RELATIONSHIP BETWEEN SELECTED SCHOOL CHARACTERISTICS AND PRINCIPALS' PERCEPTIONS ON COST EFFICIENCY IN PUBLIC SECONDARY SCHOOLS OF BOMET COUNTY, KENYA

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been presented in this or any other university for the award of a degree.

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Recommendation

This thesis has been submitted with our approval as university supervisors.

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DEDICATION

This thesis is dedicated to my children: Kibet, Kipkorir, Kiprotich and Cherop.

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ABSTRACT

Public secondary schools in Kenya are expected to operate efficiently in the use of resources. Despite this expectation, the cost of education in relative terms in most public secondary schools in Bomet County is still high. This may be an indicator that public schools are cost inefficient in their operations. The purpose of this study was to investigate the relationship between selected school characteristics namely; accommodation status of students, school size, type and location and principals' perceptions on cost efficiency in public secondary schools of Bomet County, Kenya. The study was informed by the education production function theory and adopted the correlational research design. The target population was two hundred and seventy principals of public secondary schools and all the five Sub-County Directors of Education in Bomet County. A sample of 175 principals was selected using stratified, proportionate and simple random sampling techniques. A semi-structured questionnaire was used to gather data from the principals and an interview schedule was used to solicit data from the Sub-County Directors of Education. The content and face validity of the two instruments were ascertained by experts from the department of Curriculum, Instruction and Educational Management, Egerton University. The reliability of the principals' questionnaire was estimated using the Cronbach alpha method. It yielded a reliability coefficient of .822, and was therefore deemed reliable. Data was analyzed with the use of the Statistical Packages for Social Sciences (SPSS) version 25.0. Hypotheses were tested using the Chi Square test for independence at .05 level of significance. Qualitative data generated by the open ended items and interviews were analyzed thematically by organizing them in themes pertinent to the study objectives and summarizing them using frequencies and percentages. The study found that relationship between accommodation status of students in schools ($\chi 2$ [4, N = 143] = 2.121, $\rho > .05$), school size ($\chi 2$ [4, N = 143] = 1.905, $p > .05$), school type ($\chi 2$ [2, N = 143] = .113, $p > .05$) and principals' perceptions on cost efficiency were not statistically significant. However, the relationship between school location and principals' perceptions on cost efficiency was statistically significant, $\chi 2$ (2, N = 143) = 8.25, $p < .05$. The study concluded that principals perceived that location affected cost efficiency, while accommodation status of students, school size and type did not. The study recommended that, principals in Bomet County be equipped with financial management skills through training in order to enhance their ability to manage the institutions effectively. The study further recommended that rural schools should consider cost reduction and saving strategies when preparing and implementing their budgets, given that school location affects cost efficiency. The findings of the study could be useful to the principals and the ministry of education in putting in place mechanisms and formulating policies that aim at promoting cost efficiency in school management. The findings of the study could also serve as reference material for researchers studying the dynamics of cost efficiency in education.

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LIST OF ABBREVIATIONS AND ACRONYMS

AFC	Average Fixed Cost
AMC	Average Marginal Cost
ATC	Average Total Cost
AVC	Average Variable Cost
BES	Boarding, Equipment and Stores
BOM	Board of Management
CDE	County Director of Education
CERT	Centre for Educational Research and Training
DEA	Data Envelopment Analysis
EENEE	European Expert Network on Economics of Education
EFA	Education for All
EWC	Electricity, Water and Conservancy
FC	Fixed Cost
FDSE	Free Day Secondary Education
GDP	Gross Domestic Product
GER	Gross Enrolment Ratio
GoK	Government of Kenya
INVALSI	Italian National Institute for the Evaluation of the School System
KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
KESSP	Kenya Education Sector Support Programme
KIPPRA	Kenya Institute for Public Policy Research and Analyses
KNEC	Kenya National Examinations Council
KSSHA	Kenya Secondary Schools Heads Association
LTT	Local, Transport and Travelling
MC	Marginal Cost
MDGs	Millennium Development Goals
NACOSTI	National Commission for Science, Technology and Innovation
OECD	Organization for Economic Co-operation and Development
OIC	Organization of Islamic Conference
PA	Parents' Association
PE	Personal Emolument

PISA	Programme for International Student Assessment
RMI	Repair, Maintenance and Improvement
SCDE	Sub- County Directors of Education
SFA	Stochastic Frontier Analysis
SPSS	Statistical Packages for Social Sciences
TIMMS	Trends in International Mathematics and Science Study
TSC	Teachers Service Commission
TVET	Technical and Vocational Education and Training
UNICEF	United Nation International Children Emergency Fund
UNESCO	United Nation Education Scientific and Cultural Organization

