RELATIONSHIP BETWEEN STUDENTS' PARTICIPATION IN INCOME-GENERATING ACTIVITIES AND THEIR ACADEMIC PERFORMANCE IN PUBLIC DAY SECONDARY SCHOOLS IN UGUNJA SUB-COUNTY, KENYA

OYUGI JOASH ONYANGO

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTER DEGREE OF EDUCATION IN EDUCATIONAL MANAGEMENT, LEADERSHIP AND ADMINISTRATION OF MOUNT KENYA UNIVERSITY

OCTOBER, 2024

DECLARATION AND APPROVAL

Declaration

This thesis is my original work and has never been presented for any academic award in any institution.

OYUGI JOASH ONYANGO

MED/2018/26070

Signature..... Date 30-10-2024

Approval

This thesis is being submitted for examination with our approval as University supervisors

DR. JANE AMUNGA, PhD

Department of Educational Foundations, Psychology and Management.

Kaimosi Friends University.

Signature..... Date 30/10/2024

DR. JOSEPH MASINDE WANGILA, PhD

Department of Education and Technology,

Murang'a University of Technology.

Signature..... Date 30/10/2024

DEDICATION

To my wife, Pecilla Magara, my daughter, Eileen Felicia, and my late parents, who shunned laziness and instilled confidence, self-discipline, perseverance and resilience.

ACKNOWLEDGEMENT

I am grateful to God for enabling me undertake this research.

My sincere appreciation goes to my supervisors, Dr. Joseph Masinde and Dr. Jane Amunga for their continuous guidance, encouragement, constructive criticism, and incisive comments throughout this academic endeavour.

I am humbled to recognize Dr. Oscar Sangoro, and Dr Kikechi Werunga for their support throughout the course.

I sincerely thank my MKU MED class 2018 classmates for their encouragement.

I appreciate the Ugunja Sub County Director of Education and all the public day secondary schools in Ugunja for allowing me to conduct this study in the location.

I acknowledge my colleague, Nancy Bitange, for her support.

My profound gratitude goes to my spouse, Pecilla Magara, and my daughter, Eileen Felicia, for their love and support throughout this noble course.

Finally, I thank the MKU Senate for providing me with the opportunity to study at this prestigious higher education institution.

ABSTRACT

Education is a critical component of social and economic growth in any society. Many countries worldwide strive to provide quality education to their citizens. In developed countries, the state fully funds both primary and secondary education. On the contrary, most developing countries find it difficult to fully finance education at both primary and secondary levels, forcing families to foot the remaining part of the bill. Unfortunately, students in developing countries participate in income-generating activities as an alternative way to meet some educational costs. This research sought to establish the relationship between students' participation in income-generating activities and their academic performance in public day secondary schools in Ugunja sub-county, Kenya. The objectives of this study were to investigate the relationship between students' participation in sand harvesting and their academic performance, to establish the relationship between students' participation in *Boda Boda* operations and their academic performance, to assess the relationship between students' participation in hawking activities and their academic performance, and to determine the relationship between students'

participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. Basu and Van's (1998) Economics of Child Labour theory was used as a basis for this research. A descriptive survey research design was used to execute the study. The target population was the 1498 students in public day secondary schools within the research area who participated in incomegenerating activities on a regular basis. The sample respondents comprised 306 students who arrived through Krejcie and Morgan's (1970) formula. The sampled students were selected using the snowball sampling technique. The data was collected using a questionnaire for independent variables and a document analysis guide for the dependent variable data. A pilot study used 36 students who were later excluded from the research. Validity was achieved by close scrutiny of the tools by the supervisors and other experts from Mount Kenya University.

A pilot study and a test-retest method were used to ensure the reliability of the research tools. Data were analyzed descriptively using percentages, means, and standard deviations. Hypotheses were tested inferentially at a 0.05 alpha significance level using Bivariate Pearson's Correlation. The r values for sand harvesting, Boda Boda Operations, Hawking, and Fishing Activities were -0.719, -0.809, -0.584, and -0.847, respectively. Results revealed a strong negative relationship between students' participation in the four income-generating activities and their academic performance in the study area. It is recommended in this study that the government should enforce all relevant policies on child labour. Secondly, the school principals should work closely with local administrators (Chiefs) to ensure that students are in school during school hours and not engaged in income generating activities. In addition, the Ministry of Education should increase capitation towards funding for public day secondary school education so that students from poor backgrounds do not engage in IGAs to finance their education, as this negatively affects their academic performance. Finally, school Boards of Management (BOMs) should establish endowment kitties to cushion students from poor backgrounds.

TABLE OF CONTENTS DECLARATION AND APPROVAL

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

AP	-Academic Performance
BBO	- Boda Boda Operations
DAG	- Document Analysis Guide
DoS	- Director of Studies
FA	- Fishing Activities
FDSEF	- Free Day Secondary Education Funds
GoK	- Government of Kenya
HA	- Hawking Activities
IGAs	- Income-Generating Activities
PDSS	- Public Day Secondary School
SHA	- Sand Harvesting Activities
SCDE	- Sub-County Director of Education
SGDs	- Sustainable Development Goals
UBE	- Universal Basic Education
UNESCO	- United Nations Education Science and Cultural Organization

CHAPTER ONE:

INTRODUCTION AND CONTEXT OF STUDY

1.0 Introduction

This chapter discusses the background to the study, the statement of the problem, the purpose, and the objectives of the study. The chapter also presents the research hypotheses, followed by the significance of the study. Limitations of the study are also discussed here. Towards the end of the chapter are assumptions of the study, the definition of terms, and the organization of the study.

1.1 Background to the study

Education is a critical component of social and economic growth in any society (World Bank, 1998) cited in World Bank (2018). It also connects significantly to all the aspects of social, political, and economic development in all countries across the globe (Abdullahi *et al*., 2015). This is because education enhances productivity, reduces poverty, eliminates hunger, promotes gender equality, reduces mortality rates, and promotes economic progression (Amdany, 2017). It is, therefore, a universally recognized investment in human capital (World Bank, 2018). However, the education performance rate varies from one continent, region, state, county, and place to another. For instance, most developed countries like the UK, China, and the US register relatively higher rates of performance in education (Orodho, 2014). These high rates could be attributed to the funding of education in these countries and other factors that promote retention of the learnt content. Orodho (2014) explains that in most developed countries like the USA and China, the state fully funds basic education (both primary and secondary) in all government-run schools. The

government also partially or fully funds higher education levels in government-run colleges and universities based on individual students' skills and economic backgrounds in these countries. Therefore, students in such countries participate in income-generating activities like sand harvesting, Boda Boda operations, hawking activities, and fishing as academic programmes, leisure activities, or to explore how they are done (Paul et al., 2019). Developing countries also strive to provide quality education to their citizens. In most countries globally, primary and secondary education are considered basic for every child between the ages of 6 and 18 (UNESCO, 2021).

In Kenya, for example, secondary education sponsorship is an initiative by the government, private individuals, and non-governmental organisations (that support students from underprivileged backgrounds to pursue an education). The Government of Kenya (GoK) has been taking steps to make quality basic education fully state-funded. For instance, in 2008, the Grand-Coalition Government provided fee subsidies to public day secondary education. Subsequent governments have further fully catered for the tuition fee for education in public day secondary schools. For instance, in 2017, the government implemented the Free Day Secondary Education (FDSE) policy to cater to public day secondary education tuition fees. However, many public day secondary schools still find it challenging to survive on the fees from the government since the government does not provide subsistence and students' meals. This has made it necessary for most public day secondary schools to charge fees for the lunch programmes, whose costs the parents must meet. The inability of the parents to meet all their children's educational and other needs

(Orodho, 2014), the students' pressure to satisfy their certain needs, and peer influence (Ojijo, 2016) have made some public day secondary school (PDSS) students to engage in Income-Generating Activities (IGAs). This happens both during and outside school-going hours (Ojijo, 2016). Some income-generating activities accessible to secondary school students include Boda Boda Operations (motorcycling), sand harvesting, hawking, fishing, and collecting and selling scrap metals. They can also work in farms and plantations, stock market businesses, selling cereals, and providing cheap domestic assistance, among other activities. Studies have shown that many students in PDSS take part in IGAs either during or outside school hours to cater for some of their needs, meet the cost of their education, and help their family members (Oladipupo & Omenawan, 2017; Adu-Gyamfi, 2014; Nthambi & Orodho, 2015; Muendo, 2015).

Students' engagement in IGAs poses a significant threat to achieving Goal 4 of Sustainable Development Goals (SDGs), especially Target 4.1, which emphasises the provision of publicly-funded equitable, inclusive, and quality basic education without any discrimination (Sustainable Development Goal 4 (SDG 4), 2021). Due to the magnitude of this matter, many scholars have thrown their weight behind the study of IGAs and have found conflicting results. Some have established that students' participation in IGAs promotes their academic performance (Olawo *et al*., 2014) while others show that those who take part in IGAs perform dismally (Adu-Gyamfi, 2014; Ako *et al*., 2014; Owusu & Dwomo, 2012; Nthambi and Orodho, 2015; Boonchooduang *et al*., 2021; Keino, 2020; Nyagwui *et al*, 2016; Amdany, 2017; Paul *et al*., 2019; Oluwagbohunmi, 2019; Ijadunola *et al*., 2015; Kaletapwa & Yumbak, 2013; Ampomah, 2012; Vieira *et al*., 2019; Maxwell,

2016; Abdullahi *et al*., 2015; Udoh *et al*., 2013; Ligeve *et al*., 2012; Omwenga, 2015; & Ojijo, 2016). In Kenya, the government has taken steps to resolve this problem of students' engagement in income-generating activities. For example, to ensure access, quality, retention, transition, and success rate in secondary schools, the Government of Kenya has adopted global policies like the Universal Basic Education outlined in the Vision 2023, the Sustainable Development Goals (SDGs), Constitution 2010, the Universal Basic Education Declaration, The Children Act of 2007, and the Basic Education Act of 2013. Also, the state has adopted the statements of the World Labour Organisation, which has often outlined that children below eighteen years should not be engaged in income-generating activities as it is equivalent to child labour. The state has also adopted national policies like The Constitution 2010, the "Mop-up" during students' transition from primary to secondary education, and the Free Day Secondary Education Policy to provide tuition funds for students in public secondary schools. However, even with all these policies in place, students in Public Day Secondary Schools are still forced to engage in income-generating activities because the funds provided by the government are still inadequate as it only caters for tuition fees and does not cater for their other educational and personal needs of the students, and their families cannot afford to provide all these. The Ugunja Sub-County Director of Education office data indicates that 1,498 out of the 5,589 public day secondary school students participated in these activities in Ugunja Sub County in 2019 alone (SCDE, 2020). This is a significant number because it represents 26.80% of the total population of students from this sub-county. Also, the academic performance in public day secondary schools for 2016, 2017, 2018, and 2019 has been 3.75, 3.62, 3.7, and 4.2 respectively

(SCDE, 2020). The performance has never passed D+ in the last four years, which is a worrying trend, calling for an immediate investigation of the relationship between students' participation in IGAs and their academic performance. Against this background, the current research is deemed necessary as a matter of urgency. The research is timely as it seeks to provide these missing facts and provide data for policy formulation by explaining the kind and strength of the relationship between students' participation in IGAs and their academic performance in Ugunja Sub-County, Kenya. The main income-generating activities in Ugunja Sub-County include sand harvesting, Boda Boda operations, fishing, and hawking. Therefore, this study aimed to explicitly look into the relationship between students' participation in income-generating activities and their academic performance in public day secondary schools in Ugunja Sub County, Kenya.

1.2 Statement of the problem

In many parts of Kenya, including Ugunja Sub County, students in public day secondary schools increasingly engage in income-generating activities such as sand harvesting, the Boda Operation, hawking and fishing activities to supplement their family incomes. Although these activities provide these students with much-needed financial support, they pose a significant challenge to their academic performance. Ugunja Sub County is badly affected in this regard since a total of 1,498 out of around 5,589 public day secondary school students were still participating in these activities in the Sub County as of 2019, according to the report obtained from Ugunja Sub County Director of Education Office (2020). This is a significant number because it represents 26.80% of the total population of students in public day secondary schools from this sub-county. Also, the academic

performance in public day secondary schools for 2016, 2017, 2018, and 2019 has been 3.75,

3.62, 3.7, and 4.2, respectively, meaning that it has never passed D+ in these four years. These worrying trends call for an immediate investigation of the relationship between students' participation in IGAs and their academic performance in secondary schools. If this issue is not addressed, this large student population will likely suffer academically due to engagement in IGAs. If nothing is done to address this situation, the global aims of education will not be achieved; the achievement of Universal Basic Education (UBE) as outlined in Vision 2030 and the fourth target of SDGs will also not be possible. Additionally, Kenya will be left behind in the global development. Despite the popularity of students' participation in income-generating activities, nothing can be done so far because although some policies exist, there is still inadequate empirical evidence on the extent to which they affect academic performance and how those policies can be adjusted and implemented to solve this problem. This study was therefore carried out to provide facts and figures that are important for formulating policies and providing actionable implementation strategies on the existing ones to sufficiently address the issue of students' participation in IGAs so that it does not compromise their academic performance.

1.3 Purpose of the study

This study investigated the relationship between students' participation in incomegenerating activities and their academic performance in public day secondary schools in

Ugunja Sub-County, Kenya.

1.4 Objectives of the study

Four objectives guided the study;

i. To investigate the relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

ii. To establish the relationship between students' participation in Boda Boda operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

iii. To assess the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

iv. To determine the relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja sub-county, Kenya.

1.5 Research hypotheses

Four null hypotheses were formulated from the objectives mentioned above and tested statistically at 0.05 alpha level of significance. The null hypotheses were considered for this study, and instead of the alternative hypothesis, they show the direction and strength of the relationship between variables. Additionally, it was the most appropriate since the general assumption of this study was that there was no relationship between students' participation in income-generating activities and their academic performance. The hypotheses were as follows;

H_{O1}: There is no statistically significant relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

H_{O2}:

There is no statistically significant relationship between students' participation in Boda Boda operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

H_{O3}:

There is no statistically significant relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

H_{O4}: There is no statistically significant relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

1.6 Significance of the study

The findings of this study have both practical and theoretical relevance with regard to education in secondary schools and income-generating activities.

1. Practically, the results of this research are a source document for head teachers, educational policymakers and stakeholders to make significant decisions that address the school fees challenges that drive students to engage in incomegenerating activities. This will ensure an improved access, retention, transition, and success rate in secondary education in Kenya.
2. It also provides information on how Sand Harvesting, Boda Boda Operations,

Hawking, and Fishing Activities relate to academic performance for educational institutions' headteachers, Boards of Management (BOMs), and other government bodies to develop targeted programmes like scholarships and put in place endowment funds to support needy students and keep them in school.

3. This research also informs government agencies about community involvement in ensuring students do not engage in income-generating activities.
4. Other sub-counties with similar demographics and income-generating activities being carried out by secondary school students may use the findings of this study to make significant decisions regarding secondary education policies.
5. Theoretically, this study enhances stakeholders' knowledge of the students' income-generating activities and their effect on academic performance, especially at the secondary school level. The findings of this study also showed that participation in IGAs is negatively correlated with academic performance. This should enable teachers to insist on regular school attendance.
6. The knowledge created in this study provides a basis for future studies related to this field, which will obtain relevant issues while building knowledge and addressing the gaps in this area of interest.

1.7 Scope of the study

Karamti (2016) defines the scope of a study as the respondents, time, and geographical space within which the study is to be conducted. This study was conducted in 20 public day secondary schools in Ugunja Sub-County, Siaya County, Kenya, between September and November 2022. The respondents included 306 secondary school students in Ugunja

Sub-County who engaged in income-generating activities. The study used these respondents to investigate the relationship between students' participation in IGAs, such as sand harvesting, Boda Boda operation, hawking, and fishing activities, and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

1.8 Limitations of the study

A limitation can be described as a variable that poses a possible challenge to the study but cannot be under the direct or indirect control of the researcher (Orodho, 2014). However, the researcher ought to be aware of their limitations.

i) One of the limitations of this study was that it does not provide solutions to all the other factors that may, in one way or another, relate to the academic performance of students in secondary schools in Kenya.
ii) Another limitation would be the biases of self-reporting through the questionnaires.
iii) Limited documentation on the involvement of students in income-generating activities was also a potential limitation of this study.
iv) Inconsistencies of academic performance as it was only based on examination scores.
v) The study was limited to public day secondary schools in Ugunja. This means the findings cannot be generalized beyond day secondary schools in Ugunja.

The effect of these limitations was minimised by using a document analysis guide for extracting academic scores from original merit lists from the DoSs to regulate biases in self-reporting, explaining to the students the need to be honest in their responses, and using an average of several tests to ensure consistency in academic performance scores.

