



An Analysis of Student–Teacher Ratio as a Determinant of Cohort Survival Rates in Kenya’s Public Secondary Schools

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ABSTRACT

Basic education provides the foundation upon which a child’s learning is established. Secondary education, the upper echelon of basic education, is pivotal since it equips the learner with essential skills, knowledge and competencies which are critical for human capital development and poverty reduction. The role that secondary education plays in nurturing and preparing an individual to effectively function in society cannot therefore be overlooked. Student-Teacher ratio (STR) plays a crucial role in education generally and on students’ survival rate specifically. It is thus against this backdrop that the study sought to establish the impact of STR on Survival Rates in Bureti Sub County. The theories that were used are Classical Educational Production Function Theory and Human Capital theory were found to be appropriate. Descriptive, ex-post facto and correlational research designs were adopted. Purposive sampling techniques were used to select respondents. The sample size were 40 school Principals and 40 Directors of Studies. Data was collected using Questionnaire, interview schedules and document analysis guide. 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. The study established that there was a moderate negative relationship between STR and Survival Rate with a correlation coefficient of -0.418 at a set p-value of 0.05. The coefficient of determination $R^2 = 0.1747$ meant that STR accounted for 17.47% of the variation in survival rate. The study concluded that the STR has a negative influence on Survival Rates. This is an indication that more teachers should be employed to improve on survival rates in schools. The study recommended that Student Teacher Ratio should be improved to increase Survival Rates. 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.

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BACKGROUND INFORMATION

Education, a catalyst for human capital development and poverty reduction, is associated with absolute political, economic and social growth (UNESCO, 2015). Ball (2017) argues that education is one of the top priorities in the political agenda of many countries as such, a country's economic and social growth cannot be achieved in its absence. A report developed by USAID (2001) reveals that education develops democracies, sustains per capita income, stabilizes health and is important in conserving resources. Moreover, it is an investment in human skills instrumental for increased economic growth and social development. Education in Sub-Saharan Africa is increasingly viewed as a means of emancipation and a transformative project for social mobility. Therefore, developing nations have pursued policies such as universal or free primary education to increase access to education and improve student outcomes (Ruff, 2016).

Class size which translates to student teacher ratio has a significant impact on several other variables such as academic performance, survival rate and teacher turnover among others. As such, there have been calls from different players in the education sector to reduce class sizes. This call has been positively received by many countries which have taken the initiative to reduce the class sizes for the benefit of both learners and the teachers. According to Blatchford and Lai (2012) it is mainly believed that smaller classes provide a better teaching and learning environment.

Higher student teacher ratios have had ramifications in the education sector. A study conducted by Njoroge, Mulwa and Kiweu (2023) revealed that high teacher-student ratio means that teachers handle many lessons per week and may also face class management challenges particularly in discipline management. Additionally, the number of students attended to by one teacher may affect students' performance this is so because the larger the class, the more demanding the class is and individual needs and interests of learners' especially slow ones are not adequately attended to. Negative effects of high student teacher ratios are corroborated by study conducted by Bakar and Mwila (2022) who posit that high teacher student ratio leads to a compromised teaching and learning process; negatively affects classroom management practices and makes it impossible for teachers to implement competence-based curriculum. Another study that supports the negative effects of high student teacher ratios was done by Mulausi and Kalemba (2020) who noted that in classes with higher student numbers pupils hardly asked questions; the only activity that they were involved in was listening and copying notes. Additionally, teachers were in a hurry to teach topics instead of pupils. This means that teachers were more concerned with completing their syllabi at the expense of the learners' comprehension of the concepts taught.

Massive research has been conducted on the student teacher ratio. One of the pioneer research

projects on this concept is the Tennessee Student/Teacher Achievement Ratio Study (STAR) Project and the group of subsequent studies using its survey data (Word et al., 2004). Another was done by Fubile, and Sawe (2022) to investigate the impact of Pupil Teacher Ratio (PTR) on academic performance in mastering reading, writing, and arithmetic competencies in public primary schools in Morogoro Municipality. A descriptive survey design was used. Interviews and documentary reviews were used in collecting data for the study which was then analysed descriptively. The study revealed that PTR significantly influences the performance of pupils in standard formation assessments and in mastering reading, writing, and arithmetic competencies. Ajani, and Akinyele (2014) also did a study that investigated the effects of student-teacher ratio on academic achievement of selected secondary school students in Port Harcourt metropolis, Nigeria. The research employed a descriptive survey research design. Simple Random Sampling Method was used to select 3 Senior Secondary Schools in Port Harcourt Local Government Area of Rivers State where 120 students were randomly selected (40 students per school). A researcher- designed questionnaire and Achievement Test in Mathematics were the major instruments used in collecting the data which were analysed using Pearson Product Moment Correlation coefficient statistical tool at 0.05 level of significance. Results showed that there is a significant relationship between student's perception of students-teacher ratio and academic achievement in Mathematics.