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Education is a well-structured and systematic process of acquiring knowledge and skills through well-structured instructional programmes (Chazan, 2022). According to Alsuliman et al. (2019), education aims at assisting individuals develop; promote equity, personal freedom and human rights. It also plays a major role in boosting friendship, understanding tolerance, thus enabling people to interact freely. Somani (2017) considers it as a powerful tool for social mobility and a process through which people are trained to take their responsibilities in social settings. Education also enables its beneficiaries to exploit the environment for productive gain and sustainable livelihood and preserve it (Brown, 2016). Education thus plays a key role in facilitating acquisition of knowledge and skills, attitudes and values which are important for personal development. It also enhances the ability of consumers of education to act as agents of social and economic change in their communities. Further, education is a significant predictor of the social and economic development of nations (de Mouraa & Bispo, 2019). Globally, formal education is provided at five levels, namely, pre-primary (preschool, early childhood education [ECDE]), primary, secondary, tertiary (colleges, vocational training centers) and university (Ndemwa & Otani, 2020).

Secondary school education is the phase of formal learning which follows primary school and recedes higher education (Behlol et al., 2019). This level of education is important because it plays a major role in feeding tertiary institutions and universities with graduates, and the world of work with labour (Mackatiani et al., 2023). Secondary school education also been associated with education in primary schools since it provides pupils with the motivation to remain in school, learn and progress (Raghupathi & Raghupathi, 2020). This stage of education is important because it aims at equipping learners with knowledge, skills and assists them develop mentally, socially, morally and spiritually so that they are all round persons (Lessa et al., 2018). The skills acquired are essential as they boost learners' self-discipline, respect for self and others, sense of purpose, integrity and development of positive attitudes. For secondary schools to achieve their objectives of equipping graduates with knowledge, skills and attitudes, they must be managed effectively.

Secondary schools must be managed well given that effective management plays a significant role in realization of an institution's educational objectives. Ali and Abdalla (2017) define management as the function of coordinating efforts of workers of a business or

an organization to achieve some stated objectives through effective and efficient use of available resources. Rizescu et al. (2020) contend that management comprises of five basic elements, namely planning, organizing, coordinating, directing and controlling. Management at the secondary school level involves application of its principles in mobilizing resources, planning and organizing for instruction, assessment and co-curriculum activities and achievement of set educational goals (Nzioka & Orodho, 2014). Kabiru et al. (2018) aver that effective management ensures that the required material resources and human capital are always available at the workplace. In a school setting, management involves creating and maintaining an environment in which education systems function efficiently for realization of their aims, thus benefiting the learners who are the main stakeholders.

In Kenya, secondary schools are categorized as private and public. Private secondary schools are managed by their owners while public ones are managed by Boards of Management (BoM) (Wanjala, 2021). The board of management comprises of the principal, who is its secretary and members appointed by the County Education Board. Principals are appointees of Teachers Service Commission (TSC) and are in charge of schools (TSC, 2011). Principals are assisted to manage schools by their deputies who are also appointees of the TSC (Musyoka, 2018). Principals are also assisted to manage schools by head of departments, who coordinate operations of departments. Parents' Associations (PA) can be considered as part of school management since they assist in maintenance of students' discipline, mobilizing funds for constructing physical facilities, purchase of instructional materials (Nyakan, 2018). Prefects are also part of school management since they have a role to play in the daily operations of schools such as maintenance of students' discipline and acting as the link between learners and school administration (Kabugi, 2013). Principals and other school administrators should possess the competencies to manage schools efficiently. This is essential because most schools face many challenges in the form of teacher shortages, inadequate infrastructure and instructional materials, over-enrolment and inadequate funds and irregular disbursement of capitation (Ndemwa & Otani, 2020; Otieno & Ochieng, 2020).

Schools are established to achieve stated goals and objectives such as providing learners with opportunities to acquire knowledge, skills and attitudes (Chu, 2017). The goals of schools include promoting learners' self-development and harmonious co-existence with other members of society. Further, education aims at promoting, self-respect and reliance, cooperation, adaptability, a sense of purpose, self-discipline, patriotism and preparing students to contribute positively towards the development of society. Provision of adequate

resources is a prerequisite to actualization of educational goals and objectives in school system (Eric & Ezeugo, 2019). This calls for elaborate financing of education across the world by governments, given that it is their mandate to do so (Roser & Ortiz-Ospina, 2016). However, governments worldwide do not have adequate funds to meet the demands of education and are therefore under increasing pressure to use education resources efficiently (World Bank., 2020). These financial challenges demand cost efficiency in the management of available resources in schools. According to Menon and Phalachandra (2018) cost efficiency is the act of changing a process to work in a better way or product for purposes of saving money. In the context of schools, cost efficiency is concerned with realization of set educational goals at minimum costs or achievement of better outputs for a given set of inputs (Olatunji et al., 2017). It means that determination of cost efficiency requires availability of input and output data.

