Student-Teacher Ratio as a Predictor of Academic Achievements in Public Secondary Schools in Kericho County, Kenya

Viviline Ngeno

University of Kabianga

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ABSTRACT

Education is a vital aspect in human life and basic education is considered a human right. This study established the influence of Student- Teacher Ratio on Academic Achievements in Public secondary Schools in Kericho County, Kenya. A conceptual framework was formulated to guide the study. The independent variable was Student-Teacher Ratio while the dependent was Academic Achievements in Kericho County, Kenya. *Ex post facto*, Descriptive and Correlational Research design was adopted in the study. The study population was 4,457 Principals, Sub County Quality Assurance and Standard Officers, Directors of Studies and form IV students of 2011. The sample size was 485. Snowball and saturated sampling techniques were used to select respondents. Questionnaire, interview schedules, Focus Group Discussion and document analysis guides were used to collect data. Validity of a measurement instrument is the extent to which the instrument measures what it is supposed to measure. Reliability coefficient of the principals' questionnaire was 0.80 at set p-value of 0.05. Quantitative data was analyzed using cohort analysis, descriptive and inferential statistics. Qualitative data was transcribed and analyzed in emergent themes and sub themes. The study established that there was a moderate positive relationship between Student-Teacher ratio and students' academic achievement with a coefficient of 0.389* at a p-value of 0.05. Coefficient of determination R^2 was 0.151 which means that the student teacher ratio accounted for 15.13% of the variations in KCSE. The study recommended the need to recruit more teachers to reduce the Student- Teacher ratio. This will not only reduce the teaching workload but also give teachers ample time to prepare and effectively engage the learners thereby improving performance. The findings of this study are significant to stakeholders in education as it informs them on the need to review the policy with a view to improving secondary school education so as to achieve education objectives.

Key words: Student Teacher ratio, Academic achievements and Public secondary Schools

INTRODUCTION

Studies carried out by Rasheed, Aliero & Danjuma, (2024) was of the opine that education is the process through which knowledge, skills, ideas, values and attitudes are transmitted from one generation to another. Through education, individuals or young citizens acquire knowledge, skills, capacities and character that would help them develop into well-adjusted adults who would be useful to themselves, their families and the society at large. A similar view on education is held by Migwi & Michubu, (2024) who postulates that according to Global Action for Children, education is a form of investment that promotes the growth of both individuals and society as it is a globally acknowledged basic human right which is considered to be the cornerstone of all progress and human resource development. She further opines that in any civilization, formal education continues to be the main tool for social, political, technological and economic mobilization. Adejuke et al., (2019) posit that education is considered as an instrument of great effects on both national economy and individual financial income. Thus, it may be considered an important tool for economic growth of the nation.

Education is a fundamental human and enabling right. To fulfil this right, countries must ensure universal access to inclusive and equitable quality education and learning, leaving no one behind. Education aims at the full development of the human personality and promotion of mutual understanding, tolerance, friendship and

peace. The main duty-bearer in protecting, respecting and fulfilling the right to education is the state. As a shared societal endeavour, education implies an inclusive process of public policy formulation and implementation. Thus, civil society, teachers and educators, the private sector, communities, families, youth and children all have important roles in realizing the right to quality education (UNESCO, 2019).

The significance of education for any society cannot be overlooked. According to Adika, (2020) education has been globally regarded as the key to overall national development. It has been thought to improve the production capacity of societies thereby reducing poverty by mitigating its effects on population, health and nutrition. It is one of the most fundamental instruments that can be used for bringing change in an individual and the entire society as far as development is concerned. According to UNESCO (2019), education is central to the realization of the 2030 Agenda for Sustainable Development. Within the comprehensive 2030 Agenda for Sustainable Development, education is essentially articulated as a stand-alone goal (SDG4) with its 7 outcome targets and 3 means of implementation.

Countries the world over have put in place varied strategies to ensure that they provide their citizens with quality education. Adejuke et al., (2019) posit that quality education has multiple benefits as higher levels of academic achievement is associated with higher earnings and economic mobility, better health, lower mortality rates and greater participation in the leadership process in one's immediate and the global community. The key stakeholders in the education process are teachers and learners. These participants must effectively play their roles for a successful interaction to take place in the school environment. Teachers are the fundamental components of any educational system of any country as they are responsible for the quality of education, for this, they play their vital, impressive and decisive roles for the improvement of the quality of education (Ahmad et al., 2019).

The success of an education system is dependent on several variables. This argument is corroborated by Kalemba & Mulauzi, (2020) who note that class size plays a pivotal role. The influence of class size on pupil outcomes is an aspect of the learning environment which has been a subject of much debate among parents, politicians, teachers, teacher unions and educationists in many countries. Migwi & Michubu, (2024) also support the assertion that several variables influence the provision of quality education. They opine that education is far more complex than a perfect economic production function and numerous interconnected variables influence the quantity and quality of the output. Examples of such variables include socio-economic and family impacts as well as school inputs.