Kaloki et al., (2015) conducted a study on Pupil-Teacher Ratio and its Impact on Academic Performance in Public Primary Schools in Central Division, Machakos County, Kenya. The study targeted the 78 public primary schools from which a total of 24 schools were sampled for the study. Descriptive survey design was adopted additionally, questionnaires were used to collect data for the study. The analysis involved the use of simple regression to determine whether PTR predicts performance in national examinations. The relationship between PTR and performance was worked out using Pearsons's product moment correlation coefficient R, the value of R calculated was -0.323. This negative correlation between the PTR and performance indicated that as PTR increases performance decreases and vice versa. Most of these studies aim at examining the relationship between class size and student achievement but not the relationship between student teacher ratio and survival rate. It thus against this backdrop that this study sought to examine the effect of Student Teacher Ratio on Student Survival Rates in Public Secondary Schools in Bureti sub County, Kenya.

Purpose of the Study

The purpose of the study is to determine the effect of Student Teacher Ratio on Student Survival Rates in Public Secondary Schools in Bureti Sub County, Kenya.

Research Objective

To determine the effect of Student Teacher Ratio on Student Survival Rates in Public Secondary Schools in Bureti sub County, Kenya.

Research Question

What is the effect of Student Teacher Ratio on Student Survival Rates in Public Secondary Schools in Bureti sub County, Kenya?

Research Hypothesis

There is a positive relationship between Student Teacher Ratio and Student Survival Rates in Public Secondary Schools in Bureti sub County, Kenya.

SYNTHESIS OF LITERATURE

Ruff (2016) carried out a study on The Impacts of Retention, Expenditures, and Class Size on Primary School Completion in Sub-Saharan Africa: A Cross-National Analysis. Using data from the UNESCO Institute for Statistics and Path analysis, the study explored the associations between educational inputs and primary education completion in Sub-Saharan Africa. The study found out that lower pupil-teacher ratios can contribute to greater freedom given to teachers, allowing for increased individualized attention and structural support for students in need. This study differs from the current in a number of ways. For instance, while the former study employed only one theory, the current was grounded in two that is, the Classical Educational Production Function theory and Human Capital theory. Another point of divergence between this and the current study is that the former was cross-national research meaning it cut across several countries while the current was research conducted in one country. Additionally, while the former was interested in the Impacts of Retention, Expenditures, and Class Size on Primary School Completion in Sub-Saharan Africa, the latter was interested the effect of student teacher ratio on student survival rates in public secondary schools in Bureti sub County, Kenya. The former focused on primary school while the latter on secondary.

Hojo (2021) conducted a study on the association between student-teacher ratio and teachers' working hours and workload stress: evidence from a nationwide survey in Japan. Data on working environment for teachers and STR in Japanese schools were obtained from TALIS 2018 dataset, an international, large-scale survey that asks teachers and school leaders about working conditions and learning environments at their schools. In order to obtain nationally representative sample of teachers, a stratified two-stage probability sampling design was used. Regression results revealed that student-teacher ratio was positively correlated with total work hours and workload stress of teachers. In particular, teachers

working in schools with high student-teacher ratio spent more time on time-consuming tasks such as marking/correcting student work and communication with parents or guardians. The coefficient estimates suggested that, on average, lowering the student-teacher ratio by five in lower-secondary school was associated with 2.8 hours shorter working hours per week ($p < 0.001$). This study is different from the current which is interested not in the relationship between student teacher ratio and workload but on the effect of student teacher ratio on student survival rates. The former study was a nationwide survey conducted in Japan while the current involved public secondary schools in Bureti sub County in Kenya. The sampling designs used in the two studies were also different.

Frost et al., (2025) carried out a study to empirically evaluate the effects of varied student-teacher ratios on staff and student behavior in a special education classroom. The results of this study show that students engaged in fewer academic tasks and more problem behavior with lower teacher–student ratios, and staff engaged in more reactive behavioral interventions and less appropriate student interactions with lower teacher–student ratios. While this study furnishes the current with literature on student teacher ratio, it differs from the current in a number of ways for instance, this study used respondents in a special education classroom while respondents used in the current study were from schools that catered for normal students that is those without special needs. The study locations were also different for the two studies.