Literature shows that computation of cost efficiency is a controversial topic given that there is no consensus on what constitute an input and output, due to the complex nature of education (Barra & Zotti, 2016; Tellis, 2017; Wirtz & Zeithaml, 2018). Scholars like Gralka et al. (2019) consider resources such as school infrastructure, instructional materials, teachers and support staff as education inputs. Organization for Economic Co-operation and Development (OECD) (2017) is of the view that labour, capital and technology used in the teaching-learning process are education inputs. Educational outputs on the other hand comprise of indicators such as students' knowledge and skills, performance in examinations as measured by scores and grade, pass rates, and learners' attitudes, discipline and behaviour (Alsuliman et al., 2019). Cost efficiency is determined using various methods, one of which is the expenditure approach. It involves computing the cost of all inputs and outputs of an education system and expressing them as a ratio (Nauzeer et al., 2018). Agasisti et al. (2017) considers cost efficiency as optimum utilization of input resources for achievement of the highest educational output levels while Kiveu (2018) determined cost efficiency by examining expenditure incurred by students from the time of entering a secondary school to the point of exit.

Most secondary schools worldwide have limited resources and one of the challenges they face is how to utilise limited facilities and inadequate trained personnel they own to meet the unlimited educational needs of society (Dearden et al., 2014). Cost efficiency challenges in schools manifest themselves in inadequate, underutilization and wastage of resources, unaffordable and unsustainable costs of education coupled with low outputs

(Council of the European Union, 2019; European Commission, 2018). A study by World Bank (2019) estimated that 16% of funds allocated to education in developing countries go to waste due to poor management and escalating cost of inputs. Studies conducted in Asia noted that ever rising secondary school enrolment has placed significant strain on both governments and education institutions leading to inefficient use of resources (Akareem & Hossain, 2016; Wong & Deng, 2016). The results of a study by United Nation Education, Scientific and Cultural Organisation (UNESCO) (2016) in Table 1 illustrates cost efficiencies in various countries. It was determined using government expenditures in education as the input and Proramme for International Student Assessment (PISA) marks in mathematics, reading and science as outputs.

Table 1: *Global Theoretical and Actual Expenditure per Graduate in US Dollars in 2015*

Region	Theoretical Expenditure	Actual Expenditure	Variance
Europe and Central Asia	86,843	95,000	8,156
Middle East	68,880	78,592	9,712
East Asia and the Pacific	41,773	45,108	3,335
Latin America and Caribbean	26,656	34,647	7,991
North Africa	23,731	31,062	7,330
South Asia	7,223	10,675	3,452
Sub Saharan Africa	5,991	9,283	3,292

Source: UNESCO (2016)

Table 1 shows that for all the regions, there was a mismatch between theoretical expenditures and the actual expenditures. The mismatch between theoretical government expenditures and the actual explicitly indicates low levels of cost efficiency.

Cost inefficiency in secondary schools is also a problem in Africa. The rapid expansions in school enrolment in Sub-Saharan African countries have put substantial pressure on education systems' ability to provide quality education due to increased operation costs (Ajayi et al., 2017; Evans & Popova, 2016). Nauzeer et al. (2018) observed that cost efficiency of secondary schools in Mauritius were low. A study in Nigeria by Kolawole and Ogbiye (2020) observed high levels of cost inefficiency in schools that was attributed to wastage caused by high levels of repetitions and dropout rates. Adejumo-

Ayibiowu (2018) also observed low levels of cost efficiency in secondary schools. The observation was attributed to below decline in students' academic achievement despite increases in funds allocated to schools. Mbiti et al. (2019) study also showed that increase in expenditure in education did not affect students learning outcomes in Tanzania. The study associated this observation to the impact of other factors such as low teacher motivation, absenteeism and inadequate monitoring of learning activities

Cost inefficiency in the utilization of resources allotted to Kenya's public secondary schools is also widespread (Achoka et al., 2018; Lwakasana & Getange, 2017). The inefficiency is attributed to competing demands for limited resources, wastage of scarce resources and higher prices of inputs. A study by Mwikya et al. (2019) linked cost inefficiency in provision of educational services in public schools to inadequate funds from the government, which were often not released on time. Mwambari (2018) attributes cost inefficiency in secondary schools in Kenya to inadequate resources, high students-teacher ratio and the ever increasing cost of inputs to education.