1.9 Delimitations

The excellent record keeping and accuracy in recording and keeping the research tools enabled the researcher to collect quality and reliable data. The study was conducted in all public day secondary schools in Ugunja Sub-County, Kenya, for maximum representation and ease of generalisation.

1.10 Assumptions of the study

i) It was assumed in this study that Fishing, Boda Boda operations, sand harvesting, and hawking were the major income-generating activities that most youths in the research area engage in.

ii) It was also assumed that students' participation in income-generating activities has no relationship with their academic performance.

iii) Another assumption was that the respondents would be able to give their honest responses to the questions asked using the research tools.

iv) Additionally, it was assumed that the students who participated in IGAs knew each other and that they would be willing to refer the researcher to other students involved in the IGAs freely.

v) Finally, it was assumed that the end-term examinations administered in the public day secondary schools in Ugunja Sub County were standardised since they had the test items extracted from a common national curriculum dictating what should be covered within a given period.

1.11 OPERATIONAL DEFINITION OF TERMS

Income-generating activities (IGAs): economic activities that students participate in while out of school to earn money.

Academic performance: the average mean grades of students in their termly examinations since they ventured into IGAs.

Boda Boda operations: Riding, maintenance, or dealing in motorcycles and their parts for commercial purposes.

Sand harvesting activities: Activities that take place within and around sand mines, like scooping, loading and offloading, transportation, and selling of sand.

Hawking activities: Activities involved in the street selling merchandise within different towns and market centres.

Fishing activities: Activities that take place within and around the fishing environment, like actual fishing, making of fishing nets, transportation of fish, and repair of fishing gadgets.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature related to the relationship between students' participation in income-generating activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. The literature on the relationship between sand harvesting activities, Boda Boda operations, fishing activities, and hawking and academic performance in public day secondary schools in Ugunja Sub-County, Kenya,

will be discussed in detail. The theoretical and conceptual frameworks are also presented in the final parts of this chapter, together with a recap of the literature review.

2.2 Empirical Literature

2.2.1 Sand Harvesting and Academic Performance

Kisipan (2019) describes sand harvesting as the mining or extraction of sand from either open pits, beaches, oceans, riverbanks, or river beds. They assert that the harvested sand has a variety of uses, ranging from construction activities to manufacturing cement and concrete materials. According to these scholars, some of the consequences of sand harvesting are environmentally related (erosion, pollution, danger to wildlife, flooding, and ecosystem challenges, among others) and human-related (socioeconomically). These human consequences affect educational attainment among students. According to Karseth and Sivesind (2010), the main aim of any curriculum is to enhance academic performance among students, and its success is measured in grades and the quality of life of the learners after school. However, previous research has established that various factors like the income-generating activities, of which sand harvesting is part, influence the students' academic performance. Therefore, scholars of education, management, administration, leadership, and economics across the globe have been drawn to studying how sand harvesting might affect academic performance in schools.

According to Ghanney (2020), many students work part-time or full-time (paid or unpaid) in sand harvesting locations. Ghanney outlines some activities that pupils participate in around the sand harvesting environments, such as scooping, washing, transportation, and

selling sand. These activities are also highlighted by Oladipupo and Omenawan (2017) and Muendo (2015), who assert that the forces that push the young populace into sand harvesting are the family's socio-economic background, the strife for financial freedom and lack of essential life commodities. In his study, Ghanney (2020) involved 113 pupils as respondents. Ghanney's study was critical to the just concluded research because it identified the activities students engage in and the driving force for engaging in them. The findings were also critical in constructing section A of the questionnaire used in the current study. However, they did not show the relationship between students' participation in these activities and their academic performance, which was the main focus of the just-completed study.

Another study by Adu-Gyamfi (2014) indicates that academic performance is significantly lower among students who engage in sand harvesting activities than among their peers who do not partake in such activities. Adu-Gyamfi 's study, which used a sample size of 30 teachers and 150 students, established that sand harvesting might not be child labour per se but negatively influences educational attainment. The results of this descriptive survey study align with Ako et al. (2014), which showed that sand harvesting tends to distract students from their academics due to absenteeism. This comparative study by Adu-Gyamfi was crucial to the current study due to its mixed approach and the results that performed this study's possible findings, while the current study used a quantitative approach with less bias from the researcher.

In the rejoinder is Owusu and Dwomoh's (2012) study that was conducted to establish the effect of the illegal extraction of minerals on teenagers in the Kwaebibirem District of

Ghana. The study was triggered by environmental and socio-economic challenges associated with mining activities. It was conducted through a case study of all the towns in the Kwaebibirem District. The results of the survey conducted by these scholars indicated that youths are adversely affected by illicit mining operations. The study expounds on these impacts, such as a high rate of teenage pregnancies, disrespectful attitudes towards the elders, an engagement in socially undesirable behaviour (like smoking and immorality), and student turnover – all of which negatively affect their academic performance. Owusu and Dwomoh's (2012) study was critical in the just-concluded one because it brought a different approach – a case study. The study also outlines some reasons that pressurized the youth to participate in mining activities, such as poverty, the desire to get rich quickly, and ignorance among the youth. The data collection methods used in the study were also unique, bringing new insights into the just concluded research. For instance, they used observation, interviews, and document analysis to gather raw data. All these aspects of this source contributed to the research that was just concluded.

In Kenya, scholars have also begun examining the issue of sand harvesting and its influence on academic performance among learners. For instance, an ex-post-facto study conducted by Kisipan (2019) to investigate how sand harvesting affected pupils in Kenyawa division, Kajiado County, revealed that pupils who took part in sand harvesting scored lower academic marks than their counterparts who did not. In this study, Kisipan (2019) used a sample size of 30 teachers and 150 pupils as respondents to collect data using questionnaires and interviews. The findings of this source were critical to the justcompleted study because they showed an inverse proportion between pupils' engagement in sand

harvesting activities and their academic performance, which is almost the same as that of the just-completed study. However, Kisipan (2019) used a slightly smaller sample size of students and only used questionnaires and interview schedules, while the current study utilised a Document Analysis Guide, which accurately established the actual students' scores. Additionally, the study involved primary school pupils in Kajiado as respondents, while the just completed one used secondary school students in Ugunja, bringing in the aspect of learners in a level of education above primary and a new research area.

Another study conducted by Nthambi and Orodho (2015) to assess the impact of sand harvesting on education showed that although sand harvesting provides the needed financial support to promote the students' educational needs, it also outlines that sand harvesting activities negatively influence students' academic performance in primary schools. Although Nthambi and Orodho's study would give a direct conclusion to the justcompleted study, the findings could not be generalizable to the research area; the target population was different (primary school pupils) from the just-completed study (public day secondary school students).

2.2.2 Boda Boda Operations and Academic Performance

Satiennam et al. (2016) describes Boda Boda as a bicycle or motorcycle used as a taxi. According to Satiennam et al. (2016), the Boda Boda was established as a means of public transport to address the inaccessibility of large vehicles in some areas. Globally, motorcycles are the most flexible and the cheapest means of transport. For instance, in Asian urban centres, Boda Boda is widely used for transport (Satiennam *et al.*, 2016). Also, in West and Central Africa, Boda Boda transport came to be commonly spread in Niger,

Cameroon, Nigeria, and Ghana in the 1980s (Baliarsingh *et al.*, 2018). In Nigeria, they were called 'Okada' (additionally called *inaga* or *achaba* in reference to the business involving motorbikes), the name obtained from the then-famous Airline in Nigeria, Okada Air (Baliarsingh *et al.*, 2018).

In the Eastern African Region, Kenya and Uganda referred to using the bicycle as a mode of public transport as 'Boda Boda' during the 1960s since it was used as an easy movement across the Kenya-Uganda border in Busia and Malaba (Olawo *et al.*, 2014). The taxi operators in such areas would shout the word "border" to the customers who wanted to cross into either of the countries. The Boda Boda taxi has been widespread in other parts of the two countries and their neighbourhoods. The relationship between Boda Boda operations and academic performance attracted the global attention of many scholars. Some such scholars were Boonchooduang *et al.* (2021), who argued that students who take part in motorcycling (especially without protective gear) underachieved academically more than those who did not. In their study, Boonchooduang *et al.* (2021) sought to establish the prevalence of motorcycling and its relationship with adolescent behaviours in Chiang Mai, Thailand, using a cross-sectional survey design study. The research involved 4,372 adolescents, and respondents explained that non-riding, protected riding, and unprotected riding had different degrees of academic performance, with unprotected riding relating to the lowest academic performance, followed by protected riding. This source of literature was important to the just concluded study because its findings were a pointer towards those of the just concluded study, but they could not simply be generalised in the current research area because of differences in demographic and other environmental factors between

Thailand (a developed country) and Kenya (a developing country). This, therefore, necessitated the just-completed study.

Another study by Keino (2020) established that the Boda Boda operations significantly influence school drop-outs, affecting academic performance negatively. In this study, Keino (2020) used a descriptive survey design and a study sample involving learners, Boda Boda operators, and teachers to find out how Boda Boda operations influence the school drop-out rate and how it does it. This study's findings were a pointer towards those of this research. The study was also relevant to the current one because it is a neighbouring county to Siaya; hence, they share certain activities and behaviours. However, Keino's study only focused on female students, forgetting their male counterparts. This study strengthens these findings by including the boy child as part of the target population. Secondly, the study was conducted among primary school pupils, making generalising to public day secondary schools in Ugunja, Siaya County, difficult. Finally, the current research used a document analysis guide to collect information on academic performance. The findings of Keino's study support the study conducted by Nyagwui *et al.* (2016), which established that students who use motorcycles often get injured. The study examined the risk factors of accidents and injuries related to motorcycling among secondary school students. However, it does not outline the relationship between Boda Boda operations and academic performance among public day secondary school students. Therefore, the current study bridges this gap in the literature by explaining the relationship between students' participation in Boda Boda activities and their academic performance in public day secondary schools in Ugunja Sub County, Kenya. According to Amdany (2017), students

who participate in socio-economic activities (including motorcycling) tend to achieve less in their educational goals. In a study involving 573 respondents (students, teachers, and educational officers), Amdany showed that the students who participate in these activities take most of the school time, hence absenteeism and low academic performance. However, a study by Olawo *et al.* (2014) showed contrasting results. According to these scholars, Boda Boda riding as a business has led to tremendous economic empowerment and employment provision opportunities for youth. The descriptive study by Olawo *et al.* (2014) showed that learners who carry out Boda Boda operations are empowered through it as a source of their financial support for education. In their study, Olawo *et al.* (2014) examined the impact of increased investment in the motorcycle industry on the economic development of Kisumu West District residents. The study used a respondent population of 117 Boda Boda riders and owners and a descriptive survey research design to arrive at the findings above. Olawo *et al.* argued that Boda Boda operations positively contribute to the success rates among the students who participate in it as they empower them economically. This source was critical in the just-concluded study because it presented a contrasting result from all the other sources and a yardstick against which the results of the just-concluded study were tested.

2.2.3 Hawking Activities and Academic Performance

Hawking can be described as selling commodities informally in public places like streets and from one place to another (Paul *et al.*, 2019). Participation in these activities has also increased due to poverty, lack of sponsorship, high cost of living, single parenthood, peer influence, and large family size, among other factors (Ampomah, 2012; Paul *et al.*, 2019).

According to a 2012 report by the International Labour Organization (ILO), many secondary school-aged youth engage in hawking along the roadways of urban areas due to the rise of capitalism, urbanization, and modernization (Paul *et al.*, 2019). The adults also prefer this age of children because students are considered a source of cheap labour while getting some income to sustain themselves (and, to some extent, their families). Due to the rise of this menace among public day secondary school students across the globe, numerous studies have been undertaken to ascertain the correlation between hawking activities and academic achievement at this particular educational level.

According to research conducted by Paul et al. (2019) to determine the effect of street hawking on the educational achievement of teenagers in Wukari Metropolis, hawking adversely influences academic performance. Their study used a sample size of 100 teenagers to determine the effects of street hawking. This research was crucial to the current study as it provided literature on the impact of hawking on educational performance among teenagers. The study also used a statistical method of analysis through the quantitative approach. However, it cannot fully answer the question of the just-completed research that sought to establish the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub County, Kenya. This is because the findings are limited to Wukari Metropolis. The scholars also used mixed methods, while the current study used a purely quantitative approach. Finally, the just concluded study also looked at a semi-urban locale within which the influences of urbanization and modernization have not been far-reaching.

Oluwagbohunmi (2019) also argues that students who participated in hawking activities exhibited poor academic performance due to poor study habits. The descriptive design study involved a sample population of 180 secondary school students selected purposively to establish the influence of hawking in the streets on study habits and academic performance. The results of Oluwagbohunmi's study could not be generalized to the current research area due to its limitations, which the just-concluded study sought to address. Firstly, Oluwagbohunmi (2019) collected data using questionnaires and social studies achievement tests, which could be equated to the document analysis guide for the current study. Secondly, the study's location differed from the current one. Secondly, it only addressed the issue of study habits and street hawking, but the current study considered a wider range of hawking activities.

Another study was conducted by Ijadunola et al. (2015) to find out the determinants, patterns, and effects of street hawking on the performance of in-school adolescents. In the study, Ijadunola *et al.* (2015) used a sample size of 435 teenagers and a questionnaire as the sole data collection method to establish that the adolescents who participated in street hawking were more likely to fail their exams than those who did not. The study was critical to the current research because it uses a quantitative approach to use teenagers as the respondents compare the effect of hawking on the academic performance of students who partake in it and those who do not. The recently completed study reduced the shortcomings of this research by conducting it in a new location, Ugunja Sub County, Kenya. The findings of Ijadunola *et al.*'s study were echoed by Kaletapwa and Yumbak (2013) in their research on the effects of street vending on academic performance in agriculture, especially

paper 3 (practical), in secondary schools in Taraba State. The research established that students who participated in street vending activities performed poorly in practical agriculture. This study provided critical information that points toward the current study's findings

A study by Ampomah (2012) to establish the effects of child labour in hawking (which the author calls (petty trading) in Ghana also supports the findings from the above studies. In this study, Ampomah (2012) established that most school-going children who took part in hawking could sometimes miss classes and drop out of school. However, those who try to juggle their school work with hawking could enrol late, achieve low grades, repeat classes, and even miss classes. This study was relevant to this research because it uses a mixedapproach research design, unlike the current one. The research also used purposive sampling to select three population demographics as participants (parents, children, and government officials). However, the research was conducted by Ampomah in Ga East District, which has no geographical and demographic similarity with Ugunja, the current study area. Finally, the just-concluded study uses educational institutions as the primary environments from which the raw data is collected, contrary to the previous studies. Another study conducted by Senna (2022) to investigate the effect of street hawking on the education of young female hawkers in the Volta region of Ghana found that many female hawkers cannot attend school regularly and perform poorly. In descriptive research involving interviewing and observing 60 adolescent school girls who engage in hawking activities, Senna (2022) outlined that such students engaged in hawking activities because they need to pay their school fees, provide their basic needs, and assist their parents. This

source was critical to the just-completed study because it was a pointer towards the result of the study. However, the study does not reveal the strength of the relationship between the independent and the dependent variables. Additionally, the interview and observation were inadequate in bringing out dependable results, and the two could present possible researcher biases, making the current study worth taking. Additionally, Senna (2022) only used girls as the respondents and target population, thereby sidelining the boys, a weakness that required an immediate gender intervention study. This is the gap that the justcompleted study has filled.

2.2.4 Fishing Activities and Academic Performance

Wilson *et al.* (2011) describe fishing as catching fish either as a sport, for consumption or as a source of income. According to Wilson and associates, fishing is carried out in natural lakes, seas, oceans, rivers, and streams. Artificial dams and fishponds are also sources of fish. Sahrhage and Lundbeck (2012) posit that fishing is an activity that dates back to more than 50000 years ago when vessels and hand gathering were the most commonly used methods. Sahrhage and Lundbeck also outline that, since its inception, other fishing tools have been discovered, such as netting, spearing, hand gathering, trapping, and trawling. Approximately 600 million people are globally employed in fishing (FAO, 2017). Due to the limited skills needed in fishing, a large population of individuals living near natural water bodies practice it regardless of their age or gender (FAO, 2017). As such, global scholars have seen it worthwhile to study how it affects other sectors of the economy, of which education is one.

A study by Vieira *et al.* (2013) showed that children between ages 7 and 19 accompanied their adult relatives to fish during school hours in Brazil. The scholars used a sample size of 41 young respondents and an exploratory survey with participatory observation and semi-structured interviews. They indicated that the truancy of these students due to the incompatibility of the school and fishing calendar was relatively high. These findings agreed with those of Maxwell (2016), whose study established that school attendance and academic performance rates are directly proportional. When students do not have enough pocket money, they tend to be absent from school to look for it from the lakes or rivers, leading them to perform poorly academically as they fail to compensate for the missed classes (Abdullahi *et al.*, 2015). These studies are critical in current research because of the literature they provide and their mixed research approach.