In consonance with the argument that there is need to address the numerous variables that influence attainment of quality education and by extension academic achievement Bulawa, Bukae and Moletsane, (2020) opine that different stakeholders in the education fraternity are consistently engaged to identify impediments to the attainment of quality education and how best to address them to improve educational outcomes in the 21st century and beyond. Among the impediments is the high student-teacher ratio which is occasioned by the size of the class. This challenge has been propagated by the quest for education which has led to increase in enrolment especially at the basic level leading to overcrowded classrooms which have posed challenges to the provision of quality education thereby affecting the academic performance of learners. Closely related to the problem of class size is the Student-Teacher ratio. Adejuke et al., (2019) found out that there is a clear and strong relationship between class size, student-teacher ratio and students' achievement. They noted that small classes were superior in terms of students' reactions, teachers' morale and quality of the instructional environment.

Venketsamy (2023) defines teacher-learner ratio as the number of learners grouped in a particular class. He notes that according to Hun School of Princeton (2019) the teacher-learner ratio is about more than just the number of learners in a class (class size), but how this number affects the teaching-learning relationship between the teacher and learners. The teacher-learner ratio impacts the teacher's workload and how he/she can offer quality teaching and learning to his/her learners. Venketsamy (2023) found that the lower the teacher-learner ratio, the greater the opportunity to lighten the workload of the teachers thus enabling them to focus on the quality rather than the quantity of their teaching, learning and assessment. He also found that smaller class sizes enable teachers and learners develop mutual relationships of knowing, trust and authority.

Koca & Celik, (2015) postulate that student-teacher ratio is understood by many as class size; though they are similar, they are not exactly the same thing. Class size is the number of students attending a class or in general terms, the average number of students in a classroom. Student-teacher ratio on the other hand, is the number of students per teacher or in other words, the average number of students a teacher instructs in a school. Therefore, a country, a city or school with small class size may not always have a low student-teacher ratio or vice versa. For example, a teacher might teach in small size classes but can be assigned to teach in many classes so, in such a situation the class size is small but the student-teacher ratio is high.

The relationship between student-teacher ratio and class size is elaborated by Koca and Celik, (2015) who opine that the number of students per teacher is generally associated with class size and it is mainly believed that smaller classes provide a better teaching and learning environment. This belief has been shared by countries like the USA, European countries, China, Japan and many others. Policies have therefore been put in place to reduce class sizes in such countries. To further corroborate the connection between student-teacher ratio and class size, Etomes and Lyonga (2020) posit that student-teacher ratio in any educational institution has the possibility to determine the class size, individual student's attention, quality of teaching and learning which affects students' performance. With an increase in student population, the class size automatically increases especially in situations where there are inadequate infrastructure and teaching staff, which is usually the case with public schools in Cameroon and other African countries.

UNESCO (2019) reveal that student-teacher ratio is one of the important indicators of quality of education. Reduction of very large class sizes helps teachers to make their performances better and pupils to learn more and more. This view is shared by Koca & Celik, (2015) who note that in schools with smaller student-teacher ratio, teachers can have more time to spend with each student and check their individual progress as well as provide a more individualized teaching that is more suitable to each student. Ahmad et al., (2019) opine that student-teacher ratio is responsible for the achievement of better performance and major objectives of any educational system. A similar view on the significance of student-teacher ratio is brought forth by Dasheed, Aliero & Danjuma, (2024) who opines that class-size and student-teacher ratio has a great impact on the quality of education and academic success of students. There is no doubt that pupil-teacher ratio and per-student outgoings are some of the important resource inputs for any academic institution. He further mentions that the lesser the ratio of students and teachers in the class, the better the probability of improving the quality of education and accomplishing the academic goals of institutions.

Many developing countries measure the outcome of education through the lens of the students' performance which is the outcome of the teaching – learning process (Etomes & Lyonga, 2020). Migwi & Michubu, (2024) opine that in Kenya and most other developing countries of the world, students are judged according to their achievement in teacher-made tests and standardized achievement tests. Their future career path and college placement is determined by these achievements. Migwi & Michubu, (2024) argues that in most cases, poor academic performance has been erroneously attributed to a lack of intellectual development. However, research has shown that a variety of other school-based factors (such as class size, availability of adequate instructional resources & student-teacher ratio among others) in addition to intellectual development, influence student achievement in public secondary schools.

From previous research (Koca & Celik, 2015; Ahmad et al., 2019; Etomes & Lyonga, 2020; Venketsamy, 2023 & Dasheed, Aliero & Danjuma, 2024 among others), it is evident that student-teacher ratio has a great bearing on the quality of education provided as well as the academic achievement of learners. It is therefore against this backdrop that this study sought to investigate the influence of student-teacher ratio on the academic achievement of students in public secondary schools in Kericho County, Kenya. The aim of this study is to present the realities in such learning institutions, the challenges that they have to grapple with in their quest to provide quality education and recommendations that can help stakeholders in the education sector sort the high student-teacher ratio that has been on an upward trajectory since the roll out of the free basic education in Kenya by the National Rainbow Coalition (NARC) government.

Purpose of the Study

To purpose of the study is to examine the extent to which student-teacher ratio predicts academic achievement in public secondary schools in Kericho County.

Research Objective

To examine the extent to which student-teacher ratio predicts academic achievement in public secondary schools in Kericho County, Kenya.

Research Question

To what extent does the student-teacher ratio predict academic achievement in public secondary schools in Kericho County, Kenya?

