over.

Different nations of the world have shown their concern over the negative direction that academic achievement has been taking (Desilver, 2017). The United States of America (U.S.A), is one of the countries in the world whose academic achievement levels have been on downward trajectory. Desilver reported that students in U. S. A. lagged behind other developed nations in the Programme for International Students Assessment (PISA) examinations, especially among the 12^{th} graders. In addition, Barshay (2019) points out that the achievement of Science, Technology, Engineering and Mathematics (STEM) subjects among the U.S. students has remained stagnant for over a decade. Furthermore, Camera (2022) claimed that even the academic performance of as young as 9 year olds had declined greatly in Mathematics skills since 2020 putting the country at risk. Other studies reported the same concern for the declining academic achievement in India and China (Wu, 2017). In Africa, academic achievement is also a concern for many countries. A study in Nigeria also reported worrying trends of academic achievement that made even the president of the time, lament and call for serious consultations to remedy the situation (Gbollie & Keamu, 2017).

Intelligence beliefs and task value have been identified as among factors influencing academic achievement. The two psychological constructs are intra-personal motivational variables that work together to influence academic achievement. Rieche et al. (2019) noted that learners' ability beliefs significantly influence their motivation to learn. Some studies found evidence of intelligence beliefs to directly predict academic achievement (Mullensiefen et al., 2018), while others found little direct relationship between intelligence beliefs and academic achievement (Burnette et al., 2013). On the

basis of these views, there was a need to look for a mediational variable. The researcher settled on using academic engagement, which is a self-regulatory quality, to mediate the prediction of academic achievement by intelligence beliefs and task value.

Academic engagement has been cited as having a mediational role on the prediction of academic achievement by a number of intra-personal variables related to learning (Zhang et al., 2019). Naprabadi et al. (2019) said that the presence of academic engagement brings out maximum benefits of intelligence beliefs to academic achievement. Magno (2012) says that academic engagement is specifically related with students' intelligence beliefs. Froiland and Worrell (2016) equally found out that task value and especially the interest task value and student engagement enhanced learning and academic achievement among students of all levels. Furthermore, Ketonen et al., (2019) found engagement to be a relevant contributor to academic motivation and other positive outcomes of education, for example aspirations, and persistence. Academic engagement has motivational aspects and learners' behaviors that benefit learning context (Salmela-Aro et al., 2016; Lekwa et al., 2019). Engaged students are motivated to learn, their class attendance is regular and they take part in the necessary learning activities (Wang et al., 2015). Academic engagement therefore has been viewed as the filed on which positive intra-personal qualities thrive to lead to successful academic achievement.

Academic engagement refer to the effort, energy and the commitment the student is ready to give to their academic activities. It is a multidimensional construct or in other

words a meta-construct. Krause and Armitage (2016) as well as Trowler (2016) identified the behavioral, cognitive and affective dimensions in academic engagement. Recently a social engagement dimension has emerged in addition to these three (Bond & Bergdahl, 2022). The current study explored behavioural and emotional engagement dimensions. The behavioral dimension refers to positive classroom and school behavior like: completion of assignments, presence and active participation in the class activities, persistence in learning especially where there are challenges, and ultimately, school completion(Krause & Armitage, 2016; Singh et al., 2021;Trowler, 2016). Emotional academic engagement refers to being connected with both the school and the schoolwork (Alrashidi, et al., 2016; Hancock & Zubrick, 2015). Lei et al. (2018) reported that all the domains of academic engagement had strong positive correlation with academic achievement.

Academic achievement in Meru County, as reflected by the performance in the Kenya Certificate of Secondary Education (KCSE) has been on the downward trend. The number of schools appearing in the top 100 best schools KCSE in Kenya has been declining. In 2019, 2020, 2021, and 2022, the number of schools in Meru County, in the top 100 were: three, four, three, and two respectively (Teacher's Arena, April 14, 2023). This means a decline in the mean scores and probably the number of students joining the university. Only two schools appeared in the top 100 schools in the 2022 KCSE. There are studies in the past that have tried to address the situation by citing lack of parental participation in the education process of their children (Githinji, et al., 2016; Mwirichia, 2016; Mwirigi, et al., 2017; Thuba, et al., 2017), impoverished family

backgrounds (Muyalo, 2017) and administrative factors (Mwingirwa, 2016). All these factors are not part of the learner but are rather external. Hence, the current study focused on issues within the students, the intra-personal characteristics, that may have implication on students learning behaviour and ultimately on their academic achievement. Therefore, intelligence beliefs, and task value, as predictors of academic achievement, mediated by academic engagement, was the core concern of the current study.

There were three intervening variables in the current study: Gender, school type and age. There are previous studies that have reported interaction effects of gender with intelligence beliefs, task value, academic engagement and academic achievement. Mwangi et al (2017) found girls leading significantly in the scores of ability beliefs, among Kenya's high School students. Alagumalai and Buchdahl (2021) compared the data by PISA 2012, and equally found that the gender of the students was one of the factors that affected mathematics literacy.

Nalova and Etomes (2019) found that school type and age significantly correlated with achievement in mathematics and English, among pupils in private and public primary schools in Cameroon. Studies have found school type to influence students' academic achievement because of the disparities in the resources, and family economic backgrounds that go with the different school types (Abid et al 2022). The bulk of the participants of the current study were sub-county school students who hail from impoverished family backgrounds, a situation likely to influence their academic

achievement. These differences were also echoed in a study by Wu (2017), which noted that, students who rarely had breakfast before they started school in China, performed poorer in academic achievement, compared to their counterparts who had better family economic background that provided basic human needs. Granted the status of academic achievement among the secondary school students in Meru County, the current study seeks to assess the intervening role of gender, school type and age, in the prediction of academic achievement by intelligence beliefs and task value, mediated by academic engagement.

1.3 The Statement of the Problem

Low academic achievement in KCSE has consistently been reported in Meru County. The poor academic achievement in the county raised a concern among researchers, politicians and other community leaders. The same dismal academic achievement has been found even in primary schools hence the problem could be widespread. Students also portray characteristics such as truancy, absenteeism and dropout, violence and property destruction, examination malpractices, and other disruptive behaviour. These are a display of low academic engagement which ultimately influence their academic achievement negatively. Most of the above educational characteristics have been reported in Meru County.

When students do not excel in academic achievement following the above characteristics, the government, parents and other stakeholders end up losing out on their investment in education. In addition, the learners may not substantially benefit

from their secondary schooling. Those who eventually drop out of school due to low academic engagement, may miss out on progression in education and in employment opportunities in the future. They may also engage in substance abuse, or join criminal groups, hence very poor living standards. Those who may complete secondary school with poor academic grades, are likely to be ill prepared to pursue higher academic levels. Academic engagement and academic achievement therefore, have implications during and beyond high school.

Local and global studies blame the dissatisfying academic achievement on instructional materials and school structural environment (Abubakar, 2020). Sang (2018) identified family background and economic status of parents as predictors of academic achievement among secondary school students in Kericho County, Kenya. In Meru County, a research by Muyuri (2021) mentioned administrative factors as affecting academic achievement. Studies in Meru County have mainly majored on factors external to the learner. If the stakeholders invested their effort in developing the inner motivations in the learners, the dismal academic achievement in Meru County could be averted. Inner strength, otherwise inner motivations have been recognized as a major factor in sustaining lifelong learning and academic success (Woon, 2021). The students will be motivated from within, be meaningfully engaged in their learning tasks and ultimately achieve academically. Therefore, the current study aimed at establishing the intelligence beliefs and task value prediction of academic achievement, and mediational role of academic engagement in the equation, among form three students in Meru County, Kenya.

1.4 Purpose of the Study

The purpose of the current study was to find out to what extent intelligence beliefs and task value predict academic achievement mediated by academic engagement among form three students in Meru County, Kenya**.** This is important because inner motivations of students and academic engagement are major factors for students' success in education and in their future career. Academic achievement is the main goal and the measure of success, for any secondary school student, their parents, the teachers, and the government.

1.5 Objectives of the Study

There were nine objectives guiding the current study to:

i. Assess the prediction weight of intelligence beliefs on academic engagement
ii. Find out the prediction weight of task value on academic engagement.
iii. Establish the differences in the predictive weights of both intelligence beliefs and task value on academic engagement.
iv. Establish the predictive weight of intelligence beliefs on academic achievement.
v. Assess the predictive weight of task value on academic achievement.
vi. Establish the differences in the prediction weights of intelligence beliefs and task value on academic achievement.
vii. Find out the prediction weight of academic engagement on academic achievement.
viii. Establish the mediational role of academic engagement on the prediction of intelligence beliefs and task value on academic achievement.

ix. Explore the interaction effect of gender, school type and age, with the study variables.

1.6 Research Hypotheses

There were nine major hypotheses that guided data analysis in the current study. They were all aligned to the eight research objectives:

H_{a1}: There is a significant predictive weight of intelligence beliefs on academic engagement.

H_{a2}: There is a significant predictive weight of task value on academic engagement.

H_{a3}: There is a significant difference in the predictive weights of intelligence beliefs and task value on academic engagement.

H_{a4}: There is a significant predictive weight of intelligence beliefs on academic achievement.

H_{a5}: There is a significant predictive weight of task value on academic achievement.

H_{a6}: There is a significant difference in the prediction weights of intelligence beliefs and task value on academic achievement.

H_{a7}: There is a significant predictive weight of academic engagement on academic achievement.

H_{a8}: Academic engagement has a significant mediational role in the equation of intelligence beliefs and task value prediction of academic achievement

H_{a9}: There is a significant interaction effect between gender, school type and age, and all the study variables

1.7 Significance of the Current Study

The current study results may be of use to teachers, students, school counsellors, school managers and higher education institutions for describing and building some of the factors promoting academic engagement among students. The students may learn how to improve on their intelligence beliefs and task value for maximum academic engagement and ultimately success in academic achievement. The current study may help teachers and educators, in early identification of disengaged or 'at risk' students in order to facilitate targeted interventions by school managers and counselors, for greater academic engagement and academic achievement. In policy formulation and implementation, the study came up with suggestions for promoting academic engagement in order to maximize academic achievement. Higher education institutions may benefit if students nurture academic engagement at secondary school level. The study adds to the existing literature on intelligence beliefs and task value prediction of academic achievement mediated by academic engagement. The study findings also inform the applicability of the theories: Implicit Self-theories of Intelligence Beliefs and Expectancy-Value Theory (EVT) in the Kenyan context, among secondary school students.

1.8 The Limitation and Delimitation of the Study

1.8.1 The Limitations of the Study

The current study involved only 15 out of 395 public secondary schools, and 813 out of 24,304 form three students in Meru County, hence generalizability of the study findings

to populations outside the county is to be done with caution. However, sampling was done following recommendations of the required sample size for the respective population sizes. The variables of the study (intelligence beliefs, task value, and academic engagement) involve students' self-evaluation and self-reporting hence the fear of subjectivity and social desirability bias. The researcher however appealed to the participants to be honest and assured them that their answers would be confidential and anonymously handled. In addition, social desirability bias was controlled by using Social Desirability–Gamma Short Scale ([SD–GSS], Nieben, et al., 2019) to measure the honesty status of the students. The results showed very minimal correlation between social desirability scores and all the study variables, evidence that the respondents exercised high levels of honesty. There was possibility of presence of intervening variables. However, intervention of gender, school type and age were explored and the results included in the model.

1.8.2 Delimitations of the Study

Research results were based on a sample of 813 form three students from 15 public secondary schools in Meru County. The sample however, cut across all the eleven sub-counties in Meru County to ensure representativeness of the population as recommended by research experts (McCombes, 2019). Although there are more predictors of academic achievement, the study focused on intelligence beliefs and task value. Other factors influencing academic achievement for instance, learning and home environment, educational aspirations, self-regulation, social support, and perceived

competence, were left out. Only the predictive relationships between intelligence beliefs and task value, and academic achievement were considered.

1.9 Assumptions of the Study

The assumptions of the current study were that: intelligence beliefs and task value were present, and at different levels among form three students in Meru County. The researcher made the assumption that the participants would be able to self-evaluate their inner resources and give honest responses in the self-report questionnaires, and that they would accurately report their intelligence beliefs, task value, and academic engagement. It was also assumed that the teachers provided valid academic records to measure students' academic achievement. There was the assumption that there was a normal distribution of intelligence beliefs, task value, academic engagement, and academic achievement among form three students in Meru County. The study also assumed that the instruments used were valid measures of students' intelligence beliefs, task value, academic engagement and academic achievement. Furthermore, there was an assumption that the interviews would give honest opinions on the constructs under consideration.

1.10 Theoretical and Conceptual Framework

1.10.1 Theoretical Framework

The implicit self-theories of intelligence by Dweck (2000) was used to understand intelligence beliefs while Expectancy-value theory by Eccles and Wigfield (2002)

guided in the understanding of task value. None of the two theories was adequate to sufficiently explain both intelligence beliefs and task value. These two theories therefore complemented each other to help understand each of the study variables. Both intelligence beliefs and task value are part of the many intra-personal motivational beliefs meant to enhance academic engagement and ultimate academic achievement among students. These two have been considered together in the current study because of their relatedness and their commonalities as antecedents of academic engagement and of academic achievement. Scholars suggest that learners upholding incremental intelligence theories are more likely to embrace intrinsic/interest task value (Haimovitz & Dweck, 2017). This may be understood from the notion that the incremental theorists, believe, they can improve on their abilities and therefore they persist in challenging conditions, and earn every skill, with positive attitude towards their academic task. Both Intelligence beliefs and task value form a belief system that is important in facilitating learning and hence successful outcome (Woon, 2021).

1.10.1.1 Implicit Self-theories of Intelligence (Dweck, 2000). The implicit self-theories of intelligence were the work of Dweck (2000). Dweck classified students into entity theorists and incremental theorists. The entity theorists, believe that intelligence is something immutable, a predetermined quality, an inborn ability that is fixed or unchanging. On the other hand, Dweck explained Incremental theorists as people who view intelligence as a controllable quality, which can be increased and modified. Dweck used the term ‘malleable’ to describe incremental theorist view of their intelligence (Dweck, 2000). Despite the original classification, Schwinger (2021)

agreed with Dweck on a possibility of a third group of people who are neither incremental or entity theorists. They identified a 15% of the population who have mixed beliefs on how malleable their intelligence is. The same thoughts are held by Kraker-Pauw (2020) who classified intelligence beliefs into: entity, intermediate and incremental. This possibility of three composites of theories of intelligence is what brings a challenge in the attempt to classify students' in terms of their intelligence beliefs.

The current study adopted the duo classification of intelligence beliefs. Other vocabulary that have been used to refer to the theories of intelligence include: intelligence beliefs by Andreanne et al. (2015), intelligence views in the work of Bame-Aldred (2013), ability beliefs in Luo, et al. (2018), and, mindset by David (2015), Mithila et al. (2016) and Mutua, et al. (2018). The current study adapted the term intelligence beliefs. Following its exploration of learners' views on Intelligence, Implicit self-theories of intelligence fits to understand students' intelligence beliefs prediction of academic achievement.

According to Zonnefeld (2019) beliefs affect both students' thoughts and actions. The advocates of incremental beliefs show adaptive and mastery learning strategies (Luo, et al., 2014), problem-solving, self-regulatory behaviour, and deeper learning strategies (Zonnefeld 2019). Studies around the world indicate that incremental intelligence beliefs have also been linked with positive motivation, diligence, concentration, effort

and help-seeking, information search and processing, and effective decision making (Msimanga, 2014). All these are characteristics of an academic engagement.

On the contrary, the holders of entity intelligence beliefs, show such characteristics as: pessimism, and procrastination, self-handicapping, helplessness tendencies, and other negative learning attitudes, especially when faced with challenges during their academic pursuit (Wawire, 2010) and task disengagement (Vivienne et al., 2022). When they encounter stress, they are known to display poorer coping strategies than their counterparts, and they give up even on facing little hardships (Woon, 2021). Woon says that entity theorists make negative sweeping generalizations about their own ability, and are therefore unwilling to expend effort and energy in their academic tasks, hence they practice less prior to their tests administration, ending up with poor scores. Tao et al. (2021) and Wang et al. (2021) argue that entity theorists believe that ability is indicated by achievement and therefore when they encounter failure in their academic tasks, they may attribute it to inability rather than to lack of effort. This is very likely to impact negatively on their academic engagement and academic achievement. Studies have confirmed these relationship of variables even in Kenya (Mutua et al., 2018). Since self-theories of intelligence influence the academic engagement of students and eventually the academic achievement, then, this theory was deemed relevant to guide in understanding intelligence beliefs prediction of academic achievement, with the mediation of academic engagement, among form three students.

Concerning gender, Dweck (1999) said that girls are more likely to develop entity theories, while boys are more likely to develop incremental intelligence beliefs because of the praises they receive from their parents and other significant adults for following the right processes. Diseth et al., (2014) also said that girls endorsed entity theories of intelligence. Some other studies however, found girls reporting higher scores than boys in intelligence beliefs (Mutua, 2018; Mwangi et al., 2018; Rudig, 2014). Kracker-Pauw also addresses how implicit theories of intelligence relate to gender. They reported that more girls embraced entity and intermediate theories as compared to boys who majorly advanced incremental theories. Interesting results from a meta-analytic study showed no evidence of moderation of the gender on the correlation between implicit theories and academic achievement (Costa & Faria, 2018; Matheson, 2013).

1.10.1.2 Expectancy-Value Theory (Eccles & Wigfield, 2002)

Expectancy–value theory was authored by Eccles Jacquelynne (Eccles & Wigfield, 2002). Expectancy-value theory (EVT) argues that behavior that is related to achievement is linked to the expectations to succeed and the inherent value people attach to the task. Students often choose the behavior they expect to bring success and the behaviour that add value to them. Task value has been defined as the reasons that the students give for their engagement in any academic task (Eccles & Wigfield, 2002; Naushhen et al., 2019). Eccles posited that expectation to succeed interact with task values to act as predictors of important academic outcomes like sustainable learning interest, choice of tasks and task engagement, persistence in demanding learning situations, effort, and finally achievement in the academic tasks. Task value is a

motivational belief that influences how students learn and ultimately their academic achievement (Nausheen eta al., 2019).

Eccles and Wigfield came up with four task value: Utility task value, describing the perceived usefulness of that task for meeting the current and the future goals; attainment task value, describing the relevance of that task for personal worth, self-image and self-identity; interest/intrinsic task value, referring to enjoyment of the task; and cost task value, with reference to the effort needed to do it, the negative consequences, and the opportunities one needs to forgo for getting engaged with the task. All these facets of task value motivate students in their learning tasks in different intensities but none of them works in strict isolation.

Expectancy-Value Theory (EVT) was used to study factors influencing motivation to finish high school and join college, in Southern United States of America. EVT proved useful in explaining general academic motivation and effort in young people (Ball, et al., 2016). According to Eccles, et al. (2004), the choices of learning behaviour that students make and what they achieve academically are influenced directly by whether they expect to succeed and the subjective task value they attach to the task. They say that task value predicts the time the students are willing to spend in learning activities, the decisions to enroll, and the goals which they set in their education. All these are critical predictors of academic achievement. The current study therefore focuses on task value prediction of academic achievement.

Eccles et al. (1999) noted that gender differences in subjective task value were mostly domain specific. These gender differences in task value were also subject specific. In their study, Eccles et al. (1999) recorded that the boys had more positive task value in sports while the girls had more positive task value in reading and music. Guo et al. (2018) in a later research among university students, reported that men valued math-intensive subjects like mathematics, physics and engineering, while females valued humanities, languages, health and medical sciences. This choice of the subjects has been attributed by various scholars to gender role stereotyped socialization where women are associated with artistic subjects and that women prefer working with and around people as those subjects suggest (Eccles & Wang, 2016). Studies also show that females favored extrinsic motivation while males favoured attainment task value, where attainment value is associated with the desire to become important and famous (Nausheen et al., 2019). In the current study gender is looked at as an intervening variable.

The expectancy-value theory has its challenges in trying to use it. The cost task value has not featured well in literature (Wigfied & Eccles, 2020). A number of researchers have instead commonly used the first three – interest, utility and attainment task values – as the composites of task value (Dietrich et al., 2019; Part et al., 2020). Some researchers have argued that cost task value has distinct features and should stand on it's own (Barron & Hullenman 2015; Jiang et al., 2018). Perez et al. (2014) found the three (utility, interest and attainment) similar and collapsed them to one, and looked at cost task value as the negative consequences of engaging in a task. Barron &

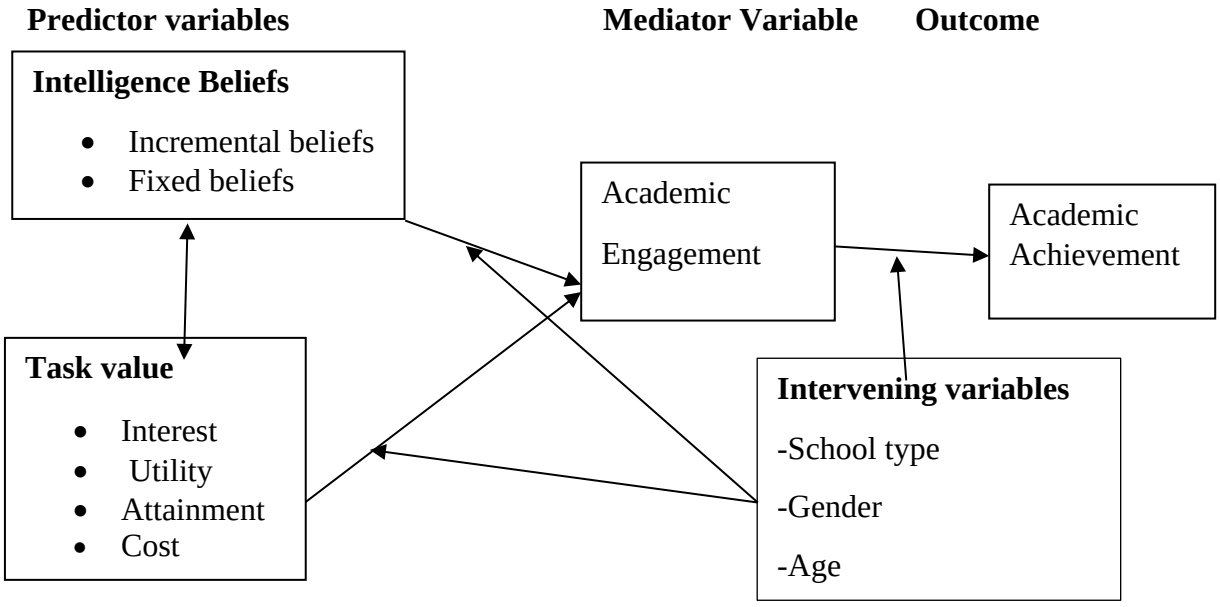
Hullenman (2015) even suggested that expectancy –value theory (EVT) need be updated to be expectancy-value-cost-theory (EVCT) so that cost can stand out on its own. The researcher therefore finds challenges aligning the literature depending on the direction taken by the researchers in that area. The current study considered task value as having four dimensions: utility, interest, attainment and cost, as originally suggested by Eccles and Wigfield (2002).

1.10.2 The Conceptual Framework

The following is the conceptual framework showing the anticipated predictions paths. It shows the predictor, mediator, intervening, and the outcome variables of the study.

Figure 1.1

Conceptual Framework



Note: ⟶ Hypothesized direction of relationship ⟷ Interactions

Figure 1.1 indicate that the predictor variables were: intelligence beliefs and task value, and the outcome variables was academic achievement. Intelligence beliefs were indicated by the scores in the implicit theories of intelligence scale. Academic engagement acted as the mediator variable and was informed by the scores in the 33-item Engagement versus Disaffection with Learning–Student Report (EDL-SR). There were three intervening variables namely: school type, gender, and age. These were indicated by the respondents in the first session of Students' questionnaire. Intelligence beliefs have two levels: Incremental beliefs held by learners who take intelligence as changeable, and fixed beliefs held by learners who take intelligence as a stable and unchangeable quality. Task value has four sub-components: interest, utility, attainment, and cost task value.

1.11 Operational Definition of Terms

Academic Achievement: This is the mean score of the end of term two examinations in year 2021.

Academic engagement: This is the learner's level of commitment and participation in their learning seen in the energy with which they do their homework, attend lessons, ask for help, set appropriate goals, and persistence (Abid, & Akhtar, 2020; Lekwa, et al., 2019)). It is informed from scores in the 33-item Engagement versus Disaffection with Learning–Student Report (EDL-SR).

Attainment task value: This is the value a task has in enhancing self-identity and self-worth. It was a subscale (8 items) in the 25-item Task Value Scale

Behavioural academic engagement: This is the learner's participation and involvement in classroom activities (Abid & Akhtar, 2020). It was measured using 17 items subscale within the 33-Item Engagement versus Disaffection with Learning – Students Report ([EDL–SR])

County Schools: These are the schools that admit students wholly from within the county

Cost task value: This is the effort to forgo something else in order to undertake the academic task. It was measured using a 3-item subscale within the 33 – item Task Value scale

Emotional academic engagement: This the learners flow with the academic task in terms of enjoying, moving along with teachers and other students and experiencing belongingness to the school and the class (Abid, & Akhtar, 2020).

It was measured using 19–Item subscale, with the 33-Item Engagement versus Disaffection with Learning – Students Report ([EDL–SR])

Extra-county schools: The formerly called provincial secondary Schools. They admit 40% of their students from outside the county where the school is situated

Incremental intelligence beliefs: These are beliefs that intelligence is modifiable and increasable. That it is a quality one can change. It was measured using four items within the 8–item Implicit Self-theories of Intelligence Scale (ISIS)

Intelligence beliefs: This is a learner's beliefs on the nature of intelligence. That is, the fixedness or the modifiability of intelligence. Intelligence beliefs were measured using the 8–item Implicit Self-theories of Intelligence Scale (ISIS)

Interest task value: This is the task value that arises from enjoying participating in the task. Pleasure and fun is derived from the activity itself. It is also called intrinsic task value (Eccles et al. 1999) It is one of the domains in task value scale. It was measured using a 7-item subscale within the 33–item Task Value scale

Fixed intelligence beliefs: These are beliefs that intelligence is a relatively stable and an unchanging entity. Fixed intelligence beliefs were measured using four items in the 8–item Implicit Self-theories of Intelligence Scale (ISIS)

Gender: Being either a girl or a boy participant. There was a space to fill the gender in the questionnaire

National school: The schools that draw their students from all over the country following a quota system. The participants chose their school type by ticking against their type.