Studies indicate that public secondary schools in Bomet like those in many other counties in Kenya use educational resources inefficiently (Chepkwony et al. 2020; Chirchir et al., 2019; Kitur et al., 2020; Koriyow, 2017; Kosgei et al., 2017; Kosgei et al., 2018). Records at Bomet County Education Office show that public secondary schools often use available resources inefficiently leading to high unit costs. Table 2 shows the difference between the theoretical average and the actual costs incurred for the years 2016 to 2019.

Table 2: *Unit Costs expressed in Kenya shillings for the years 2016 to 2019 by school characteristics*

Scale	School Characteristics	Expected	Actual	Costs Variance	Variance (%)
Location	Rural	65,788.00	67,347.50	1,559.50	2.4
	Urban	77,758.00	80,398.70	2,640.70	3.4
Accommodation status of students	Boarding	69,288.50	71,854.10	2,565.60	3.7
	Day	32,244.00	34,709.90	2,465.90	7.6
	Boarding/Day	49,507.30	54,300.40	4,793.10	9.7
Size	Single stream	45,691.50	49,398.90	3,707.50	8.1
	Two streams	67,779.00	70,262.80	2,483.80	3.7
	More than two Streams	75,798.00	77,747.50	1,949.50	2.6
Type	Single- sex	55,465.10	56,558.10	1,093.00	2.0
	Mixed	59,397.90	62,405.20	3,007.30	5.1

Source: Ministry of Education Science and Technology (2020)

Data in Table 2 reveals that schools in urban centers (KES 2640.70) recorded higher unit cost variance than those in rural areas (KES 1559.50). The results also reveal boarding/day schools (KES 2640.70) had the highest variance followed by boarding (KES 2640.70) and day institutions (KES 2640.70). With regard to school size, that single stream schools (KES 3707.50) posted the highest variance, and were followed by two streams (KES 2483.80) and more than two stream institutions (KES 1949.50). Table 2 further reveals that mixed sex schools (KES 3007.30) recorded a higher variance than single sex institutions (KES 1093.00). The presence of variances between the theoretical and observed unit costs is an indicator of cost inefficiency.

The data in Table 2 confirms that cost inefficiency is a challenge in public secondary schools in Bomet county. This is unlike the findings of studies conducted in neighbouring counties such as Kisumu, Nandi and Kericho. A study carried out in Kisumu County by Nyangia and Orodho (2014) found that cost efficiency of most public schools were relatively high. The study attributed the findings to various cost saving strategies adopted by those schools. The strategies included outsourcing services like cleaning and transport, bulk

purchasing thus enjoying economies of scale, sharing facilities with neighbouring schools assigning staff multiple tasks and engaging in income generating activities. Orwasa and Orodho (2018) established that schools in Kericho had put in place mechanisms aimed at cushioning students who had challenges paying school fees and potential dropouts, thus enhancing both internal and cost efficiencies. Ngetich et al. (2018) observed that day schools that were managed well were more cost efficient as they did not levy boarding fees and attendant accommodation expenses. These studies show that schools in Kisumu, Kericho and Nandi had high levels of cost efficiency unlike those in Bomet. The selection of Bomet was based on the low levels of cost efficiency in public schools.

Cost efficiency in schools is concerned with achievement of set educational objectives at the lowest possible cost or achievement of better outputs for a given set of inputs (Olatunji et al., 2017). Literature reveals that cost efficiency is influenced by many factors. Training and experience have been cited as one of the factors that enhance school managers' knowledge and skills, which enable them perform their administrative tasks efficiently (Menon & Phalachandra, 2018). Nyakan (2018) argues that training and experience enable school managers to run their institutions efficiently since they have the ability to save on costs by changing products or processes to work in better ways. Bibi et al. (2019) contend that possession of financial management competencies is very essential for one to succeed as a school principal. Such skills enable principals to prepare accurate school budgets and implement them and manage the school finances more efficiently, leading to reduction in operational costs, savings and enhanced cost efficiency.

Work commitment and motivation of staff have also been associated with cost efficiency (Estigoy & Sulasula, 2020). These two factors have been associated with cost efficiency because committed principals have stronger affiliations to their schools, are dedicated, diligent, and cognizant of the fact that achievement of institutions' objectives depends on them and perform their responsibilities effectively. Tokan and Imakulata (2019) contend that motivation is a correlate of cost efficiency not only because it influences the desire to do something but also impacts on the behaviour of managers. Availability of funds has also been cited as a determinant of cost efficiency (Gavurova et al., 2017). Gavurova et al. established that availability of funds enabled school administrators to plan, budget and use cost saving measures such as bulk purchasing.