Case and Deaton (1999) examined the relationship between educational inputs primarily pupil-teacher ratio and school outcomes in South Africa before the end of the apartheid government. The study used the main South African Living Standards Survey which was conducted during the last five months of 1993. The survey collected data from 8848 households in 360 clusters. The design that was adopted was two stage self-weighting and the sample was stratified by province. The study found strong and significant effects of pupil-teacher ratio on enrollment, educational achievement and test scores for numeracy. The point of divergence between this and the current study is that while this study was conducted in South Africa, the current was carried out in Kenya. This study's focus was the relationship between student teacher ratio and school outcomes while the current's focus was the relationship between student teacher ratio and students' survival rate. The methodologies adopted in the two studies were also different with the former using a two stage self-weighting design while the current employing *Ex post facto* descriptive survey and correlational research designs.

A study carried out in India by Azim Premji Foundation (2014) on Pupil-Teacher Ratios in Schools and their Implications revealed that children who attend schools with lower pupil-teacher ratios have a greater likelihood of continuing schooling for a greater number of years. This study is instrumental to the present because it was also interested in the relationship between student teacher ratio and survival rate. However, while this study

used respondents from primary schools, the current used those from secondary schools. Further differences are in the areas where the respective studies were carried out.

Ankwasiize (2018) carried out research on Teacher-Student Ratio on Classroom Practices in Universal Secondary Schools in Wakiso District-Uganda. The study used a cross-sectional research design. The research employed cluster random and purposive sampling methods while data was obtained using structured questionnaire, key informant interviews and observational protocols. This study revealed that high teacher-student ratios affect the quality of instructional environment and methods. Additionally, it affects teacher-student interactions, the teacher's morale and commitment which in turn impacts on classroom learning. This study informed the current with regard to general literature on student teacher ratio as well as data collection instruments. However, they differ on several fronts. Firstly, the research designs used differ with the former employing cross-sectional while the latter *Ex post facto* descriptive survey and correlational research designs. Secondly, while the former study was carried out in Wakiso district, Uganda, the current took place in Bureti sub County, Kenya. Thirdly, while this study dealt with teacher-student ratio on classroom practices in universal secondary schools the current looked at the effect of student teacher ratio on student survival rates in public secondary schools.

Mosteller, (1995) carried out a Tennessee STAR experiment which found that smaller ratios resulted in considerable improvement in early childhood learning and cognition. In addition, student performance in small classes in early education persists despite transitions to larger classes in later years, and that small classrooms substantially contribute to the achievement of economically advantaged students. While this study dealt with the effects of student-teacher ratios in early years of learning, the current however dealt with the effect of student teacher ratios on survival rates of learners in secondary schools. The methodologies used in data collection and analysis were also different between the two studies.

In a study carried out on analyzing the Dynamics of School Dropout in Upper Secondary Education in Latin America: A Cohort Approach, Kattan and Székely (2015) found put that limited school capacity influences dropout rates. This is because in most Latin America and the Caribbean countries, lower secondary enrollment has increased substantially since 1990 and includes lower-income populations. This movement has placed greater pressure on education systems to absorb large groups of marginalized students. An increasing share of low-income youth at the upper secondary level has been linked to upper secondary dropout across the region, as students from more disadvantaged backgrounds may need extra support to ensure they do not drop out. This study differs from the current in the sense that it focuses on the impact of increased enrollment on school drop outs while the latter is interested in the effect of student

teacher ratio on student survival rates in public secondary schools. While the former study was conducted in Latin America, the current took place in Kenya.

Venketsamy (2023) carried out a quantitative descriptive study in South African to explore the teacher-learner ratio and its effect on invitational teaching and learning. Data was analysed using frequency tables. The findings of this study revealed that the teacher-learner ratio has a negative impact on the quality of teaching and learning. Additionally, the large class size and overcrowding had an impact on the provisioning of resources to learners. This study is different from the current in the following ways: first, it was carried out in South Africa while the current in Kenya. Second, it was interested in the effect of student teacher ratio on the quality of instruction while the current focused on effects of student teacher ratio on student survival rates in public secondary schools. Third, the former used frequency tables to analyse data while the current used cohort analysis, inferential and descriptive statistics for the quantitative and thematic analysis for the qualitative data.