School type: These are categories of the public secondary schools as designated by the Ministry of Education Science and Technology (MOEST).

Social desirability: This is a bias where the respondents respond in a way that will make them look good thus concealing their true self-report. In the current study social desirability was measured using 6-item Social Desirability – Gamma Short Scale [(SD-GSS), Niebel, et al. 2019)]

Sub-county schools: These are the schools generally called the day schools or CDF assisted schools. Students attend classes during the day and sleep at their homes. The primary schools surrounding it are their catchment areas

Task value: This is the reason that a student has for actively engaging in an academic task. It is the incentive for engagement in the academic activities (Eccles et al. 1999). It was informed by the scores of the 25-item five-point Likert task value scale in Appendix I section (iii). The highest score was 125 points. A score of 63 points and above meant high task value while 62 and below denoted low task value.

Utility task value: It refers to how a task relates to the future goals. This is the ability of a task to assist in obtaining both short term and/or long- term life goals e.g. Career, material and examination grades (Eccles et al. 1999). It is one of the domains in task value scale. It was measured using a 8-item subscale within the 33–item Task Value scale.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter entails an assessment of literature related to the study. The subheadings are: intelligence beliefs as a predictor of academic engagement, task value as a predictor of academic engagement, intelligence beliefs as a predictor of academic achievement, task value as a predictor of academic achievement, prediction of academic engagement on academic achievement, and finally, the summary of related literature review and gaps identification.

2.2 Intelligence Beliefs as a Predictor of Academic Engagement

Zhen et al. (2020) carried out a study with an aim of examining how implicit theories of intelligence and academic self-efficacy related to the developmental trajectories of different domains of emotional, cognitive, and behavioural engagement among Chinese elementary school learners. The sample was three groups of elementary students recruited in three school terms: 532 in term 1, 450 in term 2, and 415 in term 3. Multiple-process growth mixture model Trajectories was used to analyze academic engagement. Analysis of variance (ANOVA) was used to compare groups' in terms of theories of intelligence, academic self-efficacy and academic engagement. The students were categorized into four engagement categories namely: persistent (71.24%), climbing (6.01%), descending (16.54%), and struggling engagement (6.20%) groups. The levels of the implicit theories of intelligence showed reverse trend over the time.

That is, as implicit theories of intelligence declined, so did the academic engagement. The struggling engagement group had the lowest scores in implicit theories of intelligence. The conclusion was that academic engagement trajectories went along with the implicit theories of intelligence. This is a clear indication of the relationship between the theories of intelligence and students' academic engagement.

Woon (2021) carried out a study to find out the relationship between implicit theories of intelligence and achievement goals, as an attempt to understand achievement in mathematics. The sample consisted of 1201 (596 male, 580 females) students, aged 13 – 17 years, in lower progress streams, in 17 public secondary schools in Singapore. Singapore practices ability streaming in their education systems (Wang, 2017). Incremental mindset predicted mastery–approach goals and achievement in Mathematics. Mastery approach is a characteristic of academically engaged students. On the other hand entity mindset predicted performance–approach and performance avoidance goals. Performance approach goals are usually embraced by learners with low academic engagement. There was need to carry out a study relating implicit theories of intelligence with learning behaviour, to find out the results in an African setting. This is because there is a cultural factor in how learners learn due to differences in the socialization processes.

Hong et al. (2021) studied the relationship between theories of intelligence and Spatial intelligence ability and graphical creativity performance among first year students in a Technical high school in Taipei City. They administered questionnaires to 308

participants, though only 273 (217 females and 56 males) questionnaires that were properly filled and analyzed. Dweck intelligence views scale (Dweck et al., 1995) was used. The results showed that incremental beliefs of intelligence positively predicted spatial intelligence and graphical creativity. Entity beliefs negatively predicted spatial creativity. Though the study did not directly relate intelligence beliefs and academic engagement, spatial and graphical creativity are skills that require a lot of engagement and can be used to insinuate an academically engaged students. Spatial, being an art subject, learning may have its own motivating factor to students. The current study comes in to study intelligence beliefs' prediction of academic engagement in a regular school situation.

Zhao and Li (2016) studied the relationship of implicit theories of intelligence and perceived enjoyment in Physical Education (PE) in three high schools in Southern China. The sample was 252 (122 boys and 130 girls) grade 12 students of ages 16–18 years. Participants' ability theories were assessed using Implicit Theories of Ability in Sports' while their perceived enjoyment in PE was tested using a 4-item scale. The correlational analysis indicated positive correlation between incremental theories of intelligence and perceived enjoyment in PE which for the purpose of the current study is equated to academic task engagement. There is need to test whether intelligence beliefs would lead to the same effects on academic tasks and in an African set up. Cocodia (2014) says the implicit theories of intelligence that people hold, may vary from one culture to another, and that the African notion of intelligence may differ from that of the Western countries.

Luo et al. (2014) studied a sample of 273 (99 boys and 174 girls), 8th grade secondary school students of average age 14.39 years, from a large school in Singapore to examine the relationship between how incremental beliefs of mathematics ability and achievement emotions, classroom engagement, and mathematics achievement. The researchers used an online survey using 3-item 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*), by Dweck (2000). Incremental intelligence beliefs correlated with: achievement emotions, classroom engagement, mathematics achievement, classroom attention, mathematics enjoyment, and mathematics pride, and negatively with: mathematics boredom, mathematics anxiety, and classroom disruption. This study measured only incremental beliefs of mathematics ability. The current study considered both the incremental and fixed intelligence beliefs in relation to academic engagement because both are reported to have relationships with learning habits (Dweck, 2006).

A study done by Cabello and Fernandez-Berrocal (2015), investigated the correlation of implicit theories of intelligence and emotional intelligence in Spain. The sample was 688 adults aged 18-73 years, recruited through posters placed in a local university campus, retirement homes and the local newspapers. Path analysis reported that incremental theorists used effective strategies such as cognitive re-appraisal and mastery-oriented strategies, experienced fewer negative emotions compared to the fixed theorists. Cabello and Fernadez-Berrocal‘s sample had a very wide age range. The current study targets only form three students, whose age range is relatively smaller, to find out how their intelligence beliefs would correlate with their engagement style.

Cabello and Fernadez-Berrocal‘s sample was not random because only those whom the posters attracted joined the study hence their high motivation might also have affected their responses.

Bame-Aldred (2013) conducted a quasi-experiment to find out how implicit theories of intelligence influenced the time spent, effort and decision accuracy on a professional task of 81 working accounting and auditing students across six universities, all in the United States. The participants performed a series of three accounting tasks: an easy task, a difficult and another easy task. They had access to seven different resource documents to assist with the tasks. Software–Spector Pro v. 6.0 – recorded time, and the strokes on the resource materials to indicate the effort and task engagement. Bame-Aldred established that implicit intelligence beliefs of the participants had no effect on the amount of time, effort and decision accuracy in the first easy task. Fixed intelligence beliefs holders scored higher than incremental intelligence beliefs holders, in effort, in time, and in decision accuracy in the difficult task. This was interpreted as high task engagement.

In Bame-Aldred’s study, incremental intelligence beliefs holders contradicted the hypothesized direction implicit self-theories of intelligence that fixed intelligence beliefs persons should score low in effort, accuracy in decision making, and the time spent on the task. Msimanga (2014) argued that, fixed beliefs persons may also be as endowed as incremental intelligence beliefs people and when they practice and have positive attitude, they can up their intelligence and their task engagement. Diseth, et al

(2014) also argued that older individuals tend to embrace fixed intelligence beliefs but still score higher task engagement. This was probably another reason for the contradicting results by Bame-Aldred (2013). May be the role of fixed intelligence beliefs of the working students, was mitigated by their expertise in the job-related tasks assigned to them. Quasi experiments are in short in randomly assigning the participants, leading to testing of unequivalent groups. This is a major cause of limited generalizability and limitations in making conclusions of the relationship between study variables.

2.3 Task Value as a predictor of Academic Engagement

Taura et al. (2015), did a study on how task value, related with active procrastination. The sample consisted 426 (males=223, females=203) pre-service teachers, aged 19-33 years, and drawn from three colleges of education, all in North-western Nigeria. Multi-stage cluster sampling was used. Task value was measured using 4-point Likert Motivated Strategies for Learning Questionnaire (MSLQ) scale. Path analysis results revealed negative correlation between active procrastination and task value. Active procrastination is a strong indicator of academic disengagement. The subjects were college students, older compared to the respondents of this study; who were form three students; in their middle adolescence, as described by the MOEST (2014).

A study by Lawanto et al. (2014), assessed how self-regulated learning, task value, and grades in an online undergraduate engineering class, from a large university in Western United States, related with their performance in their projects. The sample comprised of

80 participants, but only 57 (54 males and 3 females) returned completed questionnaires. Multiple linear regression and Spearman correlation tests revealed that task value predicted self-regulated learning, performance, task strategies, goal setting, self-evaluation and help seeking. This could be in line with Organization for Economic Co-operation and Development ([OECD], 2015) claims that students' engagement is higher in online studies because apart from the core studies, they also use information technology for entertainment. Balog and Pribeanu (2010) also noted that using computer is perceived as enjoyable in its own right. This might explain the positive correlation, hence need to test relationship of academic engagement with task value, of secondary school students in a regular physical class. The sample was small and had gender bias (against females) hence narrowing generalizability of the results. In the current study the researcher drew the sample from the four school types and it was gender balanced.

Stiwat and David (2012), carried out a case study on correlation between students' feelings and their thoughts about their studies, and their relation to their motivation and engagement. A sample of 24 (11 girls; 13 boys) grades five and six learners (equivalent of standard five and six in Kenyan education system) aged 11-13 years was purposively selected from a suburban co-educational state primary school in Melbourne Australia. Quantitative data were collected through questionnaires, and the qualitative data were collected using focus group discussion. The results revealed that intrinsic motivation correlated with ability to work with peers, desire for more learning activities and value for homework which are indicators of academic engagement. The extrinsically

motivated students reported leaving out difficult and uninteresting learning tasks, and viewed class work and homework only as a gateway to good grades, earning a praise from their tutors and for getting a good job. This is a sign of low academic engagement. The sample was small and from a single primary school hence limiting generalizability of the results. The current study sampled from varied school types. Although Stiwat and David's used questionnaires on primary school pupils, it may be questionable whether such learners have the ability to self-evaluate and therefore a risk to the validity of the results. Mellor and Moore (2013) said that children may face challenges assessing where they really are in the continuum of the scale hence make it hard to accurately assess their judgment through a paper-and-pencil questionnaire. The form three students in the current study have had more contact with academic tasks and can self-evaluate better.

2.4 Intelligence Beliefs as Predictor of Academic Achievement

Sun et al (2021) tested whether intelligence views of the Chinese and the U.S. middle-school students' were associated with their performance in mathematics. Their sample was Chinese ($n = 11,979$) and U. S ($n = 4,663$). Regression analysis results indicated that Chinese students significantly held more of fixed intelligence views than the U.S. students just as it was predicted. The country of origin and the students' mindset significantly predicted mathematics scores. This meant that the association between mindset and mathematics achievements was differently across the two countries. This was in consistent with an earlier study by Costa and Faria (2018) which noted the moderations of the influence of academic mindsets among people of different cultures.

This made it more necessary to test the influence of Intelligence beliefs among Kenayan high school students.

For the Chinese students, those who held fixed mindsets scored higher in mathematics than those who had relatively more growth mindsets. Among the U.S. students, those who held fixed mindsets had lower mathematics scores than those who had relatively more growth mindsets altogether, as expected. U.S. students' mathematics performance was tightly associated with how they reasoned about intelligence, such that students performed better in mathematics if they endorsed a more malleable view of intelligence. These results contradict the hypothesized influence of implicit intelligence theories. The cultural background intervened in the results. The fact that culture had influence in the relationship between academic mindset and performance in mathematics is the reason for the current study. The current study tested the prediction of academic achievement among high school students in a Kenyan situation.

A study by Mutua et al. (2018) assessed prediction of academic mindset and learning strategies on academic achievement among form three students in Nairobi County, Kenya. The sample consisted 488 (245 males and 243 females), of ages 15-23, from across Nairobi County. A questionnaire was used to collect quantitative data while interview schedule collected qualitative data. The results were that, fixed academic mindset (same as fixed intelligence beliefs) had negative correlation with academic achievement, while malleable academic mindset (same as incremental intelligence beliefs) had positive correlation with academic achievement

Costa and Faria (2018) did a meta-analytic review of 46 studies on relationship of implicit theories of intelligence with academic achievement. The sample of the students involved consisted 412,022. The results indicated more of positive correlation between incremental theories of intelligence and grades in overall achievement. However, some disparities arose with some of the results. The students of Asian and Oceanic countries origin, in the Eastern continents, reported that incremental beliefs predicted academic achievement while the European participants reported positive correlation between entity beliefs and achievement. North America showed negative association between entity views of intelligence with academic achievement. The results of the meta-analysis showed differences in the influence of implicit theories of intelligence among different cultures of the world. The moderation effects of cultural background was very clear just like in the study by Sun et al. (2021). The current study came in to assess the prediction of intelligence beliefs on academic achievement among Kenyan secondary school students, a different culture altogether.

2.5 Task Value as Predictor of Academic Achievement

Kuramsal (2021) carried out a cross-sectional survey study among 8th grade students from public schools in Kahramanmaraş City, in Turkey. Their sample consisted of 342 (Male=193, Female=149) students, ranging from 13 –14 years, with a mean age of 13.5 years. Kuramsal aimed at investigating the effects of academic amotivation on academic achievement among middle school learners. The correlation between effort beliefs and academic achievement was significantly negative. Amotivation is reduction of motivation to persist in a goal-directed behavior. There was significant negative

correlation between academic amotivation and academic achievement. This suggest that when motivation reduces, then academic achievement reduces. Student's t-test analysis also showed significant gender differences in academic achievement. The study was testing indirectly, whether motivation; equivalent to task value in the current study; affected academic achievement. The current study assessed the prediction of academic achievement by task value.

Oyuga et al (2019) conducted a quantitative –qualitative survey among orphaned students in Bondo District. Their sample was 300 secondary school orphans and 35 head-teachers. The respondents filled a 5–point Likert scale questionnaire. Document analysis was also done for academic performance. Pearson product moment correlation coefficient reported a weak significant positive correlation between task value and academic performance and especially the importance dimension. Ryan and Deci (2017) reported a strong correlation between motivation and wellness. Could these responses be due to the status of these children, who were orphans, be experiencing demotivation hence wellness did not make sense to them? Investigation needed to be done targeting all students without the tag of being orphans hence the current study came in.

Fernando et al. (2017) studied Spanish secondary school students to find out the whether expectancy-value beliefs mediated relationship of Self-Efficacy, satisfaction, and academic achievement. Their sample was 797 (males=404, females=393) aged 12-17 years and 23 teachers (males=11, females=12) of average age of 31 years. Expectancy-value beliefs had significant and direct positive effect on students'

satisfaction and their academic achievement. The findings showed that all the task value components (utility, importance, interest and cost) positively predicted academic achievement. Guo et al. (2015) also found out that mathematics' utility, importance and interest value significantly explained students' academic achievement. Guo et al argued that when students value their task, they make the right choice, make effort and persist in doing it even under challenging situations, ultimately resulting in success.

Safavian and Conley (2016) did a study on expectancy-value beliefs as predictors of mathematics achievement and enrollment, among Hispanic and Non-Hispanic youths. The sample consisted 926 (females=472, Males=454) seventh grade students, enrolled in pre-algebra classes in three urban middle schools in Southern California. Most of the population was from outside America and therefore the end of course examination was supposed to measure whether the students had attained the state-adopted mathematics standards. The survey questionnaire was administered to the students by research assistants who were trained for the task, in their regular classrooms. The end of course results were taken. Hierarchical multiple regressions confirmed utility task value positively predicted achievement in mathematics.

Lawanto et al. (2016) investigated relationship between self-regulated learning skills, task value, and project performance in a web-intensive undergraduate course. Data was collected from 80 participants, although only 57 (females=3, males=54) returned completed questionnaires, usable for the analysis. The Study participants were mechanical engineering students in a large university in western United States.

Participation was voluntary and prior to participation, the students completed a letter of consent. A multiple linear regression test was used and the findings revealed that students' task value in a web-intensive engineering course significantly predicted students' project performance. Students who value the tasks within a course are more motivated and engaged, thus increasing their ability to master the tasks. May be the students in a web-intensive course are not solely focused on getting a grade and completing the curriculum, but also enjoy the moments in the computer.

2.6 Academic Engagement Prediction of Academic Achievement

Iris et al. (2021) carried out a study among primary school children in northern Spain. Their sample consisted of 717 students. The objective was to determine how cognitive, emotional and behavioral engagement dimensions, together, and separately related with academic achievement and the self-regulation of learning. Most students in the study came from moderate socio-economic backgrounds. School engagement measure (SEM), Spanish version was used to collect data. Management of the environment and information, and help-seeking behaviour, all of which are indicators of behavioural academic engagement, had significant positive correlation with performance in both Spanish mathematics, and significant negative correlation with maladaptive regulatory behavior. The study population resembled the population of the current study in socio economic status. The current study however uses Skinner's (2009) engagement versus disaffection with learning-students report scale, which has only emotional and behavioral domains of academic engagement.

Velez (2016) carried out a study using the descriptive-correlational research design to study students' engagement prediction of academic performance. The participants were randomly selected, to get 155 second year students. Standardized and reliable questionnaire (α = .71) were used to collect data on students' school engagement. Cumulative Grade Point Average (GPA) for two earlier years were used for students' academic performance. Data was analyzed using descriptive statistics and the null hypotheses were tested using multiple linear regression analysis. The findings supported the hypothesis that students' engagement and especially behavioral engagement influences academic performance. Chisace et al. (2017) also exclaimed that lower grades in academic achievement is obvious for disengaged students. Chisace et al. also noted the importance of engagement in co-curricular activities, in boosting students' academic performance.

Carmel and Yossi (2016) did a study on the correlation between students' disruptive behavior as reported by their classmates, and their academic achievement in their native languages. The sample consisted of 2,422 students from 181 classrooms of 61 Jewish schools. Students filled a self-report with a 5-point Likert scale questionnaire measuring students' engagement. Students test scores in: reading comprehension, writing, and grammar of Hebrew language were recorded. Classrooms that had less than three students were not considered for sampling. The final sample size was 2,346 students from 145 classes in 52 schools. Multivariate analysis reported significant negative correlation between students' disruptive behavior as reported by their classmates' and their test scores in Hebrew language after controlling for all the other classroom and

students' factors. These results agree with Kinsler's findings that disruptions hinder the learning process, leading to poor academic performance (Kinsler, 2013).

2.7 Interaction effect of gender, school type and age with the study variables

Kracker-pauw et al. (2022) carried out a study to find out Students' beliefs about the nature of intelligence (mindset). The sample consisted of 492 second-year students from 10 secondary schools doing preparatory vocational secondary education. Their ages ranged from 13 to 15 years (M = 13.77, SD = 0.66); 53.7% of them were boys (n = 264) while 46.3% were girls (n = 228). Data was collected using Theory of Intelligence (TOI) questionnaire by Dweck (2000) which contained three "entity" statements. The items were scored along a 6-point Likert scale 1 = *strongly agree* to 6 = *strongly disagree*. The results were categorized into three levels: entity, intermediate, or incremental. Focus groups interviews were also used for qualitative data to enhance the results validity. The results showed interaction effect of gender on theories of intelligence of students. More girls than boys embraced entity and intermediate intelligence theories. Kracker-Pauw's results agreed with those of Ayoub et al. (2022), who found gender differences in implicit theories of intelligence among gifted fifth and sixth grades students, in favour of the boys.

Amir et al. (2014) did a cross-sectional study to establish the impact of age and gender on students' engagement. The sample consisted of 836 students from three different ages 12 years (in year 6), 14 years (form 2) and 16 years (form 4). Students' engagement inventory was used to measure three dimensions of students' engagement: affective, behavioural and cognitive. Multiple analysis of variance (MANOVA) was

used for data analysis. The results were that those aged 12 years had a higher mean of affective engagement compared to those of 14 and 16 year olds respectively. The same were the scenario for cognitive engagement. It might be that as the students grow older, school tasks become less interesting hence lower engagement. However, the boys became less engaged faster than girls as they grew older. Females recorded higher engagement compared to their male counterparts of all ages.

Cansız, et al. (2019) studied the impact of school type on academic achievement of high school students' in Turkey. Students' achievement was defined in terms of the overall measure of the Basis for Admission Score (BAS). The whole population of 3,752,374 high school students, covering the period of 2014-2016 was studied. The average of the BAS scores for the private schools was 424.20 and that of public school students, was 287.85. The public school students had scored far much lower than the private secondary school students. Some of the explanations the researchers gave for the disparity in the academic achievement of those students were their family backgrounds in terms of education of parents, socio-economic status and the number of siblings in the family. We see the same disparities in our schools today where the so called day secondary schools, draw their students mostly from impoverished backgrounds. They are the majority of students.

2.8 Summary of Related Literature Review and Gaps Identification

One major research gap in the reviewed literature was cultural differences. Most studies reviewed were done outside Africa (Europe, Asia, United States, china and Australia)

with only one in Nigeria and two in Kenya. Chen and Wong (2014), argue that some societies are usually more competitive and motivating than others and push their students to positive intelligence theories, task value, and academic engagement, and consequently positive academic achievement. A person's upbringing, which is embedded in their culture, profoundly affects how students see, approach, process information, interpret their intelligence and their approach to learning (Cocodoa, 2014; Lyken-Segosebe, 2017; Lynch, 2016). Culture influences the energy the students invest in their studies (Costa and Faria, 2018). Carrying out a study on intelligence beliefs and task value as predictors of academic achievement with mediation of academic engagement, was therefore necessary, in order to test these variable in an African setting specifically in Kenya.

Implicit theories of intelligence, are sensitive to culture (Dweck and Leggett, 1988). Moreover, the reviewed literature showed that African and Asian respondents majored on the social dimension of intelligence and especially the matters that enhanced relationships within the group. On the other hand, the Western people, valued individualistic academic performances and excellence, and valued the process of learning hence intelligence beliefs positively predicted both academic engagement and academic achievement (costa & Faria, 2018). This argument presented possible differences on the development of intelligence beliefs and how those beliefs influence learning and academic achievement of students across cultures. Thus, exploring intelligence beliefs prediction of academic achievement among Kenyan secondary school students was necessary.

Most studies were done among university students, a few in primary schools, and a few among high school students. Two of the studies done in the universities contradicted the hypothesis assumed by implicit self-theories of intelligence, drawing attention to the implication of age and work experience, on the prediction of intelligence beliefs on academic achievement. Some samples were small raising the issue of generalizability. Lyken-Segosebe (2017) also noted that student engagement or disengagement styles are both student driven and institution driven. Therefore, the type of the institutions where the studies were done matters. In some of the academic engagement studies, respondents scored higher in the behavioural dimension of engagement while in others they scored higher in the affective domain.

Literature review in the interaction effects of school type, gender, and age with the study variables, some findings followed different directions. Some reported males as being more academically engaged than females while others reported the females scoring higher in engagement. In most studies the boys embraced incremental intelligence beliefs while girls embraced entity intelligence beliefs and the results were vice versa in others.

With these gaps in place therefore, the current study examined the intelligence beliefs and task value prediction of academic achievement, with mediation of academic engagement, among form three students in Meru County Kenya.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Chapter three entails the research design, research methodology and variables of the study. This is followed by the locale of the study, the target population, the sampling techniques, and the sample size. In addition, the research instruments, the pilot study, the data collection methods, and data analyses are also discussed. The chapter ends with logistical and ethical considerations.

3.2 Research Design

Convergent parallel mixed methods research design by Creswell (2014) was used. This design is focused on gathering both the quantitative and the qualitative data, at a single phase, analyzing the data separately, and then comparing the results side by side. The results of qualitative data were useful in confirming or disconfirming the findings of quantitative data. Quantitative data were collected through paper and pencil questionnaire, while qualitative data were collected using guided focus group interview. The purpose of using this design was the assumption that using both quantitative and qualitative methods, provides a more complete understanding of the research problem (Almalki, 2016; Creswell, 2014).

3.3 Research Methodology

Both quantitative and qualitative data collection methods were applied. Mcleod (2017) says that quantitative methods is critical establishment of general laws of relationships among variables. Almalki (2016) supported use of qualitative methods to help enhance, confirm, and clarify probable inconsistencies and contradictions that may have arisen with the quantitative method. Therefore, combination of both quantitative and qualitative methods was advantageous to the study. Quantitative data were collected through self-report questionnaires while qualitative data was collected using guided focus group interview. The quantitative data was analyzed statistically by use of SPSS Version 25, while the qualitative data was analyzed following the study themes. Inferential statistics tests were applied to test the hypotheses. Generalizations were made following the results of the statistical tests. The transcriptions from the guided focus group interview were analyzed under several themes and presented thematically in line with the study objectives. Discussions, generalizations, and recommendations were made.

3.4 Variables of the Study

There were two predictor variables. Intelligence beliefs with two levels namely: incremental and fixed intelligence beliefs, which was indicated by the scores from the 8–items implicit theories of intelligence scale by Dweck (2000). Task value, was the second predictor variable, with four levels namely: interest, utility, cost and attainment. They were derived from the 25–items task value scale by Matthew and Nicholas' (2014). The two predictor variables are inner resources affecting students' academic

engagement and ultimately academic achievement. Academic engagement was used as the mediator variable in the prediction of intelligence beliefs and task value on academic achievement. Academic engagement was measured using the scale: Engagement versus Disaffection with Learning–Student Report ([EDL–SR], Skinner, et al., 2009) with 33–item scale. Academic achievement was derived from academic achievement Proforma filled by the respective class teachers in the sampled schools. All the variables in the study were measured at the interval level of measurements.