Another research conducted in Nigeria by Udoh *et al.* (2013) showed that fishing is one of the most frequently used ways for parents and students to finance education. However, at the same time, it also leads to poor performance among the students who practice it (Udoh *et al.*, 2013). This study agrees with Maxwell (2016) that most students accompany their parents, relatives, or friends to fish. According to the study, Udoh *et al.* (2013) also established that unlike in the USA, where most people practice fishing as a leisure or sporting activity, individuals in Nigeria use fishing to earn income. According to Westway *et al.* (2009), few students from the fishing communities go through basic education (primary and secondary education). In a study conducted in Uganda within the lake region, Westway *et al*. (2019) established that socio-economic activities are not favourable for education. These activities coincide with the academic calendar (Vieira *et al.*, 2013). The

findings of the study by Westway *et al*. could be generalizable to the current study area, but this was not possible, necessitating the just-concluded study because of its shortcomings. Firstly, the study was conducted in Uganda, a country on the western side of Kenya that has characteristics different from those of the study area.

Kenyan education has also faced some challenges from fishing, especially among the fishing communities (along the rivers, lakes, and oceans). As such, education scholars have attempted to investigate the influence of fishing on pupils' academic performance. An investigation by Ligeve *et al.* (2012) showed that pupils who engage in fishing score relatively lower marks in exams than their counterparts who do not participate in fishing. In the same study, the boys engaged in fishing scored relatively higher marks than the girls' counterparts. Ligeve *et al.* (2012) also outline the fishing activities students can participate in, such as cleaning and preserving fish, selling fish, and repairing fishing nets. This study's findings agree with Omwenga (2015), who asserts that learners involved in any form of child labour perform poorly compared to their colleagues who never participate. This comparative study provides a foundation on which the current research borrows information and proves that fishing activities influence academic performance.

Similarly, another study by Ojijo (2016) on how fishing influences academic performance in secondary schools agrees with Ligeve *et al.* (2013), which found that students who participate in fishing activities score significantly lower academic marks than students who do not. Additionally, Ojijo outlines more activities that students are involved in around the fishing area, including setting nets in the lake, repairing fishing nets, actual fishing, and removing fish from nets. These findings are critical to the current study because of their

findings and the various research methods they employ. The present study provides more information based on analysis based on statistical significance. The reviewed literature shows that students who participated in IGAs perform poorly academically than those who did not. These findings foretold the findings of the just-concluded study. However, they were conducted in locations far from the current study area, hence the limited application of the study area. Additionally, they did not present the link between students' participation in IGAs and their academic performance. Finally, their research design differed from the just-completed descriptive survey based on a questionnaire and DAG as data collection tools.

2.3 Theoretical framework

Basu and Van 1998 Theory

This research is supported by Basu and Van's (1998) theory of Economics of Child Labour, which stipulates that child labour can have complex and often negative effects on their educational outcome. They argue that even though the students' engagement in incomegenerating activities may provide short-term benefits to the students and their families, it often leads to long-term negative consequences on students' educational attainment and future opportunities in life. This phenomenon results from three facts. Firstly, the trade-off

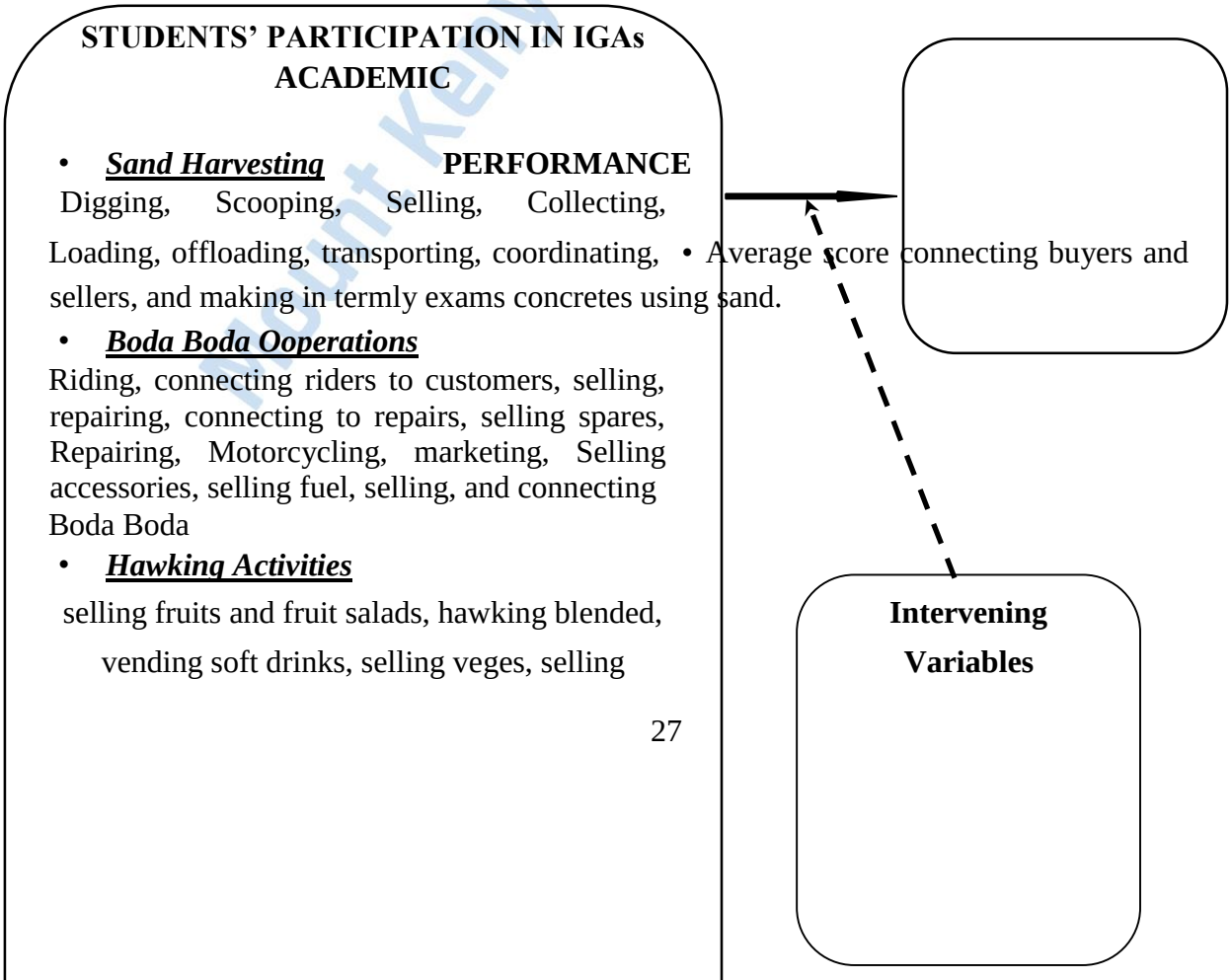
between working and academic performance often negatively affects academic performance and retention rate. Secondly, their economic backgrounds drive them to engage in income-generating activities as they work due to their financial challenges.

Finally, the existing policy interventions make the situation complex since just stopping the students from engaging in income-generating activities demands that their parents' earnings be increased to compensate for their children's income if they are working. However, this is a complex issue since the market demands relatively cheap labour that could only be realised through students' engagement in income-generating activities, and parents' wages cannot be increased. Therefore, students engage in these activities because of economic pressure beyond their personal and family control. Because of this, students are still engaging in IGAs, potentially threatening their academic achievements since the existing policies have been complex in implementation.

2.4 Conceptual framework

A conceptual framework describes the interrelationships among variables. The data from the students' questionnaire and the Document Analysis Guide are presented in *Figure 1*.

Independent variables ***Dependent variable***



second-hand clothes, selling utensils, dealing in second hand shoes, selling hot and cold coffee, selling snacks, selling tea, selling electronics, dealing in jewellery, hawking pesticides, selling hawking beauty products

- ***Fishing Activities***

Fishing, making fishing nets and rods, smoking fish, selling fishing materials, loading fishing merchandise, cleaning fish, repairing fishing tools, transporting fish, connecting fishers to mongers, transporting fishers, and operating fish.

- Gender
- Family factors
- Government policies

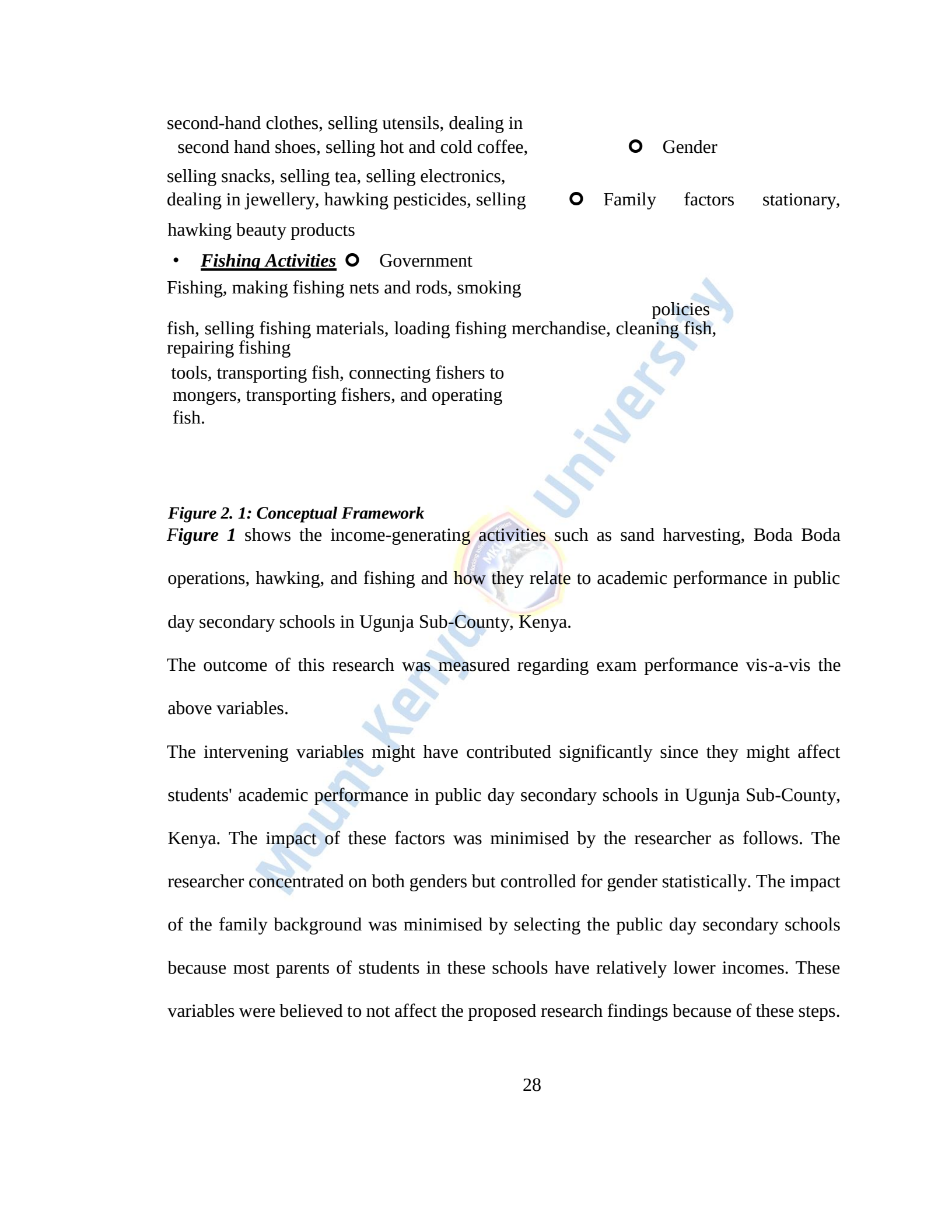


Figure 2. 1: Conceptual Framework

Figure 1 shows the income-generating activities such as sand harvesting, Boda Boda operations, hawking, and fishing and how they relate to academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

The outcome of this research was measured regarding exam performance vis-a-vis the above variables.

The intervening variables might have contributed significantly since they might affect students' academic performance in public day secondary schools in Ugunja Sub-County, Kenya. The impact of these factors was minimised by the researcher as follows. The researcher concentrated on both genders but controlled for gender statistically. The impact of the family background was minimised by selecting the public day secondary schools because most parents of students in these schools have relatively lower incomes. These variables were believed to not affect the proposed research findings because of these steps.

2.5 Recap of literature review

The reviewed literature can be summarised in five sentences. Firstly, students' engagement in sand harvesting activities provides them with some income but interferes with their academic performance. Secondly, students who engage in Boda Boda operations gain materially and boost their income but perform relatively poorly academically. Thirdly, hawking activities make students waste school time and fail to recover, hence poor academic performance. Fourthly, the students who participate in fishing activities are more likely to perform poorly academically than their counterparts who do not. Finally, although the findings of the previous studies have revealed this, they have helped in coming up with certain policies. However, implementation of such policies is quite complex as the student's participation in these income-generating activities is brought about by forces that call for a comprehensive approach involving the labour market, the community, educational institutions, and the government. These are the gaps that the current study sought to fill.

CHAPTER THREE:

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the research design, study location, target population, sample size, and procedures. Moreover, the research tools, validity, and reliability are outlined. Finally, the chapter presents data collection techniques, analysis, and the study's ethical considerations.

3.1 Research design

According to Achoka *et al.* (2018), a research design is how the research data is collected and analyzed. A descriptive survey study design was used to execute the research via structured questionnaires and a Document Analysis Guide to extract data from the respondents. This design was deemed appropriate for the research because it quantitatively describes a given population's attitudes, trends, and opinions while testing how different variables are associated. Moreover, the design was economical and faster in data collection, which could not have been possible with the other designs. The quantitative data were collected via structured questionnaires and DAGs from a sample of 306 students participating in IGAs. The independent variables under investigation were sand harvesting, Boda Boda Operations, hawking activities, and fishing activities, the data of which were collected using the questionnaire. However, the dependent variable, academic performance, was the students' average scores in end-term examinations since they engaged in these income-generating activities.

3.2 Location of the study

Baliarsingh *et al.* (2018) define the study's location as the respondents, time, and geographical space within which the study is conducted. Ugunja Sub County was chosen for this study because of its geographical, population, economic, and educational background.

Geographically, Ugunja Sub County is one of the sub-counties in Siaya County, Kenya, covering approximately 210 sq. Km. It borders other sub-countries such as Butere to the east, Gem to the southeast, Alego to the southwest, and Ugenya to the northwest. Ugunja Sub County has two administrative divisions, namely, Sigomere and Ugunja. These divisions have 21 sub-locations, 4 locations, and three wards: Sigomere, Ugunja, and Sidindi. The sub-county lies on a latitude of 0.182304 and a longitude of 34.296658. The sub-county's GPS coordinates are 0° 10' 56.2944" N and 34° 17' 47.9688" E.

Based on population, Ugunja Sub- County has 93,372 people, according to the 2019 census (KNBS, 2020). Therefore, the major markets here (Sigomere, Ugunja, and Sidindi) have the highest population. Data from the Office of the Sub County education offices in 2019 outline that the sub-county has 69 public primary schools with a total enrolment of 26308 pupils (13,281 boys and 13,124 girls) and 24 public secondary schools with a total enrolment of 10792 students). It has one technical institute and two colleges but no university. Among the public secondary schools in Ugunja Sub County, four are boarding, while 20 are day schools. The residents of Ugunja Sub County depend on Agriculture, transport activities, and hawking as their main economic activities. The sub-county receives two rainy seasons: one from March to June and another from September to December.

River Nzoia also traverses the sub-county as it enters Lake Victoria, where some fish sold in the local markets are fished. The river and rainfall facilitate power generation and large-scale irrigation for farming potatoes, maize, cassava, sorghum, and beans. However, other activities like sand harvesting in River Nzoia and mining gold are vital in generating income in the sub-county.

The Sub County is badly affected in this regard since a total of 1,498 out of around 5,589 public day secondary school students were still participating in these activities in the Sub County as of 2019, according to the report obtained from Ugunja Sub County Director of Education Office (2020). This is a significant number because it represents 26.80% of the total population of students in public day secondary schools from this sub-county. Also, the academic performance in public day secondary schools for 2016, 2017, 2018, and 2019 has been 3.75, 3.62, 3.7, and 4.2, respectively, meaning that it has never passed D+ in these four years. These worrying trends call for an immediate investigation of the relationship between students' participation in IGAs and academic performance.