Kiambati and Katana (2020) carried out a study to establish the influence of school resources on students' dropout rate in secondary institutions in Kikuyu Sub-County. The study employed a descriptive survey design, collected data using pre-determined questionnaires and interviews then analyzed it using descriptive statistics. The study revealed that high student-teacher ratios contributed significantly to student dropout rates especially among at risk learners like those from needy backgrounds. While this study was interested in the influence of school resources on students' dropout rate in secondary institutions in Kikuyu Sub-County, the current was interested on effect of student teacher ratio on student survival rates in public secondary schools in Bureti sub County. Even though this study does not focus on student teacher ratio, it gives information on the significance of school resources in promoting education in the wake of Free Secondary Education. This study also informs the current with regard to the data collection instruments used as well as techniques used in data analysis. The point of divergence however is in the research designs employed.

Werunga et al., (2012) reports that application of Free Primary Education has led to increased enrollment leading to high ratio of teacher-pupil resulting to indiscipline among pupils. It has also brought about relatively fewer facilities compared to the numbers of pupils a situation that has led to the administration of fewer exams by teachers because of the increased workload. This has resulted in poor KCPE performance among pupils in Kaptama Division, Mt. Elgon District, Kenya. This study informs the current with regard to the effect of high student teacher ratios on academic performance even though the current study's focus is on the effect of student teacher ratio on survival rate. This study's data is obtained from respondents in primary

while the current's is from secondary. While this study was carried out in Mount Elgon, the current was conducted in Kericho.

Mathu (2016) conducted research on the Influence of Free Primary Education on the Pupils Retention Rate: The Case of Gatanga District, Muranga County, Kenya. This study was grounded on the Effective Schools theory propounded by Lezotte (2001); it used *Ex post-facto* descriptive survey while purposive and simple random sampling techniques were employed to select the respondents. Data was collected using a document review as well as closed and open-ended survey questionnaires. The study found out that availability of classrooms and playground affect pupils' retention rate; additionally, provision of text books, exercise books, learning manuals, desks, sanitary towels, and sport gear also play an instrumental role in retaining pupils. This study is instrumental to the current because it brings to perspective factors that have influenced survival rates of learners after the conception of the Free Primary Education. Additionally, it informs the current in relation to data collection instruments, sampling techniques and research design. There are differences noted for example, while this study used only one descriptive design that is the *ex-post-facto* descriptive survey, the current used two that is *Ex post facto* descriptive survey and correlational research designs. The theories employed to analyse data were also different with the former grounded in Effective Schools theory and the latter in Classical Educational Production Function and Human Capital theories. The former research was interested in Free Primary Education while the current was done in student teacher ratio and survival rate.

Mutinda and Ochieng' (2022) carried out a study on Teacher-Pupil Ratios and Pupils' Retention Rates versus Academic Performance in the Context of Free Primary Education: Empirical Evidence from Public Primary Schools in Lunga Lunga Sub County, Kenya. The study used a descriptive survey design and a sample size of 27 head teachers and 354 pupils. Questionnaires were used to collect data while analysis entailed the application of descriptive and inferential statistics. The study revealed that Free Primary Education potentially affected the ability of the teachers to effectively engage pupils in discussion, presentations, simulations and debates. The study further noted that the difference in pupils' retention rates versus their academic performance was significant at 95% confidence interval. The study thus concluded that the pupils' retention rates influence academic performance of a school in various ways. This study was pivotal to the current in the sense that it informed it with regard to the variable of retention rate. While it was interested in Teacher-Pupil Ratios and Pupils' Retention Rates in the Context of Free Primary Education, the current was interested in Teacher-Student Ratios and Students' Retention Rates in the Context of Free Secondary Education. This study further informed the current with regard to data collection tools as well as data analysis strategies.

Gichohi (2014) conducted a study to investigate the Institutional Factors Affecting Pupils' Retention in

Public Primary Schools in Nakuru North District, Kenya. The study was guided by Expectant theory advocated by Vroom. Simple random sampling was used to select the 99 respondents for the study. Two data collection instruments were used to obtain data from the respondents. Questionnaires were administered to teachers while interview schedules were used for the head teachers. The study revealed that teacher pupil ratio influences pupils' retention; lack of teachers in their school makes the learning process less fun and this to some extent affects retention. Moreover, the poor ratio of teachers to pupils has contributed to some pupils moving to other schools. This study is instrumental to the current since it brings to the fore some of the factors that influence retention in schools. It also informs the current with regard to data collection tools. The two studies however differ with regard to the theories which they are grounded in; while the former is grounded in Expectant theory, the latter is grounded in the theories of Classical Educational Production Function and Human Capital.