Research Hypothesis

There is a positive relationship between Student-Teacher Ratio as a Predictor and Academic Achievements in Public Secondary schools in Kericho County, Kenya

SYNTHESIS OF LITERATURE

Studies carried out by Koca and Celik (2015) to identify if there is a significant correlation between number of students per teacher and students' achievement. The data for the number of students per teacher was obtained by dividing the total number of students by the total number of teachers in high schools in every city of Turkey. This study found a negative correlation between student-teacher ratio and achievement ranking of cities in the Transition to Higher Education Examination. The study noted that majority of the cities that rank in the last 15 have a student-teacher ratio bigger than 20 and most of cities that rank in the first 15 have student-teacher ratio below 15. The study concluded that student-teacher ratio is a critical variable that not only affects the performance of learners but also the effectiveness of teachers in delivering their mandate. The finding of this study informs the current which is also interested in examining the influence of teacher-student ratio on the academic achievement of secondary school students. This study differs from the current however, in some ways for instance, while this study was conducted in Turkey, the current has been conducted in Kenya. The data for the study conducted in Turkey was analyzed using a correlation analysis. Moreover, the study used existing data gathered from Ministry of National Education of Turkey and Student Selection and Placement Center. The current study on the other hand, used both primary and secondary data. Data was obtained using questionnaire, interview schedule and Focus Group Discussions from different respondents as well as a document analysis guide. Additionally, analysis of quantitative data was done using cohort analysis, descriptive and inferential statistics while the qualitative one was transcribed and analyzed in emergent themes and sub themes.

In a study conducted in Pakistan by Ahmad et al., (2019) to explore the relationship between the student-teacher ratio and academic achievements at the secondary level in the subject of physics, it was noted that academic achievements of the students at the secondary level in the subject of physics are inversely related with the student-teacher ratio. This means that the lower the student-teacher ratio, the higher the academic achievements and the higher the student-teacher ratio, the lower the academic achievements. This study is different from the current one because while it employed an experimental research design and used descriptive statistics to analyse data, the current used *Ex post facto* descriptive, correlational and mixed method research design. In addition, this study was interested in the relationship between student-teacher ratios in the performance of physics at the secondary level in Pakistan while the current one was interested in the influence of student-teacher ratio on the general academic achievement of secondary school students in Kericho, Kenya.

While using data available online, Galang et al., (2021) investigated the student-teacher ratio of various Southeast Asian nations and each country's reading performance through the lens of the Programme for International Student Assessment (PISA) scores. The study revealed that countries with a low student-teacher

ratio ranked higher in reading performance than those with a high student-teacher ratio. Singapore, Malaysia and Brunei Darussalam with a ratio ranging from 8 to 11.6, scored 408- 549 points in the PISA Reading Test while Thailand, Indonesia and the Philippines with a ratio ranging from 15 to 36, scored 340-393 points. This study is instrumental to the current in the sense that it provides information on the student-teacher ratio and its influence on students' performance from varied countries. It however differs from the current with regard to methodology. For instance, while the data analyzed was obtained from online sources, the current obtained primary data from respondents. Moreover, the study locations for this study were Southeast Asian nations while the current study's location was a single East African country that is, Kenya.

A South African study conducted by Venketsamy (2020) used a descriptive and causal non-experimental design to determine the teacher-learner ratio and its effect on invitational teaching and learning. The study revealed that the teacher-learner ratio was the determining factor in the effectiveness of promoting invitational education. The study noted that large class size has a negative impact on teachers and learners' attitudes toward schooling. It was found that most teachers spent their time trying to discipline the learners instead of teaching. The study concluded that the large number of learners in a class affects the quality of teaching, learning, assessment and support to learners. As a result of the increased teacher-learner ratio, most teachers do not know their learners nor do they know the learners' learning problems and socio-economic conditions. This study informs the current with regard to some of the instruments used to collect data. Both employed questionnaire and interview schedule to collect data from respondents. The point of divergence however, is that the current also employed Focus Group Discussions in data collection. Another difference is that while this study used primary school teachers as respondents, the current used secondary school teachers. The locations of the study were different with the former being conducted in South Africa and the latter in Kenya.

A study investigated Teachers' Perception on the Impact of Large Class Size on the Academic Performance of Junior Secondary School Students in Kebbi Central Senatorial Zone, Nigeria. Dasheed, Aliero and Danjuma (2024) used survey research design to probe the opinions of the respondents. Two (2) self-designed questionnaires titled: Large Class Size and Students' Academic Performance Questionnaire (LCSSAPQ) and Academic Performance Rating Scale (APRS) were used to collect data. The respondents were selected using purposive, proportionate and simple random sampling techniques. Descriptive statistics was used to answer the research questions while corresponding hypotheses were tested using independent t-test. This study revealed that large class size causes distractions and uncontrollable behaviour which seriously affect students' academic performance. The study noted that large class size constituted congestion, poor class room management and overcrowding, which greatly affect the teaching and learning process in junior secondary schools in Kebbi central senatorial zone Kebbi State, Nigeria. This finding is in consonance with a similar study by Rufina, Esther and Anastecia (2018) on the impact of class size on students' academic performance in Biology in Idemili North Local Government Area of Anambra State. This study revealed that large class size had a negative effect on students' academic performance in biology. These two studies talk about class size thus, they are instrumental to the current which also looks at class size as a construct of student-teacher ratio. The points of divergence are on the research designs used, locations of the studies, data collection instruments as well as the data analysis techniques.