3.3 Target Population

Orodho (2014) describes the target population as a group of people, animals, or objects pertinent to specified problems and of interest to the researcher. Therefore, this study targeted all the 1498 students in public day secondary schools in Ugunja Sub County, Kenya, who engaged in IGAs, as revealed by the data from the Ugunja Sub County Director of Education Office (SCDE, 2020). These students were targeted as they were best placed to give information to address the research objectives adequately.

3.4 Sample Size and Sampling Techniques

The criteria of Krejcie and Morgan's (1970) formula below were used to determine the required number of respondents;

$$S = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P(1-P)}$$

Where = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841),

N = the target population,

P = the population proportion (assumed to be .50 since this would provide the maximum sample size),

d = the degree of accuracy expressed as a proportion (.05)

Substituting N with 1498, the study's target population, and the result rounded off to the nearest whole number, a sample size (S) of 306 students who participated in IGA's in the research area were used as respondents. This number sufficiently represented the target population (Krejcie and Morgan, 1970).

The researcher used snowball sampling to obtain this sample from the target population. This sampling procedure was deemed most appropriate for collecting data because of the sensitivity of the research topic. The researcher, therefore, identified a few students meeting the inclusion/exclusion criteria and used them to identify and trace the others. The respective schools (where the sampled students went) were identified through purposive to collect data on their academic performance.

3.5 Data Collection Tools

Two tools were used to extract the study's data from the respondents. These included a questionnaire detailing the information on independent variables and a Document Analysis Guide (DAG) for the dependent variable.

Apart from the introduction section, the questionnaire had four main sections labelled A, B, C, and D. All the statements in the four sections were positively worded and 5-point Likert scale with *Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), Strongly Disagree (SD).* Section A had ten statements seeking information about respondents' participation in various sand harvesting activities to collect data to address the first research objective. Section B had 13 statements seeking information about respondents' participation in Boda Boda Operations in the research area to collect data used to address the second research objective. Section C had 15 statements seeking information about respondents' participation in hawking activities in the research area to collect data to address the third research objective. Finally, Section D had 13 items, seeking information about respondents' participation in fishing activities in the research area to collect data to address the fourth research objective. The questionnaire was used since participation in IGAs is a sensitive topic, which calls for a self-reporting tool. Also, it is inexpensive to administer over a short period to a larger respondent population.

The Document Analysis Guide was used to capture data on academic performance. It collected information on the respondents' schools, zones, divisions of the school, and the trends in each of the student's academic performance for the years they had participated in

IGAs. To fill the DAG, the students' termly academic progress reports were scrutinized and recorded in the DAG. The reports were to be obtained from the respective Directors of Studies (DOSs), and the researcher filled in the details in person.

3.6 Test for validity and reliability of the tools

3.6.1. Validity

According to Achoka *et al.* (2018), the validity of any tool tools is the degree to which the tools used in a study are accurate in measuring the study's intended purpose. This study considered the content validity and face validity of the study tools. According to Achoka *et al.* (2018), the content validity of a research tool is guaranteed through cross-examination and certification by experts in the research area. In this regard, the researcher sought the assistance of the supervisors and other experts at the Mount Kenya University School of Education to improve the content validity of the research tools. The researcher sought the intervention of supervisors and other educational research experts to assess the face validity of the research tools. The experts were asked in writing to rate each tool on a scale of 1 to 10, and their scores for the questionnaire had an average validity value of 8.0, while that of DAG was 8.7. These values implied that the two research tools were valid, as they surpassed the threshold of 7.0, as stipulated by George and Mallery (2003).

3.6.2. Reliability

Orodho (2014) defines the reliability of a research tool as its capacity to generate accurate results when subjected to repetitive evaluations consistently. To ensure reliability, a testretest method was used, where the two research tools were administered twice within

one month after two weeks to the same respondents, who were later excluded from the actual study to prevent the halo effect. The responses from the second test were correlated against the first using Pearson's Product Moment Correlation Coefficient (PMCC). Any tool whose

"r" (correlation coefficient) was greater than or equal to 0.7 was deemed reliable (George & Mallery, 2003).

To this end, both research tools had their reliability coefficients surpassing the 0.7 thresholds since the questionnaire and DAG had r values of 0.803 and 0.832, respectively. The research tools used in this study were, therefore, all reliable.

3.7 Data Collection Procedure

The researcher submitted the research proposal to the Mount Kenya University Ethical Review Committee for ethical certification after the proposal had been approved at the school level. The researcher subsequently applied for a research permit at NACOSTI. The researcher subsequently visited the Ugunja Sub County Director of Education office to obtain research authorisation and identify the key informants from those who engaged in income-generating activities and the schools they attended. These key informants were instrumental in identifying their fellows who participated in the income-generating activities as per the list from the Sub County Office. Then, the researcher visited the respective schools where the key informants and the respondents learnt to book an appointment and consent from the school principals. Their consent was then sought, and privacy was assured. The researcher recruited a group of five research assistants from his school's teaching staff to help administer the questionnaires and DAG. They were

considered so because they were deemed to be professional with a high level of integrity and confidentiality. The teachers also clearly explained the aims and any relevant information the respondents needed to be clarified. The researcher then trained the research assistants on conducting themselves throughout the research process. The critical areas of their training were on handling the respondents and their data, explaining the research details to the respondents, administering the tools, being present to ensure they address any issues raised, scrutinising the instruments for 100% completion, collecting all the tools, and handing them back to the researcher for safe storage and analysis. Additionally, the researcher obtained the consent of all participants and guaranteed that any data they contributed would be handled with the highest level of confidentiality. Finally, the researcher collected data in two phases. In the first phase, the researcher administered the IGAs questionnaire assisted by five research assistants. The researcher and the assistants physically went to each school where the students they identified learnt, explained the reason for the data collection, and any other relevant information that would help them freely participate in the study. The second phase involved recording the trends in each student's performance in DAG, which the researcher did after obtaining the merit lists from the various Directors of Studies (DoSs) of the identified schools where the respondents learnt.

3.8 Data Analysis Procedures

Data analysis is the synthesis of raw data to produce meaningful information through interpretation (Mugenda & Mugenda, 2003). In this study, the quantitative data gathered

by the questionnaires and DAG were first analysed descriptively through descriptive statistics: means, percentages, and standard deviations using Statistical Package for Social Sciences (SPSS) Version 23. The four hypotheses were then tested statistically at a 0.05 alpha level of significance using inferential statistics, namely Bivariate Pearson's Correlation. The results have been displayed in tables.

3.9 Ethical considerations

Orodho (2014) defines ethical considerations as an idea or opinion's moral and social relevance. To achieve research ethics,

i) The researcher obtained permission from the Mount Kenya University (MKU) Ethical Review Committee (ERC) and the National Commission for Science, Technology, and Innovation (NACOSTI). The researcher also obtained permission from the schools' administrations before collecting data.

ii) The researcher assured the respondents of the confidentiality and privacy of their information. They were assured that the information extracted from them would not be released to any third party without their written permission.

iii) The researcher also explained the purpose of this study to them and said that it is normal to engage in IGAs; they should not shy away from providing as honest information as possible about the IGAs.

iv) Due to the potential psycho-social effect of the study, the participants were also assured that the information they provided would be used purely for academic purposes and that the raw data would be discarded once the research process was complete.

v) The researcher sought consent to confirm their willingness to participate in the study. The researcher also informed them that they could access the study findings upon completing its process.

vi) The research tools did not include the respondents' names and admission numbers. Instead, pseudonyms were used to ensure the respondents' privacy and anonymity.

CHAPTER FOUR:

RESEARCH FINDINGS AND DISCUSSIONS

4.0 Introduction

The chapter presents data screening, preliminary data analysis, and the findings and discussions of statistical analyses of the collected data with respect to each of the research objectives. The objectives of this research were to investigate the relationship between students' participation in sand harvesting and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya, to establish the relationship between students' participation in *Boda Boda* operations and their academic performance in public day secondary schools Ugunja Sub-County, Kenya, to assess the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya, and to determine the relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

4.1 Data Screening

The researcher took several steps to screen the collected data for accuracy and quality. To begin, the SPSS version 23 program Missing Value Analysis was employed to evaluate any missing values in the dataset. Descriptive statistics were employed to perform data screening, which involved evaluating the distribution of values across all research variables. From the process, it was established that some data were erroneously entered into the software. For this reason, the researcher compared all values transferred to the data

sets to those on the originally filled questionnaires. This was done so that if any data value in the data set goes beyond the acceptable range, the entire variable was reviewed to isolate and correct the errors therein. After the process was completed, there were no remaining cases in the programme. This made it ready for the next phase of screening. Finally, the researcher examined the data for consistency and to ensure that there were only logical relationships among the research variables. In other words, oversights and mistakes, like feeding male data in the female category and vice-versa, were corrected, and errors were eliminated immediately. Additionally, variables with questionable values were closely examined and compared to the raw data of the tools' hardcopies that the participants filled. The researcher then compared the questionnaires' values to those entered in the data file. Consequently, all the inconsistencies were eventually addressed, leading to 100% availability, logic, and consistency of the collected data before conducting the analysis.

4.2 Preliminary Data Analyses

Just before the actual analysis of the collected data, the researcher performed many preliminary analyses to establish all the requisite respondents' demographic information for this study. The results of the preliminary analysis are displayed in *Table 4.1*.

Table 4.1: Summary of Respondents' Age and Gender

AGE	FEMALE		MALE		TOTAL	
14-16	47	(15.36%)	87	(28.43%)	134	(43.79%)
17-19	65	(21.24%)	95	(31.05%)	160	(52.29%)

Over 19	7	(2.29%)	5	(1.63%)	12	(3.92%)
TOTAL	**119**	**(38.89%)**	**187**	**(61.11%)**	**306**	**(100%)**

Source: SPSS output

The table reveals that of the 306 respondents, 119 (38.9%) were female, while 187(61.1%) were male. Generally, there are more males than females in Boda Boda operations. The table further shows that 134 (43.8%) respondents were between 14 and 16 years, 160 (52.3%) were between 17 and 19 years, and 12 (3.9%) were above 19 years. This shows more males than females, while most respondents were in the 17-19 age bracket. The rate of return of all the research tools was also calculated to determine if any research tool was wasted or if the research assistants were inefficient to the extent of failing to collect all the research tools. The results of the calculation indicated that there was no missing research tool after the data collection process. This positive observation was especially so because all two research tools (questionnaire and DAG) had maximum possible return rates of 100%. This important milestone was achieved due to several measures the researcher implemented. These included (i) the researcher and research assistants' physical presence to supervise the whole data collection exercise and address any challenges that demanded their immediate attention, (ii) the researcher's effective sensitization of respondents on how important their responses were formulation and implementation of any policies in the future, (iii) production of coloured copies of these tools which made them attractive, (iv) use of sufficient and effective research assistants who were able to reach every respondent, and (v) careful collection, package, and safe custody of all the research tools.

Finally, the completion rate was also calculated to establish if the respondents responded to all the items in the research tools administered before they were returned. It was also done to see if significant amounts of data were lost during the study. The completion rate was calculated by dividing the count of completely responded-to items in each research tool by the total count of the corresponding items in the tools. The quotient of this division was then multiplied by 100. Therefore, the completion rate of the DAG is 100%, while the questionnaire is 98%. This shows that the DAG completion rate was higher than the questionnaire. However, both were relatively high, showing that insignificant data were lost during the data collection process. Scientific inquiry has reached a momentous milestone with the discovery of this phenomenon (Fan and Yan, 2010). The researcher successfully attained this milestone by implementing a variety of precautions to prevent data loss. These include (i) assuring the respondents of their anonymity by using pseudo names instead of their actual names, (ii) assuring them of confidentiality of the information they provided before the data collection, (iii) producing coloured and attractive copies of the tools, (iv) allocating sufficient amounts of time that most respondents needed to respond to all items in each research tool based on the observations the researcher made from the pilot study, (vi) clearly articulating the importance of the study beforehand to the respondents, (vii) providing clear and simple instructions on how to fill each part of the tools, and (viii) using language that is commensurate to the respondents' level of education and avoiding jargon, which would discourage them from participating in the process.

4.3 Statistical Assumptions

The four research hypotheses were tested inferentially using Bivariate Pearson's Correlation (BPC), a parametric test that relies on several assumptions. According to Cox (2006), violating these assumptions may lead to the committing of type I or type II errors during hypothesis testing. For this reason, the researcher assessed all statistical assumptions of BPC beforehand to ensure there was no room for committing any of these errors. Additionally, errors cannot be disregarded, as doing so would increase the probability of spreading erroneous conclusions. Scholars have also noted that while investigators may readily disregard certain BPC test assumptions, they must consistently be prepared to clarify them to avoid ignoring them in their analysis (Haghighat et al., 2016). The assumptions mentioned above are as follows: linearity, related pairings, level of measurement, normality of variables, and absence of outliers (Nikolic et al., 2012). Related pairs can be described as pairs of close variables. In other words, each observation or participant data point should contain a pair of values (Nikolic, 2012) extracted from the filled relevant questionnaires and DAG sections. So, if the correlation was between sand harvesting and academic performance, as in the first null hypothesis of the study, then each observation should have both the SHA (from section A of the questionnaire) and DAG scores. This was the resultant case in this study since the case-by-case careening of data revealed no missing values.

The level of measurement refers to the relationship between a pair of variables. In order to ensure that Pearson's correlation test applies to continuous variables, the researcher must employ Spearman's correlation test when one or both variables have ordinal levels of

measurement (Haghighat et al., 2016). The variables under examination in this test were the scores obtained by students on the questionnaire and DAG in testing all the null hypotheses for this study. The data collected from the questionnaires were on continuous intervals, while those on the DAG were ratio scales, with the scores in each incomegenerating activity correlated against academic performance. The questionnaire scores (5point Likert scale) were converted from an ordinal continuous interval to a ratio scale to allow for parametric testing (Traylor, 1983). This was possible since, as Chen and Wang (2014) explain, "a Likert scale data can be converted to a continuous interval data when the points are assigned a score from 1 to 5 hence making the distance between two scores equal". Therefore, after assigning a score from 1 to 5 across the Likert scale, strongly agree (SA), agree (A), undecided (U), disagree (D), and strongly disagree (SD), the distance between them becomes the same.

Homoscedasticity can be described as the nature of the final shape of the graph produced by the scatter plot (Gwilym, 2017). Achieving linearity is essential when performing BPC. A "straight line" relationship between variables is referred to as linearity. A line connecting every dot in a scatter plot in a left-to-right direction should be a straight line, not a curve. Homoscedasticity is the distance between points along a straight line in a scatter plot; therefore, the scatter plot should appear like a tube. In the case of a cone-like shape, homoscedasticity would not be satisfied (Marno, 2012). In order to accomplish this, the scatter plots were constructed in the form of a tube, with students' academic performance along the y-axis and their scores in participation in all four economic activities examined

in this study along the x-axis. This indicated that the assumption of homoscedasticity was met.

The absence of outliers can be described as having all values of all the variables close to one another in a dataset (Ijsmi, 2017). An outlier's existence can potentially introduce bias into the correlation results due to the excessive displacement of the line of best fit in a particular direction. This can result in the correlation yielding misleading information (Haghighat *et al.*, 2016). An outlier is a value deviating by 3.29 standard deviations from the mean, or ±3.29 units, when converted to units. Every value within the prescribed parameter margins ensured that the data collected by each research instrument did not contain any outliers.

4.4 Relationship between Sand Harvesting and Academic Performance

This section presents and discusses the findings of the first objective, which was to investigate the relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Many descriptive analyses were conducted on data gathered by section A of the questionnaire (sand harvesting) to establish the patterns and trends that explain the observations made in the quantitative data analysis. *Table 4.2* summarizes responses to the sand harvesting activities extracted from the questionnaire.

Table 4.2 Responses on the Sand Harvesting

STATEMENT	SA	A	U	D	SD	TOTAL
dig sand from the riverbank	96	77	1	66	66	306
scoop sand from the riverbed	107	92	0	47	60	306
sell sand	95	78	0	65	68	306
collect harvested sand	101	75	0	67	63	306
Load to lorries	92	81	0	60	73	306
offload sand from lorries	101	75	0	67	63	306
coordinate sand harvesting activities	92	81	0	60	73	306
transport sand	100	73	0	69	64	306
make concrete using sand	83	95	0	61	67	306
connect the sellers and buyers of sand (brokerage)	94	78	0	77	57	306

Source: Field data

As shown in the table, the respondents were provided with a total of 10 statements in section A (sand harvesting activities), with the responses ranked on a Likert scale of five points (Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). As the table reveals, most of the responses were affirmative of the statements in the section, implying they participated in some or all the sand harvesting activities mentioned. Additionally, of all the activities carried out in and around sand harvesting, the highest number of students participated in scooping the sand (34.9% of the participants), collecting harvested sand, offloading sand from lorries (28% of the participants), and transporting sand (32.7% of the participants). The statement with the least number of students' affirmations (strongly agreed) was making concretes using sand.