Theoretical framework

Classical Educational Production Function Theory

Classical Educational Production Function Theory which was developed in the 1960s and 1970s particularly through the works of economists like Eric Hanushek was adapted in this study. This theory is an economic model that seeks to explain the relationship between educational inputs and student outcomes. 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 this theory is 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 the current study since STR is one of the inputs of the education system and an independent variable in this study.

Human Capital Theory

Human Capital Theory which was developed by Adam Smith in 1776 and expanded by Gary Becker (1964) and Theodore Schultz (1961) was also adapted in this study. According to this theory, education is an investment in people increasing their knowledge, skills, and productivity thus leading to higher earnings and economic growth. The Assumption of this theory is that individuals and societies are more likely to invest in education if the benefits outweigh the costs. This theory was applicable to this study because the government

incurs costs when employing teachers to improve on survival rates. When students stay in school until they complete their studies, the number of skilled individuals is increased thereby promoting long-term socio-economic growth.

Conceptual Framework

The conceptual framework (Figure 1) postulates that survival rate is influenced by Student Teacher Ratio in Kenya. The conceptual framework was based on the concept of investment choices advanced by Pscharapolous and Woodhall (1985). The adaptation involved having one independent and five dependent

variables with one intervening variable. The originator of this concept provided a production function equation in which there was one dependent and many independent variables: $Y = X_1 + X_2 + X_3 + \dots$ (Pscharapolous & Woodhall, 1985). The available data presupposed that STR could influence survival rate in secondary schools. Woodhall (2004) indicates that education is a form of investment in human capital that yields economic benefits and contributes to the country's future wealth by increasing the productive capacity of its people. STR is an investment choice by the Government of Kenya aimed at promoting quality education and ensuring students complete their studies in time.

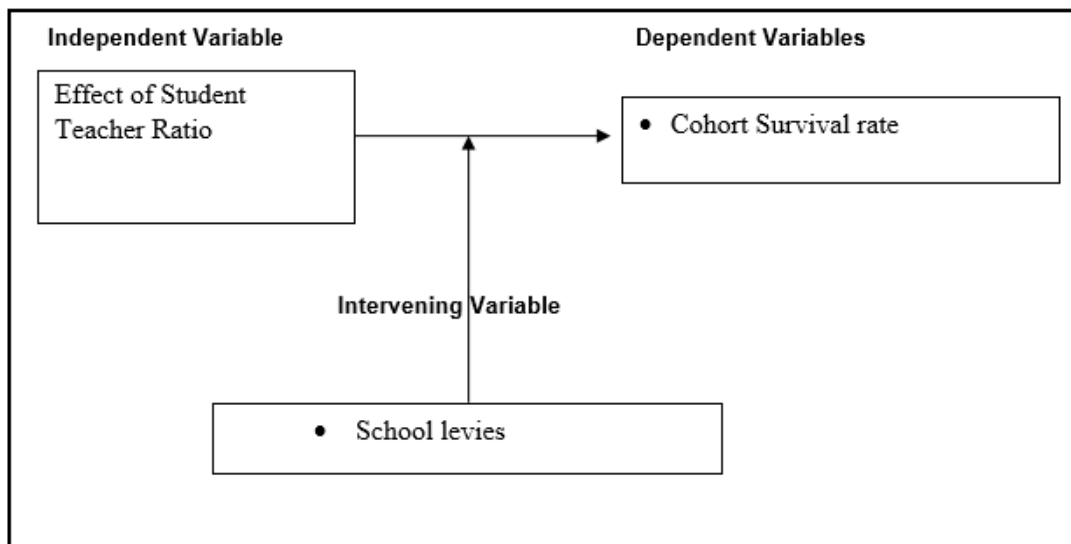


Figure 1: Conceptual Framework Showing the effect of Student Teacher Ratio on Survival rate in Bureti sub County

This conceptual framework was adapted to focus on independent and dependent variables. Independent variable was STR while dependent was Survival rate. According to Mc Burney and White (2010) an independent variable is selected by the experimenter to determine the effects of behaviour while dependent variable is a measure of a subject's behaviour that determines independent variable effects. This study focused on the following variables: Student Teacher Ratio and Survival rate in Bureti Sub County. The school levies was an intervening variable.

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 have 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 Survival rate in Bureti sub County. This was done through the use of relevant documents like class registers, school fees registers and admission books. Descriptive survey research design which involves careful description of education phenomena and reports the way things are was adopted in this study.