3.5 The Location of the Study

The study was done in Meru County, Kenya. Academic achievement in Meru County has been dismal long enough to raise concern. For example, the county became number 46 out of 47 counties in 2017 KCSE (Mutethia, 2018). In 2019, only a few qualified to join university degree programs after doing their KCSE (Dibondo, 2020). There are several other characteristics of the secondary school students in Meru, which denote some degree of absence of, or low academic engagement. Strikes and destruction of property, examination malpractices, absenteeism and ultimate school dropout (Mwingirwa, 2016), have been reported. Reviewed literature indicates that these are characteristics of low academic engagement (Abid & Akhtar, 2020). The Government of Meru County (2018) reported that only 45% of children ages 14-17 were in school. This implies that a whole 55% missed out on schooling due to high rates of school dropout. Absenteeism and ultimate drop out from school is a major indicator of academic disengagement, the opposite of the very needed academic engagement. In 2016, the media headlines showed unrest in various secondary schools in the country,

and the bulk of which was in Meru County (Manyara, 2016, July 18). The same phenomenon was repeated in 2018. Kenya Digital News (July 12, 2018) reported that 35 schools in Kenya that school term, the bulk of which was in Meru County, had experienced unrest and students destroyed school property, just to get an opportunity to leave school.

3.6 Target Population

The researcher targeted all form three students in 395 public secondary schools in Meru County. Form three students were preferable for the current study for they have been in secondary school for almost three years, and had made their subject selection for their form four examination. According to Mutweleli (2014), form three students have already a defined direction, and, the nearness to the examination is expected to make them get more serious with their studies. Form three students have experience with learning tasks. They must be thinking about their academic achievement. Ireri (2015) describes students who have been in school for at least three years as having attained definite academic status which is a self-evaluative aspect of identity. Intelligence beliefs have a developmental aspect. They develop early in age, as early as kindergarten (Champagne, 2015), and heighten during adolescence (Blackwell et al., 2007). Most form three students are adolescents and hence at their height of implicit theories of intelligence display. Form three students are assumed to have already attained particular learning habits and strategies. This implies a lot to their academic engagement and ultimately their academic achievement. Such students therefore, can self-evaluate their intelligence beliefs, task value, engagement and achievement.

3.7 Sampling Techniques and the Sample Size

3.7.1 Sampling Techniques

This study used multistage sampling technique. The researcher used purposive sampling to select Meru County and for selection of form three students because of their experience with learning after being in secondary school for three years. Cluster sampling was done to select national, extra-county school cluster, county schools, and the sub-county school cluster. Purposive sampling was done to ensure that the schools selected into the study were spread over all the eight sub-counties in Meru County and to ensure that all the public school types in the county were represented. Random sampling was applied to select one stream from any school which had more than one stream. Therefore, the sample included national schools, extra-county schools, county schools, sub-county schools, spread over the whole of Meru County. This was to ensure variability within the sample.

3.7.2 Sample Size Determination

According to The County Government of Meru (2018) publication, the county had 395 Public secondary schools with a probable population of 93, 217 students; 45,598 males and 47,619 females. The form three students were estimated to be 23,304 (11,399 males and 11,904 females). To settle on the number of students to participate in the current study, the researcher used the established sampling table by Research Advisors (2006). According to this table (Appendix G), a target population of 23,304 requires a sample of 758 with 95% confidence level. Israel (1992) advises that the sample size in the

established tables reflect the obtained responses and therefore recommends that the number be increased to check the non-responses. The researcher added 92 students to caution the possible non-responses and to increase generalizability. The addition was calculated using Burke and Christensen (2014, pp.169) formula of sample size adjustment. The study sample therefore came to 850 (Appendix H) form three students in Meru County. Kish (1965) formula was used for proportionate sample sizes across the four school clusters. The formula is 'n_h' = (N_h / N) x n. Where 'n_h' represents the size of the sample for stratum '*h*', N_h' is the size of the population for stratum '*h*', 'N' is the total target population, and 'n' is the total sample (Kish, 1965). Twenty-nine form three students from two schools in Meru County participated in guided focus group interview for qualitative data; one girls extra-county and one mixed sub county school.

3.8 Research Instruments

In this study, three instruments were used: A self-report questionnaire, academic achievement proforma and an interview schedule. The questionnaire consisted of the introductory note, demographic information, followed by the four scales namely: Social Desirability –Gamma Short Scale (SD-GSS), Implicit Self-theories of Intelligence Scale (ISIS), task value scale, and Engagement versus Disaffection with Learning-Student Report (EDL-SR). Below is a description of each of the research tools.

3.8.1 Social Desirability - Gamma Short Scale ([SD-GSS] Nieben et al., 2019))

Social Desirability - Gamma Short Scale (SD-GSS) is a 6-item instrument developed by Nieben et al. (2019). The scale measures two aspects of social desirability. The first three items measure exaggerating positive quality (PQ+), and the last three, Minimizing negative qualities (NQ-). The items are in 5-point Likert rating scale which ranged from 1= *doesn't apply at all*, to 5= *applies completely*. The scores of social desirability are computed separately, and correlation analysis with the other self-reported instruments done. High correlation would imply possible distortion of respondents' responses on the self-report questionnaires. The scale is in Appendix B section (ii).

3.8.2 Implicit Self-theories of Intelligence Scale (Dweck, 2000)

The scale is in Appendix B section (ii). Implicit self-theories of intelligence scale is an 8-item instrument developed by Dweck (2000), where each statement reflects a first-person claim on the nature of intelligence. Dweck reported an internal consistency of between α = .90 to .92. An example of implicit self-theories item is 'I can learn new things, but I don't have the ability to change my basic intelligence'. De Castella and Byrne (2015) tested the scale on 643 Australian high school students and recorded internal consistency of α =.90. In De Castella and Byrne's study, the scale uniquely explained the variance in intelligence beliefs. The scale is scored on a 5-point Likert scale, where items 1-4 will score 5=*Strongly Disagree* to 1= *Strongly Agree*, while items 5-8 are reverse coded. The score range from 8 to 40. Any score of 21 and above

denotes incremental intelligence beliefs while a score of 20 and below indicate fixed intelligence beliefs. The scale is in Appendix B, section (iii).

3.8.3 Task Value Scale (Matthew & Nicholas, 2014)

The current study adopted Matthew and Nicholas' (2014) task value scale originally designed to assess post graduates subjective task value in making decisions to pursue postgraduate training. The scale has 25 items capturing the four sub-components of task value: utility (10, 15, 17, 18, 19, 20, and 25), attainment (7, 8, 9, 11, 12, 13, 14, and 22), interest (1, 2, 3, 4, 5, 6, and 16), and cost (21, 23, and 24) as suggested by the expectancy- value theory. The scale items were modified to fit secondary school context but each item remained very closely aligned to the original. The scale was on 5-point Likert scale with 1= *Strongly Disagree* to 5= *Strongly Agree*. Items 21-23 were reverse coded. An example of a task value item is 'The challenge of academic work is exciting'. A score of 81-125 and above denoted high task value, 41-80 average and 25-40 was considered low task value. The scale is in Appendix B (iv).

3.8.4 Engagement versus Disaffection with Learning – Student Report ([EDL – SR], Skinner, et al., 2009)

This 33-item scale was first developed by Skinner, et al. (2009) as a 27-item instrument. Karla (2014) modified the scale by adding six behavioral disaffection (BD) items. The scale has four dimensions: 17 emotional engagement (EE) items; 16 behavioral engagement (BE) items. The instrument was Likert scale (4-point) ranging from 1=*Very*

Untrue to 4=*Very True*. Twenty-two items (1, 3, 5, 6, 7, 9, 11, 12, 13, 15, 16, 17, 19, 20, 22, 23, 24, 27, 29, 30, 32, and 33) were reverse coded. These are actually items that displayed low engagement behavior. When reverse scored, they show the level of engagement. The highest score for the scale was 132 points showing highest level of academic engagement, while the lowest was 33 points denoting low academic engagement. Skinner, et al. (2008) had used the 27-item version of the engagement versus disaffection with learning-students report scale, to test motivation among third to seventh grade students in public schools. He wanted to examine the internal dynamics of behavioral and emotional disengagement. This study used the 33-item version of the Skinner et al scale (Skinner et al., 2009) to study the engagement behavior of the students Meru County, Kenya. The scale is in Appendix B (v).

3.8.5 Academic Achievement Proforma

Participant's academic achievement was taken from the class teacher's mark records and filled into the achievement proforma, in Appendix C. This is the test scores, in grade points, from a comprehensive examination done in the term, that is, term one 2021. The researcher worked closely with the class teacher to give the participants a code during questionnaire filling. This code corresponded with the serial number of the student in the class list in order for the class teacher to use it in assigning them their test scores. The teachers had used Kenya National Examination (KNEC) grading system to award points to the students. The highest points for any student was 84 points

3.8.6 Guided Focus Group Interview Schedule Guide

The use of a guided focus group interview schedule in qualitative data collection, is useful for the purpose of gaining in-depth understanding of a social issue (Nyumba et al ., 2018). It is in Appendix D. The persons involved in the interview are known to have similar experiences or social situations. This makes it appropriate for gathering collective views and meanings among form three students. All the questions are derived from the paper and pencil questionnaires hence covering all the variables of the study. There were seven questions on intelligence beliefs, six on task value and four on academic engagement.

3.9 Pilot Study

The questionnaire was used for pilot study before the actual study. The pre-testing was done on 39 students selected from a school in the target population, similar to but not in the study sample. Pilot study data was analyzed and the results were useful for the adjustments of the study instruments before the final study. Correction of wording and ambiguities was done.

3.9.1 Validity of the Study Instruments

The researcher worked closely with the supervisors, and consulted with other research experts in Educational Psychology Department, to ensure content validity. Face validity was ensured by following the specifications of APA formatting, editing, fine printing using quality paper, and by following the Kenyatta University School of Education

research guidelines. The items of the scale put into consideration the supportive aspects of academic engagement like the support of teachers, peers, and parents. Costa and Faria (2018) had confirmed the construct validity of the implicit theories of intelligence among many cultures of the world.

3.9.2 Reliability of the Study Instruments

Pre-testing of the study instrument was done during the pilot study and then Cronbach alpha (α) sought to establish the levels of internal consistency. The necessary adjustments in wording of the items were made before the measures were used in the main study. Pilot study results were used to calculate internal consistency of the instrument. The Cronbach Alpha of the three main scales is in Table 3.

Table 3.1

The Reliability Statistics of the Study Variables

Variable	*N*	α	α Based of Standardized Item
Intelligence beliefs	8	.75	.73
Task value	25	.83	.80
Academic engagement	33	.87	.87

N = 39; $p < .05$

The data in Table 3.1 show that the three study instruments had appropriate Cronbach alpha. Intelligence beliefs had (α=.75), task value (α =.83), and academic engagement (α = .87).

3.10 Data Collection Techniques

An initial visit to each of the sampled schools was done to create a working relationship with the respective school principals and class teachers, for the actual data collection. The class teachers of form three classes in the sample were requested to assist during data collection. The participants were given instructions on the questionnaire filling and the rating scale explained. The researcher and the respective class teachers supervised the filling of the questionnaires. During qualitative method, the researcher conducted the guided focus group interview. The researcher was accompanied by an assistant to help in recording the discussion in an audio gadget. Two audio recording gadgets were used for the purpose of ensuring success. The average time for filling the questionnaires and for conducting the interview was 30-40 minutes. The filled questionnaires and the recorded interviews were kept well awaiting coding and analysis. The class teachers used the code numbers in the questionnaires (which followed the class register's serial numbers), to fill their students test scores in the academic achievement proforma.

3.11 Data Analysis

Quantitative data was obtained from the questionnaires and the academic achievement proforma. That data was coded ready for analysis using the Statistical Package for Social Sciences (SPSS) version 25. The researcher entered the coded data into the computer and the data was cleaned to ensure that those with improper entries were removed so that they could not interfere with the results. The questionnaires that were cleaned were those which showed some distinct pattern of responses, insinuating some absentmindedness or a negative attitude while filling them. Those questionnaires that

had many unfilled questions were also left out. The relevant descriptive statistics were computed. These included: the means, maximum, minimum, range, standard deviation, Skewness and Kurtosis. Inferential statistics were ran on the data, testing various null hypotheses at significance level of ($p < .05$). These included regression analysis, Analysis of Variance (ANOVA), correlation tests, independent samples students' t-test, and post hoc comparison analysis. The following were the null hypotheses and their respective statistical tests:

H_{01}: There is no significant prediction weight of intelligence beliefs on academic engagement.

Statistical test: Linear regression analysis.

For in-depth understanding of the relationships, two supplementary hypotheses were formed:

$H_{01.1}$: There is no significant prediction weight of incremental intelligence beliefs on academic engagement

$H_{01.2}$: There is no significant prediction weight of fixed intelligence beliefs on academic engagement

The above two supplementary hypotheses were tested using multiple linear regression analysis.

H_{02}: There is no significant prediction weight of task value on academic engagement

The statistical test used was linear regression analysis.

For in-depth understanding of this hypothesis four supplementary hypotheses were raised in accordance with the task value types:

$H_{02.1}$: There is no significant prediction weight of interest task value on academic engagement.

$H_{02.2}$: There is no significant prediction weight of utility task value on academic engagement.

$H_{02.3}$: There is no significant prediction weight of attainment task value on academic engagement.

$H_{02.4}$: There is no significant prediction weight of cost task value on academic engagement.

The supplementary hypotheses were tested using multiple linear regression analysis.

H_{03}: There is no significant difference in the prediction weight of intelligence beliefs and task value on academic engagement

Statistical tests: multiple linear regression analysis

H_{04}: There is no significant prediction weight of intelligence beliefs on academic achievement.

Statistical test: Linear regression analysis

Two supplementary hypotheses were raised from hypothesis four:

$H_{04.1}$: There is no significant predictive weight of incremental intelligence beliefs on academic achievement

$H_{04.2}$: There is no significant predictive weight of fixed intelligence beliefs on academic achievement.

The supplementary hypotheses were tested using multiple linear regression analysis.

H_{05}: There is no significant prediction weight of task value on academic achievement

Statistical test: Linear regression analysis.

Four supplementary hypotheses were formulated to enhance understanding of this hypothesis:

$H_{05.1}$: There is no significant prediction weight of interest task value on academic achievement.

$H_{05.2}$: There is no significant prediction weight of utility task value on academic achievement.

$H_{05.3}$: There is no significant prediction weight of attainment task value on academic achievement.

$H_{05.4}$: There is no significant prediction weight of attainment task value on academic achievement.

The four supplementary hypotheses were tested using multiple linear regression analysis.

H_{06}: There is no significant difference in the prediction weights of intelligence beliefs and task value on academic engagement

Statistical tests: multiple linear regression analysis

H_{07}: There is no significant prediction weight of prediction of academic engagement on academic achievement.

Statistical test: Bivariate correlation and linear regression analysis.

Two supplementary hypotheses arose from this hypothesis. These were:

$H_{07.1}$: There is no significant prediction weight of behavioural academic engagement and academic achievement

$H_{07.2}$: There is no significant prediction weight of emotional academic engagement and academic achievement

H_{08}: Academic engagement has no significant mediational role in the equation of intelligence beliefs and task value prediction of academic achievement

H_{09}: There is no significant interaction effect of gender, school type and age, with the study variables

3.12 Logistical and Ethical Considerations

3.12.1 Logistical Consideration

The researcher secured authorization for data collection from Graduate School of Kenyatta University. The researcher also obtained data collection license from the National Commission for Science, Technology, and Innovation (NACOSTI). The Ministry of Education Science and Technology (MOEST) offices at the county headquarters permitted data collection in Meru County in the sampled schools. Quality paper, print and spacing was used for neat research instruments. The researcher packaged and labeled the packages according to the respective schools for ease during the actual data collection, and easier confirmation of the return rate. The researcher either called or visited, and sought consent of the respective principals of the sampled schools for rapport and familiarization, and booking of data collection dates. After data collection, the filled questionnaires were carried and later checked for any need of editing awaiting coding and analysis. Those with missing data were cleaned out. Coding was done and inferential tests ran on the data.

3.12.2 Ethical Considerations

The introduction part of the questionnaire briefed the respondents of the confidentiality that would be observed in handling their responses, and appealed to the respondents not to make any writing or identification marks on their questionnaire, for anonymity to be ensured. The purpose of the research was well explained to the respondents. Moreover, the researcher had a letter of introduction from the graduate school, a research license from the National Commission for Science, Technology, and Innovation (NACOSTI), and data collection authorization letter from the county Education office of Meru. The school principals signed the consent form in Appendix A and no one was coerced. Beneficence was ensured by assuring the participants that no undesirable persons would access the data and that it was not whatsoever be used to victimize any one of them, and that the data would solely be used for the purposes of this research. The researcher gave them a commitment to confidentiality in handling their responses.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND DISCUSSION OF THE FINDINGS

4.1 Introduction

Chapter four is organized into introduction, general and demographic data, findings, interpretations, discussions, and exploratory analysis, as per the research objectives. For every objective, appropriate descriptive statistics are given followed by inferential statistics testing the null hypotheses, qualitative analysis, and discussion of those results. Exploratory analysis results of the interaction effects of the intervening variables –gender, school type and age – with each of the study variables, was also presented.

4.2 General and Demographic Data

This section contains, the return rate of the questionnaires, information on participants' gender, age and school types.

4.2.1 Representation by Gender, School Type and Age

The age of the participants was 15 – 22 years and average age was 17.70 years. A total of 850 participants were given the questionnaires but only 813 (male =383 and females = 430), were available for analysis. The girls were more (52.9%) than the boys (47.1%).

4.2.2 Return Rate

A total of 850 (450 females, 400 males) questionnaires were distributed by the researcher, to form three students in 15 secondary schools in Meru County. All of them were collected after the filling session. However data cleaning during the data coding process was done and 36 of the questionnaires were discarded. The criteria that was used to discard the questionnaires were: those questionnaires which had some unanswered questions, those whose responses showed a distinct pattern which suggested some dishonesty, and, some questionnaires of respondents who did not have the academic achievement score in the academic achievement proforma, probably not having done the examination under consideration, due to various reasons. Therefore, the questionnaires that were ready for analysis were 813 (95.6%) as presented in Table 4.1.

Table 4.1

Students' Questionnaires Return Rate by School Type

School Type	Dist'd	Schools	Returned	% of the sample	Return Rate (%)
National	40	1	36	4.4	90
Extra-County	350	4	337	41.5	96.2
County	90	2	79	9.7	87.8
Sub-County	370	6	361	44.4	97.5
Total	850	13	813	100	95.6

Note. N = 813, Dist'd = the number of questionnaires distributed in each school type

The data in Table 4.1 shows that a total of 813 questionnaires were successfully completed and ready for the data analysis process. This was 95.6 % return rate. The table also shows that students from the sub-county secondary schools were more in the sample (361) since they host the most of the secondary school students in Kenya and by extension, in Meru County. This was followed closely by the extra-county schools (337), then County (79) and finally the national schools (36) had the least respondents.

4.2.3 Discussion of the Demographic Data

The females were more than the males (females = 450, males = 400). The gender distribution of the study sample agrees with the current trends in Kenya. Faria (2021) reported that there are more girls (1.77 million), than the boys (1.75 million) in secondary schools in Kenya. The same was noted by Moraa (2021) who reported that four counties in Kenya had more girls than boys sit the KCPE and KCSE in the year2020. This might be attributed to the global campaign for the empowerment of the girl child through education causing most school going girls to be in school.

4.3 Results of the Study

The presentation of the research findings followed the study objectives. For every objective, the descriptive statistics: frequencies, maximum score, minimum score, mean, range, standard deviations, skewness and Kurtosis, were given. The null hypothesis were tested using regression analysis, and Pearson product moment correlation coefficient. Other inferential statistics used were: Analysis of Variance

(ANOVA), post hoc analysis, and independent samples t-test. Qualitative analysis was done following distinct themes. Discussions was made to show how the results of the current study relate to previous studies done on the same study variables.

4.3.1 Social Desirability Check

The scores for social desirability were computed from the students' responses to the 6-items Gamma-Short Desirability Scale (GS-DS) in Appendix B (ii). Scores ranged from 1 to 5 on a 5-point Likert Scale where, 1= "*doesn't apply at all",* to 5 = "*all applies completely"*. Three of the items were reverse coded. The maximum score of social desirability was (30), the minimum was (12) and the range was (18) points. The mean was (M = 22.99, SD = 3.8). The skewness was (-.17) and Kurtosis of (-.58). Linear multiple regression was done to find out the correlation of social desirability scores with each of the study variables and the findings were displayed in Table 4.2.

Table 4.2

Correlations Matrix of Social Desirability Scores with the Study Variables

Variable	*p*	*1*	*2*	*3*	*4*	*5*
1. SD	.00	–				
2. AE	.00	.03	–			
3. AA	.00	.02	.99	–		
4. IB	.00	.05	.62	.61	–	
5. TV	.00	.07	.62	.61	.99	–

Note: N = 813 SD = Social Desirability, AE = Academic Engagement, AA = Academic Achievement, IB = Intelligence Beliefs, TV = Task Value.

The information in Table 4.2 shows that social desirability scores had reasonably low correlation with each of the study variables. The highest scores of correlation were between social desirability and task value (r (813) =.07, $p < .05$), followed by social desirability and intelligence beliefs (r (813) = .05, $p < .05$), social desirability and academic engagement (r (813) = .03, $p < .05$) and lastly social desirability and academic achievement (r (813) = .02, $p < .05$). This is the preferred situation because high correlations between the social desirability scores and any variable scores, would imply that distortion of the responses occurred. Further interrogation of the findings using linear multiple regression results revealed that social desirability explained only 07 % (R^2 = .07) of the study findings. This implies that there was only 07% distortion of the responses. This is a negligible percentage of distortion of the responses. This was construed to mean that the results were 93% honest. This is acceptable.

4.3.2 Intelligence Beliefs as a Predictor of Academic Engagement

This section has four areas: the descriptive statistics of intelligence beliefs and academic engagement and their domains, hypothesis testing, the study findings and their discussions.

4.3.2.1 Description of Participants' Intelligence Beliefs. The descriptive statistics of students' responses to intelligence beliefs 8-item scale were: minimum score = 20.00, maximum score = 40.00), range = 20.00, and, mean (*M* = 30.02, *SD* = 3.71). The Skewness was (*Sk* =-.04) while the Kurtosis was (*Kur* = -.16). The descriptive statistics of the domains of intelligence beliefs was also done and the results presented in Table 4.3.

Table 4.3

Descriptive Statistics of the Domains of Intelligence Beliefs

Sub-Scale	Range	Min	Max	*M*	*SD*	*Sk*	*Kur*
FIB	16	4	20	14.95	.76	-.74	.28
IIB	16	4	20	15.07	.73	-.68	.20

Note:N=813; FIB=Fixed Intelligence Beliefs; IIB=Incremental Intelligence Beliefs; *M*=mean; *Min* = Minimum; *Max*=Maximum; *SD* =Standard Deviation; *Sk* = Skewness; *Kur* = Kurtosis

The information in Table 4.3 shows that the incremental intelligence beliefs mean score was higher (M=15.07) than that of fixed intelligence beliefs (14.95). The distribution of both domains were negatively skewed implying that the respondents might have exaggerated their intelligence beliefs answers. The kurtosis values were less than three implying platykurtic distribution, that is, widely spread out distribution. The descriptive statistics of academic engagement scores was done and the findings were: the maximum score was 132 and minimum of 71, giving rise to a range of 61. The mean of academic engagement was (*M* = 101.08, *SD* =12.60). The descriptive statistics of the domains of academic engagement were also computed. The results are in Table 4.4.

Table 4.4

Descriptive Statistics of Academic Engagement Domains

Variable	Range	Min	Max	*M*	*SD*	*Sk*	*Kur*
BAE	30	34	64	48.79	6.40	-.05	- .49
EAE	31	37	68	52.29	6.24	.17	- .26

Note. N = 813; *Min* = Minimum; *Max* = Maximum; *M* = Mean; *SD* = Standard Deviation; *Sk*. Skewness; *Kur* = Kurtosis; BAE = Behavioural Academic Engagement; EAE = Emotional Academic Engagement.

The findings in Table 4.4 show that emotional academic engagement had higher mean (*M* = 52.29, *SD* = 6.24), and the data was also highly positively skewed meaning more values were on the positive score. On the other hand behavioural academic engagement had a mean of (*M* = 48.79, *SD* = 6.40) and the data was near normally distributed. The

respondents seem to have embraced more emotional academic engagement than behavioral academic engagement. Negative Kurtosis for both behavioural and emotional academic engagement means low spread of the scores.

4.3.2.2 Hypothesis Testing. Based on objective one of the current study, the first hypothesis was framed as:

H_{01}: There is no significant prediction weight of intelligence beliefs on academic engagement.

Simple linear regression analysis was used to test this hypothesis. The model summary was presented in Table 4.5.

Table 4.5

The model summary of the Regression of Intelligence Beliefs on Academic Engagement

Model	*R*	R^2	*Adj* R^2	*F*	*df1*	*df2*	*p*
1	.62	.38	.38	506.01	1	811	.00

Note: N = 813; $p < .05$; R^2 = Coefficient of determination, *df* = degrees of freedom; F = critical value of F.