None of the respondents scored Undecided (U) except 1 (I dig sand from river banks – 0.3% of the participants). The response rate for all the statements was 100%.

The students' scores as shown in *Appendix 1* recorded in the DAG, indicate a downward trend as the age of those who engage in these activities advances. For instance, over 25 out of 134 students between ages 14 and 16 scored above the average percentage of 50%, while in the second age bracket (17-19), only 2 out of 160 students scored above 50 marks. However, none scored 50% and above in the last age bracket.

The students' scores in sand harvesting and academic performance as measured by section A of the questionnaire and the DAG were descriptively analysed to generate Means and Standard Deviations (S.D). The outcomes here were mean and standard deviations for sand harvesting activities of 76.95 and 4.9445, respectively, while the means scores and standard deviation for their academic performance were 29.39 and 8.9395.

As outlined above, this study's first objective was to investigate the relationship between students' participation in sand harvesting and their academic performance (AP) in public day secondary schools in Uguna Sub County, Kenya. Data with respect to this objective were collected using section A of the questionnaire and the Document Analysis Guide. From the objective mentioned above, the first null hypothesis of this study was formulated as follows:

H_{O1}: *There is no statistically significant relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.*

This hypothesis was tested at 0.05 by performing Bivariate Pearson's Correlation (BPC) on all the sampled students' scores in section A as the independent variable and in the DAG as the dependent variable. The results of this correlation analysis were as presented in *Table*

4.3 thus:

Table 4. 3: Correlation between Sand Harvesting Activities Participation and AP Scores

VARIABLE	Sand Harvesting Score	AP Score
Sand Harvesting Score	-	-0.739*
AP Score	-0.739*	-

* $p < 0.001$, $\alpha = 0.05$

Source: SPSS output

The results presented in Table 4.3 indicate a significant inverse correlation (r = -.739*, p <.001 at α =.05) between students' academic performance and their sand harvesting scores. Based on the analysis, the Pearson correlation coefficient (r = -.739) is more closely located near -1 than zero, indicating a strong association. Furthermore, the correlation coefficient (r) is also negative (-*.739*), implying that a student with high sand harvesting scores had low academic performance scores and vice-versa. These two revelations contradict the assertion of the first null hypothesis (H_{O1}). The null hypothesis (HO1) was therefore refuted on the basis of the empirical evidence derived from the data collected in section A of the questionnaire and DAG, which supported the opposite conclusion. As the data demonstrates, students' academic performance in public day secondary schools within the study area is negatively correlated with their participation in sand harvesting activities (SHA).

This relationship was statistically significant at the 0.05 alpha level, contradicting this study's first null hypothesis. The negative value of the correlation coefficient implies that the more students engaged in sand harvesting activities, the lower their academic performance and vice-versa. This also implies that participation in sand harvesting activities has negatively affected the academic performance among the sampled students in the research area. Moreover, the calculated correlation coefficient was associated with a p-value of -0.719, less than the predetermined alpha value of 0.05, indicating that this association was statistically significant.

These results can also be attributed to the fact that students found scooping sand, collecting the harvested sand, and offloading sand to be either easier to do had no strict legal requirements, or promised higher income rates since the activities had the greatest number of participants. It also implies that because other sand harvesting activities, such as digging sand from river banks, selling sand, loading sand to lorries, coordinating sand harvesting activities, transporting sand, making concretes, and brokerage between buyers and sellers, also received some participants scoring strongly agree and agree, they equally have a significant negative relationship with their academic performance. This revelation confirms that these students participate in sand harvesting activities, which is negatively associated with their academic performance. It could also be argued that the three had the strongest relationship with students' academic performance in public day secondary schools.

The results of this study also agree with those of Adu-Gyamfi (2014), who indicated that students who participate in sand harvesting activities perform relatively poorly in academics compared to their counterparts who do not participate in sand harvesting.

EduGyamfy's study, which involved a sample size of 30 teachers and 150 students, established that sand harvesting might not be child labour as such but negatively influences educational attainment, just like the revelations of a descriptive survey by Ako *et al.* (2014), which showed that absenteeism as a result of sand harvesting distracted achievement of desired learning outcomes among the affected students. Also, a case study conducted by Owusu and Dwomoh (2012) also supported this study's findings as it indicated that sand mining activities have a negative impact on the youth and those participating in it led to a high rate of teenage pregnancies and disrespectful attitudes towards the elders, which negatively affect their academic performance. Finally, an ex-post-facto study conducted by Kisipan

(2019) to investigate how sand harvesting affected pupils in Kenyawa division, Kajiado County, also supports the findings of the just-completed study by revealing that pupils who take part in sand harvesting scored lower academic marks than their counterparts who did not. In this study, Kisipan (2019) used a sample size of 30 teachers and 150 pupils as respondents to collect data using questionnaires and interviews. The findings of this source were critical to the just-completed study because they showed an inverse proportion between pupils' engagement in sand harvesting activities and their academic performance, which is almost the same as that of the just-completed study. However, Kisipan (2019) used a slightly smaller sample size of students and only used questionnaires and interview schedules, while the current study utilised a Document Analysis Guide, which accurately established the actual students' scores. Additionally, the study involved primary school pupils as respondents, while the just completed one used secondary school students.

4.5 Relationship between Boda Boda Operations and Academic Performance

This section presents a detailed discussion of the findings of the second objective, which was to establish the relationship between students' participation in Boda Boda Operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Several descriptive analyses were performed on data collected by section B (Boda Boda Operation part) of the research tools on the independent variable to establish the patterns and trends to explain the observations made in the quantitative data analysis. *Table 4.4* summarizes the sampled respondents' responses in the BBO part of the questionnaire.

Table 4.4: Responses on the Boda Boda Operations

STATEMENT	SA	A	U	D	SD	TOTAL
I ride Boda Boda	120	98	0	50	38	306
I connect motorists and their customers (brokerage)	122	74	0	67	43	306
I sell motorcycle spare parts	102	81	1	59	63	306
I repair motorcycles	110	75	0	57	59	301
I connect motorcyclists to their repair shops	75	98	0	66	67	306
I sell riders' costumes	95	78	0	65	68	306
I market Boda Boda products	92	81	0	60	73	306
I sell fuel to motorists	106	76	3	61	60	306
I transport Boda Boda products	80	98	0	66	62	306
I load merchandise to motorbikes	101	78	0	74	53	306
I sell motorbikes	97	91	0	60	57	305
I connect buyers and sellers of motor accessories	96	70	0	70	70	306
I connect the Boda Boda motorists to motorbike dealers	95	81	0	60	70	306

Source: Field data

From the table, the respondents were provided with a total of 14 statements in section B, with the responses ranked on a Likert scale of five points (Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). The table indicates that most of

the responses were affirmative of the statements in the section, which implies they participated in some or all the Boda Boda Operations mentioned therein. It is also evident in the table that of all the Boda Boda Operations respondents in the completed study, the highest number of students connected motorists to their customers (39.8%) and participated in the actual riding of Boda Boda (39%). Similarly, the statement with the least number of students' affirmations (strongly agreed) was connecting Boda Boda riders to motor repair shops.

The students' recorded in the DAG as shown in *Appendix 1*, indicate a downward trend as the age of those who engage in these activities advances. For instance, over 25 out of 134 students between ages 14 and 16 scored above the average percentage of 50%, while in the second age bracket (17-19), only 2 out of 160 students scored above 50 marks. However, none scored 50% and above in the last age bracket.

The students' scores in Boda Boda Operations and academic performance as measured by section B and the DAG were descriptively analysed to generate Means and Standard Deviations (S.D). The outcomes here were mean and standard deviations for the Boda Boa Operation part of the questionnaire, which were 75.02 and 3.9576, respectively, while the means scores and standard deviation for their academic performance were 29.39 and 8.9395.

The second objective of this study was to establish the relationship between students' participation in *Boda Boda* operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. Data that were used to achieve this objective were gathered using section B of the questionnaire and the DAG for the

independent and dependent variables, respectively. This objective guided the formulation of the second null hypothesis for this study thus:

H_{O2}: There is no statistically significant relationship between students' participation in Boda Boda Operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

This null hypothesis was tested statistically at a 0.05 alpha level of significance using the Bivariate Pearson's Correlation (BPC). This parametric test was performed on all the sampled students' scores in section B of the questionnaire as the independent variable and their academic performance grades as captured in the DAG as the dependent variable with respect to *H_{O2}*. The outcome of this correlation analysis was as presented in *Table 4.5* thus:

Table 4.5: Correlation between Boda Boda Operations Participation and AP Scores

VARIABLE	Boda Boda Operations participation Score	AP Score
Boda Boda Operations participation Score	-	-0.809*
AP Score	-0.809*	-

* $p < 0.001$, $\alpha = 0.05$

Source: SPSS output

The results presented in *Table 4.5* demonstrate a significant inverse correlation ($r = -0.809$, $p<.001$ at $\alpha =.05$) between students' academic performance and their participation in Boda

Boda Operations. This was because the Pearson's correlation coefficient for BBO and AP scores obtained is closer to -1 than zero, hence the description of the association as 'strong.' Additionally, the table also reveals that the sign of the correlation coefficient (r) is negative, which implies that a respondent who obtained high scores in the Boda Boda Operations part of the Questionnaire recorded low scores in the DAG, an indicator of low academic performance and vice-versa. The evidence provided by these inferential statistics refutes the claims of the second null hypothesis. For this reason, H_{O2} was rejected. Alternatively, it can be asserted that a strong negative relationship exists between students' participation in Boda Boda operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Findings of this study with respect to the second objective after statistical testing of the second null hypothesis established that there was a strong negative correlation between students' participation in Boda Boda operations and their academic performance in public day secondary schools in Ugunja Sub-County. Contrary to the assertions in this study's second null hypothesis, this correlation exhibited statistical significance at the 0.05 level of significance. A correlation coefficient with a negative value indicates that students' academic performance decreases in direct proportion to their involvement in Boda Boda operations within the research domain; conversely, an increase in the opposite direction results in improved academic performance. From this finding, it is possible to conclude that there is an inverse relationship between students' academic achievement in the research area and their level of engagement in Boda Boda. Moreover, the statistical significance of this association is established by the fact that the p-value corresponding to the calculated

correlation coefficient acquired through BPC was lower than the predetermined alpha value.

These results can also be attributed to the fact that students found connecting Boda Boda riders to their clients and actual riding of Boda Boda to be the Boda Boda operation activities that were either easier to do, had no strict legal requirements, or promised higher rates of income since the activities that had the greatest number of participants. It also implies that because other Boda Boda Operations such as selling motorcycle spare parts, repairing motorcycles, connecting motorcyclists to their repair shops, selling riders' costumes, using Boda Boda for self-transport, marketing Boda Boda products, selling fuel to motorists, transporting Boda Boda products, loading merchandise to motorbikes, selling motorbikes, and connecting buyers and sellers/dealers, also received some participants scoring strongly agree and agree, they equally have a significant relationship with their academic performance. This revelation confirms that these students indeed participate in Boda Boda Operations, which is negatively associated with their academic performance. It could also be argued that the three had the greatest effect on students' academic performance in public day secondary school.

Another study by Boonchooduang et al. (2021) supported these findings, which found that students who take part in motorcycling (especially without protective gear) underachieved academically more than those who did not. Through a cross-sectional survey design, the study conducted in Chiang Mai, Thailand, involved 4,372 adolescent Boda Boda riders as respondents. In the rejoinder were the findings of a study by Keino (2020) that established that participation in Boda Boda operations significantly influences school drop-out cases

among the affected students, consequently lowering their academic performance. The descriptive survey by Keino (2020) used both learners, Boda Boda operators, and teachers as respondents to find out how Boda Boda operations influence the school drop-out rate and how it does.

However, these findings disagree with a study by Olawo *et al.* (2014), who posited that Boda Boda operations positively contribute to the success rates among the students who participate in it. Olawo *et al*. (2014) argue that students can raise their fees and attend school afterward by engaging in Boda Boda operations. It can be argued that students' lost time engaging in Boda Boda operations cannot be recovered.

4.6 Relationship between Hawking Activities and Academic Performance

This section presents and discusses the findings of the third objective which was to assess the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Several descriptive analyses were performed on data collected by section C (Hawking Activities) of the questionnaire to establish the trends and patterns and explain the observations made in the quantitative data analysis. *Table 4.6* presents the summary of the responses of the sampled respondents in section C of the questionnaire.

Table 4.6: Responses on the Hawking Activities

STATEMENT	SA	A 77	U	D 66	SD	TOTAL
I engage in selling fruits and fruit salads	96		1		66	306
I hawk blended juice	107	92	0	47	60	306
I vend soft drinks	95	78	0	65	68	306
I sell vegetables, onions, and tomatoes	101	75	0	67	63	306
I sell second-hand clothes	92	81	0	60	73	306
I sell utensils	101	75	0	67	63	306
I sell second-hand shoes	92	81	0	60	73	306
I sell hot and cold coffee	100	73	0	69	64	306

I sell snacks	83	95	0	61	67	306
I sell tea	94	78	0	77	57	306
I sell electronics and their accessories	76	98	0	66	66	306
I deal in jewellery	91	79	0	75	61	306
I hawk pesticides	99	80	0	59	68	306
I hawk stationary	94	83	0	57	72	306
I hawk beauty products	100	75	0	65	66	306

Source: Field data

From the table, the respondents were provided with a total of 15 statements in section C of the questionnaire, with the responses ranked on a Likert scale of five points (Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). As the table indicates, most of the sampled students were affirmative of the statements in the section, which implies that they indeed participated in some or all the hawking activities mentioned in the questionnaire. Additionally, of all the hawking activities the respondents participated in, the highest number, representing 34.9%, was hawking blended juice. This was followed by 33% for selling utensils, vegetables, onions, and fruits. At the same time, the statement with the least number of students' affirmations (strongly agreed) was selling electronics and their accessories. Additionally, none of the respondents scored Undecided (U) except 01 (I engage in selling fruits and fruit salads).

The students' scores recorded in the DAG as shown in *Appendix 1*, indicate a downward trend as the age of those who engage in these activities advances. For instance, over 25 out of 134 students between ages 14 and 16 scored above the average percentage of 50%, while in the second age bracket (17-19), only 2 out of 160 students scored above 50 marks. However, none scored 50% and above in the last age bracket.

The students' scores in Hawking Activities and academic performance as measured by section C of the questionnaire and the DAG were descriptively analysed to generate Means and Standard Deviations (S.D). The outcomes here were mean and standard deviations for the section of the questionnaire were 87.86 and 3.2085, respectively, while the means scores and standard deviation for their academic performance were 29.39 and 8.9395.

This study's third objective was to assess the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. Data used to achieve this objective were gathered using section C of the questionnaire and the DAG the independent and dependent variables, respectively. Based on this objective, the third null hypothesis of this investigation was formulated as follows:

H_{O3}: *There is no statistically significant relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.*

Bivariate Pearson's Correlation (BPC) was used to test this null hypothesis at a 95% confidence level. This inferential test was implemented by correlating all the sampled students' scores in section C as the independent variable and their academic performance scores captured in the DAG as the dependent variable. The output of this analysis is presented in *Table 4.7* thus:

Table 4.7: Correlation between Hawking Activities Participation and AP scores

Variable	Hawking Activities Participation	AP Score

	Score	
Hawking Activities Participation Score	-	-0.584*
AP Score	-0.584*	-

* p = 0.008, $\alpha = 0.05$

Source: SPSS output

It can be observed from the table that there was a moderate negative association between students' participation in hawking activities scores and their academic performance scores *[r = -.584, p = .008* at $\alpha = .05$*]*. The association was classified as "moderate" because Pearson's correlation coefficient between the obtained section C and DAG scores is situated midway between 0 and -1. The table further reveals that the sign of the correlation coefficient (r) is negative, which implies that a respondent who obtained high scores in section C recorded low scores in the DAG and vice-versa. These inferential statistics provide evidence that refutes the assertions of the third null hypothesis. For this reason, H_{O3} was rejected. Alternatively, it can be asserted that students' participation in hawking activities has a statistically significant influence on their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

The findings of this study with respect to the third objective and statistical testing of the third null hypothesis revealed that there was a moderate negative correlation between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County. In contrast to the expectations expressed in the third null hypothesis of this study, the analysis revealed a statistically significant

association with a significance level of 0.05. Students who participated in hawking activities in the research area exhibited poorer academic performance than those who engaged in less of the same (or vice versa), as indicated by the negative value of the correlation coefficient. To this end, it can be deduced that participation in hawking activities negatively affected the students' academic performance in the research area. These results could also be attributed to the fact that students found connecting selling blended juice, selling utensils, vegetables, onions, fruits, and selling cold and hot coffee as the hawking activities that were either easier to do, had no strict legal requirements or promised higher rates of income since the activities that had the greatest number of participants. It also implies that because other hawking activities such as selling fruits and fruit salads, vending soft drinks, selling second-hand clothes, selling utensils, selling second-hand shoes, selling snacks, selling tea, selling electronics and their accessories, dealing in jewelry, hawking pesticides, hawking stationary, and hawking beauty products, also received some participants scoring strongly agree and agree, they equally have a significant relationship with their academic performance. This revelation confirms that these students participate in hawking activities, which is negatively associated with their academic performance. It could also be argued that the three had the greatest effect on students' academic performance in public day secondary school.