Mucharreira et al. (2019) and Kwarikunda et al. (2020) found that school characteristics were significant predictors of cost efficiency. School characteristics refer to

the features and conditions in a learning institution (Ching et al., 2015). These attributes include leadership, policies, rules and regulations, physical facilities, instructional materials, teaching-learning processes, co-curriculum activities, culture and social environment. School characteristics have been associated with cost efficiency because they influence expenditure on education inputs and outcomes (Kareem et al., 2019; Van Hek et al., 2018). Gituru (2018) established that safety was a characteristic of a school which affected teaching and learning processes and cost of provision of education, given that it is not possible to teach and learn in an insecure environment without investing in security. A study by Musangi et al. (2017) noted high wastage rates, in form of dropouts and repetition, in government owned day secondary schools due to inability of students from informal settlements to pay school levies (development, lunch, motivation). The wastage impacted negatively on cost efficiency since human capital and facilities were under-utilized when students are not in school. The findings of this study imply that students' social and economic backgrounds influence cost efficiency. School characteristics such as accommodation status of students, size, type and location have also been cited as correlates of cost efficiency (Lee et al., 2018; Tao et al., 2019).

Studies have shown that accommodation status of students in schools affected their cost efficiency since boarding institutions require more inputs and post better examination results than their day counterparts (Chiguvi & Ndoma, 2018; Zotorvie, 2017). Accommodation status is defined as whether the institution offers boarding facilities to its learners or not (Opiyo, 2019). Mbunde (2018) categorizes accommodation status of students as boarding, day, and boarding and day. Boarding facilities of a school may be within or outside the institution, and comprise of rooms, meals, bedding, water and sanitation and recreational facilities. There is evidence in literature that students' accommodation status is related to cost efficiency. Behhaghel et al. (2017) demonstrated that cost per student in schools which offer accommodation was twice as high as that of day institutions. The high cost per student in boarding schools was attributed to accommodation inputs and teacher and support staff salaries. The study also found that students in boarding schools performed better in examinations than those in day schools. The good performance in boarding schools was attributed to small class sizes, infrequent disruptions of scheduled activities, longer study hours and frequent interaction between learners and their teachers. A study by Mbunde (2018) on the analysis of the relationship between students' accommodation status and provision of education revealed that day schools were less costly and draw more students than those with boarding facilities. Day schools offered basic requirements in the provision

of education such as teachers, instructional materials and classrooms at lesser costs. The findings also indicated ineffective use of resources in both boarding and day schools.

School size has been cited as one of the determinants of cost efficiency (Grosskopf et al., 2016; Thng, 2017). Agasisti et al. (2016) have defined school size in terms of land on which it is situated, infrastructure of the learning institution, number of staff and students enrolled. According to Okundi (2020), school size is often expressed in terms of student numbers in an institution or number of streams, which is the number of classes for each given year of study. Antoniou et al. (2019) were of the view that the optimum size of a school was 801 students and that of a class was 27 students. They noted that size increases beyond these points led to unpredictability and decrease in a school's readiness to execute its mandate of providing education efficiently. Wanini (2018) expressed school sizes in terms of classes, which were catergorised as small (25 and below learners), average (26 to 40) and large (above 40) classes. Wanini observed that most of the classes in primary schools were either average (50.0%) or large classes (35.8%). Data from the Ministry of Education indicates that the average school size, expressed in terms of number of enrolled learners have been increasing over the recent years in both government owned and private secondary schools. The average school size in private institutions increased from 311 learners in 2019 to 344 learners in 2020. The size of public schools increased from 341 in 2019 to 374 students per school in 2020.

School size has been associated with cost efficiency because the numbers of enrolled students affect inputs required in the provision of education and management of learning institutions (Mucharreira et al., 2019). School size affects cost efficiency because it plays a key role in the determination of resources required and allocation in a learning institution. Schools with high number of students enjoy economies of scale in operations, while those with lower enrolment stretch their operational resources. Several studies have associated school size to cost efficiency. Crouch et al. (2020) observed that over-enrolment, repetition, and dropouts were major challenges in schools in Uganda. The high enrolment led to inadequacies in teaching and learning facilities, and overworked teachers. These challenges adversely affected provision of inputs and achievement of educational outcomes and cost efficiency of schools. A study by Isuku (2016) in public secondary schools in Nigeria found that total enrolment, the number of students per class and students-teacher ratio were significant predictors of recurring unit costs. A study in Nairobi by Ngure and Karuri (2017) established that there was a significant relationship between single streamed schools and

inefficient utilization of resources. The study noted that multiple streams schools were able to enroll more students at minimal costs without over stretching available facilities.