A study carried out on The Impact of Pupil-Teacher Ratio on Performance in Mastering Reading, Writing and Arithmetic Competencies in Morogoro Municipality, Fubile and Sawe (2022) revealed that a low pupil-teacher ratio has a positive impact on the performance of pupils in mastering reading, writing and arithmetic competencies. The researchers argued that in order to get better performance in mastering reading, writing and arithmetic competencies among others, great attention should be placed on schools' pupil-teacher ratio. They noted that pupil-teacher ratio not only affects performance but also affects the class interactions between the teacher and the pupils, the management of pupils' discipline inside and outside the classrooms and teachers' motivations in teaching inside and outside the classrooms. This study provides in-depth information to the current one on the effect of student-teacher ratio on academic performance thereby making significant contributions.

Additionally, Fubile's and Sawe's (2022) study employed a purposive sampling technique in selecting schools and respondents involved in the study, the current on the other hand, used snowball and saturated sampling techniques. Another point of departure is that this study was interested in the impact of pupil-teacher ratio on

performance in mastering reading, writing and arithmetic competencies of class four pupils in Morogoro Municipality in Tanzania while the current is interested in the influence of student-teacher ratio on the academic achievements of students in public secondary schools in Kericho County, Kenya. The previous study used a qualitative research approach while the current employed a mixed methods approach in which both qualitative and quantitative data were analyzed.

Etomes and Lyonga (2020) conducted a study which examined the effects of student–teacher ratio on students' learning and academic performance in public universities in Cameroon. Results revealed that class size, teachers' workload and teaching method as constructs of student–teacher ratio, affect students' learning and academic performance in public universities in Cameroon. The study employed a survey research design and used simple random sampling technique to select students and lecturers for the study. Data was collected using closed and open-ended questionnaires. This study is similar to the current in a number of ways. For instance, both of them used qualitative and quantitative data. While this study analysed quantitative data using descriptive statistics, the current used cohort analysis, descriptive and inferential statistics. Both studies carried out content analysis in which the qualitative data was analyzed into emergent themes and sub themes. The points of divergence however, are in the research designs that were used as well as the sampling methods to select respondents for the study. Additionally, while this study used university students and their lecturers as respondents the current used Sub County Quality Assurance and Standard Officers, Directors of Studies, principals and form four students as respondents. The study locations also differed with this study being carried out in Cameroon while the current in Kenya.

A study conducted by Kalemba and Mulauzi (2020) on the Effect of High Pupil-Teacher Ratio on the Quality of Teaching and Learning Process of Mathematics in Selected Public Secondary Schools of Lusaka District, Zambia showed that there was a close relationship between the size of the pupil-teacher ratio and the quality of outcomes. Where the ratios were bigger, results revealed that the quality of interaction between teachers and learners declined significantly, meaning that learners did not get optimal opportunities to get their personal challenges addressed by their teachers and this adversely affected pupils' performance in class. The consequence of the teacher's failure to fully interact with all the learners was that teachers could not understand each and every pupil's ability and disability hence plan for them. This study was instrumental to the current with regard to methodology since it used both qualitative and quantitative paradigms. These two methodological approaches were used to give the study an in-depth understanding that a single approach cannot attain. Additionally, it adopted a multi-method approach involving use of semi-structured interviews, Focus Group Discussions and questionnaires which the current study also used. In relation to data analysis, both studies analyzed qualitative data thematically. There are however differences in the studies in terms of study locations with this study being conducted in Zambia and the current in Kenya. Moreover, while this study specifically deals with the effect of pupil-teacher ratio on the quality of teaching and learning process in Mathematics in selected public secondary schools, the current examines the impact of student-teacher ratio on the overall academic achievement of students in public secondary schools.

A study conducted by Adejuke et al., (2019) on the Influence of Student-Teacher Ratio on the Academic Performance of Public Primary School Pupils in Odeda Local Government Area, Ogun State revealed that there is a significant effect of the student-teacher ratio on the academic performance. This means that teacher-pupil ratio is a powerful predictor of learning achievement in Nigerian schools. This study employed a descriptive survey research design and it randomly selected respondents who were primary school teachers. The study analysed demographic data using descriptive statistics while simple linear regression was applied to test the formulated hypotheses. This study contributes to the current in varied ways for instance, it informs the current with regard to methodology since both have employed descriptive statistics to analyse data. While this study used a descriptive survey research design, the current employed *Ex post facto* descriptive, correlational and mixed method research design. Moreover, the previous study was done in public primary schools in Odeda Local Government Area, Ogun State, Nigeria while the current was done in public secondary schools in Kericho County, Kenya.

Ankwasiize (2018) conducted a study in Uganda to evaluate student-teacher ratio on classroom practices in Universal Secondary schools in Wakiso District. The study revealed that teacher-student ratios affect the teacher's morale and commitment. Moreover, the study noted that a high teacher-student ratio reduces teacher-

student interaction. The study further showed that low teacher-student ratios minimize indiscipline problems. The variables of discipline, motivation and commitment all contribute to academic achievement of learners. In sum, this study noted that the student-teacher ratio plays a critical role in academic achievement such that the lower the ratio, the better the achievement and vice versa. This study differs from the current one with regard to the research designs and sampling techniques used. While this one used the cross-sectional research design and respondents were sampled using cluster random and purposive sampling methods, the current adopted *Ex post facto*, descriptive, correlational and mixed method research design while respondents were sampled using snowball and saturated sampling techniques. The two studies are similar in the sense that both used qualitative and quantitative data. Additionally, this study collected data using structured questionnaire, key informant interviews and observational protocols while the current used questionnaire, interview schedule, Focus Group Discussion and document analysis guides. Finally, while the previous study was carried out in Uganda the current was conducted in Kenya.