Furthermore, this correlation was deemed statistically significant because the p-value corresponding to the calculated correlation coefficient acquired through BPC was smaller in magnitude than the specified alpha value. These results are consistent with those of Paul, Allison, and Dickay (2019), whose research examined the impact of street vending on

adolescents' academic achievement in the Wukari Metropolitan Area. According to their research, peddling negatively impacted academic achievement. However, while the present study used 306 students, Paul, Allison, and Dickay (2019) used a smaller sample size of 100 teenagers to determine the effects of street vending on their academic performance.

The findings of the just-concluded study are also supported by Oluwagbohunmi (2019), whose study was descriptive and involved a sample size of 180 students and respondents. Oluwagbohunmi (2019) found that students who participated in hawking activities exhibited poor academic performance due to poor study habits. The scholar also explains that street hawking risks the lives of school-going students mentally and physically. Oluwagbohunmi (2019) collected data using questionnaires and social studies achievement tests, which could be equated to the document analysis guide for the current study. Although the findings agree, the present study used a relatively larger sample size. Another study whose findings support those of the current research with respect to the third objective is that by Ijadunola *et al.* (2015), who found out the patterns, determinants, and effects of street hawking on the school performance of in-school adolescents. In the study, Ijadunola *et al.* (2015) used a bigger sample size of 435 adolescents and a questionnaire as the sole data collection method to establish that the adolescents who participated in street hawking were more likely to fail in their exams compared to their counterparts who did not. The major concern about the study by Ijadunola *et al*. was that they used self-reporting tools to capture data on academic performance, yet there are more reliable tools that can capture information on academic performance, like document analysis guides, as was done in the present study.

Another study that supports this study's findings is by Kaletapwa and Yumbak (2013), who investigated the effects of street hawking on academic performance in practical agriculture in secondary schools in Taraba state, Nigeria. However, the study focussed on academic performance in practical agriculture; hence, the findings cannot be generalized to other curriculum subjects. The present study used all subjects in the curriculum in the schools that were used.

Finally, the study is supported by Senna's (2022) study, which investigated the effect of street hawking on the education of young female hawkers in the Volta region of Ghana and found that many female hawkers cannot attend school regularly and perform poorly. In a descriptive research that involved interviewing and observing 60 adolescent school girls who engage in hawking activities, Senna (2022) outlined that such students engaged in hawking activities because they needed to pay their school fees, provide their basic needs, and assist their parents. This source was critical to the just-completed study because it was a pointer towards the result of the study. However, the study does not reveal the strength of the relationship between the independent and the dependent variables. Additionally, the interview and observation were inadequate in bringing out dependable results, and the two could present possible researcher biases, making the current study worth taking. Additionally, Senna (2022) only used girls as the respondents and target population, thereby side-lining the boys, a weakness that required an immediate gender intervention study. This is the gap in which the just-completed study has filled.

4.7 Relationship between Fishing Activities and Academic Performance

This section presents and discusses the findings of the fourth objective, which is to determine the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Several descriptive measures were computed on data collected by section D of the questionnaire with the intention of establishing the trends and patterns to explain the observations made in the quantitative data analysis. *Table 4.8* shows the summary of the responses of the sampled respondents in section D of the questionnaire.

Table 4.8: Responses on the Fishing Activities

STATEMENT	SA	A	U	D	SD	TOTAL
I engage in actual fishing	98	75	0	67	66	306
I make fishing nets and rods	108	80	0	57	61	306
I smoke fish	99	76	0	66	65	306
I sell fishing materials	90	83	0	77	56	306
I repair fishing boats	96	77	0	67	66	306
I load fishing merchandise from boats and lorries	87	92	0	67	60	306
I clean fish	95	78	0	65	68	306
I sell fish	101	75	0	67	63	306
I transport fish to the market	100	75	0	67	64	306
I repair fishing nets and rods	75	98	0	66	67	306
I connect the fishers and the fishmongers	91	78	0	74	63	306
I transport fishers	98	76	0	65	67	306
I operate and preserve fish	94	73	0	67	72	306

Source: Field data

As the table shows, most of the respondents were affirmative of the statements in section D, which implies they indeed participated in some or all the fishing activities in the research area, as mentioned in the questionnaire. From the table, the respondents were provided with a total of 13 statements on fishing activities, with the responses ranked on a Likert scale of five points (Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). As the table indicates, most of the sampled students were affirmative of the statements in the section, implying that they participated in some or all the fishing activities mentioned in the questionnaire. Additionally, of all the fishing activities the respondents participated in, the highest number, representing 35%, was making fishing nets and rods, followed by 33% selling fish. In addition, the statement with the least number of students affirmations (strongly agreed) was repairing fishing nets and rods (75). Additionally, none of the respondents scored Undecided (U).

The students' scores recorded in the DAG as shown in *Appendix 1* indicate a downward trend as the age of those who engage in these activities advances. For instance, over 25 out of 134 students between ages 14 and 16 scored above the average percentage of 50%, while in the second age bracket (17-19), only 2 out of 160 students scored above 50 marks. However, none scored 50% and above in the last age bracket.

The students' scores in Fishing Activities and academic performance as measured by section D of the questionnaire and the DAG were analysed descriptively to generate Means, Standard Deviations (S.D). The outcomes here were mean and standard deviations for section D of the questionnaire were 92.94 and 4.6039, respectively, while the means scores and standard deviation for their academic performance were 29.39 and 8.9395.

This study's fourth objective, as outlined in Chapter One of this work, was to determine the relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. Data that were used to achieve this objective were gathered using section D of the questionnaire and the Document Analysis Guide. The fourth null hypothesis of this study was formulated from this objective thus:

H_{O4}: There is no statistically significant relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

Statistical analysis was conducted to test this hypothesis at an alpha level of significance of 0.05. Bivariate Pearson's Correlation (BPC) was applied to the scores of the dependent variable, the DAG, and the Fishing activities section of the questionnaire (FA) for all the

sampled students. The results of this correlation analysis were as presented in *Table 4.9* thus:

Table 4.9: Correlation between Fishing Activities Participation and AP Scores

VARIABLE	Fishing Activities Score	AP Score
Fishing Activities Score	-	-0.847*
AP Score	-0.847*	-

* p = 0.001, α = 0.05

Source: SPSS output

As we can see from the Table, there was a strong negative association between students' fishing activities scores and their academic performance scores *[r = -.847, p=.001* at α = *.05]*. The obtained Pearson's correlation coefficient is closer to -1 than zero because of this; thus, the association is described as "strong." In addition, the table reveals that the correlation coefficient (r) has a negative sign, indicating that students who obtained high scores in section D also obtained low scores in the DAG, and conversely. This finding suggests that there was a negative correlation between academic achievement and fishing activity level among students in the study areas; conversely, students who participated in fishing activities to a lesser extent had higher academic achievement. The fourth null hypothesis of this study, which was refuted based on empirical evidence gathered by section D of the questionnaire and DAG, is in direct opposition to each of these revelations. Conversely, one could argue that a notable inverse correlation exists between the academic

achievement of students attending public day secondary schools in the study area and their engagement in fishing activities.

Results of this study with respect to the fourth objective revealed that there was a strong negative association between students' participation in fishing activities and their academic performance in public day secondary schools in the research area. This association was statistically significant at the 0.05 alpha level, contrary to the assertion of the fourth null hypothesis of this study. The negative value of the correlation coefficient implies that the more a student engages in fishing activities, the lower their academic performance is, and vice versa. This implies that participation in fishing activities has negatively affected the academic performance among the sampled students in the research area. Moreover, this association was statistically significant since the p-value associated with the results of the calculated correlation coefficient was less than 0.05, which was the stipulated alpha value. These results can also be attributed to the fact that students found making fishing nets and rods, selling fish, and transporting fish from the fishing areas to the market as the fishing activities that were either easier to do, had no strict legal requirements or promised higher rates of income since the activities that had the greatest number of participants. It also implies that because other fishing activities such as the actual fishing, smoking fish, selling fishing materials, repairing fishing boats, loading fishing merchandise from boats and lorries, cleaning fish, repairing fishing nets and rods, connecting the fishers and the fishmongers, transporting fishers, operating and preserving fish, also received some the participants scoring strongly agree and agree, they equally have a significant relationship with their academic performance. This revelation confirms that these students indeed

participate in fishing activities, which is negatively associated with their academic performance. It could also be argued that the three had the greatest effect on students' academic performance in public day secondary school.

These findings are in harmony with a Brazilian study conducted by Vieira *et al.* (2013), which showed that children between the ages of 7 and 19 accompanied their adult relatives to fish during school hours in rural Brazil. Their study used a sample size of 41 young respondents and an exploratory survey with participatory observation and semi-structured interviews. The study indicated that the truancy of these students due to the incompatibility of the school and fishing calendar was relatively high, resulting in them attaining poor grades in school.

These findings also agree with those of Maxwell (2016), whose study established that the rate of school attendance and academic performance were directly proportional variables, just like the BPC results of the present study with respect to H_O4. According to Maxwell (2026), when students do not have enough pocket money, they tend to be absent from school to look for it from the lakes or rivers around, leading them to perform poorly academically as they fail to compensate for the missed classes.

CHAPTER FIVE:

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1.Introduction to the Chapter

This chapter presents a summary of the findings, conclusions made from the research findings, the researcher's recommendations, and suggestions for further research.

5.2.Summary of the Findings

The findings of this study can be summarised as follows;

5.1.1. Sand harvesting activities and their academic performance

From this study's objective (i), which was to investigate the relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya, it was found that there was a statistically significant strong negative correlation between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. The value of Pearson's correlation coefficient on this relationship was r = -.719, p=.001 at $\alpha = .05$. The Pearson correlation coefficient of -.739) is more closely located near -1 than zero, indicating a strong association. Furthermore, the correlation coefficient (r) is also negative (-.739), implying that a student with high sand harvesting scores had low academic performance scores and vice-versa. These two revelations contradict the assertion of the first null hypothesis (H_{O1}).

5.1.2. Boda Boda operations and academic performance

From this study's objective (ii), which was to establish the relationship between students' participation in Boda Boda operations and their academic performance in public day

secondary schools in Ugunja Sub-County, Kenya, it was established that there was a statistically significant strong negative correlation between students' participation in Boda Boda operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. The value of Pearson's correlation coefficient on this relationship was r = -.809, p=.001 at α = .05. The Pearson correlation coefficient of -0.809 is more closely located near -1 than zero, indicating a strong association. Furthermore, the correlation coefficient (r) is also negative (-0.809), which implies that a student with high Boda Boda Operations scores had low academic performance scores and vice versa. These two revelations contradict the assertion of the second null hypothesis (H_{O2}).

5.1.3. Hawking activities and academic performance

From this study's objective (iii), which was to assess the relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya, it was found that there was a statistically significant moderate negative correlation between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

The value of Pearson's correlation coefficient on this relationship was r = -.584, p=.008 at α = .05. The *BPC of -.584,* midway between 0 and -1 hence making the association "moderate." Also, the sign of the correlation coefficient (r) is negative, which implies that a respondent who obtained high scores in hawking activities recorded low scores in academic performance and vice-versa, which refutes the third hypothesis (H_{O3})

5.1.4. Fishing activities and academic performance

From this objective of the study (iv), which was to determine the relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja sub-county, Kenya, it was determined that there was a statistically significant strong negative correlation between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. The value of Pearson's correlation coefficient on this relationship was r = -.847, p=.001 at $\alpha = .05$. The Pearson's correlation coefficient of -.847 is closer to -1 than to zero; thus, the association is described as "strong." In addition, the correlation coefficient (r) has a negative sign, indicating that students who obtained high scores in fishing activities obtained low scores in academic performance and vice-versa, which is contrary to the fourth hypothesis (H_{O4}).

5.3.Conclusions from the Main Research Findings

Based on empirical evidence arising from data that were collected in this descriptive survey and the subsequent statistical testing of the four null hypotheses of this study, four major conclusions have been arrived at:-

5.2.1. Participation in Sand harvesting and Academic Performance There was a strong negative relationship between students' participation in sand harvesting activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

5.2.2. Participation in Boda Boda and Academic Performance

There was a strong negative relationship between students' participation in Boda Boda Operations and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

5.2.3. Participation in Hawking and Academic Performance

There was a strong negative relationship between students' participation in hawking activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

5.2.4. Participation in Fishing and Academic Performance

There was a strong negative relationship between students' participation in fishing activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya.

5.4. Recommendations from the Study

As it has been found in this study, there is a strong negative relationship between students' participation in income-generating activities and their academic performance in public day secondary schools in Ugunja Sub-County, Kenya. Based on these findings, there are some recommendations the researcher puts forward for key education for policy action. This has been done so because the study's implications directly concern the problem that necessitated this study in the first place.

5.3.1. Recommendations for the Ministry of Education

Based on the findings of this study, the following are recommendations for the Ministry of Education.

Firstly, the Ministry of Education needs to increase capitation towards funding for public day secondary school education so that students from poor backgrounds do not absent themselves from school to engage in IGAs to finance their education, as this negatively affects their academic performance.

Secondly, the ministry should encourage the management of schools to develop institutionbased income-generating activities to help the students practice them while in school and reduce the time they spend engaging in them outside the school. This will help the students acquire both financial literacy and practical income-generating skills while still engaging in academics.

5.3.1. Recommendations for the Educational Institutions in Ugunja Sub County

From the findings of this study, the following recommendations are proposed to help educational institutions in Ugunja Sub County address the negative consequences of students' engagement in income-generating activities on their academic performance.

i) The management of secondary schools in Ugunja Sub County should partner with county governments, private individuals, and non-governmental organisations to provide financial aid or scholarship to students in these schools to reduce the financial pressure that forces them to engage in income-generating activities.

ii) Schools should also strengthen guidance and counselling to help students understand both the short-term and long-term effects of their engagement in income-generating activities and their career prospects. This programme should also seek alternative ways to support such students financially.

iii) The schools could also set up a system to monitor students who engage in income-generating activities and closely track their academic performance so that they could come up with remedial programmes to help such students catch up with the others. This will reduce the negative effect of engagement in IGAs.

5.3.2. Recommendations for the Ministry of Interior

The following recommendations are made from the findings of this study to the Ministry of Interior.

i) Through the local administration, the Ministry should conduct public awareness through community groups, chief's *barazas*, and other avenues to sensitize parents and guardians on how they can discourage their children in secondary schools from engaging in income-generating activities in Ugunja Sub County.

ii) The ministry needs to crack down on any students who engage in incomegenerating activities, arrest them, and get them back to school, as their frequent absenteeism leads to them performing poorly academically.

5.3.3. Recommendations for the County Government of Siaya

The Siaya County government should develop policies that can help provide financial support to students through bursaries and student feeding programmes to reduce the

financial burden that forces students to engage in income-generating activities. Secondly, the county government should restrict the age limits for sand harvesting activities and other income-generating activities that attract school-going children to force them back to school to improve their academic performance. The age limit should be restricted to above 19 as it is the age with the least number of students in secondary school.

5.4 Suggestions for Further Research

It was impossible to investigate all the factors that could, in one way or another, relate to students' performance because of several limitations like resources, time, and scope of the study. However, with regard to students' participation in income-generating activities, many gaps are likely to exist still, even after the adoption of all recommendations of this study. It is for this reason that some suggestions are made for further research to bridge some of these gaps. They include the following;

i) The current study established that some students engage in more than one incomegenerating activity. Other studies should consider looking into how each of the statements affects academic performance. For example, how scooping sand alone affects the academic performance of secondary school students.

ii) This study only focussed on sand harvesting, hawking, fishing, and Boda Boda operations. Other researchers should investigate other activities like child prostitution to investigate its prevalence in the research area and its influence on the academic performance of the perpetrators.

iii) The study should be replicated in counties other than Siaya to ascertain if this study's findings are universal.

iv) Other studies should investigate the relationship between students' participation in IGA's and other aspects of learning other than academic performance, e.g., their attitude, motivation, and self-efficacy in education, as they too play a key role in the all-around development of a learner.