Cost of education and efficiency of schools may differ by the type of learning institution due to gender specific needs of students (Wong et al., 2018). Schools are categorized according to gender composition of student populations, which can either be male, female or a combination of the two (Ministry of Education, Science and Technology [MOEST], 2018). In Kenya, an institution with only female or male learners is categorized as single sex schools while those with male and female students are referred to as mixed sex schools. Dustman's (2017) study in South Africa revealed that academic performance of students from single sex institutions was better than those from mixed sex schools. The difference in performance by school type was attributed to the disruptive behaviour of students in mixed gender schools and tendency of presence of girls in such institutions to distract boys from engaging in academic activities. Ozuome's et al. (2020) study in Nigeria indicated that opportunities to develop ones potential in mixed sex school setting of girls were not equal to those of boys. The results also indicated that single sex schools, whether boys only or girls only, performed better than mixed sex ones. These results confirmed that single sex schools were more cost efficient given that they perform better in examinations. Okurut (2018) noted that repetition and dropout rates among female students in Uganda were higher than that of the boys. Kiveu (2018) considers repetition and dropping out as a cause to wastage of educational resources and increase costs of education. The foregoing discussion have demonstrated that there is a link between school type and cost efficiency

Studies have shown that school location is a significant predictor of cost efficiency (Gibbons et al., 2018; Kyambi, 2019). Location has been defined as a particular place in the physical environment where something is situated (Eugene & Ezeh, 2016). A school may be located in a rural setting, which is in the country side or an urban area that is a town or city. Education for All (2015) contends that factors within a school locality such as availability of transport, communication, housing and social amenities affect education inputs and cost efficiency of schools. A study conducted in South Africa found that rural school faced many challenges that were unique to their environments that had cost implications (Du Plessis & Mestry, 2019). These challenges included parents' lack of interest in their children's education, deplorable conditions in classrooms, inadequate funding from the government, lack of water, sanitation facilities and electricity and under qualified teachers. The other barriers to effective provision of identified by the study were multi-grade teaching. Morgan

et al. (2017) noted that physical facilities and social amenities in most rural schools were inadequate; this forced them to look for alternatives at extra cost.

The foregoing discussions revealed that most secondary schools in Kenya, including those in Bomet County are cost inefficient. The discussions also revealed that school characteristics were significantly related to cost efficiency. The discussions further reveal that there are controversies in definition of inputs and outputs, and computation of cost efficiency in schools due to the complex nature of education. In addition, computation of cost efficiency requires well-kept and up to date financial data at the school level, which can be accessed by an investigator. Lack of complete data is a major challenge in most public secondary schools in Kenya (Musyoka, 2018). Due to these challenges, this study used principals' perception on cost efficiency as a measure of the construct.

Perception has been defined as the process through which people choose, organizes and interprets stimuli from the environment obtained through hearing, seeing, smelling, touching and tasting (Haridas et al., 2021). It thus can be considered as the process of organizing and interpreting stimuli from the environment and giving it meaning. Literature reveals that perceptions significantly influence people's attitudes, how they view the world, communicate, behave and perform tasks assigned to them (Aan et al., 2015). Literature also reveals that perceptual measures of variables can be used during inquiries when factual measures are not available (Nyenze, 2016).

The foregoing discussions have revealed that schools in Bomet and other counties in Kenya are cost inefficient. Records at the Bomet County Education Office showed inefficiencies in schools as evidenced by differences between the theoretical average unit cost and the actual unit cost incurred between the years 2014 and 2017 (Ministry of Education [MoE], 2018). The discussions also revealed that school characteristics are among factors that influenced cost efficiency (Isuku, 2016; Morganet al., 2017; Ozuome's et al., 2020). For instance, Gavurova et al. (2017) demonstrated that school size, expressed in terms of numbers enrolled, staff salaries, planning, organisation and delivery of instruction were predictors of level of expenditure in education. This study investigated the association between selected attributes of government owned secondary schools in Bomet, Kenya and principals' perceptions on cost efficiency. The attributes were accommodation status of students, school type, size and location. This study focused on Bomet because there was limited literature on relationship between accommodation status of students, school size, type and location and principals' perceptions on cost efficiency of public schools.