Njoroge, Mulwa and Kiweu (2023) conducted a study on Student–Teacher Ratio and Teaching Experience as Determinants of Students' Academic Achievement in Secondary Schools. The study revealed that there is no statistically significant relationship between student-teacher ratio and students' academic achievement. The study further noted that teachers experience management challenges in classes with high number of students. In essence, the larger the class, the more demanding it is and the less the interests of individual learners are catered for. This study informed the current on data analysis in the sense that while it used inferential and descriptive statistics to analyse quantitative data, the current used cohort analysis, descriptive and inferential statistics. The two studies differ in the sense that this one used only one data collection instrument which is a questionnaire while the current elicited data using questionnaire, interview and Focus Group Discussions. The two studies are similar in the sense that both of them are conducted in Kenya and both involve secondary school students.

A study conducted in Mombasa County by Kamoet and Mbirithi (2024) aimed at investigating the effect of the Teacher-Student Ratio on students' academic achievement by analyzing its influence on the quality of education, interactions between students and teachers and whether high teacher workload and stress adversely affect the learning and teaching experience revealed a varied range of viewpoints. A notable majority, comprising 17 out of the 24 teachers, concurred that the teacher-student ratio holds significant sway over the overall quality of education, emphasizing the positive influence of a balanced ratio. When delving into the relationship between a lower teacher-student ratio and improved interaction, a prevailing 18 out of 24 teachers endorsed the notion that a reduced ratio positively contributes to heightened student-teacher interaction. The study thus concluded that Teacher-Student Ratio (TSR) is a crucial consideration, with overwhelming support for the positive effects of a lower TSR on educational quality and interactions. It emphasized the need to address teacher workload and stress for an optimal learning environment. This study used a descriptive research design; data was collected from 1000 respondents who were selected using the random sampling technique. The respondents comprised principals, teachers and learners. The data was collected using semi structured questionnaires and interview schedules. The current study on the other hand, employed *Ex post facto,* descriptive survey and comparative research designs. Moreover, data was collected from 485 respondents comprising Principals, Directors of Studies, Form Four Students and Sub-County Quality Assurance and Standard Officers. The researcher collected data using questionnaire, interview schedule, Focus Group Discussion and document analysis guides. Finally, while the previous study was carried out in Mombasa County, the current was conducted in Kericho County.

Theoretical framework

Classical Educational Production Function Theory

Classical Educational Production Function Theory was adapted in this study. This theory was developed in the 1960s and 1970s, particularly through the works of economists like Eric Hanushek, who used it to assess the efficiency of school inputs. It is an economic model that seeks to explain the relationship between educational inputs and student outcomes, often measured in terms of academic achievement. It borrows from the production function concept in economics, where output is produced from a set of inputs. The Educational Production Function (EPF) attempts to model how various inputs such as teachers, class size, facilities, and

student background are transformed into outputs such as test scores, graduation rates, and other academic achievements. Just as a factory uses labour and capital to produce goods, schools use resources to "produce" education. The Classical Educational Production Function Theory provides a foundational framework for analysing the effectiveness and efficiency of educational inputs. While useful for policy-making and resource allocation, it should be applied with caution and supplemented with qualitative assessments due to its limitations. This theory is relevant in this current study teachers is one of the inputs education system and an independent variable in this study. While the output is academic performance which is the dependent variable.

Conceptual Framework

The conceptual framework was based on the concept of investment choices advanced by Psacharopolous and Woodhall (1985) since education is an investment. It was also guided by Classical Educational Production Function Theory that adapted in this study and it was relevant since in and education system there are inputs among them are teachers while outcomes are academic achievements. The independent variable was student-teacher ratio while the dependent was student Academic achievements in school.

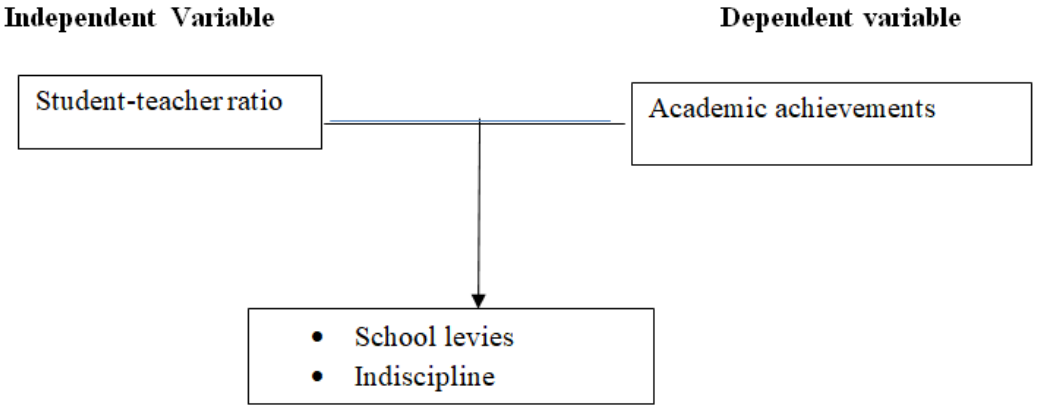

Figure 1: Conceptual Framework showing the student teacher ratio as an independent variable and Academic Achievement as dependent variable in Kericho County, Kenya.