According to the model summary in Table 4.5, intelligence beliefs explained 38% (R^2 = .46, $p < .05$) of the variations of academic engagement at one degrees of freedom (F (1, 811) = 506.01, P <.05). The null hypothesis was therefore rejected. The alternative hypothesis was true; intelligence beliefs had statistically significant prediction weight

on academic engagement. Two supplementary hypotheses, following the domains of intelligence beliefs, were formulated from hypothesis one, for in-depth analysis:

$H_{01.1}$: There is no significant predictive weight of incremental intelligence beliefs on academic engagement

$H_{01.2}$: There is no significant predictive weight of fixed intelligence beliefs on academic engagement

The two supplementary hypotheses were subjected to multiple linear regression analysis. The model summary results are displayed in Table 4.6.

Table 4.6

The Model Summary of the Regression of the Domains of Intelligence Beliefs on Academic Engagement

Model	*R*	R^2	*Adj* R^2	*F*	*df1*	*df2*	*p*
1	.68	.46	.46	340.14	2	810	.00

Note: $N = 813$; $p < .05$; R^2 = Coefficient of determination, *df* = degrees of freedom; *F* = critical value of *F*.

The summary model in Table 4.6 showed that when the two domains combined Incremental and fixed intelligence beliefs, they accounted for 46% ($R^2 = .46$). Bivariate correlation analysis was also carried out for further verification. The results showed that incremental intelligence beliefs correlated significantly and positively with academic engagement (r (813) =.58, $p < .05$). Fixed intelligence beliefs as well significantly and positively correlated with academic engagement (r (813) = .19, $p < .05$). This led to the rejection of the two supplementary null hypothesis and acceptance of the alternative.

Both incremental and fixed intelligence beliefs had significant predictive weights on academic engagement. Analysis of Variance (ANOVA) was done to find out the exact predictive weights for each domain of intelligence beliefs, on academic engagement. Table 4.7 has the results.

Table 4.7

The ANOVA of Regression of the Domains of Intelligence Beliefs on Academic Engagement

Model		*S S*	*df*	*MS*	*F*	*p*
1	Regression	58802.45	2	29401	340.14	.00
	Residual	70015.98	810	86.44		
	Total	128818.42				

Note: N = 813; *SS* = Sum of Squares; *df* = Degrees of freedom; *MS* = Mean Squares; *F* = critical value of F

The findings in Table 4.7 show that there was statistically significant difference in the prediction of academic engagement by the domains of intelligence beliefs (F (2,810) = 340.14, $p < .05$). For further interrogation of the findings, regression Beta coefficients of the domains of intelligence beliefs on academic engagement were computed. The results are in Table 4.8.

Table 4.8

Beta Coefficients of the Domains of Intelligence Beliefs

Variable	*B*	β
Constant	36.76	-
IIB	2.86	.67
FIB	1.42	.34

Note: N = 813; IIB = Incremental Intelligence Beliefs, FIB = Fixed Intelligence Beliefs.

The information in Table 4.8 show that incremental intelligence beliefs had higher significant and positive contribution to the variance of academic engagement (β = .67, p < .05). The first supplementary null hypothesis was thus rejected. The fixed intelligence beliefs Beta coefficient was (β =.34, p < .05). This was lower than that of incremental intelligence beliefs but because it was positive and significant, thus leading to the rejection of the second supplementary null hypothesis. The prediction equation from the analysis was as follows:

$$\tilde{y} = 36.76 + .67 \text{ (I IB)} + .34 \text{ (FIB)} \ (R^2 = .46) \ p < .05.$$

Where: $\tilde{y}$ = the predicted academic achievement score, IIB = Incremental Intelligence Beliefs, FIB = Fixed Intelligence Beliefs. The equation implies that for each standard deviation increase in incremental intelligence beliefs and fixed intelligence beliefs, academic engagement increases by .67 and .34 points respectively. Incremental intelligence beliefs therefore was the best in prediction of academic engagement, among the two domains of intelligence beliefs.

4.3.2.3 Qualitative Data on Intelligence Beliefs. This section explored students' thoughts on intelligence beliefs. There were seven questions. The seven question elicited responses that could tell the nature of intelligence beliefs the students held. Two themes came out distinctly: Incremental intelligence beliefs and fixed intelligence beliefs. It was possible for one question to elicit both incremental intelligence beliefs and fixed intelligence beliefs. For that reason, the themes in this section were analyzed together using the following the questions.

Question 1: Are there subjects which you find more difficult than others?

The respondents cited subjects like: Physics, Chemistry, Biology and Mathematics as the most difficult. A few students however mentioned Agriculture, Business studies and Geography. This implies that basically any subject can be difficult depending on the student, though majority will usually mention the science and mathematics subjects.

Question 2: What have you been doing with those difficult subjects?

The students in Extra-county schools said

"I look for more questions in that subject and look for answers from the text books."

" Some subjects, are much difficult even if you revise, you still find you have failed the test". This is a fixed intelligence beliefs approach and hence low engagement is likely to low academic achievement. These findings agree with the quantitative result where the respondents from extra county schools recorded higher scores in intelligence beliefs, academic engagement and in academic achievement compared to the students from the county and sub-county schools.

Question 3: What do you mainly do when you encounter a challenging question in an assignment or homework?

The respondents had the option of 'Quit', 'ask a friend for help', 'consult my teacher for help', and, 'check for the answers in the text book'. They were allowed to select all statements that rhymed the actions they would take. Interestingly, all the respondents chose the last three options which are incremental beliefs thoughts. None of the respondents wished to quit, not even those from the sub-county schools. These responses are incremental intelligence beliefs.

Question 4: What do you do when you don't score the marks that you expected in an examination?

The students had the option to say " I feel frustrated and give up," or say, " I seek a different strategy to prepare for the next examination" . Apart from the above options the respondents were prompted to say how else they reacted to failure in their examinations. Some added that:

"I revise the question paper again and again, then I look for more related questions."

"I identify the topics I failed and revise on them again, or, I seek a friend to help work on the missed questions."

"I go to the text books where the topics I missed are."

It seems that all the respondents embraced the incremental intelligence beliefs statement. Incremental intelligence beliefs proposes seeking alternative strategy to succeed in the future examinations, where failure has been encountered.

Question 5: Do you think you can perform better in your current academic work? Yes/No. Briefly comment on your answer.

All of the respondents, whether in the sub-county school or extra-county school types, answered 'Yes' to this question. They believed that it was possible to do better than they were doing at the moment. These findings agreed with those of the quantitative study where majority of the learners embraced the incremental intelligence beliefs ideas. Some of the personal responses to this question were:

"I will consult my teachers".

" I will look for questions on the topics and revise more".

Question 6. Which two statement best describes your opinions?

There were five statements to choose from. Statement (a), (d) and (e) were fixed intelligence beliefs statements, while (b) and (c) were incremental intelligence beliefs statements. The statements were as follows:

a. In class I work very hard to make sure I compete with my classmates.
b. In class I work very hard to make sure I understand the content
c. I like to understand and master what the teacher teaches.
d. If only I would be top five in class I would be very happy
e. I wish I did not have to go to school. Everything is so hard

The choice of the responses revealed three categories of intelligence beliefs among the respondents: Category one, were those who elicited purely incremental intelligence beliefs. They were twenty students out of the twenty-nine. This was the biggest

category of the three. These respondents chose the statements ‘a’ and ‘b’: “In class I work very hard to make sure I understand the content,” and, “ I like to understand and master what the teacher teaches.”

Category two was made up of those who purely embraced the fixed intelligence beliefs: Two out of the 29 respondents chose the statements “In class, I work very hard to make sure I compete with my classmates” and “If only I would be top five in class I would be very happy.” The two statements reflect fixed intelligence beliefs. The motivation to engage and to do well in their academic tasks, tends toward outshining their colleagues in the competition and to be at the top of the class. They also chose the statement, “I wish I didn’t have to go to school. Everything is so hard”. This is a sign of giving up.

Category three respondents, were those who chose two opposing intelligence beliefs showing that they toed the middle line. These had interesting choices of their responses. Two of the 29 students chose the responses: “In class I work very hard to make sure I compete with my classmates” and,” I like to understand and master what the teacher teaches.” The first statement is a fixed intelligence beliefs statement while the second was an incremental intelligence beliefs statement. Two others chose, “I like to understand and master what the teacher teaches” and, “If only I would be top five in class I would be very happy.” The first statement was an incremental intelligence beliefs opinion while the second was a fixed intelligence beliefs opinion.

Question 7: What is your opinion on this statement?

The statement was, “I cannot change my academic performance or my intelligence, it is the way I was born. I have nothing I can do. No matter my effort, my intelligence will remain the way it is now”.

This statement intended to evaluate who held incremental intelligence beliefs and fixed intelligence beliefs. A student said “I think I can change my intelligence. The way I was born I do not know how much intelligence I have. So I have to search and reach the maximum of my intelligence.” This embraces the opinion that intelligence grows. It is an incremental intelligence beliefs opinion. Another supported the statement by saying, “If you were born with intelligence nobody would attend school to be taught. We go to school so that we can improve on our intelligence.” The same student said that “Somebody has been in school and no matter what they do they remain down academically”. They said ‘ I am doing what it takes and I can’t do well?” This was a sub county school student. Once again the element of mixed intelligence beliefs featured. This was an example of those students who do not fall on either extreme of the intelligence beliefs.

A student who preferred to use third person tense said that, “The statement is true for some because no matter the effort they put they cannot do better in their academic performance”. This response is a fixed intelligence beliefs alignment and it was echoed by a few others. Majority of the extra county school students however believed they

could improve their performance and that was the reason they were in school. A few respondents thought that their effort may not change their academic achievement.

4.3.2.4 Discussion of the Findings. The null hypothesis was that "there was no significant predictive weight of intelligence beliefs on academic engagement among form three students". The results showed that those students who scored highly in intelligence beliefs, in other words, those students who had incremental intelligence beliefs, also scored highly in their academic engagement. Multiple regression analysis of the domains of intelligence beliefs on academic engagement recorded that the incremental intelligence beliefs was the best predictor of academic engagement. There are previous studies that have reported similar outcomes, where intelligence beliefs contributed to variations of academic engagement. For example, Woon (2021) studied effects of incremental intelligence beliefs intervention on high school students learning behaviour. Woon found that the interventions brought positive changes in mathematics achievement motivation of the students. Studies around the world indicate that incremental intelligence beliefs have been linked with positive motivation, diligence, concentration, effort and help-seeking, information search and processing, and effective decision making (Msimanga, 2014). These results agree with those of Zhao and Li (2016), who confirmed that intelligence beliefs influenced learning habits of Chinese high school students. In Zhao and Li study, incremental theorists showed positive study habits. Zhao and Li who reported that intelligence beliefs positively correlated with perceived enjoyment of physical education, equivalent to academic engagement in the current study.

Furhermore, Cabelo and Fernardez-Berrocal (2015) found positive correlation between incremental theories of intelligence and effective learning strategies like cognitive re-appraisal and mastery oriented goals. These learning strategies are some of the characteristics of academic engagement. Bostwick et al. (2017), said that incremental theorists are more likely to put effort and investment when faced with difficulties in their learning process. Generally, in a situation of stress or demands, students who endorse a more malleable theory of intelligence are more likely to come up with workable strategies that will lead to success. On the same note, Martin et al. (2013) found that the students who held malleable theories of intelligence were dynamic and had higher levels of academic engagement. They are more likely than their counterparts in fixed theories, to pursue the pathway of academic engagement under challenging learning environments. People who view their intelligence as increasable are said to display characteristics such as: adaptive and mastery and deeper learning strategies, problem-solving and self-regulatory behaviors (Luo, et al., 2014; Martin, et al. 2013)). Zonnefeld (2019) discussed the role of personal beliefs in the learning process and they posited that beliefs affect both students' thoughts and actions. All these are characteristics of an academic engagement.

However, a contradicting pattern was found in several other studies. Results of an earlier study by Dupeyrat and David (2004) among French college students showed incremental beliefs correlating negatively with learning goals, an ingredient of academic engagement.

On a similar note, a study by Bame-Aldred (2013) among working auditing and accounting students in six universities in the United States, reported that both incremental and fixed intelligence beliefs correlated positively with time management, effort and decision making accuracy. This fails to bring out the differences in the influence of intelligence beliefs on engagement styles. The contradiction in these two studies may be due to the age of the respondents. May be the fact that Dupeyrat and David (2004) and Bame-Aldred (2013) respondents were adults, might have influenced the results. Other factors like experience at work might have added to their performance and not merely the intelligence beliefs they held. Diseth et al. (2014) alleged that age affects intelligence beliefs with the older folk tending toward fixed intelligence beliefs while still upholding high task engagement. These studies point out to the need for further studies especially on the role of age on the pathways of intelligence beliefs

Question six of the guided focus group interview had provoking results that students were asked to choose two statements which matched their opinions, out of the possible five that were presented to them. While there were those whose choices placed them into either incremental or fixed intelligence beliefs, 4 out of 29 students combined statements from the two sides of the theories of intelligence. This is consistent with the findings of Kraker- Pauw (2020) that categorized their respondents into entity, intermediate and incremental intelligence beliefs. Schwinger (2021) also said that about 15% of students fall into the intermediate intelligence beliefs category. Dweck (2000) had said that some people's intelligence beliefs may not be placed in any of the two major categories but lie in the middle.

The findings from the current study and the previous ones show that intelligence beliefs is a major predictor of the most needed academic engagement among learners. This has a lot of implication to the parents and the teachers to groom the learners early enough to develop incremental theories of intelligence. Though inborn abilities can be cited, they should not be at the centre of the teachers and parents' praises as the source of success. Success experiences need be recognized as effort and use of appropriate learning strategies. The teachers and parents should attribute failure to lack of effort rather than lack of ability. Children can be taught to embrace effort as source of success. Ng and Wei (2020) noted that the Chinese parents attributed their children success to their effort and not abilities. Though in their study, the Chinese children recorded more entity beliefs, they still performed academically because of the meaning of intelligence given in their culture. This gives the learners hope for success as they know they can still apply effort for the subsequent learning tasks.

Buckley et al (2019) suggests that implicit theories of intelligence develop as early as kindergatten. Heyman and Campron (2006) says that children hold systematic ability beliefs early as they receive cues from parents and teachers about their performance of tasks. These ability beliefs can therefore be shaped early by praising their success in terms of their strategies and not the outcomes and talents. It is therefore important that children are trained on incremental intelligence beliefs from early years through adolescent and this will have positive implication on education. Research findings have shown that entity theories predicted truancy, self-handicapping and academic disengagement among high school students (De Castella & Byrne (2015). Inculcating

incremental intelligence in our children therefore will save the stakeholders the trouble involved in dealing with these negative behaviours. Various studies indicate that people differentiate into entity and incremental intelligence theorists at around the onset of adolescence starting age 13 years (Blackwell et al, 2017, Diseth, et al., 2014; Msimanga, 2014). Early interventions therefore will ensure that by the time our children reach adolescence they have taken a positive path in their intelligence beliefs. The respondents of the current study are adolescents and therefore appropriate target population for study on intelligence beliefs.

4.3.3 Task Value as a Predictor of Academic Engagement

This section is about the results of the second objective, the null hypothesis testing, the qualitative data, and the discussion of the findings.

4.3.3.1 The findings of the study. The descriptive statistics of task value and academic engagement were computed. The maximum score of task value was (125.00), minimum of (62.00), hence range of task value scores was 63.00. The mean score of students' task value was (94.07). The distribution was negatively skewed (-.16). This may be an evidence that students rated themselves highly in task value. The results were further used to put students into three categories: low (62-70 points), average (71-91 points) and high task value (92-125 points). The descriptive analysis of the levels are in Table 4.9.

Table 4.9

Descriptive Statistics of Academic Engagement by Levels of Task value

Level	*N*	Percent	*M*	*SD*	*SE*
Low task value	26	3.2	79.1	7.79	1.53
Average task value	284	34.9	94.3	11.79	0.70
High task value	503	61.9	106.1	9.95	0.44
Total	813	100	101.1	12.60	0.44

Note: *N* = 813, *M* = Mean, *SD* = Standard Deviation, *SE* = Standard Error

The data in Table 4.9 shows that 61.9% (*M* =106.1, *SD* = 9.95) of the respondents had high task value, while 34.9% (*M* = 94.3, *SD* = 11.79) had average task value, and 3.2% (M =79.1, *SD* = 7.79) had low task value. Analysis of variance (ANOVA) was computed to find out whether there were statistically significant mean differences of academic engagement between the levels of task value. The findings of ANOVA are presented in Table 4.10.

Table 4.10

ANOVA of Academic Engagement Based on Levels of Task Value

	SS	*df*	*MS*	*F*	*p*
Between Groups	38213.74	2	19106.90	170.81	.00
Within Groups	90604.73	810	111.92		
Total	128818.47	812			

Note. $p < .05$; $N = 813$, *SS* =Sum of Squares; *df* =degrees of freedom; *MS*= Mean Square; *F* = Critical Value of F

The results of ANOVA in Table 4.10 reports a statistically significant differences in the means of academic engagement by the different levels of task value (F (2, 810) =170.8, $p < .05$). This was the evidence that the academic engagement of the low, average and high task value respondents was not equal. A post hoc comparison analysis was computed to establish the exact differences among the groups. The findings were as in Table 4.11.

Table 4.11

Post Hoc Analysis of Academic Engagement based on Levels of Task Value

(I) Task Value Level	*(J)* Task Value Level	*MD (I-J)*	*SE*	*p*
Low Task Value	Average task value	-15.15	2.17	.00
	High task value	-26.94	2.13	.00
Average task value	Low task value	15.15	2.17	.00
	High task value	-11.80	.79	.00
High task value	Low task value	26.94	2.13	.00
	Average task value	11.80	.79	.00

Note. *N* = 813; *MD* =Mean Difference; *SE* = Standard Error

The results in Table 4.11 show that all the six pairs of task value levels vary statistically significantly in their academic engagement. The major differences in academic engagement was reported between the respondents with high task value and those with low task value (*MD* = 26.94), in favour of the learners with high task value levels. This has an implication academic engagement of students rose with the task value levels.

4.3.3.2 Hypothesis Testing. The second hypothesis was tested. It was framed as follows:

H_{02}: There is no significant predictive weight of task value on academic engagement.

Linear regression analysis was used to test the hypothesis. The findings were that task value accounted for 38% (R^2 = .38, $p < .05$), of the variations of academic engagement. As task value increased, academic engagement increased. The data also indicated that the correlation between task value and academic engagement was positive and significant (r (813) = .62, $p < .05$)**.** The second null hypothesis was thus rejected in favour of the alternative. There was statistically significant predictive value of task value on academic engagement. The null hypothesis was rejected and the alternative thus accepted. Four supplementary hypotheses were formulated from H_{02} for in-depth interrogation of the predictive weights of the domains of task value on academic engagement. The hypotheses were in line with the four domains of task value, that is, utility task value, interest task value, attainment task value and cost task value. The supplementary hypotheses were framed as follows:

$H_{02.1}$: There is no significant predictive equation of interest task value on academic engagement.

$H_{02.2}$: There is no significant predictive weight of utility task value on academic engagement.

$H_{02.3}$: There is no significant predictive weight of attainment task value on academic engagement.

$H_{02.4}$: There is no significant predictive weight of cost task value on academic engagement.

Multiple regression analysis was used to test the four supplementary hypotheses to assess the contribution of each of the four domains of task value to the variations of academic engagement. The results were as in Table 4.12

Table 4.12

Model Summary of Regression of Domains of Task Value on Academic Engagement

R	R^2	*Adj* R^2	*F*	*df1*	*df2*	*p.*
.63[a]	.39	.39	132.91	4	808	.00

The information in Table 4.12 shows that the four domains combined accounted for 39% (R^2 = .39) of the variations of academic engagement. This implies that every of the four domains of task value is important for students to be academically engaged. The four null hypotheses were then rejected and their alternative hypothesis adopted. One-way ANOVA was performed to interrogate the contribution of each of the task values on academic engagement. The results were presented in Table 4.13.

Table 4.13

ANOVA for the Domains of Task Value on Academic Engagement

Model		SS	*df*	MS	*F*	*p*
1	Regression	50801.39	4	12700.34	131.53	.00
	Residual	78017.03	808	96.56		
	Total	128818.42	812			

Note: N = 813; *SS* = Sum of Squares; *df* = Degrees of freedom; *MS* = Mean Squares; *F* = critical value of F

The data in Table 4.13 show statistically significant differences in the means of academic engagement by the four domains of task value (F (4, 808) = 131.53, $p < .05$).

Beta coefficients were analyzed to assess the specific weights of every domain. The results showing the standardized Beta coefficients are in Table 4.14

Table 4.14

Standardized Beta Coefficients for the Domains of Task Value on Academic Engagement

Domain	β	*p*
Constant	40.62	.00
Interest task value	.09	.03
Utility task value	.34	.00
Attainment task value	.03	.61
Cost task value	.23	.00

Note. $N = 813$

The data in Table 4.14, show all the task value domains had positive predictive values on academic engagement. However, utility task value had the highest prediction weight of academic engagement ($\beta = .34$, $p < .05$), among the four domains of task value was followed by Cost task value ($\beta = .23$, $p < .05$), and interest task value ($\beta = .09$, $p < .05$), in that order. Thus, the corresponding supplementary null hypotheses were rejected. However, attainment task value had positive but non-significant prediction weight on academic engagement ($\beta = .03$, $p > .05$). Supplementary hypothesis $H_{02.3}$, which stated

that ‘there is no significant prediction equation of attainment task value on academic engagement’, was thus accepted. The following is the prediction equation of the model**.**

$\tilde{y}$ = 40. 62 +.34 (UTV) + .09 (I TV) + .03 (ATV) + .23 (CTV) (R^2 = .40) $p < .05$.

Where ỹ = the predicted academic engagement scores, ITV =Interest Task Value, UTV = Utility Task Value, ATV = Attainment Task Value, CTV = Cost Task Value

The equation implies that for each standard deviation increase in utility task value, interest task value, attainment task value, and cost task value, academic engagement increases by .09, .34, .03 and by .23 points respectively. The equation shows that the respondents in the current study attached more value to the tasks that are likely to contribute to their future success (utility task value) in terms of career, and good lifestyle. They were therefore willing to pay the cost needed (cost task value) to engage in them hence the high scores in cost task value. The third most popular task value was Attainment tasks value. The results show that not many students enjoyed the academic tasks for their own sake hence the low scores in Interest task value. The main contributors to the variations of academic engagement were therefore, the utility task value (UTV) and the cost task value (CTV). The correlation analysis was also done to find out the correlations of each of the domains with academic engagement. The results are in Table 4.15

Table 4.15

Correlation Matrix of Domains of Task Value with Academic Engagement

Variable	1	2	3	4	5
1. Academic Engagement	–				
2. Interest Task Value	.46 **	–			
3. Utility Task Value	.61 **	.57 **	–		
4. Cost Task Value	.59 **	.68 **	.83 **	–	
5. Attainment Task Value	.52 **	.56 **	.88 **	.66 **	–

Note. $N = 813$

The findings in Table 4.15 indicate that all the domains of task value were positively and significantly correlated to academic engagement. Utility task value had the highest correlation with academic engagement (r (813) = .61, $p < .05$), followed by cost task value (r (813) = .59, $p < .05$), followed by attainment task value with (r (813) = .52, $p < .05$), while interest task value had the least correlation (r (813) = .46, $p < .05$). The results revealed that the success that a task is likely to bring in the future was a major consideration for the students before they engaged in the learning tasks. Students care less whether they enjoyed the task (interest task value) or not.

4.3.3.3 Qualitative Data Analysis of Task Value as Predictor of Academic Engagement and Academic Achievement. There were seven questions on this

objective. The responses brought to light the students' views concerning the four domains of task value.

Question 1: I am happy that I am a secondary school student. Comment on this statement. This question aimed at finding out whether there was Interest task value in the belief systems of the students.

The responses ranged from that they were learning something new which they had not learnt in primary school but the obstacles were many. A student said,

" Of course I will learn things that are different from what I learnt in primary school. But the problem of waking up early in the morning is overwhelming". Some said that there were so many challenges in school. This is a bit of low cost task value. However, majority believed that the challenges propelled them to work harder because education shaped their destiny. This gave them reason to put effort and remain in school. Someone said,

"Though there are many challenges, I must work harder every day because I have a destiny I am looking at".

Question 2: How is being in school making you a better person?

Many of them said that school gave them respect, prepared them to be better persons for the future, protected them from adverse experiences outside school, helped them in building friends, and made them equal to successful persons in the society. Majority agreed that completing form four would make them better than those who stopped at class eight, in that they gained self-management skills and etiquettes of learned people, and language skills, which would give them high level of maturity. It protected them

from the bad experiences those not in school were experiencing. Education prepared them to deal with the people outside, to educate others outside, and they gained respect compared to those not in school.

Question 3: Look at our society. How do those who finish form four become better than those who do not?

The respondents had many reasons for persisting in school. Some said that,

"Those who finish form four are better in terms of decency and neatness, and have polished language use which is important in interacting with people outside."

"Secondary school experience help them gain self –management skills, high level of maturity and they therefore finally lead a better life."

"They gained ability to manage self-sustaining ventures like business, in a better way. Above all, the form four certificate gives them a chance to get a job."

Looking at the responses, the respondents attached various values to completion of secondary school education: attainment task value: polished language, self-management skills, neatness, decency, and maturity; utility task value: a job, businesses, leading a better life.

Question 4: What specific sacrifices and effort do you make for being a student?

This question was intended to investigate cost value task.

The extra county students said that they denied themselves sleep by waking up early in the morning, taking not very pleasant meals in school, missing siblings' company, and remaining in school while others went home. This is high cost task value.

"We wake up very early compared to when we are at home. I miss my sisters and brothers and the food we eat here in school is not like home food."

The sub-county school students mentioned that they walked to their school every day, attending school every day, poor study support facilities at home, and they had forgone company of family members over the weekends.

"Walking from home is not easy. And then it is every day. Sometimes we have no fuel at home to do homework. We have to be in school during weekend missing my family."

Students from both extra-county and sub county schools said they had challenges with time and difficulty of learning materials

"Sometimes we look for answers to questions without success. Time can never be enough to do everything.'

All the school type students were paying some substantial cost to remain in school.

Question 5: Are the sacrifices mentioned in (4) above worthy?