1.2 Statement of the Problem

Most public secondary schools face financial challenges. They are thus expected to be efficient in use of resource and operate at the lowest possible unit cost when accomplishing set educational goals. However, reports from the Ministry of Education indicate that government owned secondary schools in Bomet County have not been able to realise the expected cost-efficiency levels. Records at the Bomet County Education Office show huge differences between the actual expenditure and the amounts listed in budgets, an indication that public secondary schools face cost inefficiencies in their operations. Other challenges in schools are misallocation of resources and unrealistically high unit costs making savings unfeasible. The cost efficiency challenges negatively affect learners' access to and ability of these public institutions to provide quality education. The cost efficiency challenges in these institutions could perhaps be due to school characteristics such as students' accommodation status, size, type and location. This research explored the association between these four school characteristics and principals' cost efficiency perspectives in government owned secondary schools in Bomet County, Kenya. There was need to conduct this inquiry as a way of addressing high unit costs experienced in the county. The study was also deemed necessary because of dearth in literature that links the selected school attributes and government owned secondary schools in cost efficiency of public secondary schools in the county. It was envisaged that conducting the study would address existing literature gaps and offer fresh perspective about the research phenomenon.

1.3 Purpose of the Study

The goal of this inquiry was to examine the relationship between selected school characteristics and principals' perceptions on cost efficiency of public secondary schools. The selected characteristics were accommodation status of students, school size, type and location.

1.4 Objectives of the Study

The study was guided by the following specific:

i) To establish the relationship between students' accommodation status and principals' perceptions on cost efficiency of public secondary schools in Bomet County.

ii) To determine the relationship between school size and principals' perceptions on cost efficiency of public secondary schools in Bomet County.

iii) To establish the relationship between school type and principals' perceptions on cost efficiency of public secondary schools in Bomet County.

iv) To determine the relationship between school location and principals' perceptions on cost efficiency of public secondary schools in Bomet County.

1.5 Hypotheses of the Study

The following hypotheses were tested during this inquiry:

HO_1: The relationship between students' accommodation status and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.

HO_2: The relationship between school size and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.

HO_3: The relationship between school type and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.

HO_4: The relationship between school location and principals' perception on cost efficiency of public secondary schools is not statistically significant.

1.6 Significance of the Study

The study findings are expected to give a better insight of the association between students accommodation status, school type, size and location and cost efficiency in public schools. Such an insight may assist stakeholders in the education sector like planners, government policy makers, parents, school administrators, researchers and academicians in their endeavours to reduce on costs of operating public secondary schools and save. Parents and school administrators may utilize the study findings to guide budgeting for education of their students and schools. The findings may provide school managers with expenditure patterns which can be used to make projections on education cost. This may guide policy decisions on expanding existing facilities and building new schools.

The findings may also assist education policy makers in identifying possible cost reduction strategies and address the cost efficiency issues. Further, Ministry of Education planners and policy makers may use the findings as a guide when reviewing the actual cost of producing a graduate at secondary school level of education. The information may be useful for planning, budgeting and guiding resource allocation and utilization. Lastly, the findings are expected to mitigate dearth in literature and be used as a reference material for

researchers and academicians keen on studying the dynamics of costs in public secondary schools in Kenya.

1.7 Scope of the Study

The study was carried out in Bomet County, Kenya and involved only public secondary schools. It investigated the relationship between selected school characteristics and principals views on cost efficiency. The indicators of cost efficiency were cost reduction and saving measures undertaken by schools. The school characteristics covered was accommodation status of students, school size, type and location. On students' accommodation status, the study analyzed boarding, day and boarding/day categories. With regard to school size, the study investigated single and two streams and three streams and above. The aspects of school type examined were single-sex and mixed sex categories while those of location were rural and urban school. Two instruments, a principals' questionnaire and a Sub County Director of Education interview schedule were used to gather data from the sample groups.

1.8 Limitations of the Study

A number of weaknesses were noted during this study. Cost efficiency was measured based on the principals' perceptions. Ideally, cost efficiency should be measured using objective rather than perceptual measures. Wall et al. (2004) recommends use of perceptual indicators of a construct when objective measures cannot be established due to logistical challenges. Perceptual measure was considered a limitation as it is not of the same quality as an objective one.

Some schools did not have comprehensive and up-to-date records which capture all school activities with regard their value (e.g labour provided by students), money generated, savings (sourcing foodstuff from farms, bulk buying) and education outputs. This affected the quality of data and findings since such records are essential in the determination of cost efficiency.

This investigation relied more on quantitative than qualitative methods and could have suffered from weaknesses associated with it such as not providing an investigator with the opportunity to view a phenomenon from different research lenses, and integrating data from many sources (McKim, 2017). A balanced combination of both quantitative and qualitative methods could have provided a better insight or yielded different results.

1.9 Assumptions of the Study

It was assumed during this research that:

i) The respondents who participate in this inquiry gave honest and factual answers to questions asked.

ii) All secondary schools prepare budget estimates at the beginning of each year.

iii) There was an element of homogeneity in financial management competence of principals.