This conceptual framework was adapted to focus on independent and dependent variables. Independent variable was Student teacher Ratio while dependent variable was Students' Academic Achievements. According to Mc Burney and White (2010) an independent variable is selected by the experimenter to determine the effects of behavior while dependent variable is a measure of a subject's behavior that determines independent variable effects. This study focused on Student Teacher Ratio as independent variable and students' academic achievement as dependent variable in Kericho County. The school levies were intervening variables and indiscipline.

RESEARCH METHODOLOGY

Ex post facto, descriptive survey and correlational research designs were used in this study. *Ex post facto* research design seeks to discover possible causes of behaviour, which has already occurred and cannot be manipulated (Gall, Gall & Borg, 2007). For the purpose of this study *ex-post facto* research design allowed the researcher to get all the relevant information on student teacher ratio and KCSE mean scores in Kericho County. This was done through use of relevant documents like registers, school fees registers and admission books. Descriptive survey research design involves careful description of education phenomena and reports the way things are. The descriptive survey is able to explore the relationship between variables in their natural setting as they occur (Leedy &Ormrod, 2005). The design was appropriate because it allowed the use of questionnaires and interviews schedules as research instruments for collecting data at a given point in time. Questionnaire is widely used in the descriptive research because they help obtain facts and figures about current conditions and are useful in making inquiries concerning their views and opinions (Mugenda & Mugenda, 2003). This enabled the researcher to get the relevant information to compute student teacher ratio and academic achievement. The weaknesses in the questionnaires were dealt with by the use of interview schedule. According to Mugenda and Mugenda (2003) correlational research design is used to establish

relationship between variables. Correlational involves collecting data in order to determine whether and to what degree a relationship exists between variables. The degree of relationship is expressed as a correlation coefficient (r). The design was relevant in this study because it assisted in establishing the influence of student teacher ratio and academic achievement. Reliability coefficient of the principals' questionnaire was 0.80 at set p-value of 0.05.

The study was done in Kericho County which is made up of five sub counties namely: Ainamoi, Belgut, Bureti, Londiani and Kipkelion. The performance from 2004 to 2007 was observed to be fluctuating as signified by the lowest mean scores of 4.76 in 2004 and 5.83 which is the highest in 2005. This is an indication that the County was not performing well in secondary education as the mean scores remained below average for the years. KCSE is the ultimate indicator of students' academic achievement. It was therefore necessary to carry out the study in this county to establish the causes of poor performance. The study population was 4,457 comprising Principals, Sub County Quality Assurance and Standard Officers, Directors of Studies and Form Four Students of 2011. The sample size was 485; snowball and saturated sampling techniques were used to select respondents. Questionnaire, interview schedules, Focus Group Discussion guide and document analysis guide were used to collect data. Documents used were class registers. An open-ended questionnaire was administered to each school Principal from the selected 40 schools. Open ended questionnaires were important in this study because they are used to obtain facts about current conditions and in making inquiries concerning views and opinions brought forth (Mugenda & Mugenda, 2003). A document analysis guide was used to assist the researcher examine the relevant documents with the intention of getting crucial information. Documents used were the class registers from the 40 secondary schools in Kericho County, Kenya. The instruments that were validated were questionnaire and Document Analysis Guide. The instruments that were validated were questionnaire, interview schedule, Focus Group Discussion, observation guide and Document Analysis Guide.

Validity of a measurement instrument is the extent to which the instrument measures what it is supposed to measure. Validity takes different forms, each of which is important in different situations (Mc Burney & White, 2010). Reliability of a measurement instrument is the extent to which it yields consistent results when the characteristic being measured has not changed. Test- Retest was done. The instrument was used whereby the instruments were administered to the same respondent twice at an interval of two weeks in 5(10%) of the principals and Pearson product moment correlation coefficients was used to compute the correlation coefficient. The correlation coefficient was 0.8 at a set p-value of 0.05. This means the instrument was reliable as the calculated coefficient was greater than 0.7. Two weeks were found to be standard for these instruments to piloted again (Mugenda & Mugenda, 2003).

Interpretation of Pearson Correlation Co- Efficiency

Correlation coefficients (r) were therefore interpreted to determine the influence of student-teacher ratio on the dependent variables in terms of direction and strength of relationship. Elfison, Runyon and Haber (1990) interpretation guideline was adopted (Table 1).