Majority, (actually 27 out of the 29 respondents) answered "Yes" to this question. They agreed that the sacrifices and effort were worthy. A prompting question on why they thought it was a worthy engagement brought responses like, "No sacrifice , no success" From the responses it was clear that they embraced attainment task value, utility task value, cost task value, and interest task value in that order.

Question 6: What are the advantages of being secondary school student? Pick the best description of yourself.

There were three statements that represented possible responses from the students. These were:

a. I enjoy being a secondary school student
b. Being a secondary school student makes me an important person in my society
c. I will get a job, make money and live a comfortable life after my education

Each respondent was given a chance to pick their responses. Out of the 29 students 24 of them – which is 82% – chose (b) "Being a secondary school student makes me an important person in the society". This is interesting because majority of the students embraced attainment task value whereas in the quantitative methods, attainment task value had positive non-significant prediction weight on academic engagement ($\beta = .03, p > .05$). Utility task value showed where some respondents said that education would give them a job, an opportunity to make money and live a comfortable life in the future. That is, engaging in education made them important persons and would help them meet their future goals of making their families better. Incidentally, no single student, out of the 29 focus group interview respondents said they persisted because they enjoyed being in school. In other words, in the responses to this particular question, no respondent chose interest task value as their inner motivation for being in school and being engaged.

Question 7: Some students who were in standard eight, form one, and form two with you long dropped out of school. What is your reason for persisting in school?

In responding to this open-ended question, the following were some of the answers from the sub county school students.

“Education is preparing me to be a better person in the society” – attainment task value

“Being in school protects me from the bad experiences that those who are not in school go through” – utility task value. “My destiny is being shaped” (This is utility task value). I interact with many people to be able to deal with people outside (This is attainment task value). I will be able to educate those who depend on me (This is utility task value).” The trend was the same for extra and the sub-county school students. Among the responses from the extra county school respondents were:

> “Education gives me a chance to enjoy learning something new every day. It helps me to focus on the future” (This is utility task value). “Education will give me a chance to change my family in the future.” (This is utility task value). “I need education to get a job” (This is utility task value)

Interestingly no student gave the reason for persisting in school as enjoying the process. Interest task value was lacking among the respondents.

4.3.3.4 Discussion of the findings. The null hypothesis sought to confirm whether there was significant prediction weight of task value on academic engagement. The results were that there was statistically significant prediction weight of task value on academic engagement. All the domains of task value: utility, attainment, interest and cost, equally predicted academic engagement, with utility task value on the lead. The findings agree with several previous studies. A study by Lawanto (2014) reported how undergraduate students perceived the course study materials in terms of utility, interest,

and importance, related strongly with their self-regulation in learning. Though this was not a direct correlation with academic engagement, self- regulated learning skills are known to be a critical characteristic of academic engagement. This shows that once the learners attach value to their academic tasks, they develop positive learning habits and strategies to succeed. That is, they give their energy to the task hence recording high academic engagement and ultimately high academic achievement.

Eccles (2005) notes that task value has a developmental aspect and is most salient during adolescence. The explanation for this is that adolescence is the period when they are setting most life's goals like career (Munanu, 2016), and, settling their personal and academic identities (Ireri, 2015). Eccles (2005) added that the adolescents are willing to pay the cost (Cost Task Value), in terms of the time and effort used, to achieve academically for the future. The cost task value was the second best predictor of academic engagement. Furthermore, Osman, et al. (2021) carried out a study among online undergraduate students, from a big public university located in Southwest United States. Task values was associated with expectations and actual task completion which is a critical indicator of academic engagement.

Interestingly, the findings of this study reported that of all the domains of task value, utility task value had the highest predictive value on academic engagement, followed closely by cost task value utility task value. Hypothetically interest task value would be expected to be the main reason for task engagement. Zhen et al. (2018) argued that high intrinsic value (interest in the current study) acted as fuel for self-driven learning

strategies that facilitated students to persist and invest effort leading to high achievements in mathematics engagement. From the qualitative data, students did not insinuate interest task value at all. We may conclude that the form three students in this study considered their academic achievement as instrumental in meeting their short term and long term goals. For that reason, the cost task value and the utility majored in their reasons for engagement. The parents and teachers should up their strategies of boosting the students' value for their academic tasks in order boost academic engagement and consequently higher the academic outcomes will be achieved. Studies have shown that people expend their effort and energy on tasks that they attach value to. More studies need to be carried out in future to understand students' academic engagement. As Upadyaya et al. (2021) notes, academic engagement is a complex quality that cannot be understood fully by use of prediction and correlational settings. More comprehensive approach to even the situations students are in is important.

4.3.4 Predictive weights of Intelligence Beliefs and Task Value on Academic Engagement

The researcher tested hypothesis three stated as follows:

H_{03}: There is no significance difference in the prediction weights of intelligence beliefs and task value on academic engagement.

Multiple regression was used for analysis and the results presented in Table 4.16

Table 4.16

Correlation Matrix of Intelligence Beliefs, task Value and Academic Engagement

Variable	1	2	3
1. AE	–		
2. IB	.62 **	–	
3. TV	.62 **	.99 **	–

Note. N = 813; $p < .05$; AE = Academic Engagement, IB = Intelligence beliefs, TV =Task Value

The data in Table 4.16 shows that the correlation between intelligence beliefs and academic engagement, and between task value and academic engagement was equal (r (813) = .62, $p < .05$). Multiple regression analysis was also done for further comparisons. The model summary was indicated in Table 4.17

Table 4.17

Model Summary of Regression of Intelligence Beliefs and Task Value on Academic Engagement

R	R^2	*Adj* R^2	*SE*	*F*	*df1*	*df2*	*P*
.63	.38	.38	9.90	252.79	2	810	.00

Note. N = 813; R^2 = Coefficient of determination, *SE*= Standard Error, *df* = degrees of freedom; *MS* = *F* = critical value of *F*.

The information in Table 4.17 showed that the two predictor variables jointly accounted for 38% (R^2 = .38) of the variance of academic engagement. The two were positive predictors of academic engagement (F (2, 810) = 252 .79, $p < .05$). This led to rejection of the null hypothesis and acceptance of the alternative. There is significant prediction weight of both intelligence beliefs and task value on academic engagement. For further interrogation of the results, Beta coefficient analysis were done and the data presented in Table 4.18.

Table 4.18

Beta Coefficient of Intelligence Beliefs and Task Value on Academic Engagement

Model		*β*	*p*
1	Constant	37.49	.00
	Intelligence Beliefs	.51	.00
	Task Value	. 11	.00

Note. N = 813

The information in Table 4.18 indicate that both intelligence beliefs and task value were positive and significant predictors of academic engagement. However, intelligence beliefs had higher Beta coefficient of (β =.51, p <.05), compared to task value (β = .11, p <.05). The prediction equation from the data was as follows:

$$\tilde{y} = 37.49 + .51\ (IB) + .11(TV)\ (R^2 = .38)\ p < .05$$

Where $\tilde{y}$ = the predicted academic engagement scores, IB = Intelligence Beliefs, TV = Task value. The equation implies that for each one-unit increase in intelligence beliefs

and task value, academic engagement increases by .51 and .11 respectively. The equation shows that intelligence beliefs had the greatest contribution to the variations of academic engagement hence the best predictor of academic engagement in the model. The null hypothesis, "There is no significant difference in prediction equation of intelligence beliefs and task value on academic engagement among form three students in Meru County" was rejected and the alternative favoured. Both intelligence beliefs and task value were statistically significant and positive predictors of academic engagement but intelligence beliefs provided the best prediction model. There was a difference in their prediction weights.

4.3.5 Intelligence Beliefs as Predictor of Academic Achievement

The descriptive statistics of academic achievement were presented, followed by null hypothesis testing and data presented in the respective tables, qualitative data presentation and the discussion of the findings.

4.3.5.1 Descriptive analysis of academic achievement. The maximum score for academic achievement was 82 points and the minimum was 8 points giving a range of 74 points. This shows quite a huge difference in academic achievement between the top scorers and the lower scorers among form three students. The mean score was (M = 41.42, SD = 13.56). The skewness was .15 and the Kurtosis was at - .05.

4.3.5.2 Testing the Null Hypothesis. The fourth null hypothesis was:

H_{04}: There is no significant prediction weight of intelligence beliefs on academic achievement.

Linear regression analysis was done to find out the predictive weight of intelligence beliefs on academic achievement. The model summary was presented in Table 4.19.

Table 4.19

Model Summary of Regression of Intelligence Beliefs on Academic Achievement

R	R^2	*Adj* R^2	*SE*	*F*	*df1*	*df2*	*P*
.61	.37	.37	9.90	484.61	1	811	.00

Note. N = 813; R^2 = *SE*= Standard Error, *df* = degrees of freedom; *MS* = *F* = critical value of *F*.

The data in Table 4.19 show that intelligence beliefs accounted for 37% (R^2 = .37) of the variations of academic achievement. The data were recorded in Table 4. 20.

Table 4.20

Correlation Matrix of Intelligence Beliefs on Academic Achievement

		A A	IB
Pearson Correlation	AA	1.00	
	IB	.61	1.00

Note. N = 813, $p < .05$; AA =Academic Achievement; IB = Intelligence Beliefs

The data in Table 4.20 suggest that the correlation between intelligence beliefs and academic achievement was (r (813) = .61, $p<$. 05). Hence, Intelligence beliefs was reported to be statistically significant positive predictor of academic achievement thus the null hypothesis was rejected. Two supplementary hypotheses in line with the two domains of intelligence beliefs, were formulated from (H_{04}) for further interrogation of the results. They were stated as follows:

$H_{04.1}$: There is no significant predictive weight of incremental intelligence beliefs on academic achievement

$H_{04.2}$: There is no significant predictive weight of fixed intelligence beliefs on academic achievement

The supplementary hypotheses were tested using multiple linear regression analysis. The results were presented in Table 4.21.

Table 4.21

Model Summary of Regression of the domains of Intelligence Beliefs Academic Engagement

R	*R^2*	*Adj R^2*	*SE*	*F*	*df1*	*df2*	*P*
.67	.45	.45	10.10	327.56	2	810	.00

Note. N = 813; R^2 = Coefficient of determination; *SE*= Standard Error; *df* = degrees of freedom; F = critical value of F.

The information in Table 4.21 reveals that 45% (R^2 = .45) of the variations of academic achievement was accounted for by the combination of the two domains. The two

domains contributed to the equation. The two hypotheses were rejected and their alternatives adopted. That is, both incremental and fixed intelligence beliefs had significant predictive weight on academic achievement. ANOVA was done to assess whether there were statistical significant differences among the prediction weights of the two domains of intelligence beliefs on academic achievement. The results are in Table 4.22.

Table 4.22

ANOVA of the Domains of Intelligence Beliefs on Academic Achievement

Model		*SS*	*df*	*MS*	*F*	Sig.
1	Regression	66791.10	2	33395.55	327.56	.00
	Residual	82581.04	810	101.95		
	Total	149372.13	812			

Note. N = 813; *SS* = sum of squares; *df* = degrees of freedom; *MS* = mean square; F = critical value of F.

a. Dependent Variable: academic achievement

b. Predictors: (Constant), Incremental intelligence beliefs and fixed intelligence beliefs.

The results in Table 4.22 revealed that, both incremental intelligence beliefs and fixed intelligence beliefs had positive significant prediction on academic achievement (F (2, 810 = 327.56, $p < .05$). They data also confirms that there was statistically significant difference between the predictive values of incremental intelligence beliefs and fixed intelligence beliefs on academic achievement (F (2, 810) =327.56, $p < .05$). To

determine the exact predictive weights of the two domains on academic achievement, Beta coefficient analysis was done and the results are displayed in Table 4.23**.**

Table 4.23

Beta Coefficients of the Domains of Intelligence Beliefs on Academic Achievement

Model		β	*p*
1	Constant	- 26. 94	.00
	Fixed Intelligence beliefs	.34	.00
	Incremental intelligence beliefs	.66	.00

Note. N = 813

The information in table 4.23 indicates that incremental intelligence beliefs was the best predictor of academic achievement. The prediction equation from multiple regression analysis is as follows:

$$\hat{y} = - 26.94 + .34 \text{ (FIB)} + .66 \text{ (IIB)} \ (R^2 = .37) \ p < .05$$

Where $\hat{y}$ referred to the predicted value of academic achievement, FIB is the fixed intelligence beliefs, IIB is incremental intelligence beliefs. The equation suggests that for every standard deviation increase of fixed intelligence beliefs and of incremental intelligence beliefs academic achievement increases by .34 points and .66 respectively.

4.3.5.3 Discussion of the Study Findings. The current study results have confirmed that there is significantly positive prediction of academic achievement by intelligence beliefs. The two domains of intelligence beliefs: incremental and fixed intelligence beliefs were also predictors of academic achievement. Several other previous studies reported the same prediction of academic variables. Woon (2021) in a study concluded that incremental intelligence beliefs intervention, had positive changes in mathematics achievement. Woon noted that in demanding and challenging academic situations, implicit theories of intelligence (ITI) have tendencies to influence academic achievement. Since incremental theory holders are of the view that they can change their intelligence, they apply effort even in difficult situations with an aim to overcome the obstacles. This effort leads into development of new coping skills hence new abilities to master the challenge and succeed. Sub–county schools are the most recent category of schools in Kenya, and they host the bulk of the high school population, and are mostly attended by the impoverished population of the society. It is understandable then that even under these circumstances, some students emerge successful in their academic achievement. Students with the malleable view of intelligence usually adapt to and ultimately succeed in a stressful or demanding situation like that which is presented by the sub–county schools. There is dire need to facilitate growth of the incremental intelligence views in our children early in life.

A study by Mutua et al. (2018) reported positive relationship between mindset (intelligence beliefs in the current study), and academic achievement of secondary school students in Kenya. Mutua et al. also reported negative correlation between fixed

intelligence beliefs and academic achievement. The same is echoed in the work of Burnette et al., (2013) that students' implicit theories of intelligence had positive effects of on the academic outcomes. Additionally, a meta-analysis of 46 studies by Ana and Luisa (2018) showed that implicit theories of intelligence related significantly and positively with academic achievement of high school students. The same is upheld in the study by Luo et al. (2014) who found that incremental beliefs correlated with mathematics achievement. This shows that implicit theories of intelligence have influence on both general academic achievement and on specific subjects.

Several scholars have tried to understand and explain why holders of incremental intelligence beliefs achieve more academically. Luo et al. (2014) found out that they develop achievement emotions, and attention in the learning situation, which lead to great performance. Luftenegger et al. (2019) suggested that since human beliefs profoundly influence behavior, the learners who hold incremental beliefs engage continuous effort which adds greatly to academic achievement. Rieche et al. (2019) says that intelligence beliefs affect the motivation to learn, which Braasch et al. (2014) also supports. Rieche et al and Braasch et al say that, apart from leading to better academic achievement, it can also increase completion rates and other positive learning behaviour. Once students believe that they can promote their ability, they put more effort in making it work and they finally succeed.

On the other hand, the fixed intelligence beliefs holders are said to perceive learning as unachievable. They settle for less hence they are likely to have no commitment to

growth. Such students avoid challenging learning situations and therefore their academic achievement may be low compared to the incremental beliefs holders. Lou et al. (2017) observed that fixed intelligence beliefs were negative predictors of learning outcomes. Those students who hold entity intelligence beliefs, show such characteristics as: helplessness and self-handicapping tendencies, pessimism, procrastination, and other negative attitudes especially in the face of academic challenges (Wawire, 2010) and task disengagement (Vivienne et al., 2022).

Entity intelligence theorists reported reduced practice prior to tests, poorer coping strategies when under stress, and give up prematurely on slight hardship (Woon, 2021). Woon says that they make sweeping generalizations about their ability and are unwilling to expend energy and effort in their academic tasks. Tao et al (2021) and Wang et al., (2021) argue that entity theorists believe that ability is indicated by achievement and therefore when they encounter failure in their academic tasks, they may attribute it to inability rather than to lack of effort. They are likely to transfer the attitude to the next task and therefore keep failing. This is very likely to impact negatively on their academic engagement. The current study and previous research has clearly highlighted intelligence beliefs as a critical quality in influencing academic achievement and holds a key to future success in education.

4.3.6 Task Value as Predictor of Academic Achievement

This sections is about the descriptive statistics of the variables, the null hypothesis testing, qualitative data and the discussion of the results.

4.3.6.1 Descriptive Analysis of Variables. Description of academic achievement by the levels of task value is shown in Table 4.24

Table 4.24

Descriptive Statistics of Academic Achievement by Levels of Task Value

Level	*N*	%	*M*	*SD*	*SE*
Low Task Value	26	3.1	17.6	8.43	1.65
Average Task Value	284	34.9	34.2	12.52	.74
High Task Value	503	62.0	46.7	10.87	.48
Total	813	100	41.4		

Note. N =813; *M* = Mean; *SD* = Standard Deviation; *SE* = Standard Error

The findings in Table 4.24 indicates that 503 (62 %) had high task value and the same had equally higher scores in academic achievement compared to the other groups (*M* = 46.7%, *SD* = 10.87). Those who had average task value were 284 (34.9 %) and their academic achievement scores were (*M* =34.2, *SD* = 12.52). Low task value respondents were only 26 (3.1 %) and had the least scores in academic achievement (*M* = 17.7, *SD* = 8.43).

4.3.6.2. Testing Hypothesis. The fourth hypothesis was aligned to the fourth objective of seeking prediction of academic achievement by task value. It was:

H_{05}: There is no significant prediction weight of task value on academic achievement

Linear regression analysis was used for testing this hypothesis. The results showed that task value explained 37% (R^2 = .37) of the variations of academic achievement. The correlation between task value and academic achievement was (r (813) = .61, $p < .05$). This led to the rejection of the null hypothesis and adoption of the alternative. There was significant prediction weight of task value on the variations of academic achievement, Analysis of variance (ANOVA) was done and the results displayed on Table 4.25.

Table 4.25

ANOVA of Academic Achievement based on Levels of Task Value

	S S	*df*	*M S*	*F*	*p*
Between Groups	43880.4	2	21940.2	168.5	.00
Within Groups	105491.8	810	130.2		
Total	149372.1	812			

Note. N = 813; SS = Sum of Squares; *df* =degrees of freedom; *MS* = Mean Squares; F = critical value of F

The findings shown in Table 4.25 indicate that there was statistically significant difference in academic achievement of the participants by different levels of task value (F (2,810) =168.5, $p <$. 05). The academic achievement mean scores of high, low and average levels of task value were not equal. To determine which groups had the differences, post hoc analysis of academic achievement based on task value levels was computed and the results were recorded in Table 4.26.

Table 4.26

Post Hoc Analysis of Academic Achievement based on Task Value Levels

(I) Task Value Level	*(J)* Task Value Level	*MD (I-J)*	*SE*	*p*
Low task value	Average task value	-16.56	2.33	.00
	High task value	-29. 13	2.29	.00
Average task value	Low task value	16.56	2.33	.00
	High task value	-12.57	.85	.00
High task value	Low task value	29.13	2.30	.00
	Average task value	12.57	.85	.00

Note. N = 813; *MD* = mean difference, *SE* standard error, *p* =significance level

The post hoc analysis in Table 4.26 indicated that there were differences between the six pairs of task value levels. However, the biggest differences were between the low task value and high task value (-29.13), and between the high task value and the low task value (29.13) pairs. This implies that task value has great influence on the

academic achievement of learners in form three. Four supplementary null hypotheses in line with the four domains of task value were formed from H_{05}, for in-depth analysis:

$H_{05.1}$: There is no significant prediction weight of interest task value on academic achievement

$H_{05.2}$: There is no significant prediction weight of utility task value on academic achievement

$H_{05.3}$: There is no significant prediction weight of attainment task value on academic achievement

$H_{05.4}$: There is no significant prediction weight of cost task value academic achievement

The four supplementary hypotheses were tested using multiple regression analysis. Both correlation matrix and regression data were used to interrogate the findings. The correlation matrix were displayed in Table 4.27

Table 4.27

Correlation Matrix of the Domains of Task Value with Academic Achievement

Variable	*p*	1	2	3	4	5
1. AA	.00	–				
2. ITV	.00	.46**	–			
3. UTV	.00	.60**	.57**	–		
4. CTV	.00	.58**	.70**	.83**	–	
5. ATV	.00	.52 **	.56 **	.88 **	.66 **	–

Note. N =813; p <.05; AA = Academic Achievement; ITV = interest Task Value; UTV = Utility Task Value; CTV = Cost Task Value; ATV = Attainment Task Value

According to the data in Table 4.27, utility task value scored highest in correlation with academic achievement (r (813) = .6.00, p < .05), followed by cost task value (r (813) = .58, p < .05), followed by attainment task value with (r (813) = .52, p <.05), while Interest Task Value had the least correlation (r (813) =.46 p <.05). Regression analysis was also performed for further interrogation of the results. The model summary was shown in Table 4.28.

Table 4.28

Model Summary of Multiple Regression of the domains of Task Value on Academic Achievement

R	R^2	*Adj* R^2	*SE*	*F*	*df1*	*df2*	*P*
.63	.38	.38	10.67	126.19	4	808	.00

Note. N = 813; $p < .05$; R^2 = Coefficient of determination; *SE*= Standard Error; *df* = degrees of freedom; *F* = critical value of *F*.

Table 4.28 shows that the domains of task value combined explained 38% (R^2 =.38, $p <$ .05) of the variations in academic achievement. The four domains of task value combined had significant predictive value on academic achievement. Analysis of variance (ANOVA) was done to find out whether there were significant statistical differences in the predictive weights of the task value domains on the variations of academic achievement. The ANOVA data was displayed in Table 4.29.

Table 4.29

ANOVA of Academic Achievement from the Domains of Task Value

Model		*SS*	*df*	*MS*	*F*	*p*
1	Regression	57433.74	4	14358.43	126.19	.00
	Residual	91938.40	808	113.79		
	Total	149372.13	812			

Note. N = 813; SS = Sum of Squares; *df* =degrees of freedom; *MS* = Mean Squares; *F* = critical value of F

The data in Table 4.29 show that there were significant statistical differences in the prediction weights of the different task values on academic achievement (F (4,810) =126.19, $p <$. 05). Beta coefficient were computed to determine the exact predictive weights of each domain of task value on academic achievement. Find the results are in Table 4.30.

Table 4.30

Beta Coefficient of Task Value Domains on Academic Achievement

Variable	β	*p*
Constant	-24.45	.00
Interest task value	.11	.00
Utility task value	.38	.00
Cost task value	.20	.00
Attainment task value	-.01	.86

Note. N = 813

The data in Table 4.30 presents utility task value (β = .38 $p <$. 05) as the best predictor of academic achievement. It was followed by cost task value (β = 20, $p <$. 05), and interest task value (β = .11, $p <$ .05). It was concluded that Utility task value, cost task value and interest task value had significant predictive value on academic achievement of form three students in Meru County, Kenya. Attainment task value had negative Beta coefficient (β = - .01, $p >$. 05). This statistic suggests non-significant contribution of attainment task value on academic achievement. The multiple regression equation was as follows:

$$\hat{y} = -24.45 + .11(ITV) + .38\ (UTV) + .20\ (CTV) - .01\ (ATV)\ (R^2 = .38\ )\ p < .05$$

Where $\hat{y}$ stands for the predicted value of academic achievement, ITV is interest task value, UTV is utility task value, CTV is cost task value and ATV is attainment task value. The equation suggests that for every Standard Deviation increase in interest task value, utility task value and cost task value, academic achievement increases by .11 , .38, and .20, respectively. On the other hand, for every Standard Deviation increase in attainment task value, academic achievement increases by -.01 points. From the equation it is clear that utility task value was the best predictor of academic achievement. Attainment task value was statistically non-significant predictor of academic achievement.

4.3.6.3 Discussion of the Findings. The current study reported positive prediction of academic achievement by task value. Three categories of task value: utility task value, cost task value and interest task value statistically positively and significantly predicted academic achievement. Al-Harthy and Aldhafri (2014) in their investigation of how self-efficacy and task value related to academic performance on the other side, among Qaboos university students. The results showed that self-efficacy related with task value and the two had significant correlation with the students' Grade Point Average (GPA). Though these two studies were done in the university, they are a pointer that once students perceive their academic tasks as important they devise ways of succeeding in them. Lawanto (2014) postulated that, motivated students explore and extend their knowledge and skills, showing increased effort, persistence and adaptive emotional reactions when faced with difficulties. These learning behaviors are the pre-

requisites for high academic achievement. The positive results agree with those of Mucherah and Stahl (2014) whose regression analyses of reading motivation and achievement among middle school learners, showed that task value predicted reading achievement among both the U.S. and Kenyan learners.

However, in their investigation of the relationship between task value and academic performance among high school orphans in western Kenya Oyuga, et al. (2019) found a weak but positive correlation between task value and academic performance among orphaned secondary school students. The learners must place a value on their academic tasks and then lay the necessary strategies to achieve and finally they achieve. The same is put forth by Liem et al. (2008) who put it that achievement motivation constructs of which task value is one, energizes and directs learners' behavior towards achievement. Liem et al. had found out that both self-efficacy and task value were positive predictors of students' mastery goal orientation. Mastery goal adoption leads to high academic achievement.

Task value seems a quality that should be cultivated among learners of all levels. When learners value their academic tasks, they are motivated and are likely to exhibit increased energy, effort, persistence and other adaptive behavior towards their learning even when faced with difficulties if they value their tasks. That intentional energy becomes an important determinant of academic success. In addition, task value predicts other positive learning behavior which in turn leads to positive academic achievement. On testing the domains of task value, it is interesting that utility task value tops in

predicting academic achievement followed by cost task value. Traditionally interest task value, equated to intrinsic motivation, has been viewed as the best predictor of positive learning behaviour and outcome (Zhen et al, 2018). This is an outcome that needs to be investigated further in order to understand fully what task value is giving our students the energy to perform and succeed in their tasks. The stakeholders of education and especially the parents and teachers who interact continuously with the learners need to intentionally inculcate task value in the learners so that academic achievement can be uplifted.