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 interview schedules as research instruments for collecting data at a given point in time. Questionnaire enabled the researcher to get the relevant information to compute survival rate. The weaknesses in the questionnaires were dealt with by the use of interview schedule. Correlational research design was also used in the current study. According to Mugenda and

Mugenda (2003) correlational research design is used to establish relationship between variables. Correlational design involves collecting data in order to determine 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 STR on survival rate in the county.

The study population consisted of 56 secondary school principals and 56 Directors of Studies in Bureti Sub County. The school principals were selected as respondents since they are the school accounting

officers and are in a better position to avail all the information required on STR and Survival rate. The principals had all the relevant documents required for instance, class registers, admission books, accession and fee registers. They also had vast experience hence better placed to give the relevant information. Directors of Studies were also used as teachers' representatives moreover, they had a lot of experience and were in a better position to provide the required data as well as relevant information on the influence of STR on Survival rate in Bureti sub County.

The sample size

Table 1: Sample Frame

Category of Respondents	Target population (N)	Sample size (n)	Percentage (%)
School Principals	56	40	71.43%
Directors of Studies	56	40	71.43%

Purposive sampling technique was used to select the 40 Directors of Studies and the 40 School Principals. The 40 schools used in the study had a complete cohort from one to form four. The new schools were left out. According to Creswell (2014) Purposive sampling is a technique in which researchers intentionally select individuals and sites to learn or understand the central phenomenon.

Instruments for Data Collection

Questionnaire, interview schedule and document analysis guide were used in this study. Questionnaire is widely used in descriptive research because it obtains facts about current conditions and is useful in making inquiries concerning views and opinions (Mugenda & Mugenda, 2003). The instrument was selected because it gives the respondents adequate time to provide the information required. In addition, respondents' identities are hidden thus they do not shy off from providing information. A document analysis guide was used to assist the researcher examine the relevant documents and get appropriate information. Varied documents such as class and fee registers, accession registers, and admission books used were pivotal in the analysis of STR and Survival rates in Bureti sub County.

Interview schedules were used for Directors of Studies and the School Principals to get information on the impact of STR on Survival rate in Bureti sub County. A questionnaire was also administered to the 40 school principals to get more information on the same. The researcher tested the data collection instruments to determine whether they were reliable or not. Reliability of a measurement instrument is the extent to which it yields consistent results when the characteristic being measured has not changed. Like validity, reliability takes

different forms in different situations (Leedy & Ormrod, 2005). Test – retest method was adopted in this study because the instruments were to be administered on different occasions for a period of six months. The instruments were administered to the same respondents twice at an interval of two weeks 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 were reliable as the calculated coefficient was greater than 0.7.

Student Teacher Ratio was computed per school in Bureti sub County. The STR ratio 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

Survival rate was calculated on the basis of the reconstructed cohort method which uses data on enrolment and repeaters for consecutive years (UNESCO, 2009 b). Computations were done per school to determine the cohort survival rate in Bureti sub County. The survival rate was computed using the following formula given by (UNESCO, 2009 b).

$$SR_{g,i}^k = \frac{\sum_{t=1}^m p_{g,i}^t}{E_g^k} \times 100$$

where: $P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$

i grade (1,2,3.....n)

t year (1,2,3.....m)

g pupil cohort

$SR_{g,i}^k$ Survival Rate of pupil-cohort g at grade i for a reference year k

E_g^k Total number of pupils belonging to a cohort g at a reference year k

$P_{g,i}^t$ Promoters from E_g^k who would join successive grades i throughout successive years t

R_i^t Number of pupils repeating grade i in school year t

$$SR_{g,i}^k = \frac{\sum_{t=1}^m p_{g,i}^t}{E_g^k} \times 100$$

Where: $P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$

Pearson Correlation (r) was then done to determine the influence STR on survival rate in Bureti sub County.

Interpretation of Pearson Correlation Co- Efficiency

Correlation coefficients (r) were therefore interpreted to determine the Impact of STR on Survival rates in terms of direction and strength of relationship. Elfison's, Runyon's and Haber's (1990) interpretation guideline was adopted (Table 2).

Table 2: 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 2, 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 explanation was adopted in the interpretation of Pearson (r) and coefficient of determination R^2 in this study.

Findings

The return rate of principals' questionnaire was as shown in Table 6.

Table 3: Return Rate of the Principals Questionnaire used for Data Collection

Respondents	Issued	Number Returned	Percentage (%)
Principals	40	40	100
Totals	40	40	100

From Table 3, it can be observed that all principals returned the questionnaire as was required. The rate of return for the questionnaires was 100%. This data on return rates helps to justify the validity of the data that was used in this study and the new knowledge generated.