Table 1 Interpretation of Pearson Correlation Coefficients (r)

Strength of the relationship	**Positive (+)**	**Negative (-)**
Weak/low/small	0.01 – 0.30	0.01 – 0.30
Moderate/ medium	0.31 – 0.70	0.31 – 0.70
Strong/high	0.71 – 0.99	0.71 – 0.99
Perfect relationship	1.00	1.00
No relationship	0.00	0.00

From Table one (1) it can be observed that Pearson *(r)* between + or - 0.01 – 0.30 is a weak/low/small relationship, between + or - 0.31 – 0.70 is a moderate/medium, while relationship between + or - 0.71 – 0.99 is a strong/high relationship. Perfect relationship is where it is positive or negative 1.00 while 0.00 means there is

no relationship. Coefficient of determination R^2 is the square of the Pearson *r* which tells how much of the variance is accounted for by the correlation which is expressed in percentages while the other remaining percentage could be due to other factors (Leedy & Ormrod, 2005). This was adopted in the interpretation of Pearson (*r)* and coefficient of determination R^2 in this study.

RESEARCH FINDINGS

Demographic Characteristics of the Respondents

The respondents in this study included school Principals, Director of Studies, DQASO and students. Their demographic characteristics were as shown in Tables 3 and 4.

Table 2 Principals' Gender and Headship Experience (n=40)

Demographic characteristics	Frequency (f)	Percentage (%)
Gender		
Male	30	75.00
Female	10	25.00
Total	**40**	**100.00**
Headship Experience in years		
5	1	02.50
6-10	12	30.00
11-15	17	42.50
16-20	10	25.00
Total	**40**	**100.00**

Table 2 indicates that out of all the 40 (100%) school Principals involved in the study, 30 (75%) were male while 10 (25%) were female. This shows that very few female teachers are appointed as school Principals in Kericho County. This is in agreement with a study carried out in a sampled number of schools in Kenya by Bosire et al., (2009) where it was indicated that out of the 30 sampled school Principals 22(79%) were male while 6 (21%) were female. The school principals' leadership experience was also indicated with one (2.50%) having experience of being a head between 5 years, 12 (30.00%) had an experience of 6-10years, 17 (42.50%) had an experience of 11-15 years while 10 (25.00%) had an experience of 16-20 years.

From the findings in Table 2, most school principals had headship experience of 6 years and above. This shows that they had enough experience in school management and they were able to give the relevant information on Student- Teacher Ratio and students' academic achievement in Kericho County. Based on their experience, the principals can be relied on for the authenticity of data collected.

Student Teacher Ratio in Kericho County as indicated by the school Principals

The number of TSC teachers in Kericho County secondary schools was 754 while the number of students was 42,965. The Student Teacher Ratio (STR) in Kericho County was computed. The TSC teachers-student ratio in Kericho County was arrived at by using the formula by UNESCO Guideline (2009 b).

Formula:

$$PTR_h^t = \frac{E_h^t}{T_h^t}$$

Where

PTR_h^t Pupil/Student teacher ratio at level of education *h* and year *t*

E_h^t Total number of pupils or (students) at level of education *h* in the school year *t*

T_h^t Total number of teachers at level of education *h* in school year *t*

STR $= \frac{42,925}{997} = 43:1$

Students' Performance in KCSE in Kericho County as indicated by the school principals

To establish the influence of student-teacher ratio on Academic performance in KCSE, the performance of the first cohort of students after introduction of free secondary education was established. Pearson Product moment correlation between Student-Teacher Ratio and Academic Performance in KCSE was computed. The KCSE means results were as shown in Table 3.

Table 3 KCSE Mean Scores in Kericho County as indicated by the principals (n=40)

Mean scores	KCSE Mean Scores	
	Frequency (f)	Percentage (%)
2.00-3.99	2	5
4.00-5.99	20	50
6.00-7.99	8	20
8.00-9.99	10	25

Source Researcher (2024)

Table 3 indicates the schools' mean scores as given by the school Principals.From the 40 schools, 2(5%) had their mean score ranging from 2.00 to 3.99, twenty (50%) had their mean scores ranging from 4.00 to 5.99, 8(20%) had their mean scores ranging from 6.00 to 7.99 and 10 (25%) had their mean scores ranging from 8.00 to 9.99 respectively. Table 8 shows that 8(20%) of the schools that had their mean scores ranging from 2.00 to 3.99 had improved as only 2(5%) had a mean score range of 2.00 to 3.99. There was also a noticeable improvement when 6(15%) of the schools had mean scores of above 8.00 when all factors influencing quality of education held constant except Student-Teacher Ratio. The improvement was attributed to the subsidy from the government which catered for educational inputs over and above the parental inputs geared towards enhancing students' performance. In order to establish the influence of Student-Teacher Ratio on students' academic achievement for 2008 cohort, data on Student-Teacher ratio and students' academic achievements per school was correlated using Pearson product Moment correlation. The Interpretation was done in Table 5.

Table 4 Pearson Product Moment Correlation (r) Matrix for Student Teacher Ratio and Students' Academic Achievement in Kericho County

	Mean Scores	Student Teacher Ratio
Pearson Correlation	1	.389*
Sig. (2-tailed)		.013
N	40	40
Pearson Correlation	.389*	1

Sig. (2-tailed)	.013	
N	40	40

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

Table 4 indicates that the relationship between Student-Teacher Ratio and students' academic achievement was moderate, positive and statistically significant with a coefficient of 0.389 at a set p-value of 0.05. According to Elfison, Runyon and Haber (1990); Leedy and Ormrod (2005) guideline Correlation coefficients (r) interpretation indicated that this is a positive moderate influence. This means that student-teacher ratio accounted for an increase in KCSE mean scores. Coefficient of determination R^2 was 0.151 which means that the student teacher ratio accounted for 15.13% of the variations in KCSE. Therefore the hypothesis that there is a positive relationship between student-teacher ratio as a predictor and academic achievements in Public Secondary schools in Kericho County, Kenya is accepted.