4.3.7 Predictive Weights of Intelligence Beliefs and Task Value on Academic Achievement

This sub-section presents the results of the assessment of the differences of the predictive weights of students' intelligence beliefs and task value on academic achievement. The descriptive statistics of intelligence beliefs and task value were computed followed by the appropriate inferential statistic. Discussions, conclusions and suggestions were made on the basis of the findings of the current study and the previous research related to it.

4.3.7.1 Descriptive statistics. The descriptive statistics of intelligence beliefs and task value are in Table 4.31.

Table 4.31

Descriptive Statistics of Intelligence Beliefs and Task Value

Variable	*R*	*Min*	*Max*	*M*	*SD*	*Sk*	*Kur*
IB	20	20	40	30.02	3.71	-.05	.16
TV	63	62	125	94.07	11.28	-.16	.22

Note. N = 813. Min = minimum; Max = maximum; M = mean; SD = standard deviation; Sk = skewness; Kur = kurtosis; IB = Intelligence beliefs; TV = Task value.

The information in Table 4.31, shows the range for the intelligence beliefs score was 20 while that of task value was 63. The minimum score for the intelligence beliefs score is 20 and the minimum for task value was 62. The maximum score for intelligence beliefs was 40 while the maximum score for task value was 125. The mean score for the intelligence beliefs was (*M* = 30.02, *SD* = 3.71) while that of task values was (*M* = 94.07, *SD* = 11.28). The coefficient of skewness for the intelligence beliefs and for task value was -.16 and -.22 respectively. This negative skewness may mean that the responses of both intelligence beliefs and task values may have been overrated. The kurtosis for the total academic mindset score was .17 while that of total learning strategies score was .11, hence a leptokurtic distribution for both variables meaning that the scores were clustered around the mean.

4.3.7.2 Testing the hypothesis. The hypothesis number sis (H_{06}) was in line with objective six and it framed as follows:

H_{06}: There is no significant statistical difference in the predictive weights of intelligence beliefs and task value on academic achievement

The null hypothesis was tested using multiple linear regression analysis. The analysis gave both the correlation and regression data. Table 4.32 presents the correlation matrix of intelligence beliefs, task value and academic achievement.

Table 4.32

Correlation Matrix of Intelligence Beliefs and Task Value on Academic Achievement

	1	2	3
1. AA	–		
2. IB	.61**	–	
3. TV	.61**	.99**	–

N = 813, *Note:* AA = Academic Achievement, IB = Intelligence Beliefs, TV= Task Value

The results in Table 4.32 show a strong correlation between intelligence beliefs and academic achievement on one side (r (813) = .61, $p < .01$) and between task value and academic achievement (r (81) =.61, $p < .01$). Interestingly the correlation coefficients of intelligence beliefs and academic achievement and that of task value and academic

achievement were the same. The model summary of the regression analysis was presented in Table 4.33.

Table 4.33

Model Summary of Regression of Intelligence Beliefs and Task Value on Academic Achievement

R	R^2	*Adj* R^2	*SE*	*F*	*df1*	*df2*	*P*
.61	.37	.37	10.74	242.03	2	810	.00

Note. N = 813; R^2 = Coefficient of determination; *SE* = Standard Error; *df* = degrees of freedom; F = critical value of F.

The findings in Table 4.33 shows that intelligence beliefs and task value combined accounted for 37% of the variations of academic achievement (R^2 = .37, p < .05). Analysis of Variance (ANOVA) was also computed for further interrogation of the differences in the predictive values of intelligence beliefs and task value on academic achievement. The results are as shown in Table 4.34.

Table 4.34

ANOVA of Intelligence Beliefs and Task Value on Academic Achievement

Model		*SS*	*df*	*MS*	*F*	*p*
1	Regression	55874.68	2	27937.34	242.03	.00
	Residual	93497.45	810	115.42		
	Total	149372.13	812			

Note. N =813; *SS*=Sum of Square; *df* =degrees of freedom; *MS*=Mean Square; *F*=critical value of F

The findings in Table 4.34 indicate statistically significant differences in the means of students' intelligence beliefs and task value prediction of academic achievement (F (2, 810) = 242. 03, $p < .05$). The researcher went further to compute Beta coefficients to find out the exact predictive weights of intelligence beliefs and task value on academic achievement. The results are in Table 4.35.

Table 4.35

Beta Coefficient of Intelligence Beliefs and Task Value on Academic Achievement

Model		B	β	*t*	*p*
1	Constant	-25.96		-7.87	.00
	Intelligence Beliefs	2.03	.56	1.74	.08
	Task value	.07	.06	.18	.85

Note. N =813; B = Unstandardized Beta; β=Standardized Beta; *t* =Critical Value of t; *p*<.05; *r* = Correlation coefficient

The findings in Table 4.35 indicate non-significant positive predictive weight of intelligence beliefs (β = .56, $p > .05$) and very non-significant positive predictive weight of task value (β = .06, $p > .05$) on academic achievement. The H_{06} was therefore rejected and alternative was taken as true. The difference in the prediction weights of intelligence beliefs and task value on academic achievement were statistically significant.

4.3.8 Prediction of Academic Engagement on Academic Achievement

This section presents testing of the null hypothesis number seven.

4.3.8.1 Testing the Null Hypothesis. This is the null hypothesis H_{07} stated as:

H_{07}: There is no significant prediction equation of academic engagement on academic achievement.

Regression analysis was used to test the hypothesis. The results are in 4.36.

Table 4.36

Correlation Matrix of Academic Engagement and Academic Achievement

	1	2
1. Academic engagement	1	
2. Academic achievement	.99**	1

Note. $N = 813$ $p < .05$

The data in Table 4.36 indicate perfect correlation between academic engagement academic achievement (r (813) = .99, $p < .05$). The records in Table 4. 37 show the model summary of regression analysis

Table 4.37

Model Summary of Multiple Regression of Academic Engagement on Academic Achievement

R	R^2	*Adj* R^2	*SE*	*F*	*df1*	*df2*	*P*
.99	.99	.99	1.00	147114.90	1	811	.00

Note. N = 813; R^2 = Coefficient of determination; *SE*= Standard Error; *df* = degrees of freedom; F = critical value of F.

The data in Table 4.37 was consistent with the correlation matrix. Academic engagement explained 99% of the variations of academic achievement. On the basis of both correlation and regression coefficients the null hypothesis was thereby rejected and the alternative was favoured. There was statistically very significant predictive value of academic engagement on academic achievement. Out of this null hypothesis, two supplementary null hypotheses were formulated in line with the domains of academic engagement. They were stated as follows:

$H_{07.1}$: There is no significant prediction weight of behavioural academic engagement and academic achievement

$H_{07.2}$: There is no significant prediction weight of emotional academic engagement and academic achievement.

The two supplementary null hypotheses were tested using multiple linear regression analysis. The results are presented in Table 4.38.

Table 4.38

Correlation Matrix of Domains of Academic Engagement and Academic Achievement

		1	2	3
1. AA	Pearson Correlation	–		
2. BAE	Pearson Correlation	.99**	–	
3. EAE	Pearson Correlation	.99**	.98**	–

Note. N = 813; AA = Academic Achievement; BAE = Behavioural Academic Engagement; EAE = Emotional Academic Engagement

The data in Table 4.38 shows that the correlations between behavioural academic engagement and academic achievement was near perfect (r (813) =.99, $p<$. 05). The same case with correlation of emotional academic engagement which was near perfect (r (813) =.98, $p < .05$) but slightly lower than the former. Behavioural academic engagement and emotional academic engagement correlation was also near perfect (r (813) = .98, $p < .05$). For further understanding of the findings, Beta coefficient was computed and the results are shown in Table 4.39.

Table 4.39

Beta Coefficient of Domains of Academic Engagement on Academic Achievement

	β	*r*	*p*
Constant	-68.12		.00
Behavioural academic engagement	.41	.99**	.00
Emotional academic engagement	.59	.99**	.00

Note. N = 813; β= Standardized Beta; r = correlation coefficient; p = significance level.

The information in Table 4.39 indicated that both the behavioural academic engagement ($\beta = .41$, $p < .05$) and emotional academic engagement ($\beta = .59$, $p < .05$) explained academic achievement. However the results revealed that emotional academic engagement was the best of the two domains of academic engagement in explaining the variations of academic achievement. The resulting equation is as follows:

$$\tilde{y} = -68.12 + .41\ (BAE) + .59\ (EAE)\ (R^2 = .37)\ p < .05$$

Where $\tilde{y}$ is the predicted academic achievement score; BAE is the behavioural academic engagement; EAE is the Emotional academic achievement. The prediction equation suggests that for each standard deviation increase in behavioural academic engagement and emotional academic engagement, academic achievement increases by .41 and .59 points respectively. The beta coefficient results which favoured emotional academic engagement were interesting seeing that the separate correlations of the domains and

academic achievement, were the same and near perfect. The domains combined had correlations (r (813) = .99, $p < .05$).

4.3.8.2 Discussion of the Findings. The results of the current study shows statistically significant prediction equation of academic engagement on academic achievement. Emotional academic engagement had higher contribution to academic achievement compared to behavioural academic engagement. Iris et al. (2021) reported that Spain respondents, who were of average social economic status persons reported positive correlation between academic engagement and academic achievement. All the domains of school engagement had positive correlation with academic achievement Lei et al. (2018) had similar results. A study in Kenya by Musila (2022) among form three students in Machakos county, found cognitive and emotional engagements to be positive and significant antecedents of academic achievement.

The results of this study and the reviewed literature agree that academic engagement is the way to go in causing positive outcomes in education. The only question is which dimension of academic engagement has higher prediction weight on academic achievement. While in the current study emotional academic engagement was the highest in predictor of academic achievement, Delfino's (2019), Putwain et al (2019), and Velez (2016) found behavioral dimension ahead of cognitive, and emotional engagements, in predicting academic performance.

Notwithstanding the differences in the prediction values of the different dimensions of academic engagement on academic achievement, it is clear that with academic engagement the students would achieve maximally academically. The current study report of a near perfect (r (813) = .99, p < .05) correlation and prediction of academic engagement on academic achievement is a sure bet that this is the quality that our learners need to sustain them in school, and for their ultimate success. Academic engagement will not just improve academic achievement but uplift general positive learning characteristics that keep learners in school.

Iris et al (2021) said that school engagement explained the differences not only in academic performance but also in self-regulation. The students who were engaged had the highest grades and at the same time they had less maladaptive regulatory behaviours. Close to Iris et al, were the findings of Uka and Uka (2020) who concluded that school engagement was relevant for successful school attendance and class transitions. School presence and transition are two major needs in the schools. If students can remain in school, then they can learn, and exit the program, with impressive academic achievement.

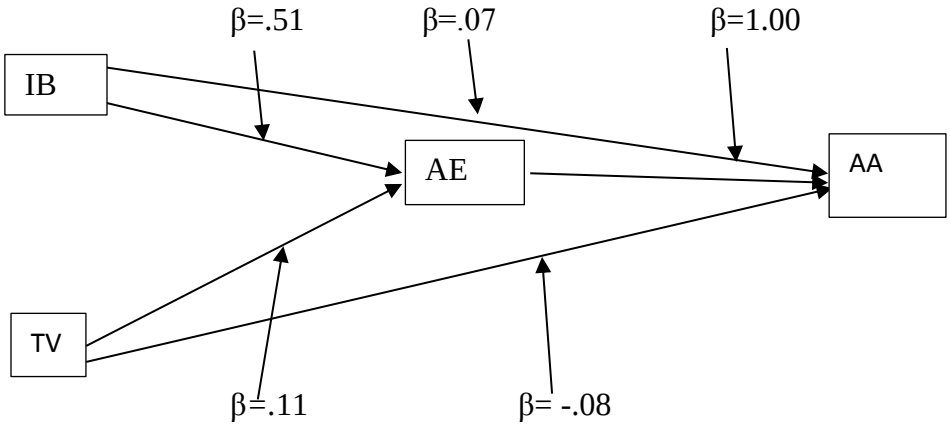
4.3.9 The mediational role of academic engagement in the prediction of intelligence beliefs and task value on Academic Achievement

This session aims at examining the best prediction path for the prediction of academic achievement. This was done by computing the path analysis. The appropriate path coefficients were analysed.

4.3.9.1 Computing the Mediational Paths. The computations were done by multiplying the coefficients of the paths from the predictor variable to the mediator variable, by the coefficient of the path from the mediator variable to the outcome variable. The results were compared with the direct paths from predictor to the outcome variables. The path coefficients are shown in figure 4.1.

Figure 4.1

Path Analysis Showing the Path Coefficients



Note. *N* = 813; IB = Intelligence beliefs; TV = Task Value; AE = Academic Engagement; AA = Academic achievement.

The data in Figure 4.1 shows the possible paths in the current study. The following direct paths were identified:

i. The path from IB to AE whose β=.51,
ii. The path from IB to AA with β=.07
iii. The path from AE to AA where β=1.00)
iv. The path TV to AE with β =.11
v. The path TV to AA (*β*=-.08).

Two mediational paths were identified. These were:

i. Paths IB to AE to AA.

   IB to AE * AE to AA, that is, (β= .51*1.00 =.51, *p* <.05). This is higher than the direct path of IB to AA (β = .07, p <.05)

ii. Path TV to AE to AA.

   TV to AE *AE to AA, that is, (β =.11*1.00 =.11, *p* <.05).

Task value did not predict academic achievement directly but only in the presence of academic engagement. Coefficients of paths TV to AE and path AE to AA were multiplied. This is a bigger coefficient compared to the direct path of task value to academic achievement. The presence of academic engagement in the equation raised the prediction of task value on academic achievement though by a small margin. The mediation weight of academic engagement on the predictive value of academic

achievement by intelligence beliefs was high and therefore the best fit model for the current study.

4.3.9.2 Discussion of the findings. Following the results of the current study, it appears that engagement is the mediating variable in the prediction of academic achievement by both intelligence beliefs and task value and especially for intelligence beliefs. In literature, engagement has been viewed as a necessary mechanism mediating relationships of different variables that lead to success in learning. A study by Malechwanzi and Hongde (2018) seeking relationship between the learning resources and students' learning outcomes, reported complete mediation of the relationship by academic engagement. The indirect effect was very significant compared to the direct path. This implies that it does not matter whether students are provided with everything they need to succeed, but that they must be academically engaged to succeed.

The results of this study imply that if the learners have the right intelligence views and they are involved and committed in their learning tasks (academically engaged), they are bound to overcome any learning challenges and emerge successful in their academic achievement. This is supported by Naprabadi et al (2022) who said that optimum benefits of intelligence beliefs in science could only be achieved when academic engagement is present It is not surprising that in the current study academic engagement prediction of academic achievement was near perfect ($\beta = .99$, $p < .05$), and the correlation between the two variables also near perfect (r (813) = .99, $p < .05$).

Academic engagement therefore remains the ligament that hold academic success among our students.

4.4 Exploratory Analysis

The researcher explored the interaction between gender school type and age, with all the study variables. This is in alignment to objective nine and H_{09} respectively. Hypothesis number nine was framed as follows:

H_{09}: There is no significant interaction effect of gender, school type and age categories, with the study variables

4.4.1 Interaction between Gender, Intelligence Beliefs and Task Value, Academic Engagement and Academic Achievement

This section deals with the description of intelligence beliefs, task value, academic engagement, and academic achievement by gender, and the tests of the main interaction effects of the above study variables with gender. The section ends with discussion of the interaction effects findings.

4.4.1.1 Interaction between Gender and Intelligence Beliefs. The researcher sought to explore the interaction effect of gender, school type and age with students intelligence beliefs, task value, academic engagement and academic achievement. This exploration helped in controlling for the interactions of the study variables and to

provide further interrogation into the results. Descriptive analysis of intelligence beliefs scores by gender were computed and the scores displayed in Table 4.40.

Table 4.40

Descriptive Statistics of Intelligence Beliefs by Gender

	Gender	*N*	*M*	*SD*	*SE*
Intelligence Beliefs	Male	383	30	3.76	0.19
	Female	430	29.13	3.43	0.17

Note: N=813; *M* = Mean, *SD*=Standard deviation, *SE* = Standard Error

The information in Table 4.40 shows that the males scored higher (*M* = 30, *SD* = 3.76) than the females (*M* = 29.13, *SD* = 3.43) in intelligence beliefs. The domains of intelligence beliefs were also described based on gender. The were as shown in Table 4.41.

Table 4.41

Description of Domains of Intelligence Beliefs by Gender

	Gender	*M*	*SD*
Intelligence Beliefs	Male	15.59	2.77
	Female	14.60	3.0
Fixed Intelligence beliefs	Male	15.25	2.90
	Female	14.68	3.15

Note. N = 813; FIB = Fixed Intelligence Beliefs, IIB = Incremental Intelligence Beliefs.

The findings in Table 4.41 indicate a difference in the intelligence beliefs means of males and females. The male participants scored higher in all the domains of intelligence beliefs. An independent-samples t-test was computed to compare the means of males and females in the domains of intelligence beliefs, to find out whether the means had significant statistical differences. The findings were recorded in Table 4. 42.

Table 4.42

Independent Samples t-test of Intelligence Beliefs by Gender

	P	*t*	*df*	*p*	*M*	*SE*
Equal variance assumed	.00	6.09	811	.00	5.90	.86
Equal variance not assumed		6.05	773.52	.00	5.90	.57

Note. N = 813; $p < .05$; *df* = degrees of freedom; *M* = Mean; *SE* = Standard Error

The data in Table 4.42 showed statistically significant differences in the means of intelligence beliefs by gender (t (811) = 6.09, $p < .05$). The results proof that the males and females were statistically not equal in their intelligence beliefs scores. Another Independent samples t-test for the domains of intelligence beliefs was performed for further understanding of the results. The findings were presented in Table 4.43.

Table 4.43

Independent Samples t-test of Domains of Intelligence Beliefs by Gender

Variable		*F*	*p*	*t*	*df*	*p*
IIB	Equal Variance assumed	4.37	.04	4.83	811	.00
	Equal Variance Not assumed			4.85	810.06	.00
FIB	Equal Variance assumed	1.01	.31	2.67	811	.01
	Equal Variance Not assumed			2.69	810.05	.01

Note. N =813; IIB = Incremental Intelligence Beliefs; FIB = Fixed Intelligence Beliefs; *df* = degrees of freedom; *F* = critical value of F; *t* = critical value

The data in Table 4.43 show significant differences in incremental intelligence beliefs (*t (*811) = 4.85, p <.05) by gender, hence Equal variance was not assumed. There was non-significant statistical mean differences in fixed intelligence beliefs by gender (*t* (811) =2.67, $p > .05$). Equal variance was assumed. This favours the null hypothesis, there is no significant difference in the means of fixed intelligence beliefs by gender.

4.4.1.3 Interaction between Gender and Task Value. The purpose of this analysis was to find out how being male or female influenced the scores of the participants in task value. The description of the task value by gender was given**.** They are presented in Table 4.44.

Table 4.44

Descriptive Statistics of Task Value by Gender

	Gender	*N*	*M*	*SD*	*SE*
Task Value	Male	383	96.7	11.37	.57
	Female	430	91.43	10.53	.52

Note. N = 813, *M* =Mean; *SD* =Standard Deviation; *SE* =Standard Error

The data in Table 4.44 shows that the males reported higher task value (*M* = 96.75, *SD* 1=11.37), compared to females (*M* = 91.43, *SD* = 10.55). Descriptive analysis of task value domains by gender was also done. Though task value per see had the statistics presented in Table 4.44, it was necessary to assess the descriptive statistics scores of individual domains in order to make meaningful comparisons and conclusions. These domains are: the utility task value, attainment task value, interest task value, and the cost task value. The results were recorded in Table 4.45.

Table 4.45

Descriptive Statistics of Domains of Task Value by Gender

Variable	Gender	*N*	*M*	*SD*	*SE*
Interest	Male	383	29.89	2.73	.14
	Female	430	28.76	2.02	.10
Utility	Male	383	29.32	4.43	.22
	Female	430	27.72	4.46	.21
Attainment	Male	383	26.97	4.43	.23
	Female	430	26.38	4.05	.20
Cost	Male	383	14.12	2.08	.11
	Female	430	12.87	2.01	.10

Note. *N* = 813; M = Mean; *SD* =Standard Deviation; *SE* =Standard Error

The data in Table 4.45 shows that the males had higher mean scores in all the domains, compared to the female students. In interest the males scored (*M* (383) = 29.89, *SD* =2.73) while females scored (*M* (430) = 28.76, *SD* = 2.02). In Utility the males scored (*M* (383) = 29.32, *SD* =.22) while the females scored (*M* (430) = 27.72, *SD* = 4.4 6). In attainment the males scored (*M* (383) = 26.97, *SD* = 4.43) while the females scored (*M* (430) = 26.38, *SD* = 4.05). In cost the males scored (*M* (383) = 14.12, *SD* = 2.08) while the females had (*M* (430) = 12.87, *SD* = 2.01). For inferential statistical comparisons

and differences, independent samples t-test was performed. The results are in Table 4.46.

Table 4.46

Independent Samples t-test of Task Value based on Gender

	F	*p*	*t*	*df*	*p*	*M*	*SE*
Equal variance assumed	8.35	.00	5.81	811	.00	4.53	0.78
Equal variance not assumed			5.80	778.8	.00	4.53	0.78

Note. N = 813; *df* =degrees of freedom; p <. 05; M = Mean; *SE* = Standard Error

The independent-samples t-test information in the Table 4.46 show indicate statistically significant differences of task value by gender (t (811) = 5.81, $p < .05$). Equal variance was not assumed. Therefore, following the results the t-test, the null hypothesis was rejected in favour of the alternative taken. There are statistically significant differences in the means of task value by gender. Need for further interrogation led to the performance of independent samples t-test to find out whether the differences in mean scores of the domains of task value by gender were statistically significant. The results were presented in the Table 4.47.

Table 4.47

Independent Samples t-test of Task Value Domains by Gender

Variable		*F*	*p*	*t*	*df*	*P*
ITV	Equal Variance assumed	113.95	00	6.73	811	.00
	Equal variance not assumed			6.61	696.52	.00
UTV	Equal Variance assumed	.04	.84	5.14	811	.00
	Equal variance not assumed			5.15	801.14	.00
ATV	Equal Variance assumed	-137	.72	1.99	811	.05
	Equal variance not assumed			1.98	778.30	.05
CTV	Equal Variance assumed	27.18	.00	8.67	811	.00
	Equal variance not assumed			8.65	793.5	.00

Note. $N = 813$; *df* = degrees of freedom; *F* = critical value of F; $p < .05$

The results in Table 4.47 show that three domains of task value had statistically significant difference by gender. These are interest task value (t (811) = 6.61, $p < .05$), utility task value (t (811) = 5.14, $p < .05$) and cost task value (t (811) = 8.67, $p < .05$). Attainment task value scores had marginally non-significant mean differences by gender (t (811) = 1.99, $p > .05$).

4.4.1.3 Interaction between Gender and Academic Engagement. The descriptive statistics of academic engagement by gender and the tests of the interaction effects were presented in this section. Independent samples t-test was carried out to find out the differences of academic engagement scores by gender. The findings were recorded in Table 4.48.

Table 4.48

Independent Samples t-test of Academic Engagement based on Gender

	F	*p*	*t*	*df*	*p*	*M*	*SE*
Equal variance assumed	9.84	.00	6.85	811	.00	5.90	.86
Equal variance not assumed			6.80	765.5	.00	5.90	.87

Note. N = 813; F = critical value of F; df = degrees of freedom; M = mean; SE = Standard Error.

Table 4.48 shows result of the independent-samples t-test indicating statistically significant difference in task value means by gender (t (811) = 6.80, $p < .05$). Therefore, equal variance is not assumed. This led to the rejection of the null hypothesis and acceptance of the alternative hypothesis was adopted. There is statistically significant gender differences in the task value means by gender.

4.4.1.4 Interaction between Gender and Academic Achievement

Independent samples t-test was performed and the findings recorded in Table 4.49.

Table 4.49

Independent Samples t-test of Academic Engagement based on Gender

	F	*p*	*t*	*df*	*p*	*M*	*SE*
Equal variance assumed	10.81	.00	6.85	811	.00	6.35	.93
Equal variance not assumed			6.79	760.83	.00	6.35	.94

Note. N = 813; F = critical value of F; df = degrees of freedom; M = mean; SE = Standard Error.

The data in Table 4.49 show results of the independent-samples t-test indicating statistically significant difference in academic achievement means by gender (t (811) = 6.79, $p < .05$). Therefore, equal variance is not assumed. The null hypothesis was therefore rejected and the alternative hypothesis taken. There was statistically significant academic achievement means differences by gender.

4.4.2 Interaction between School Type, Intelligence Beliefs, Task Value, Academic Engagement and Academic Achievement

The descriptive and the inferential statistics of interaction of school type with all the study variables; intelligence beliefs, task value, academic engagement, and academic achievement; were done and presented in this section.

4.4.2.1 Interaction between School Type and Intelligence Beliefs. The descriptive and inferential statistics of school type and intelligence beliefs were done and presented in this section. The descriptive statistics were recorded in table 4.50.

Table 4.50

Descriptive Statistics of Intelligence Beliefs by School Type

School Type	*N*	*M*	*SD*	*SE*
National	39	31.59	2.7	.44
Extra County	237	31.29	3.4	.22
County	86	29.86	4.1	.44
Sub County	451	29.25	3.6	.17
Total	813	100	3.7	.13

Note: N =813; *M* = mean; *SD* = Standard Deviation; *SE* = Standard error.

The data in the Table 4.50 above provides evidence that the intelligence beliefs scores were highest among National school students (*M* = 31.59 *SD* = 2.7), followed by the

extra county students (*M* = 31.29, *SD* = 3.4), county schools (*M* = 29.86, *SD* = 4.1) and lastly the sub-county schools (*M* = 29.25, *SD* = 4.1). Analysis of variance (ANOVA) was done to find out whether there were statistically significant differences between the means of intelligence beliefs by school type. The findings were recorded in Table 4.51.