REFERENCES

Abdullahi, H. A., Mlozi, M. R. S., & Nzalayaimisi, G. K. (2015). Determinants of students' academic achievement in agricultural sciences: A case study of secondary schools in Katsina State, Nigeria. *African Educational Research Journal*, *3*(1), 80-88.

Achoka, J. S. K., Wakwabubi, S., Shiundu, J. O., & Ejakait, E. (2018). Students' Socioeconomic Status and Enrolment in Public Secondary Schools in Kenya. *IJASSH*.

Adu-Gyamfi, E. (2014). The effect of illegal mining on school attendance and academic performance of junior high school pupils in Upper Denkyira West District of Ghana. *Journal of Education & Human Development*, 3(1), 523-545.

Ako, T. A., Onoduku, U. S., Oke, S. A., Idris, F. N., Umar, A. N., Ahmed, A. A., & Abba, F. M. (2014). Environmental Effects of Sand and Gravel Mining on Land and Soil in Luku, North Central Nigeria.

Amdany, E. J. (2017). Boy-Child Participation and Retention in Public Secondary Schools: The Role of Socio-economic Factors with Examples from Baringo County, Kenya.

Ampomah, F. (2012). *Child Labour in Petty Trading (Hawking Business) in Ghana: A Case Study of the Madina and Abokobi areas in the Ga East District* (Master's thesis, The University of Bergen).

Baliarsingh, D., Parab, S. H., & Patil, V. N. (2018). Analysis of student academic performance using Hadoop. *International Journal of Advanced Research, Ideas, and Innovations in Technology*, *4*(2), 2420-2422.

Basu, K., & Van, P. H. (1998). The economics of child labour. *American economic review*,

412-427.

Boonchooduang, N., Likhitweerawong, N., & Louthrenoo, O. (2021). Prevalence of unprotected motorcycle riding and its association with other risk behaviors among adolescents in Chiang Mai, Thailand. *Traffic injury prevention*, *22*(1), 85-89.

Chen, H. C., & Wang, N. S. (2014). The assignment of scores procedure for ordinal categorical data. *The Scientific World Journal*, *2014*.

Cox, D. R. (2006). *Principles of statistical inference*. Cambridge University Press.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, *26*(2), 132–139

FAO. 2017. The CWP Handbook of Fishery Statistics. http://www.fao.org/fishery/cwp/handbook/G/en [accessed 31 August 2019].

George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference 11.0 update (4th ed.). Boston: Allyn & Bacon

Ghanney, R. A. (2020). Academic Performance of Basic School Pupils In Sand Winning Areas: The Case Of Selected Junior High Schools In The Awutu-Senya West, Ghana. *European Journal of Social Sciences Studies*, *5*(6).

Gwilym, P. "Heteroscedasticity: T*esting and Correcting in SPSS,"* (PDF). pp 12-18

Haghighat, M., Abdel-Mottaleb, M., & Alhalabi, W. (2016). Discriminant correlation analysis: Real-time feature level fusion for multimodal biometric recognition. *IEEE Transactions on Information Forensics and Security*, *11*(9), 1984-1996.

Ijadunola, M. Y., Ojo, T. O., Babatunde, A., Olatunji, G. J., Owolabi, G. K., Adewale, I. A., ... & Friday, I. S. (2015). Street hawking among in-school adolescents in a southwestern town in Nigeria: pattern, determinants, and effects on school performance. *International journal of adolescent medicine and health*, *27*(1), 41-48.

Ijsmi, E. (2017). Application of Quantile regression in clinical research: an overview with the help of R and SAS statistical package. *International Journal of Statistics and Medical Informatics, 2 (1), 1*, *6*.

Kaletapwa, F., & Yumbak, G. (2013). The risks of street hawking among students of practical agriculture in secondary schools in Taraba State. *J Educ Pract*, *4*(15), 125-128.

Karamti, C. (2016). Measuring the Impact of ICTs on academic performance: Evidence from higher education in Tunisia. *Journal of Research on Technology in Education*, *48*(4), 322-337.

Karseth, B., & Sivesind, K. (2010). Conceptualising curriculum knowledge within and beyond the national context. *European Journal of Education*, *45*(1), 103-120.

Keino, K. J. (2020). *Influence of Motorcycle (Boda Boda) Business on Pupils' Drop-out in Public Primary Schools in Rangwe Sub County, Homa-bay County, Kenya* (Doctoral dissertation, University of Nairobi).

Kenya National Bureau of Statistics (KNBS). (2010). The 2009 Kenya population and housing census. *Volume IC, population distribution by age, sex, and administrative units*.

Kisipan, B. (2019). *Effect of sand harvesting on pupils' learning in public primary schools in Kenyawa division, Kajiado County, Kenya* (Doctoral dissertation, Africa Nazarene University).

Krejcie, R.V., & Morgan, D.W., (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*

Kühne, O. (2020). Landscape conflicts—a theoretical approach based on the three worlds theory of Karl Popper and the conflict theory of Ralf Dahrendorf, illustrated by the example of the energy system transformation in Germany. *Sustainability*, *12*(17), 6772.

Ligeve, S. N., Poipoi, M. V., & Maragia, S. N. (2012). The Influence of Participation in Fishing activities on Academic Achievement of Primary School Pupils in Suba & Homabay Districts, Kenya. *An International Journal of Academic Research in Progressive Education and Development*, *1*(3), 1-11.

Marno, V. (2012). *A guide to Modern Econometrics*, 5th edition. Chichester: Wiley

Maxwell, L. E. (2016). School building condition, social climate, student attendance, and academic achievement: A mediation model. *Journal of Environmental Psychology*, *46*, 206-216.

Muendo, M. N. (2015). The Socio-Economic Effects Of Sand Harvesting In River Thwake, Kathiani Division, Machakos County, Kenya (Doctoral dissertation, UNIVERSITY OF NAIROBI).

Mugenda, O.M and Mugenda A.G. (2003). *Research methods: Quantitative and quantitative approaches.* Nairobi: African Centre for Technological Studies, (ACTS).

Nikolić, D., Mureşan, R. C., Feng, W., & Singer, W. (2012). Scaled correlation analysis: A better way to compute a cross-correlogram. *European Journal of Neuroscience*, *35*(5), 742-762.

Nthambi, M. V., & Orodho, J. A. (2015). Effects of Sand Harvesting on Environment and Educational Outcomes in Public Primary Schools in Kathiani Sub-County, Machakos County, Kenya. *Journal of Education and Practice*, *6*(24), 88-97.

Nyagwui, A. E., Fredinah, N., Che, L. B., & Yulia, B. (2016). Motorcycle injury among secondary school students in the Tiko municipality, Cameroon. *Pan African medical journal*, *24*(1).

Ojijo, G. (2016). *Influence of Fishing Activities on Academic Performance of Secondary School Students in Rachuonyo North Sub-county, Kenya* (Doctoral dissertation, University of Nairobi).

Oladipupo, O. O., & Amenawon, I. E. (2017). The Impact of Some Socio-economic Factors on Academic Performance: A Fuzzy Mining Decision Support System. *International Journal of Database Theory and Application*.

Olawo, K. W., Ochieng, I., Ombok, O. B., & Achieng, F. (2014). The effect of increased investment in Boda Boda business on economic empowerment of people in Kisumu West district. *European Journal of Business and Management*, *6*(39), 177-184.

Oluwagbohunmi , M. F. (2019). Influence of Street Hawking On Study Habit and Academic Performance of Secondary School Students in Ado-Ekiti, Nigeria. *European Centre for Research Training and Development UK*, 37–45.

Omwenga, P. C. (2015). The effect of child labour on academic achievement of primary school pupils: a case of Voi division of Voi district, Taita-Taveta County Kenya (Doctoral dissertation, Moi University).

Orodho, J. A. (2014). Financing basic education: What are the equity and quality implications of free primary education (FPE) and free day secondary education (FDSE) policies in Kenya?

Owusu, E. E., & Dwomoh, G. (2012). The impact of illegal mining on the Ghanaian youth: Evidence from Kwaebibirem District in Ghana. *Research on Humanities and Social Sciences*, *2*(6), 86-92.

Parker, C., Scott, S., & Geddes, A. (2019). Snowball sampling. *SAGE research methods foundations*.

Paul, A., Allison, R., & Dickay, A. (2019). Street Hawking Effect on Teenagers Educational Performance in Wukari Metropolis. *International Journal Of Innovative Research And Development*, *8*(10). DOI: 10.24940/ijird/2019/v8/i10/oct19087

Sahrhage, D., & Lundbeck, J. (2012). *A history of fishing*. Springer Science & Business Media.

Satiennam, T., Jaensirisak, S., Satiennam, W., & Detdamrong, S. (2016). Potential for modal shift by passenger car and motorcycle users towards Bus Rapid Transit (BRT) in an Asian developing city. *IATSS Research*, *39*(2), 121-129.

Senna, R. (2022). Impact of street-hawking on the education of young girls in the Sogakofe community, Volta Region, Ghana. In *Proceedings of the International Conference on Social Sciences* (Vol. 8, No. 01).

Sustainable Development Goal 4 (SDG 4). (2021). Sustainable Development Goal 4 (SDG 4) | Education within the 2030 Agenda for Sustainable Development. Retrieved 11 November 2021, from https://sdg4education2030.org/the-goal

Taherdoost, H. (2017). Determining sample size; how to calculate survey sample size. *International Journal of Economics and Management Systems*, *2*.

Traylor, M. (1983). Ordinal and interval scaling. *Journal of the Market Research Society*, *25*(4), 297–303.

Udoh, M. T., Achike, A. I., & Mkpado, M. (2013). Effects of Fishing Activities on the Academic Performance of Teenagers in Riverine Areas of Nigeria: Implications for Educational Development Policy in Nigeria. *Journal of Studies in Social Sciences*, *2*(2).

Umanailo, M., Pratiwi, R. D., & Indah, F. P. S. (2019). Negative Impact of Industry on Society Using Ralph Dahrendorf's Conflict Theory. In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (pp. 673-76).

UNESCO, G. (2015). Education for all 2000–2015: Achievements and challenges. *EFA Global Monitoring Report*, *500*.

UNESCO. (2021). Education transforms lives. Retrieved 11 November 2021, from https://en.unesco.org/themes/education

Vieira, N. C., Moraes, S. C. D., & Nunes, Z. M. P. (2013). A study of fishing and educational level of young fishers on the Bonifácio Village, Bragança, Pará, Northern Coast of Brazil. *Boletim do Instituto de Pesca*, *39*(2), 195-204.

Westway, E., Barratt, C., & Seeley, J. (2009). Educational attainment and literacy in

Ugandan fishing communities: Access for All. *Maritime Studies*, *8*(2), 73-97.

Wilson, A. D., Binder, T. R., McGrath, K. P., Cooke, S. J., & Godin, J. G. J. (2011). Capture technique and fish personality: angling targets timid bluegill sunfish, Lepomis macrochirus. *Canadian Journal of Fisheries and Aquatic Sciences*, *68*(5), 749-757.

World Bank. (2018). World Bank World Development Report 2018: Learning to Realize Education's Promise Washington, DC: World Bank, 2018. *Population and Development Review*, *44*(2), 404-405.

APPENDICES

Appendix I: Research Tools

a) Questionnaire

INTRODUCTION

I am Joash Oyugi, a postgraduate student at Mount Kenya University pursuing a Master of Education. Please feel free to respond to the issues asked in the questionnaire. Any information you provide here will be treated as private and confidential and will not be accessed by any third party. This questionnaire is designed to collect information on how students' involvement in sand harvesting, Boda Boda Operations, Hawking, and Fishing activities relate to their academic performance in public day secondary schools in Ugunja sub-county, Kenya. The information collected will be used solely for this research study and nothing else.

DEMOGRAPHIC INFORMATION

Gender _____ Age _____

*In the following sections, tick (√) appropriately per each statement. Strongly Agree (**SA**), Agree (**A**), Undecided (**U**), Disagree (**D**), and Strongly Disagree (**SD**).*

SECTION A: SAND HARVESTING ACTIVITIES

Statements on Sand harvesting activities	**SA**	**A**	**U**	**D**	**SD**

i) I dig sand from the riverbank.					
ii) I scoop sand from the riverbed.					
iii) I sell sand					
iv) I collect harvested sand.					
v) I Load to lorries					
vi) I offload sand from lorries.					
vii) I coordinate sand harvesting activities.					
viii) I transport sand					
ix) I make concrete using sand.					
x) I connect the sellers and buyers of sand (brokerage)					

SECTION B: BODA BODA OPERATIONS

Statements on Boda Boda operations	**SA**	**A**	**U**	**D**	**SD**
i) I ride Boda Boda.					
ii) I connect motorists and their customers (brokerage).					
iii) I sell motorcycle spare parts.					
iv) I repair motorcycles					
v) I connect motorcyclists to their repair shops.					
vi) I sell riders' costumes.					
vii) I market Boda Boda products.					
viii) I sell fuel to motorists.					
ix) I transport Boda Boda products.					
x) I load merchandise onto motorbikes.					
xi) I sell motorbikes					
xii) I connect buyers and sellers of motor accessories.					
xiii) I connect the Boda Boda motorists to motorbike dealers.					

SECTION C: STUDENTS' PARTICIPATION IN HAWKING ACTIVITIES

Statements on Hawking activities by students	SA	A	U	D	SD
i) I engage in selling fruits and fruit salads.					
ii) I hawk blended juice.					
iii) I vend soft drinks					
iv) I sell vegetables, onions, and tomatoes.					
v) I sell second-hand clothes.					
vi) I sell utensils					
vii) I deal in second-hand shoes.					
viii) I sell hot and cold coffee.					
ix) I sell snacks					
x) I sell tea					
xi) I sell electronics and their accessories.					
xii) I deal in jewelry					
xiii) I hawk pesticides					
xiv) I hawk stationary					
xv) I hawk beauty products.					

SECTION D: STUDENTS' PARTICIPATION IN FISHING ACTIVITIES

Fishing activities by students	SA	A	U	D	SD
i) I engage in actual fishing.					
ii) I make fishing nets and rods.					
iii) I smoke fish					
iv) I sell fishing materials.					
v) I repair fishing boats.					
vi) I load fishing merchandise from boats and lorries.					

vii)	I clean fish					
viii)	I sell fish					
ix)	I engage in repairing fishing boats and vessels.					
x)	I transport fish to the market.					
xi)	I repair fishing nets and rods.					
xii)	I connect the fishers and the fishmongers (brokerage)					
xiii)	I transport fishers					
xiv)	I operate and preserve fish.					