This findings therefore concurs with the study conducted in Pakistan by Ahmad et al., (2019) which explore the relationship between the student-teacher ratio and academic achievements at the secondary level in the subject of physics and it was noted that academic achievements of the students at the secondary level in the subject of physics are inversely related with the student-teacher ratio. But it's not agreement with the studies carried out by Koca and Celik (2015) in Turkey to identify if there is a significant correlation between number of students per teacher and students' achievement. This study found a negative correlation between student-teacher ratio and achievement ranking of cities in the Transition to Higher Education Examination. With the current study there is a moderate positive influence between student teacher ratio and academic achievements. While it is in agreement with the studies done in Southern Asia by Galang et al., (2021) this study investigated the student-teacher ratio of various Southeast Asian nations and each country's reading performance through the lens of the Programme for International Student Assessment (PISA) scores. The study revealed that countries with a low student-teacher ratio ranked higher in reading performance than those with a high student-teacher ratio. It however differs from the current with regard to methodology. For instance, while the data analyzed was obtained from online sources, the current obtained primary data from respondents. Moreover, the study locations for this study were Southeast Asian nations while the current study's location was a single East African country that is, Kenya.

This study is also in agreement with the study conducted in South African by Venketsamy (2020) used a descriptive and causal non-experimental design to determine the teacher-learner ratio and its effect on invitational teaching and learning. The study revealed that the teacher-learner ratio was the determining factor in the effectiveness of promoting invitational education. The study noted that large class size has a negative impact on teachers and learners' attitudes toward schooling. It also concurs with the study done in Nigeria on Teachers' Perception on the Impact of Large Class Size on the Academic Performance of Junior Secondary School Students in Kebbi Central Senatorial Zone by Dasheed, Aliero and Danjuma (2024) which used survey research design to probe the opinions of the respondents. This study revealed that large class size causes distractions and uncontrollable behaviour which seriously affect students' academic performance. It is also in agreement with study carried out on The Impact of Pupil-Teacher Ratio on Performance in Mastering Reading, Writing and Arithmetic Competencies in Morogoro Municipality, Fubile and Sawe (2022) it revealed that a low pupil-teacher ratio has a positive impact on the performance of pupils in mastering reading, writing and arithmetic competencies.

A study conducted by Kalemba and Mulauzi (2020) on the Effect of High Pupil-Teacher Ratio on the Quality of Teaching and Learning Process of Mathematics in Selected Public Secondary Schools of Lusaka District, Zambia showed that there was a close relationship between the size of the pupil-teacher ratio and the quality of outcomes is in agreement with the current study. While the this study does not concur with the study done in Kenya by Njoroge, Mulwa and Kiweu (2023) conducted a study on Student–Teacher Ratio and Teaching Experience as Determinants of Students' Academic Achievement in Secondary Schools. The study revealed that there is no statistically significant relationship between student-teacher ratio and students' academic achievement. However the current study concurs with the study conducted in Mombasa County by Kamoet and Mbirithi (2024) that aimed at investigating the effect of the Teacher-Student Ratio on students' academic

achievement by analyzing its influence on the quality of education, interactions between students and teachers and whether high teacher workload and stress adversely affect the learning and teaching experience revealed a varied range of viewpoints. A notable majority, comprising 17 out of the 24 teachers, concurred that the teacher-student ratio holds significant sway over the overall quality of education, emphasizing the positive influence of a balanced ratio.

CONCLUSION

Student-teacher ratio plays a critical role in the academic performance of a learner. The findings of this study have revealed that a higher student-teacher ratio has drastically affected the academic performance of learners in public secondary schools in Kericho. This situation requires that urgent action is taken to address the student-teacher ratio. Where there is a balanced ratio, students tend to perform well because they interact adequately with their teachers giving them opportunities to excel in their studies. The teachers are also able to use effective teaching techniques to disseminate information in the teaching-learning process. Additionally, there is need to assess the current educational patterns with the intention of coming up with refined techniques to improve the learners' academic performance.

The following recommendations were made:

1. There is need to reduce the student-teacher ratio through the employment of more teachers. This initiative will reduce the workload and give teachers ample time to adequately prepare and effectively discharge their duties.

2. There is need to provide sufficient funds for the purchase of enough teaching and learning resources as well as for the expansion of learning facilities.

3. There is need to take into consideration the welfare of the teachers; their mental and physical well-being should be given prominence.

4. There is need for the introduction of a course purely on classroom management in higher institutions of learning for those training to become teachers in the face of growing student populations. Such a course would equip teachers with the necessary tools and information on handling large class sizes.

5. There is need to strengthen mentorship programmes in schools as a way boosting the learners' morale to excel in their studies.

6. Parents should be sensitized on the need to create conducive home environments for students especially those in day schools so that they can comfortably undertake their personal studies. Moreover, they need to be sensitized on the importance of involving both learners (male and female) in household chores to give them equal opportunities to study.

7. There is need to provide all female students with sanitary towels on a regular basis so that they can comfortably attend classes during their monthly periods.

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