Table 4.51

ANOVA of Intelligence Beliefs by School Type

	SS	*df*	*MS*	*F*	Sig.
Between Groups	747.25	3	249.08	19.35	.00
Within Groups	10414.44	809	12.87		
Total	11161.69	812			

Note: N = 813: SS = Sum of Squares; df = degrees of freedom; MS =Mean square; F = critical Value;

The results in Table 4.51 showed statistically significant difference in the means of intelligence beliefs by school types (F (3, 809) = 19.35, $p < .05$). The null hypothesis was thereby rejected and the alternative hypothesis was adopted. That is, there are statistically significant differences in the means of intelligence beliefs by school types. Further, post hoc comparison analysis were done to find out the exact differences of the

intelligence means among the different school types. The findings were recorded in Table 4.52.

Table 4.52

Post Hoc Analysis of Intelligence Beliefs by School Type

(I) School Type	*(J)* School Type	*MD (I-J)*	*SE*	*p*
National	Extra County	.30	.62	.63
	County	1.73	.69	.01
	Sub county	2.34	.60	.00
Extra County	National	-.30	.62	.63
	County	1.43	.45	.00
	Sub county	2.04	.29	.00
County	National	-1.73	.69	.01
	Extra County	-1.43	.45	.00
	Sub County	.61	.42	.15
Sub county	National	-2.34	.60	.00
	Extra county	-2.04	.29	.00
	County	- .61	.42	.15

Note. N = 813; *MD* = Mean Difference; *SE* Standard Error; $p < .05$

The information in Table 4.52 indicates no statistically significant differences in intelligence beliefs mean scores of national and extra county schools (*MD* = .30, $p >$

.05), and that of between county and sub-county schools (MD = .61, $p > .05$**).** The mean differences between national school and county was statistically significant (*MD* = 1.73, $p < .05$). In addition, the mean scores between national and sub county school types was also statistically significant (*MD* =2.34, $p < .05$)).

4.4.2.2 Interaction between School Type and Task Value. This sections presents the descriptive statistics of task value by school types, analysis of variance and post hoc analysis. The descriptive statistics are recorded in the Table 4.53.

Table 4.53

Descriptive Statistics of Task Value by School Type

School Type	*N*	*M*	*SD*	*SE*
National	36	98.77	8.2	1.31
Extra County	337	97.97	10.4	.35
County	79	93.45	12.5	.67
Sub county	361	91.73	11.1	.52
Total	813	94.07	11.3	.39

Note. *N* = 813

The findings in Table 4.53 shows that students' task value scores varied as follows: national school (*M* = 98.77, *SD* = 8.2), extra county (*M* = 97.97, *SD* = 10.4) county (*M* = 93.45, *SD* = 12.5) and sub-county (*M* = 91.73, *SD* = 11.1). The national school

students had the highest task value followed closely by the extra county. Analysis of Variance (ANOVA) was done to find out whether there were significant differences in task value means among school types. The results are presented in Table 4.54.

Table 4.54

ANOVA of Task Value Means by School Type

	SS	*df*	*MS*	*F*	*p*
Between Groups	6987.29	3	2329.10	19.57	.00
Within Groups	96295.99	809	119.03		
Total	103283.27	812			

Note. N = 813; *MD* = Mean Difference; *SE* Standard Error; p = significance level

The findings in Table 4.54 show statistically significant differences between the means of task value by school types (F (2, 809) = 19.57, $p < .05$). The null hypothesis was thus rejected meaning there was statistically significant interaction between school types and task value. The researcher did a post hoc analysis to find out which school types had task value mean score differences. The results are recorded in Table 4.55.

Table 4.55

Post Hoc Analysis of Task Value by the School Type

(I) School Type	*(J)* School Type	*MD (I-J)*	*SE*	*p*
National	Extra county	.80	1.89	.67
	County	5.32	2.11	.01
	Sub county	7.04	1.82	.00
Extra County	National	-.80	1.89	.67
	County	4.52	1.37	.00
	Sub county	6.25	.88	.00
County	National	-5.32	2.11	.01
	Extra county	-4.52	1.37	.00
	Sub county	1.73	1.28	.18
Sub county	National	-7.04	1.82	.00
	Extra county	-6.25	.88	.00
	Sub county	-1.73	1.28	.18

Note. *N* = 813; *MD* = Mean Differences; *SE* = Standard Error

The findings in Table 4.55 show a non-significant mean score differences in the task value of the national school and the extra-county (*MD* = .80, *p* > .05), and no statistically significant difference in the task value means of the county and the sub-county schools (*MD* = 1.73, *p* > .05) . However, statistically significance differences were found in the mean scores of task value, between the national schools and the

county schools (*MD* = 5.02, $p < .05$), and between the national and the sub-county schools (*MD* = 7.04, $p < .05$). The task value mean scores of the extra-county and the county schools were statistically significant as well (*MD* = 4.52, $p <_.05$). The same case for and between the extra-county and the sub-county category of schools (*MD* = 6.25, $p < .05$). These results seem to point to similarities between the national school and the extra-county school categories on one hand, and the similarities between the county and the sub-county categories of school on the other hand.

4.4.2.3 Interaction between School Type and Academic Engagement. Both the descriptive and inferential analysis of interaction effects between the different school types and academic engagement were done. The results of the descriptive statistics of academic engagement by school type are recorded in the Table 4.56.

Table 4.56

Descriptive Statistic of Academic Engagement by School Type

School Type	*M*	*SD*	*Min*	*Max*
National	112.11	8.97	95	131.00
Extra County	105.06	10.94	78	132.00
County	94.23	10.47	72	118.00
Sub county	97.76	12.89	71	129.00

Note. *N* = 813; *M* = Mean; *SD* = Standard Deviation; *Min* =Minimum; *Max* = Maximum

The information in Table 4.56 indicate that the national schools scored highest mean in academic engagement (*M* = 112.11, *SD* = 8.97), followed by extra county school students who had academic engagement mean score of (*M* = 105.06, *SD* = 10.94). Surprisingly the sub county schools, which are position four in school status in the country, was position three in academic engagement score (*M* = 97.76, *SD* = 12.89), while the county schools students had the least with (*M* = 94.23, *SD* =10.47). The maximum mean score of the sub county schools was also higher (*Max* =129), than that of the county schools (*Max* =118). Analysis of variance (ANOVA) was done to find out whether there was significant statistical differences of academic engagement by school types. The findings are recorded in Table 4.57.

Table 4.57

ANOVA of Academic Engagement by School Type

	SS	*df*	*MS*	*F*	*P*
Between groups	37741.41	3	12580.47	111.75	.00
Within groups	91077.02	809	112.68		
Total	128818.42	812			

N = 813

Note. *N* = 813; *MD* = Mean Difference; *SE* Standard Error; *p* = significance level

The information in the Table 4.57 show statistically significant difference in the means of academic engagement by school type (F (3, 809) = 111.75, $p < .05$). Further analysis was done using post hoc to find out the specific differences of academic engagement means across the different types of schools. The findings are recorded in Table 4.58.

Table 4.58

Post Hoc Analysis of Academic Engagement by the School Type

(*I*) School Type	(*J*) School Type	*MD (I-J)*	*SE*	*p*
National	Extra county	8.78	1.83	.00
	County	20.19	2.05	.00
	Sub county	21.63	1.77	.00
Extra County	National	-8.78	1.83	.00
	County	11.41	1.34	.00
	Sub county	12.85	.85	.00
County	National	20.19	2.05	.01
	Extra county	-11.41	1.34	.00
	Sub county	1.44	1.25	.25
Sub county	National	-21.63	1.77	.00
	Extra county	-12.85	.85	.00
	County	-1.44	1.25	.25

Note. N = 813; $p < .05$; *SE* standard Error; *MD* = mean difference

The data recorded in Table 4.58 that major statistically significant mean score differences of academic engagement existed between the national schools and the sub-county schools students (*MD* =21.63, $p < .05$), and between the national schools and the county (*MD* = 20.19, $p < .05$). There was non-significant means differences between county and sub county schools (*MD* =1.44, $p > .05$), followed by the difference in academic engagement means of national and extra county schools (*MD*=8.78, $p < .05$)

4.4.2.3 Interaction between School Types and Academic Achievement. The researcher went ahead to test how the different school types interacted with academic achievement. The descriptive statistics are shown in Table 4.59.

Table 4.59

Descriptive Statistics of Academic Achievement by School Type

School Type	N	*M*	*SD*	*SE*
National	39	60.90	13.4	2.14
Extra County	237	49.84	11.9	.77
County	79	37.26	12.0	1.30
Sub county	451	36.11	10.7	.50
Total	813	41.42	13.6	.48

Note. *N* = 183; *M* = Mean; *SD* = Standard Deviation; *SE* = Standard Error

The data in the Table 4.59 show that the national schools' respondents scored highest scores in academic achievement (*M* =60.9, *SD* = 13.4), followed by the extra county schools (*M* = 49.84, *SD* =11.9), then the county schools (*M* = 37.26, *SD* = 12.0) and the

least was the sub county schools (*M* =36. 11, *SD* = 10.7). Analysis of Variance (ANOVA) was done to find out whether there were statistically significant differences in means of academic achievement by school types. The results are recorded in Table 4.60.

Table 4.60

ANOVA of Academic Achievement by School Type

	SS	*df*	*MS*	*F*	*P*
Between groups	45793.91	4	15264.64	119.23	.00
Within groups	103578.22	808	118.03		
Total	149372.13	812			

Note. *N* = 813; *MD* = Mean Difference; *SE* Standard Error; *p* = significance level

The information in Table 4.60 show that the means of academic achievement by different school types were statistically significant (F (4, 808) =119.23, $p < .05$). This led to the rejection of the null hypothesis and adoption of the alternative taken. A post hoc analysis was done to find out which pairs of school types had the academic achievement means differences. The results are as in Table 4.61.

Table 4. 61

Post Hoc Analysis of Academic Achievement by the School Type

(I) School Type	*(J)* School Type	*MD (I-J)*	*SE*	*p*
National	Extra county	11.06	1.96	.00
	County	23.64	2.18	.00
	Sub county	24.79	1.89	.00
Extra County	National	-11.06	1.96	.00
	County	12.58	1.42	.00
	Sub county	13.73	.91	.00
County	National	-23.64	2.18	.01
	Extra county	-12.58	1.42	.00
	Sub county	1.45	1.33	.39
Sub county	National	-24.79	1.89	.00
	Extra county	-13.73	.91	.00
	County	-1.45	1.33	.39

Note. $N = 813$; $p < .05$; *SE* = Standard Error; *MD* = Mean Difference

The data record in Table 4.61 above shows multiple comparison of the means of academic achievement across the school types. The difference between academic achievement means of national schools and extra-county was the least ($MD = 11.06$, $p < .05$). The widest gap in the academic achievement means was between National schools and sub county school ($MD = 24.79$, $p < .05$), followed by the academic achievement means difference between the National and county schools was ($MD = 23.64$, $p < .05$).

The academic achievement mean score differences between the county and the sub-county categories of schools was non-significant (MD = 1.45, p >.05). These differences in the means of academic achievement by school type implies that the national schools and the extra county schools lead in academic achievement, while the county and the sub-county categories lag behind.

4.4.3 Interaction of Age with Intelligence Beliefs, Task Value, Academic Engagement, and Academic Achievement

The purpose of this section was to assess the differences in the mean scores of each of the study variables, that is, intelligence beliefs, task value, academic engagement, and academic achievement, by the age categories. The respondents were placed in three categories: 15–17 years, 18–20 years, and 21 – 22 years.

4.4.3.1 Interaction of Age with Intelligence Beliefs. Descriptive statistics were computed followed by the comparison of means of intelligence beliefs by the three age categories. The results were recorded in Table 4.62.

Table 4.62

Description of Intelligence Beliefs, by Age Intervals

	Age Categories	*N*	*M*	*SD*	*Kur*	*Sk.*
IB	15 – 17	358	30.78	3.55	.51	-.29
	18 – 20	440	29.44	3.68	.24	.19
	21 – 23	15	28.73	4.86	-.62	-.27
	Total	813	30.02	3.71	.16	-.05

Note. *N* =813; *M* =Mean; *SD* = Standard Deviation; *Kur*=Kurtosis; *Sk* =Skewness

The results in Table 4.62 show that the intelligence beliefs mean of the participants differed from one age category to another. Age category 15-17 years scored the highest means in Intelligence beliefs (*M*=30.78, *SD* = 3.55). This was followed by the age category 18-20 years (*M*=29.44, *SD* = 3.68), and the least was 21-23 years (*M*= 28.73, *SD* = 4.86). To find out whether there were statistically significant differences in the means of intelligence beliefs among the age categories, Analysis of Variance (ANOVA) was performed. The results are in Table 4.63.

Table 4.63

ANOVA of Intelligence Beliefs by Age Categories

		SS	*df*	*MS*	*F*	*p*
IB	Between groups	379.17	3	189.58	14.24	.00
	Within Groups	10782.18	809	13.31		
	Total	11161.69	812			

Note. N = 813; *SS* =Sum of Squares; *df* = degrees of freedom; *MS* =Measure of Squares; *F*= critical value of F; $p < .05$

The ANOVA findings in Table 4.63 show that the mean scores of intelligence beliefs had statistically significant differences across the age categories (F (3, 809) =14.24, $p <$. 05). The null hypothesis was thus rejected and the alternative was taken as true. There are statistically significant intelligence beliefs mean score by the age categories. Further analysis was done using post hoc comparison analysis to find out where the exact differences were, and if the differences were statistically significant. The results are as in Table 4.64.

Table 4.64

Post Hoc Analysis of Intelligence Beliefs by Age Categories

I (Age Category)	*J*(Age Category)	*M(I-J)*	*SD*	*p*
15 – 17	18 – 20	1.34	.26	.00
	21 – 23	2.05	.96	.03
18 – 20	15 – 17	-1.34	.26	.00
	21 – 23	.71	.96	.46
21 – 23	15 – 17	-2.05	.96	.03
	18 – 20	-.71	.96	.46

Note. *N* =813; *SD* = Standard Deviation; *P*<.05; *M*=Mean; *I*&*J*=Age categories

The post hoc output in Table 4.64 show there were statistically significant differences in the mean scores of intelligence beliefs by the age categories. The biggest differences were between age category (15 – 17) years and category (21 – 23) years (*MD* =2.05, $p < .05$)

4.4.3.2 Interaction between Age Categories and Task Value. The descriptive statistics of intelligence beliefs as per the age groupings were computed. The findings are recorded in Table 4.65.

Table 4.65

Descriptive Statistics of Task Value by Age Categories

Variable	Age Category	*N*	*M*	*SE*	*Kur*	*Sk*
TV	15 – 17	358	96.43	10.73	.69	-.35
	18 – 20	440	92.30	11.22	.17	.05
	21 – 23	15	89.60	15.19	-.51	-.33
	Total	813	94.07	11.28	.22	.16

Note. *N*=813; *TV* = Task Value; *M* = Mean; *SE* = Standard Error; *Kur* =Kurtosis; *Sk* = Skewness

The results in Table 4.65 shows that the youngest category scored the highest in task value (*M* (15-17) = 96.43), while the oldest age category scored the least among the categories (*M* (21 – 23) = 89.60)

To find out whether the task value means by age categories had statistically significant differences, Analysis of Variance (ANOVA) was performed. The results are recorded in Table 4. 66.

Table 4.66

ANOVA of Task Value by Age Categories

		SS	*df*	*MS*	*F*	*p*
TV	Between groups	3684.20	2	1848.10	14.98	.00
	Within Groups	99599.08	810	122.96		
	Total	103283.28	812			

Note. N = 813; $p < .05$; TV = Task Value; *SS* Sum of Squares; *df* = degrees of freedom; *F* = Critical value of F

The data record in Table 4.66 show statistically significant differences in the means of task value by age categories (F (2, 810) =14.98, $p < .05$). The null hypothesis was therefore rejected and the alternative was taken as true. That is, there is statistically significant differences in the means of task value by age categories. To find out whether the task value means differences of specific categories were statistically significant, post hoc analysis was conducted and the results recorded in Table 4.67.

Table 4.67

Post Hoc Analysis of Task Value by Age Categories

I (Age Category)	*J*(Age Category)	*M(I-J)*	*SE*	*p*
15 – 17	18 – 20	4.13*	.79	.00
	21 – 23	6.83*	2.9	.02
18 – 20	15 – 17	-4.14*	.79	.00
	21 – 23	2.70	2.91	.36
21 – 23	15 – 17	-6.83*	2.92	.02
	18 – 20	-2.70	2.91	.36

Note. *N* =813; *SE* = Standard Error; *P*<.05; *M*=Mean; *I*&*J*=Age categories

The findings in Table 4.67 reports statistically significant task value mean differences between the age categories. The biggest difference was between the category 15 – 17 and 21 – 23 (M = 6.83, p <.05) followed by the mean differences between categories 15 – 17 and 18 – 20 (M =4.13, p <.05). The differences of the task value mean between age category 18 – 20 and 21 – 23 were not statistically significant (M = 2.70, p > .05)

4.4.3.3 Interaction of Age Categories with Academic Engagement. Descriptive statistics of academic engagement by the three age categories were performed and the results were as presented in Table 4.68.

Table 4.68

Descriptive Statistics of Academic Engagement by Age Categories

Variable	Age Category	*N*	*M*	*SE*	*Kur*	*Sk*
AE	15 – 17	358	104.34	12.34	-.48	-.13
	18 – 20	440	98.73	12.10	-.05	.22
	21 – 23	15	92.07	14.11	-1.2	.28
	Total	813	101.08	12.60	-.39	.06

Note. *N*=813; AE = Academic Engagement; *M* = Mean; *SE* =Standard Error; *Kur*=Kurtosis; *Sk*= Skewness

The data in Table 4.68 indicate that the mean scores of academic engagement were statistically significantly different across the three age categories. The youngest category scored the highest 15 – 17 (*M* =104.34), followed by age category 18 – 20 (*M* = 98.73), and the leas was age category 21 – 23 (*M* = 92.07). The lower the age the higher the academic engagement. There was need to find out whether these differences were statistically significant. Therefore, Analysis of Variance (ANOVA) was conducted and the findings shown in Table 4.69.

Table 4.69

ANOVA of Academic Engagement by Age Categories

		SS	*df*	*MS*	*F*	*p*
AE	Between groups	7442.90	2	3721.45	24.84	.00
	Within Groups	121375.53	810	149.85		
	Total	128818.42	812			

Note. *N* = 813; AE=Academic Engagement; *SS* Sum of Squares; *df* = degrees of freedom; *F* = Critical value of F

The findings in Table 4.69 indicate that the means of academic engagement by age categories had statistically significant differences (F (2, 810) =24.84, $p < .05$). Post hoc analysis was conducted to find out which specific age categories had statistically significant differences in academic engagement. The results are recorded in Table 4.70

Table 4.70

Post Hoc Analysis of Academic Engagement by Age Categories

I (Age Category)	*J*(Age Category)	*M(I-J)*	*SE*	*p*
15 – 17	18 – 20	5.61*	.87	.00
	21 – 23	12.27*	2.9	.00
18 – 20	15 – 17	-5.61*	.79	.00
	21 – 23	6.66*	2.91	.04
21 – 23	15 – 17	-12.27*	2.92	.02
	18– 20	-6.66*	2.91	.04

Note. *N* =813; *SE* = Standard Error; *P*<.05; *M*=Mean; *I*&*J*=Age categories

The data in Table 4.70 show statistically significant academic engagement means differences by age categories. The widest gap was the difference between age category 15- 17 years and category 21 – 23 (*MD* = 12.27, $p < .05$)

4.4.3.4 Interaction between Age and Academic Achievement. The descriptive statistic of academic engagement based on the age categories were done and the results shown in table 4.71.

Table 4.71

Descriptive Statistics of Academic Achievement by Age Categories

Variable	Age Category	*N*	*M*	*SD*	*Kur*	*Sk*
AA	15 – 17	358	44.88	13.31	-.23	.01
	18 – 20	440	38.93	13.03	.39	.31
	21 – 23	15	31.73	14.98	-1.29	.16
	Total	813	42.42	13.56	-.05	.16

Note. *N*=813; AA = Academic Achievement; *M* = Mean; *SE* = Standard Error; *Kur* =Kurtosis; *Sk* =Skewness

The data in Table 4.71 show that the means of academic achievement in different age categories were different. The youngest category, 15 – 17 years scored the highest mean in academic achievement (*M* = 44.88). To find out whether the differences were statistically significant, Analysis of Variance (ANOVA) was done. The result of ANOVA are presented in Table 4.72

Table 4.72

ANOVA of Academic Achievement by Age Categories

		SS	*df*	*MS*	*F*	*p*
AA	Between groups	8419.04	2	4209.52	24.19	.00
	Within Groups	140953.10	810	174.02		
	Total	149372.04	812			

Note. *N* = 813; AA = Academic Achievement; *SS* =Sum of Squares; *df* = degrees of freedom; *F* = Critical value of F

The data in Table 4.72 show that the means of academic achievement by age categories had statistically significant differences in. The researcher rejected the null hypothesis and adopted the alternative. That is, there is statistically significant different in the mean scores of academic achievement by age categories. Further analysis using post hoc was conducted to find out which specific groups had statistically significant differences. Post hoc analysis results are in Table 4.73.

Table 4.73

Post Hoc Analysis of Academic Engagement by Age Categories

I (Age Category)	*J*(Age Category)	*MD(I-J)*	*SE*	*p*
15 – 17	18 – 20	5.95*	.94	.00
	21 – 23	13.15*	3.48	.00
18 – 20	15 – 17	-5.95*	.94	.00
	21 – 23	7.20*	3.46	.04
21 – 23	15 – 17	-13.15*	3.48	.00
	18 – 20	-7.20*	3.46	.04

Note. *N* =813; *SE* = Standard Error; $p < .05$; *M*=Mean; *I*&*J*=Age categories

The data in the Table 4.73 show that academic engagement mean scores of different age categories had statistically significant differences. The biggest difference was between the lowest age category, (15 – 17) and the highest age category (21 – 23) with mean difference of (*MD* = 13.15, $p < .05$)

4.4.4 Discussion of the Findings of Exploratory Analysis

The interaction of all the intervening variables: gender, school type and age, and all the study variable, has been explored and the results displayed. All the intervening variables showed statistically significant interaction effect with all the study variables. Overall

results showed significant gender differences in the students'´ general intelligence beliefs, where girls tended to hold entity theories of intelligence in comparison to the boys. In literature, Dweck (1999) said that girls are more likely to develop entity theories, while boys are more likely to develop incremental intelligence beliefs because of the praises they receive from their parents and other significant adults for following the right processes in their learning. They said that boys were praised more than the girls. Diseth et al., (2014) also reported that girls endorsed entity theories of intelligence. On the same note, a study by Bian et al. (2017) blamed gender-stereotyping for the development of belief systems in children, and that these beliefs are formed early in life. There is need therefore to help children to develop the right beliefs concerning the source of their success early.

However, some other studies, found girls reporting higher scores than boys in intelligence beliefs (Mutua, 2018; Mwangi et al., 2018; Rudig, 2014). Interesting results from a meta-analytic study showed no evidence of moderation of the gender on the correlation between implicit theories of intelligence and academic achievement (Costa & Faria, 2018; Matheson, 2013). Yeager et al. (2019) points out the importance of interventions in students' mindsets, in order to enhance positive academic motivation, classroom behaviour and successful outcomes achievement. Furthermore, students who held incremental mindsets attained higher achievements even in challenging school environments (Yeager & Dweck, 2012)

On Gender and academic engagement, boys reported higher engagement scores than girls. On the same note, Mutua and Josphine (2020) found a significant gender differences in elaboration learning strategy and in rehearsal learning strategy. The differences were in favour of the males. Rehearsal and elaboration learning strategies are indicators of academic engagement. Their quantitative results were confirmed by qualitative findings. Morgan (2022) found significant influence of gender on academic engagement among undergraduate students, in a study undertaken in the social work school in the University of Arkansas. Girls are more likely to be affected by hardships such as poverty, insecurity in the learning environments, and long distances to and from education institutions especially in sub-county category of schools which host the majority Kenya's high school students. While at home, the girls face the burden of household chores and other family responsibilities assigned to them by their parents, when they report back home in the evening. Boys reported higher scores in academic achievement compared to girls. Other research showed differences among gender in achievement in Maths and especially during late adolescence age (Huang, 2013; Macnamara & Rupani, 2017).

School type factor ranked national schools top in all the study variables. They scored highly in intelligence beliefs, task value, and academic engagement and in academic achievement. They were followed closely by the extra-county type of schools, county and sub-county schools. Differences in school types was also found in study by Ben et al. (2018) who studied the differences in academic performance of medical students admitted from independent schools and those admitted from state owned high schools.

The students from independent schools scored significantly higher mean scores compared to students from state-funded schools. Their description of independent schools was that they were high cost, equivalent of the national school category and extra-county type of schools in the current study and selective, compared to state funded schools whose socio-economic status was equivalent to the county and sub-county schools in the current study. Differences if educational outcomes between students, may be arising from the socioeconomic differences of the learners. A greater proportion of students in national type and extra-county schools are from affluent backgrounds able to provide adequate learning facilities.

Latisha (2016) also noted that the persistent disparities in academic performance between various categories of public secondary schools was due to differences in socioeconomic background of the parents in the united State. Back in Kenya, Munanu (2016) found that the national category had higher mean-scores in the KCSE followed by the extra-county category of schools, county schools and finally the sub-county schools had the least mean scores. The influence of school type on students' academic engagement and ultimate achievement was also emphasized by Upadyaya et al. (2021). They said that students don't just engage, but rather their situations dictate how they get involved in their learning. They used the term situational engagement to bring out the idea of the differences in learners general environment.