Demographic Characteristics of the Respondents

The respondents in this study included school Principals and Directors of Studies. Their demographic characteristics were as shown in Tables 4 and 5

Table 4: 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 4 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 as appointed school Principals in Bureti sub County. This is in agreement with a study carried out in a sampled number of schools in Kenya by Bosire et al., (2009) which revealed 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 and one (2.50%) had headship experience of 5 years, 12 (30.00%) had an experience of 6-10years, 17 (42.50%) had 11-15 years of experience while 10 (25.00%) had 16-20 years.

Table 4 revealed that most school principals had headship experience of 6 years and above. This shows

that they had enough experience in school management and were able to give relevant information on Student Teacher Ratio and Survival rate in Bureti sub County. Experience is an indicator for authenticity of data collected. The principals were also better placed given that the data required dated back to the year 2004.

Table 5: Teaching experience before being Appointed as School Principals (n=40)

Years	Frequency (f)	Percentage (%)
5-10	2	5.00
11-15	5	12.50
16- 20	24	60.00
21-25	9	22.50

From table 5, those principals with a teaching experience of between 5 -10 years were 2(5%) between 11-15 years were 5 (12.50%), between 16-20 were 24(60%) while between 21-25 years were 9 (22.50%). The level of experience is an indicator that these principals had gone through all the ranks in the teaching profession and were therefore qualified to be appointed to administrative positions. According to Education Portal (2014), most principals in the US enter the profession after obtaining enough experience as teachers. This is in agreement with the findings of this study which reveal the vast teaching experience that those appointed as principals have. Therefore, they were better placed to answer questions on Student Teacher Ratio and Survival rate in Bureti sub County. Table 5 provides information on the highest professional qualifications of the sampled principals in the study.

Table 6: School Principals' Highest Professional Qualifications (n=40)

Highest Qualification	Frequency (f)	centage (%)
Bachelor's Degree	15	37.50
Master Degree	25	62.50
Total	40	100.00

From table 6, fifteen (37.50%) had a Bachelor's degree while 25 (62.50%) had Masters. Basing on the findings in Table 5, it is clear that all the principals had the required level of education. Education Portal (2014) shows that in the US the requirement to be a School Principals is a Bachelor of Education degree. This is also applicable in this study and in agreement with The Basic Education Act 2013 (Republic of Kenya, 2013). Given their academic credentials, these principals were thus in a position to understand and give the relevant information on gender parity, repeater rates, dropout rates, wastage rate and students' academic achievement in Bureti sub County.

Student Teacher Ratio in Bureti Sub County as indicated by the school Principals

The number of TSC teachers in Bureti sub County secondary schools was 754 while the number of students was 42,965. The Student Teacher Ratio (STR) in Bureti sub County was computed. The TSC teachers-student ratio in Bureti sub 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

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

Table 7: Range of Student Teacher Ratio in Bureti sub County (n=40)

Range	Frequency (f)	Percentages (%)
Below 30	7	17.50
30-40	13	32.50
Above 40	20	50.00
Totals	40	100.00

Table 7 indicates the STR ratio per schools. Those schools with STR below 30 were 7(17.50%) while with the range of 30-40 they were 13(32.50%). The schools with STR above 40 were 20(50%).

Cohort Survival rate in Bureti sub County as indicated by the school Principals

Survival rate per school was computed as follows using the formula given by (UNESCO, 2009 b) guideline.

$$SR_{g,i}^k = \frac{\sum_{t=1}^m p_{g,i}^t}{E_g^k} \times 100$$

Where: $P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$

i grade (1,2,3.....n)

t year (1,2,3.....m)

g pupil cohort

$SR_{g,i}^k$ Survival Rate of pupil-cohort g at grade i for a reference year k

E_g^k Total number of pupils belonging to a cohort g at a reference year k

$P_{g,i}^t$ Promoters from E_g^k who would join successive grades i throughout successive years t

R_i^t Number of pupils repeating grade i in school year t

$$SR_{g,i}^k = \frac{\sum_{t=1}^m p_{g,i}^t}{E_g^k} \times 100$$

Where: $P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$

Table 8 shows the survival rate per school in Bureti sub County.