Thank you for your response.

b) The Document Analysis Guide

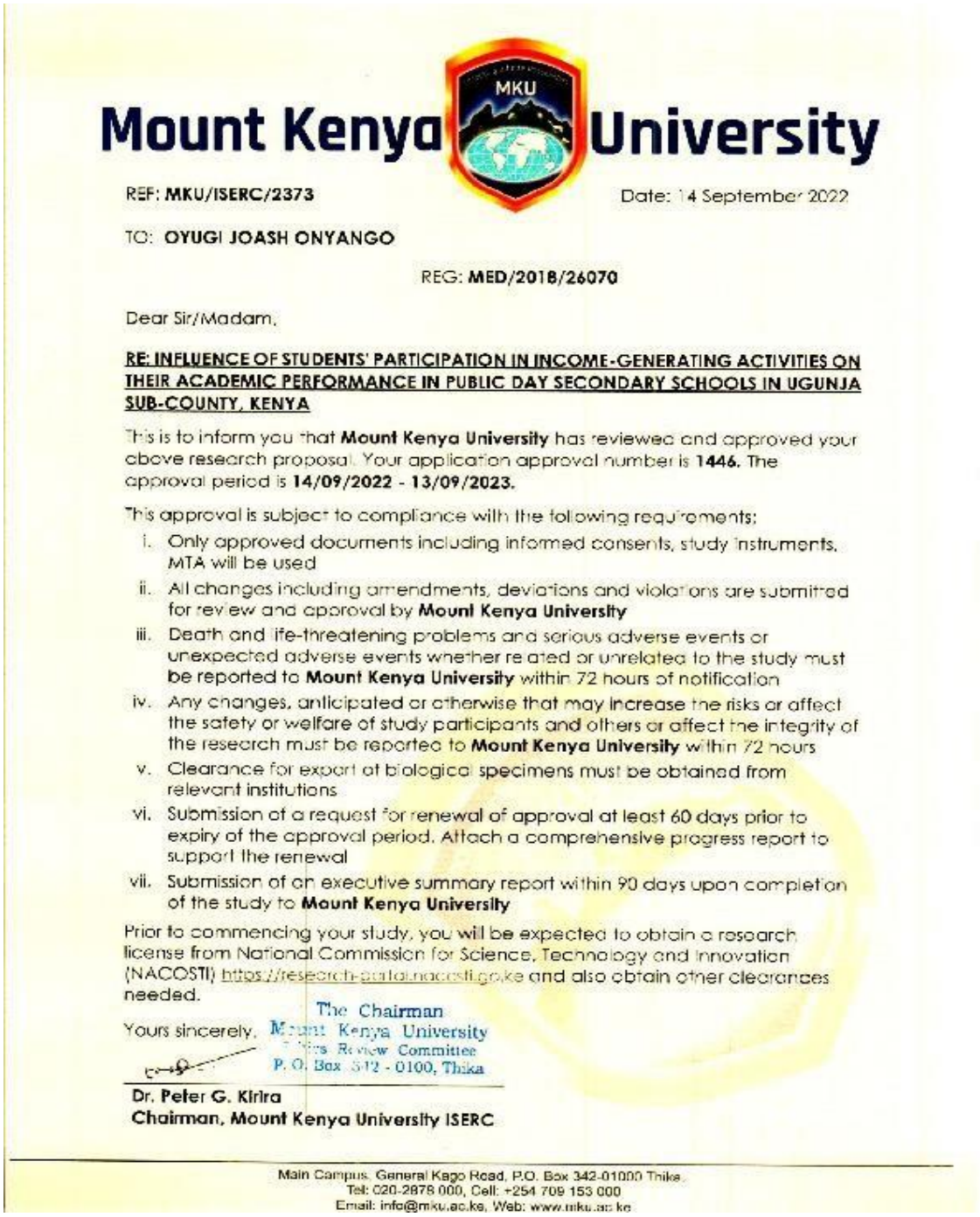
I am Joash Oyugi, a postgraduate student at Mount Kenya University pursuing a Master's degree in education. The Document Analysis Guide is intended to collect data on academic performance in public day secondary schools in the Ugunja sub-county, Kenya. The documents to be analysed are analysed examination results, which will be obtained from the DOSs of the schools. All information will be treated as private and confidential.

School _____ zone _____division _____

ACADEMIC PERFORMANCE

	2019 Exams Grade and points (termly)				**2020 Exams Grade and points (termly)**				**2021 Exams Grade and points (termly)**				**Average Scores**
Sn	**T1**	**T2**	**T3**	**Average**	**T 1**	**T 2**	**T3**	**Average**	**T1**	**T 2**	**T 3**	**Average**	

Appendix II: Ethical Research Clearance Certificate



Mount Kenya University

REF: **MKU/ISERC/2373** Date: 14 September 2022

TO: **OYUGI JOASH ONYANGO**

REG: **MED/2018/26070**

Dear Sir/Madam,

RE: INFLUENCE OF STUDENTS' PARTICIPATION IN INCOME-GENERATING ACTIVITIES ON THEIR ACADEMIC PERFORMANCE IN PUBLIC DAY SECONDARY SCHOOLS IN UGUNJA SUB-COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **1446.** The approval period is **14/09/2022 - 13/09/2023.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Dr. Peter G. Kiria
Chairman, Mount Kenya University ISERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika.
Tel: 020-2878 000, Cell: +254 709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke

Appendix III: NACOSTI Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 231334

Date of Issue: 04/October/2022

RESEARCH LICENSE

This is to Certify that Mr.. JOASH ONYANGO OYUGI of Mount Kenya University, has been licensed to conduct research in Siaya on the topic: INFLUENCE OF STUDENTS' PARTICIPATION IN INCOME-GENERATING ACTIVITIES ON THEIR ACADEMIC PERFORMANCE IN PUBLIC DAY SECONDARY SCHOOLS IN UGUNJA SUB-COUNTY, KENYA for the period ending : 04/October/2023.

License No: NACOSTI/P/22/20658

231334

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 VI: Field Authorisation Letter

MINISTRY OF EDUCATION

State Department for Basic Education

SUB-COUNTY EDUCATION OFFICE,
UGUNJA,
P.O BOX 6 – 40606
UGUNJA

E-MAIL: deougunja@gmail.com
When replying please quote

REF/UGN/ED/ADM/VOL.3/38

DATE: 05/10/2022

TO THE PRINCIPALS
UGUNJA SUB COUNTY

RE: RESEARCH AUTHORIZATION: MR. OYUGI JOASH ONYANGO REG: MED/2018/26070

The above named Mr. Oyugi Joash Onyango REG. MED/2018/26070 of Mount Kenya University has been authorized by the Ministry of Education vide Ref MKU/ISERC/2373 of 14th September, 2022 to carry our research on Influence of Students' participation in Income-Generating activities on their academic Performance in public Day Secondary Schools in Ugunja Sub County, Kenya.

Please accord him necessary assistance.

SUB COUNTY
DIRECTOR OF EDUCATION
UGUNJA
P.O. Box 6-40606, UGUNJA

5/10/2022

BONFACE E. OTULA
SUB COUNTY DIRECTOR OF EDUCATION
UGUNJA

Appendix V: Turnitin Report

OYUGI JOASH

RELATIONSHIP BETWEEN STUDENTS' PARTICIPATION INIGAs AND THEIR AP IN PUBLIC DAY SECONDARY SCHOO...

PROJECT

MASTERS

Mount Kenya University

Document Details

Submission ID
trn:oid:::1:3054809116

Submission Date
Oct 25, 2024, 6:21 PM GMT+3

Download Date
Oct 28, 2024, 8:00 AM GMT+3

File Name
OYUGI_JOASH_ONYANGO_REVIEWEDd_THESISssssss_1_1__083428_1_.docx

File Size
4.6 MB

106 Pages

22,388 Words

120,473 Characters

turnitin Page 1 of 118 - Cover Page Submission ID trn:oid:::1:3054809116

18% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Exclusions

- 1 Excluded Source

Match Groups

- **271** Not Cited or Quoted 16%
  Matches with neither in-text citation nor quotation marks
- **27** Missing Quotations 1%
  Matches that are still very similar to source material
- **6** Missing Citation 1%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

18% Internet sources
7% Publications
10% Submitted works (Student Papers)

Integrity Flags

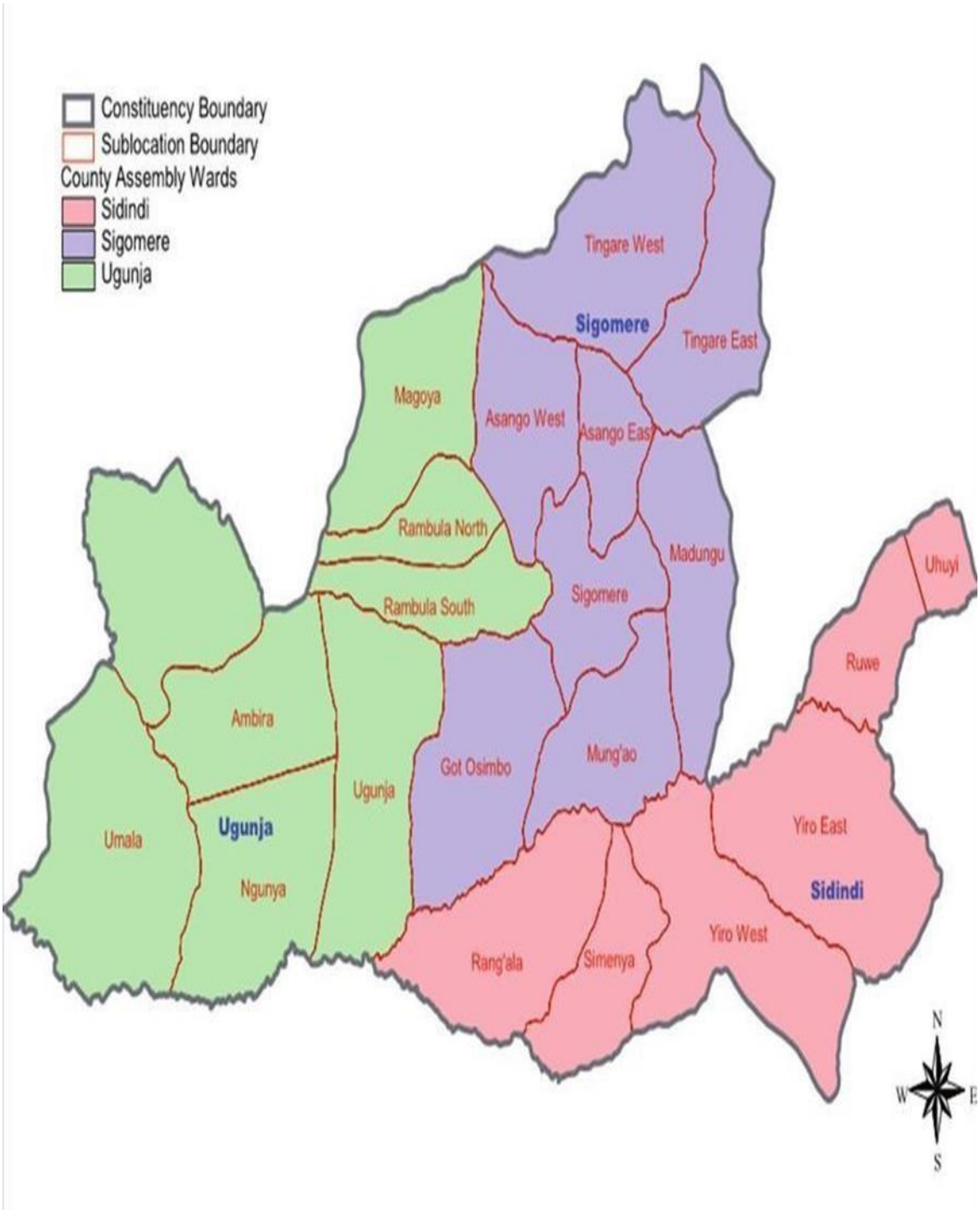
0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Appendix VI: **Map of the Research Site**



Appendix VII: Average Academic Performance Scores obtained from the DAG

S/N	Age	AV. Score
1.	20	15.00
2.	20	8.54
3.	20	19.75
4.	19	10.00
5.	19	10.00
6.	20	10.01
7.	20	10.73
8.	19	11.00
9.	19	11.73
33	15	20.67
34	15	20.67
35	16	20.67
36	18	20.67
37	18	20.67
38	18	20.67
39	18	20.67
40	18	20.67
41	18	20.67
42	18	20.67
43	18	20.67
70	19	22.00
71	16	22.06
72	18	22.44
73	18	23.15
74	15	23.28
75	18	23.35
76	19	23.79
77	15	23.96
78	18	23.98
79	17	24.18
80	18	25.00

10	19	11.73
11.	19	11.73
12	20	11.73
13	20	11.73
14	19	12.00
15	20	12.73
16	16	13.00
17	19	13.00
18	19	13.00
19	20	13.73
20	19	17.00
21	20	18.73
22	19	20.00

44	19	20.67
45	18	20.67
46	17	20.83
47	18	20.89
48	19	20.98
49	18	21.00
50	18	21.00
51	17	21.09
52	17	21.10
53	18	21.10
54	18	21.10
55	18	21.10
56	19	21.10
57	18	21.10
58	16	21.12

81	18	25.00
82	18	25.00
83	18	25.00
84	19	25.00
85.	18	25.00
86.	18	25.00
87.	18	25.00
88.	18	25.00
89.	18	25.07
90.	16	25.13
91.	18	25.18
92.	17	25.23
93.	18	25.25

23	19	20.00
24	19	20.02
25	19	20.05
26	19	20.11
27	18	20.21
28	19	20.23
29	18	20.29
30	18	20.41
31	18	20.60
32	17	20.60

59	18	21.12
60	18	21.13
61	19	21.16
62	19	21.24
63	18	21.52
64	16	21.56
65	18	21.71
66	18	21.73
67	17	21.89
68	18	22.00
69	18	22.00

94.	18	25.27
95.	18	25.33
96.	19	25.34
97.	18	25.38
98.	18	25.43
99.	18	25.43
100.	18	25.44
101.	18	25.44
102.	18	25.48
103.	17	25.51

104.	15	25.61
105.	17	25.65
106.	17	25.66

136.	17	27.62
137.	18	27.63
138.	18	27.79

168.	17	29.71
169.	16	29.82
170.	18	30.00

107.	16	25.71
108.	17	25.74
109.	17	25.74
110.	17	25.76
111.	18	25.77
112.	18	25.80
113.	18	25.82
114.	17	25.86
115.	18	25.87
116.	17	25.87
117.	18	25.96
118.	18	26.00
119.	17	26.00
120.	18	26.00
121.	15	26.14
122.	18	26.56
123.	15	26.62
124.	17	26.67
125.	17	26.80
126.	18	26.83
127.	18	26.86
128.	18	26.91
129.	18	26.97
130.	18	27.00
131.	18	27.00
132.	17	27.02

139.	15	27.83
140.	18	27.87
141.	18	27.88
142.	18	27.97
143.	19	28.07
144.	18	28.08
145.	18	28.11
146.	18	28.18
147.	18	28.20
148.	17	28.23
149.	17	28.27
150.	15	28.35
151.	17	28.35
152.	17	28.37
153.	17	28.92
154.	16	28.96
155.	18	29.27
156.	17	29.29
157.	16	29.37
158.	18	29.40
159.	16	29.41
160.	16	29.45
161.	18	29.47
162.	16	29.53
163.	18	29.53
164.	16	29.59

171.	16	30.11
172.	17	30.13
173.	16	30.47
174.	16	30.54
175.	17	30.73
176.	17	31.00
177.	18	31.00
178.	16	31.12
179.	16	31.24
180.	14	31.39
181.	16	31.52
182.	18	23.61
183.	17	31.73
184.	17	31.73
185.	15	31.89
186.	15	31.89
187.	15	31.89
188.	16	31.89
189.	16	31.89
190.	17	32.00
191.	16	32.04
192.	16	32.13
193.	15	32.22
194.	15	32.42
195.	15	32.53
196.	15	32.53

133.	19	27.10
134.	18	27.11
135.	15	27.13
200.	16	32.53
201.	14	32.53
202.	17	32.53
203.	16	32.61
204.	17	32.73
205.	15	32.75
206.	14	32.95
207.	15	32.96
208.	18	33.00
209.	15	33.18
210.	17	33.73
211.	17	33.73
212.	15	33.75
213.	16	33.76

165.	18	29.60
166.	18	29.66
167.	15	29.68
231.	17	40.73
232.	16	40.74
233.	15	41.04
234.	16	41.06
235.	16	41.11
236.	16	41.18
237.	16	41.21
238.	16	41.22
239.	14	41.28
240.	15	41.34
241.	15	41.54
242.	15	41.54
243.	14	41.54
244.	15	41.54
245.	15	41.54
246.	15	41.54
247.	15	41.56
248.	15	41.69

197.	15	32.53
198.	16	32.53
199.	14	32.53
269.	14	46.60
270.	15	46.60
271.	16	46.60
272.	16	46.60
273.	14	46.61
274.	15	46.62
275.	14	46.66
276.	14	48.34
277.	14	50.47
278.	15	50.50
279.	14	50.59
280.	14	50.67
281.	15	50.72
282.	16	50.91
283.	15	51.35
284.	14	51.52
285.	15	51.56
286.	15	51.64

214.	14	34.10
215.	15	34.12
216.	15	34.60
217.	17	34.73
218.	17	35.73
219.	17	36.73
220.	17	38.73
221.	17	38.73
222.	17	38.73
223.	15	40.00
224.	15	40.01
225.	14	40.06
226.	14	40.34
227.	15	40.38
228.	16	40.65
229.	16	40.73
230.	15	40.73

249.	16	42.03
250.	16	42.39
251.	15	42.46
252.	15	42.72
253.	18	42.73
254.	15	42.76
255.	15	43.45
256.	15	43.65
257.	17	43.73
258.	14	43.81
259.	14	45.45
260.	14	45.61
261.	15	45.61
262.	14	45.61
263.	15	45.61
264.	14	45.61
265.	17	45.61
266.	17	45.61
267.	17	45.73
268.	14	46.11

287.	15	51.85
288.	14	51.87
289.	15	51.87
290.	15	51.87
291.	15	51.88
292.	14	52.38
293.	14	53.13
294.	14	53.82
295.	16	53.82
296.	14	55.70
297.	16	55.70
298.	14	55.71
299.	16	58.00
300.	14	61.35
301.	15	65.24
302.	15	65.93
303.	14	70.00
304.	14	71.42
305.	14	80.04
306.	15	80.59