Sabitu et al (2012) studied relationship between learning facilities and students' academic performance in Nigeria, disagrees with the findings of the above studies and

the current study. They compared public and private secondary schools and found that despite the differences in the quality of facilities in the two school categories, and found non- significant differences in academic performance among their respondents. In the current study the national schools outperformed the extra-county, county and sub-county in that order, probably due to facilities and the entry behavior of students who join them. Though the entry behavior and facilities were not considered in the current study, it is perceived that national schools admit the best performing students and have the best learning facilities.

There are no studies that directly link the school types and intelligence beliefs. However the motivational aspect has influence on inner motivations of which intelligence beliefs is one Blackwell et al. (2007) suggests that implicit theories of intelligence (ITI) may influence academic achievement of students especially when the academic situation is challenging or demanding. This might give a widow to understanding the reason the learners in the sub-county schools scored lowest in intelligence beliefs. The sub-county schools learning environment is usually impoverished and hence less stimulating in comparison to that of the extra county and national schools. Studies around the globe have mentioned culture as one of the factors that shape personal belief system (Costa & Faria, 2018; Woon, 2021). Although their studies targeted wider sense of cultures, we may look at different schools having subcultures which are both school based and also depending on the home cultures of the majority of their students. Even at this level, the students from Sub County and the county schools, have cultures that disadvantage them in the formation of academically helpful belief systems.

There may be no direct link between the school type and task value but literature suggests that the learning environments contributes a lot to how much the learner values their academic tasks. Gherasim et al. (2016) suggests that the learning environment offer explanation to learners' intrinsic motivation in learning. Gherasim et al. (2016) said that the learning environment can be viewed in terms of the school characteristics that can observed (the buildings, instructional materials, and observable interactions among the learners and the teachers). Researchers found considerable variability in students' perceptions of the learning environment, and consequently, they argued that the way students interpret their classroom environment is predictive of their motivation, behavior and their cognition (Gherasim et al., 2016).

Latisha (2016) also noted that persistent disparities in academic performance among various categories of public secondary schools was due to the differences in the socioeconomic background of the parents in the united State. Ben et al. (2018) and Eccles (2011) agree that the motivational beliefs that individuals develop can be shaped by their interpretation of the experiences that they have encountered in their lives. Bandura (2010) also agrees that lack of achievement motivation (of which task value is an example) can explain low academic achievement among students from disadvantaged neighborhoods. This is the case of most of the sub county students in the current study who come from impoverished home backgrounds and at the same time make the biggest number of secondary school students' population in Kenya.

However Sabitu et al. (2012) study on relationship between learning facilities and students' academic performance in Nigeria, had different findings. They reported that though there were major differences in the quality of facilities in the private and public secondary schools, academic performance of the two school types had no significant differences. This might insinuate that there are other factors leading to disparities in academic achievement among different school types. Probably the differences may result from both the facilities and from the entry behavior of students on joining the schools. Though the entry behavior and facilities were not considered in the current study it is perceived that national schools admit the best performing students and also have the best learning facilities

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter five contains four sections. It starts with the summary of the findings of this study, followed by the implications of the results, conclusions and finally the study recommendations for policy and further investigation.

5.2 Summary of the Findings

This study aimed at investigating the intelligence beliefs and task value as predictors of academic achievement, mediated by academic engagement. The study also explored the interaction effects of gender, school type and age, with all the study variables: students' intelligence beliefs, task values, academic engagement and academic achievement. The ultimate goal was to identify the appropriate model for prediction of students' intelligence beliefs and task value on academic achievement with mediation of academic engagement.

The first objective of the study was to examine the prediction weight of intelligence beliefs on academic engagement. The tests revealed significant and positive relationship between students' intelligence beliefs and academic engagement. The students who scored low in intelligence beliefs also scored low in academic engagement. Results showed also gender differences where male respondents scored higher than the female

respondents in intelligence beliefs. National schools also scored higher in academic engagement, extra-county came second, followed by the county school category and finally the sub-county schools.

Objective two was to find out the prediction weight of task value on academic engagement. The results were positive. There was statistically significant prediction of task value on academic engagement of form three students. Multiple regression of the domains of task value showed that utility task value had higher predictive value on academic engagement followed by attainment task value, then cost task value and interest task value came last. The males still scored higher than females as they did in intelligence beliefs. ANOVA tests revealed that there were differences in the means of task value across school types. Further analysis through post hoc showed that national schools had the highest mean in task value with the followed by the extra-county secondary schools. The county and the sub-county schools followed in that order.

The third objective sought the difference between predictive weights of intelligence beliefs and of task value on academic engagement. Both intelligence beliefs and task value were positive predictors of academic engagement. Interestingly, the correlation matrix showed that their correlation coefficients were the same. However, the beta coefficient indicated that intelligence beliefs was the best of the two in predicting academic engagement in relation to task value.

The fourth hypothesis was the prediction of intelligence beliefs on academic achievement. The results of Pearson moment correlation reported positive and significant relationship. The biggest percent of the respondents endorsed incremental intelligence beliefs. The incremental beliefs respondents also recorded higher academic achievement scores compared to fixed intelligence respondents.

The fifth objective sought the predictive value of task value on academic achievement. The results of Pearson moment correlation reported significant positive correlation. Just like in the case of academic engagement, multiple regression analysis showed that scores of academic achievement were highest with utility task value, followed by attainment task value, then cost task value and the least was interest task value. The respondents scored highly in task value. The academic achievement of respondents with high task value was higher than that of respondents with average task value scores and low task value scores.

The sixth objective sought the differences in the predictive weights of intelligence beliefs and task value combined, on academic achievement. The results in the correlation matrix showed that both intelligence beliefs and task value were positive and significant correlates of academic achievement. Their correlation coefficients were equal. However, beta coefficient results revealed that intelligence beliefs predictive value on academic achievement was higher than that of task value. The predictive value of task value on academic achievement was positive but non-significant.

The seventh objective was to establish the prediction value of academic engagement on academic achievement. The correlation between the two variables was near perfect. This implies that if students' academic engagement is ensured, we can be assured of success in academic achievement. Similar direction were the results of regression analysis. Academic engagement nearly perfectly explained the variations of academic achievement.

Objective number eight was to find the mediational role of academic engagement in the prediction equation of intelligence beliefs and task value on academic achievement. All the possible path coefficients were computed. The study results confirmed that academic engagement had very strong statistically significant mediational role in the prediction of academic achievement by intelligence beliefs and task value on academic achievement. However, the more influence was on intelligence beliefs than on the task value. The direct paths from intelligence beliefs and task value to academic achievement were much weaker compared to the paths through the academic engagement. In fact, prediction coefficient of task value on academic achievement was negative and non-significant in the absence of academic engagement. This implies that if academic engagement is improved, the intelligence beliefs of students can produce better results in academic achievement.

The objective nine was to explore the interaction effects of gender, school type and age, on all the study variables. The males scored higher in all the study variables: Intelligence beliefs, task value, academic engagement and academic achievement. The

national schools led in the scores of all the study variables too, seconded by the extra-county, the county and the Sub-county schools in that order. The intervention of age on the study variables showed that respondents of ages 15-17 years scored highly in all the study variables followed by ages 18-20, and lastly those of ages 21-23 year. This implies that as the respondents move further away from the average age of form three student, (which is usually around 15-18) they score poorer in intelligence beliefs, task value, academic engagement, and ultimately academic achievement.

5.3 Conclusions

The findings of the current study indicated evidence of the hypothesized prediction of academic achievement by intelligence beliefs and task value, and the mediational role of academic engagement in the prediction equation. The two independent variables were all found to have a significant positive prediction of academic engagement and of academic achievement. Education stakeholders should endeavor to raise the learners' inner motivations for maximum academic achievement. The two variables: intelligence beliefs and task value have shown to complement each other to strongly account for academic achievement.

School type was seen to be having an influence on all the study variables. The mean of the scores of the respondents in every study variable differed with the school types. The National school students topped in the scores of intelligence beliefs, task value and academic engagement and ultimately on the academic achievement. These differences

seem to insinuate that there could be factors that are unique to specific school types that influence the learning behavior of students and the end product which is academic achievement.

The gender factor also was important part of exploratory analysis. The girls had lower means in all the study variables: intelligence beliefs, task value, academic engagement and academic achievement. This raises concern since there were more females than males in the study universe, yet they lagged behind in all these very important learner characteristics considered in the current study.

5.4 Recommendations

Based on the findings of the current study, the following recommendations for policy and further research were made:

5.4.1 Policy Recommendations

a. Considering that the county and the sub county schools had lower means in all the study variables, it is recommended that every stakeholder in education should play their part in creating an environment that allows the growth of intelligence beliefs, task value and academic engagement.
b. Incremental intelligence beliefs were strong predictors of academic engagement which in turn strongly predicted academic achievement. Education stakeholders and the

child's significant others should endeavor to praise and reward the devotion and effort in learning, rather than the inborn abilities and endowments. This approach will nurture the incremental intelligence beliefs which is sustainable in the face of challenges and difficulties common in the learning process, and will also convey to all the children, irrespective of their intelligence beliefs, a message of hope for growth of their potentials in their academic pursuit.

c. Having seen how important incremental intelligence beliefs are to the learning process and the learning outcomes, the researcher recommends that the education stake holders: the parents and the teachers, and the society at large, should cultivate in the children, incremental intelligence beliefs early in life. This is so that the children can internalize the positive motivational beliefs in their belief systems early in life and grow into that direction

d. Teacher-training institutions should include courses that help teachers with skills for helping students to develop appropriate inner motivations, and positive belief systems, for maximum academic achievement and general wellness of the learners.

e. Gender differences were found to exist in intelligence beliefs, task values, academic engagement and academic achievement in favor of boys therefore interventions should target at reducing the gender differences in the study variables in order to help reduce the gap.

f. The relationship between academic engagement and academic achievement was near perfect. The researcher therefore recommends that all the education stakeholders to make every effort to boost students' academic engagement levels as the key to success in academic achievement

g. With reference to the findings of interaction of gender with the study variable, where the youngest category (15-17) scored highest in all the study variables, the researcher recommends to the parents that they should take their children to school at their right age; the age recommended by the Ministry of Education. According to a presentation in education system in Kenya, in Russian-Africa Summit (2019), the average acceptable form one entry age is 14 years. Therefore, by form three, they should be around 17 years.

h. Following recommendation (g) therefore, the researcher recommends that teachers and parents to desist from class retention. This is because from the current study, when learners outgrow the recommended age, for the academic level they are in, they score poorly both in the positive learner behaviour, and in the outcomes.

5.4.2 Recommendations for Further Research

The researcher recommends consideration of future research:

a. The glaring pattern of national schools scoring higher than the other school categories in all the study variable, seconded by extra-county, with the county and the sub-county schools lagging behind, presents a need to undertake a study to find out school environmental factors that are unique to school types that predict learners' inner motivations like intelligence beliefs, task values, academic engagement, and, academic achievement.

b. Some of the reviewed studies on intelligence beliefs agreed with the theory that incremental intelligence beliefs predict favourable learning habits while fixed intelligence predict unfavorable learning habits. However, several others also especially those done among adult learners or working students in the universities reported fixed intelligence beliefs correlating or predicting favourable learning habits. The researcher recommends a cross-sectional or longitudinal study to find out whether it is actually age differences that caused the variations or there could be other factors responsible.

c. The respondents in guided focus group interview mentioned the subjects that they thought were difficult and that no matter how they practiced, their performance in them remained low, were mostly Chemistry, Mathematics and Biology. A study on relationship between intelligence beliefs and specific subjects like languages, and STEM subjects, should be done to find out whether intelligence beliefs are subject specific.

d. The correlation matrix of domains of task value showed interest task value had the lowest correlation with academic engagement and with academic achievement. Theory expects that interest task value should lead in predicting positive learning habits like academic engagement. Another study therefore needs to be done to find out between the four task values, which one is actually most important in predicting positive learning characteristics.

e. There is need for further investigation of the role of interest task value in the motivation of learners. This is because despite most previous literature purporting that interest task value is the best predictor of positive learning habits, the current study had the least

number of respondents embracing interest task value, as the reason for their academic engagement and academic achievement.

f. The researcher therefore recommends a study where the two variables are used as predictors of a learning habit. The literature review on task value revealed that most studies using expectancy-value theory included the two variables posited by the theory. That is expectancy for success and task value because though they are distinct aspects of the theory, the supplement each other in influencing learning habits and human behaviour in general.

g. The study need to be replicated in other counties to enable generalization of the results in Kenya because of cultural differences.

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APPENDICES

APPENDIX A: CONSENT FORM FOR THE SCHOOL ADMINISTRATOR

Dear Sir/Madam,

Your school is hereby invited to participate in a research study titled:

Intelligence beliefs and task value as predictors of academic engagement and achievement among form three students in Meru County, Kenya.

PRINCIPAL INVESTIGATOR

Name: Ruth Ncororo Munanu

Department: Educational Psychology

Address: P.O. Box, 43844, Kenyatta University, Nairobi.

Phone: 0710 455 340

e-mail: munanuruth@yahoo.com

PURPOSE OF THE STUDY

The purpose of this study was to assess the implication of students' thoughts about the malleability or fixedness of their intelligence, their task values on their academic tasks, and the implication of thus on their academic achievement, with the mediation of academic engagement.

CONFIDENTIALITY

The identity of those taking part in this study will not be disclosed. The information recorded will strictly be used only for this study

I AGREE

Principal/Deputy Principal's signature and Stamp

……

APPENDIX B: STUDENTS QUESTIONNAIRE

Dear respondent,

Thank you for willing to respond to this questionnaire. The responses will be used only for the academic research and strict confidentiality will be observed. Kindly do not write your name anywhere on this paper.

Section A: Personal Information

1. Code _____

2. Kindly indicate your gender by ticking (√) Male ( ) Female ( )

3. Kindly indicate your age _____

4. Kindly indicate your school type by ticking (√)

National School ( )

Extra- County Secondary School ( )

County Secondary School ( )

Sub-county Secondary School ( )

Section B. Social Desirability–Gamma Short Scale

Instructions: Choose 1, 2, 3, 4 or 5, to show to what extent a statement applies to you.

S/N	**ITEM**	**Doesn't apply at ↔ all applies completely**				
		1	2	3	4	5
1	In an argument, I always remain objective and stick					

	to the facts.					
2	Even if I am feeling stressed, I am always friendly and polite to others.					
3	When talking to someone, I always listen carefully to what the other person says.					
4	It has happened that I have taken advantage of someone in the past.					
5	I have occasionally thrown litter away in the countryside or on to the road.					
6	Sometimes I only help people if I expect to get help from them in return.					

Section C. Intelligence Beliefs Scale

Tick (√) in the square below the opinion that best describes the level of your agreement with the corresponding statement

Note: SD-Strongly Disagree D-Disagree NS-Not Sure A-Agree SA-Strongly Agree

S/N	ITEMS	SD	D	NS	A	SA
1	I do not think I can personally do much to increase my intelligence.					
2	My intelligence is something about me that I personally cannot change very much.					
3	To be honest, I do not think I can really change how intelligent I am.					
4	I can learn new things, but I do not have the ability to change my basic intelligence.					
5	With enough time and effort, I think I could significantly improve my intelligence level.					
6	I believe I can always improve on my intelligence.					
7	Regardless of my current intelligence level, I think I have the ability to change it.					
8	I believe I can be able to change my intelligence level as time goes.					

Section D. Task value scale

Tick (√) in the square below the opinion that shows your agreement with the statement

Note: **SD -Strongly Disagree, D-Disagree, NS -Not Sure, A-Agree, SA-Strongly Agree**

S/N	ITEM	SD	D	NS	A	SA
1	I like the challenge that I require to do my academic work.					
2	It is exciting to increase my knowledge by completing high school education.					
3	The challenge of academic work is exciting.					
4	I am excited at the idea of completing high school.					
5	I enjoy exploring challenging and new areas of my academic work.					
6	I enjoy learning from those who are doing better than me.					
7	I find it very attractive for me to pursue academic excellence.					
8	I think education will make me more worthy in the eyes of others.					
9	Secondary school education makes me feel good about myself.					
10	For me to be successful I need high school education					

11	I am proud to be a student.					
12	High school education is important to make me feel competent.					
13	I value the prestige that comes with completing high school					
14	High school education will make me feel good about myself.					
15	I think high school education is very important for my future.					
16	I will complete secondary school because I think this will make me happier.					
17	I need the secondary school education to fulfill my potential.					
18	Completing secondary school will provide me chance for a great job.					
19	I will complete secondary school because this is important for the career I want to pursue.					
20	I will complete secondary school because I have a desire to specialize in a certain area.					
21	I think I will waste a lot of money and time by the time I complete secondary school.					
22	Being in secondary school is not worth the					

	effort.					
23	I am worried that completing high school will delay other activities that I want to do in life.					
24	Completing secondary school education will delay me from marrying as soon as I want.					
25	I want to complete school education so I can make much money.					

Section E. Engagement versus Disaffection with Learning Scale – Students Report

VU=Very Untrue U=Untrue T=True VT=Very true

	ITEM	**VU**	**U**	**T**	**VT**
1	I usually argue with the teachers in class.				
2.	I try hard to do well in school.				
3.	I feel frustrated whenever I cannot answer a question.				
4.	I enjoy learning more new things in class.				
5.	When we work on something in the classroom, I get discouraged.				
6.	I get in trouble occasionally for not following the class rules.				
7.	In the class, I usually do just what is enough to get by.				
8.	Class is usually fun for me. I enjoy				

9.	When I'm doing class work, I feel a lot bored.				
10.	I usually work as hard as I can in class				
11.	I annoy my classmates when am in class.				
12.	I feel bad when I am in class.				
13.	I feel mad whenever I am working on my homework.				
14.	I listen very carefully when I am in the class.				
15.	I feel worried when I am in class.				
16.	I feel nervous whenever we start something that is new in class.				
17.	I disrupt others students' class work of when I am in class.				
18.	I get involved on whatever we work on in class.				
19	It really bothers me when I am stuck on a problem.				
20	I think about other things when I am in class.				
21	I feel interested in what we work on in the class.				
22.	I talk a lot with my classmates when I am in class.				
23.	I don't find it fun to be in class.				
24.	When I am in class, I just behave like I am working.				
25.	I feel good whenever I am in the classroom.				
26.	When I am in the class, I do not sit still but I get out of my seat				
27.	When I am in class, my mind usually wanders far away.				

28.	When I am in class, I usually participate in the class discussions.				
29.	When we are working on something in the class, I usually feel bored.				
30	When my teacher explains a new material, I usually feel bored.				
31.	I pay attention in the class.				
32.	I usually feel worried when I am stuck on a problem.				
33.	I do not try very hard at school.				

APPENDIX C: ACADEMIC ACHIEVEMENT PROFORMA FOR FORM THREE STUDENTS MARCH 2021 END OF TERM TEST

CODE	POINTS AND GRADE	CODE	POINTS
1		26	
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

APPENDIX D: TOP MERU SCHOOLS IN THE TOP 100 NATIONAL KCSE RANKING

Year	No. of school in top 100	Positions in the nation	Mean Scores
2019	3	38	8.6
		47	8.5
		57	8.37
2020	4	35	9.03
		49	8.8
		71	8.5
		76	8.4
2021	3	39	8.7
		48	8.5
		58	8.37
2022	2	22	9.96
		47	9.52

APPENDIX D: GUIDED FOCUS GROUP INTERVIEW

Introduction

Thank you for willing to participate in this research. The purpose of this interview session is to collect data on students' thoughts about the nature of intelligence, how students value their schooling and how this affects their commitment to their learning and finally on their academic performance. I appeal to you, to contribute to this discussion honestly and freely. The information you give will be used only for the purposes of this study and will not be used against you.

Intelligence Beliefs Questions

1. Are there subjects you consider more difficult than others? Name them.

2. What have you been doing about those difficult subjects?

3. What do you mainly do when you encounter challenging questions?

Quit ( )

Ask a friend for help ( )

Consult my teacher for help ( )

Check for answers from the text books ( )

4. What do you do when you don't score the marks that you expected in an examination?

a. Feel frustrated and give up ( )

b. Seek a different strategy to prepare for the next one ( )

5. Do you think you can perform better in your academic work than you are currently doing? Yes( ) No ( )

6. Which two of the following statement reflects your opinion?

a. In class I work very hard to make sure I compete with my classmates.

b. In class I work very hard to make sure I understand the content

c. I like to understand and master what the teacher teaches.

d. If only I would be top five in class I would be very happy

e. I wish I did not have to go to school. Everything is so hard

7. Comment on the following statement:

   I cannot change my academic performance, it is the way I have been born. My academic performance has been out of my effort.

Task value Questions

1. I am happy that I am a secondary school student. Comment on this statement.
2. How is school making you a better person?
3. Look at our society. How do those who finish form four become better than those who do not?
4. What specific sacrifices and effort do you make for being a student?
5. Are the sacrifices Mentioned in (4) above worthy?
6. What are the advantages of being secondary school student? Pick the best description of yourself.

   a. I enjoy being a secondary school student

   b. Being a student makes me an important person in the society

   c. I will get a job, make money and live a comfortable life in the future

7. Some students who were in standard eight, form one, and form two with you long dropped out of school. What is your reason for persisting in school?

Academic Engagement Questions

1. What are some of the challenges you face in school in the following areas?

a. Doing Homework

b. Revising for the examinations

c. Relating with other students in the school

2. Describe your relationship with:

Your teachers

Your classmates

3. Academic work is not all that fun to me. Am greatly bored.

True ( ) Not true ( )

4. Which of the following statement do you identify with?

a. I enjoy class discussions.

b. When a question is difficult I won't stop until i get the answer.

c. It is boring to stay in class the whole day.

b. I wish there were no home works to do after classes. They are so occupying

APPENDIX E: TABLE OF DETERMINING THE SAMPLE SIZE

Error Margin/ Degree of accuracy

Pop. size	**0.05**	**0.035**	**0.025**	**0.01**
10	10	10	10	10
20	19	20	20	20
30	28	29	29	30
50	44	47	48	50
75	63	69	72	74
100	80	89	94	99
150	108	126	137	148
200	132	160	177	196
250	152	190	215	244
300	169	217	251	291
400	196	265	318	384
500	217	300	377	475
600	234	340	432	565
700	248	370	481	653
800	260	396	526	739
900	269	419	568	823
1000	278	440	606	906
1 200	291	474	674	1067
1 500	306	515	759	1297
2 000	322	563	869	1655
2 500	333	597	952	1984
3 500	346	641	1068	2565
5 000	357	678	1176	3288
7 500	365	710	1275	4211
23 304	**378**	**758**	**1442**	**6801**
25 000	378	772	1448	6939
50 000	378	776	1491	8056
75 000	381	778	1506	8514
100 000	382	782	1513	8726
250 000	384	783	1527	9248
500 000	384	783	1532	9423
1 000 000	384	784	1532	9512
5 00 0000	384	784	1636	9567
10 000 000	384	784	1636	9594
100 000 000	384	784	1537	9603
400 000 000	384	784	1537	9603

Source: Research Advisors (2006). *Determining the sample size.*

https://www.research-advisors.com/tools/sample size.htm:

APPENDIX F: SAMPLE SIZE AND SAMPLING FRAME

	Population				Sample			
School-type	T(schs)	M	F	T(sts)	T(schs)	M	F	T(sts)
National	2	1406	1212	2618	1	0	32	32
Extra-county	81	1331	2923	5413	4	90	121	21
County	21	2490	1750	3081	2	40	42	82
Sub-county	276	5944	6448	12492	8	319	340	659
TOTAL	370	11171	12133	23304	15	488	546	1034

Note: M=Males, F=Females, T (schs) =Total Schools, T(sts) =Total Students

APPENDIX G: AUTHORIZATION FROM THE GRADUATE SCHOOL

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 26th May, 2020

TO: Ms. Ruth N. Munanu
C/o Department of Educational Psychology
KENYATTA UNIVERSITY

REF: E83/23875/13

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that the Graduate School Board at its meeting 20th May, 2020 approved your Ph.D. Research Proposal entitled "Intelligence Beliefs and Task Value as Predictors of Academic Engagement and Achievement among Form Three Students in Meru County, Kenya".

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking and Progress Report Forms. The Forms are available at the University's Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

c.c. Registrar (Academics) Att: Mrs Lucy Njenga
Chairman, Department of Educational Psychology

Supervisors

1. Dr. Wawire Koinange
   Department of Educational Psychology
   Kenyatta University
2. Dr. Ireri A. Muriithi
   C/o Department of Educational Psychology
   Kenyatta University

JG/cao

APPENDIX H: NACOSTI LICENSE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **431824**

Date of Issue: **26/June/2020**

RESEARCH LICENSE

This is to Certify that Ms.. RUTH NCORORO MUNANU of Kenyatta University, has been licensed to conduct research in Meru on the topic: Intelligence Beliefs and Task Value as Predictors of Academic Engagement and Achievement among Form Three Students in Meru County, Kenya for the period ending : 26/June/2021.

License No: **NACOSTI/P/20/5451**

431824

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX I: AUTHORIZATION FROM THE COUNTY EDUCATION OFFICE

REPUBLIC OF KENYA
MINISTRY OF EDUCATION
State Department of Early Learning and Basic Education

Telegrams: " ELIMU " Meru
EMAIL: cdemerucounty@gmail.com
When Replying please quote

County Director Of Education
Meru County
P.O. Box 61
MERU

Ref: MRU/C/EDU/11/1/271

11th January , 2021

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATON – MISS RUTH MUNANU

Reference is made to letter Ref: NACOSTI/P/20/5451 dated 6th June 2020.

Authority is hereby granted to Ruth Ncororo Munanu to carry out research on ***"Intelligent beliefs and task value as predictors of academic engagement and achievement among form 3 students in Meru County"*** for a period ending 26th June 2021.

The person undertaking this study is bound by all the ethical rules and regulations governing surveys of this nature.

FOR: COUNTY DIRECTOR OF EDUCATION
MERU COUNTY
P. O. BOX 61- 60200
Tel: 064-32372 MERU

p p
Robert Kithinji
For: County Director of Education
MERU

APPENDIX J: MAP OF MERU COUNTY