Table 8: Cohort Survival Rate per School in Bureti sub County (n=40)

Survival Rate (%)	Frequency (f)	Percentages (%)
0.00-19.99	1	2.50
20.00-39.99	6	15.00
40.00-59.99	16	40.00
60.00-79.99	12	30.00
80.00-99.99	5	12.5

From Table 7, one school had a survival rate ranging from 0.00 to 19.99%, six (15.00%) of the schools had survival rates ranging from 20.00 to 39.99, sixteen (40.00%) ranged from 40.00 to 59.99, twelve (30.00%) ranged from 60.00 to 79.99 and 5(12.5%) had survival rates ranging from 80.00 to 99.99. Table 8 shows the Pearson Product Moment Correlation (r) Matrix for STR and Survival Rate in Bureti sub County.

Table 9: Pearson Product Moment Correlation (r) Matrix for Student Teacher Ratio and Survival Rate in Bureti sub County

		Student Teacher Ratio	Survival Rate
Student Teacher Ratio	Pearson Correlation	1	-.418**
	Sig. (2-tailed)		.007
	N	40	40
Survival Rate	Pearson Correlation	-.418**	1
	Sig. (2-tailed)	.007	
	N	40	40

*. Correlation is significant at the 0.01 level (2-tail)

Table 9 indicates that the relationship between Student Teacher Ratio and survival rate is a positive moderate. The relationship was significant with a coefficient of -0.418 at a set p-value of 0.05. According to Elifson, Runyon and Haber (1990) and Leedy and Ormrod (2005), guideline Correlation coefficients (r) interpretation indicated that this was a negative moderate influence. This means that Student Teacher Ratio accounted for reduction in survival rate. This finding is in agreement with that of a study carried out in India by Azim Premji Foundation (2014) on Pupil-Teacher Ratios in Schools and their Implications where it revealed that children who attend schools with lower pupil-teacher ratios have a greater likelihood of continuing schooling for a greater number of years. This implies that the lower the teacher student ratio, the higher

the survival rate and vice versa. Another study that mirrors the finding of the current is the one carried out by Gichohi (2014) to investigate the Institutional Factors Affecting Pupils' Retention in Public Primary Schools in Nakuru North District, Kenya. This study revealed that teacher pupil ratio influences pupils' retention rate. It further revealed that the poor ratio of teachers to pupils has contributed to some pupils moving to other schools thereby affecting the survival rate of an institution. Mutinda and Ochieng' (2022) also corroborate the finding that higher student teacher ratios not only affect the student survival rate but also their academic performance. This was revealed in a study that they carried out on Teacher-Pupil Ratios and Pupils' Retention Rates versus Academic Performance in the Context of Free Primary Education: Empirical Evidence from Public Primary Schools in Lunga Lunga Sub County, Kenya. The study revealed that Free Primary Education potentially affected the ability of the teachers to effectively engage pupils in discussion, presentations, simulations and debates. The study further noted that the pupils' retention rates influence academic performance of a school in various ways.

Table 10: Student Reacher ratio and Cohort Survival Rate Coefficient of determination R

	R	R ²	Variation
STR and Cohort Survival rate	-0.418	0.1747	17.47%

To account for the influence of Student Teacher Ratio on Cohort survival rate, Pearson's *r* was therefore squared as indicated in Table 10. The coefficient of determination $R^2 = 0.1747$ meant that STR accounted for 17.47% of the variation in survival rate. This does not concur with a study done by Hojo (2021) on the association between student-teacher ratio and teachers' working hours and workload stress: evidence from a nationwide survey in Japan. The Japan study focused more on teachers working in schools with high student-teacher ratio and it revealed that they spent more time on time-consuming tasks such as marking/correcting student work and communication with parents or guardians.

Additionally, the finding of the current study is not in agreement with a study done by Frost et al., (2025) to empirically evaluate the effects of varied student-teacher ratios on staff and student behavior in a special education classroom. The results of this former study show that students engaged in fewer academic tasks and more problem behavior with lower teacher-student ratios, and staff engaged in more reactive behavioral interventions and less appropriate student interactions with lower teacher-student ratios. The one done in South Africa by Case and Deaton (1999) examined the relationship between educational inputs primarily pupil-teacher ratio and school outcomes before the end of the apartheid government. The study found strong and

significant effects of pupil-teacher ratio on enrollment, educational achievement and test scores.

But it does not concur with the study done by Venketsamy (2023) who carried out a quantitative descriptive study in South African to explore the teacher-learner ratio and its effect on invitational teaching and learning. The findings of this study revealed that the teacher-learner ratio has a negative impact on the quality of teaching and learning. This study focused more on teaching method.

CONCLUSIONS

The study concluded that the number of teachers should be increased in schools to improve on Cohort student survival rate in Kenya.

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