1.10 Operational Definition of Terms

Accommodation Status: Refers to a system of organising a school to facilitate teaching and learning by offering or not offering boarding facilities to students (Hendrayana et al., 2019). It referred to categorization of public secondary schools in terms of whether they offer boarding facilities to students, are day, or day/boarding status in order to facilitate teaching and learning.

Average Fixed cost: These are the costs that are required for production, which do not change as output changes, divided by the quantity of output produced (Nwokoye & Ilechukwu, 2018). It referred to fixed cost for providing education to learners in secondary schools such as, insurance, administration, expenses on development projects and personal emolument divided by enrolment.

Average Total cost: It is all the cost of production divided by the number of units produced (Ciftci et al., 2016). In the context of this research, it was determined by dividing the sum of all educational costs by the number of students in public secondary schools.

Average Variable cost: The term refers to those costs such as materials and labour that vary as output changes in short term production and is computed by dividing total variable costs by total output (MacLachlan et al., 2017). During the study, variable costs included total spent on examination fees, textbooks, teaching materials, school uniforms, meals, transportation, sports, repairs, maintenance and improvement, and electricity, water and conservancy. These costs were divided by total enrolment to give average variable cost.

Cost efficiency: Florina (2017) considers cost efficiency as the act of adopting money saving strategies in operation of organisations by either changing the product or process for the better. During the study, it referred to the ability of public secondary schools to reduce cost and save to achieve greater educational outputs.

Perception: Is the act of gathering signals from the environment gathered through sensory organs like nose, eyes, and ears, then organizing and interpreting them based on knowledge possessed and past experiences (Sarwar & Muhammad, 2020). During the research, it referred to the principals' views on the ability of the institutions they headed to reduce cost and save with a view of achieving greater educational outputs.

Relationship: It refers to mutual link between two or more constructs (Kiptum, 2016). It is operationalized in this study as the association between school characteristics and principals' perceptions on cost efficiency of schools, as expressed by the correlation coefficient.

School Characteristics: These refer to unique distinguishing qualities or features of a school, which include attributes such as gender composition of learners, size, type and available physical and human capital resources (MOEST, 2018). In this study, school characteristics refer to distinguishing features that makes it, which include accommodation status of students, size expressed in number of streams per class, type defined by gender composition of learners and location.

School location: Refers to the position of a learning institution in the physical environment in relation to others, usually expressed as rural, urban or peri-urban (Eugene & Ezeh, 2016). In this study, school location was categorized as urban or rural.

School Size: Refers to the ideal student population that should be optimized to achieve the intended school outcomes while striving for cost efficiency in operation (Darling-Hammond et al., 2020). It was operationalized as organization of classes in terms of one stream or more for purposes of effective teaching/learning in public secondary school.

School Type: Refers to a category given to a group of people that share particular qualities and are part of a larger group (Akareem & Hossain, 2016). In this study, this refers to categories of public secondary school as either single-sex or mixed school.

Unit costs: Refers to all the resources; physical facilities, equipment, instructional materials, human capital used to produce an educated person expressed in monetary terms (Yetiz & Ozekicioglu, 2020). In this study, it refers to the average cost incurred by both household and government on every student in public secondary school.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review and begins by giving an overview of educational management. This is followed by management of secondary schools, cost efficiency and its correlates. It then discusses the association between school characteristics and cost efficiency. This is followed by a section on perceptions and cost efficiency. The last two sections of the chapter contain the study's theoretical and conceptual frameworks.

2.2 Educational Management

Education is essential since knowledge that is attained through it helps open doors to a lot of opportunities for career growth (Hallinger & Kovacevic, 2019). It facilitates people's acquisition of knowledge and skills which are essential for social and economic development of the individual and country. Education is not just for imparting knowledge and skills but also enables those who have acquired it to be agents of change in their communities (Raghupathi & Raghupathi, 2020). It also has a positive impact on the social and economic development of societies and nations. The other roles of education include aiding people earn a living and generate wealth, take care of their health, enhance social cohesion and optimize their potentials.

Education is a human right as enshrined in the Universal Declaration of Human Rights (UDHR) report of 1948 (Brown, 2016). This declaration has been supported by various entities such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), Convention against Discrimination in Education (CDE) the International Covenant on Economic, Social and Cultural Rights (1966) and the Convention on the Elimination of All forms of Discrimination against Women (UNESCO, 2018). These treaties support development of education and measures to render it accessible to all children (Mweni, 2018). These treaties also acknowledge that education plays a key role in promoting development of the individual and humans rights and freedom. In addition, outcomes of education promote understanding, friendship and tolerance and enable individuals to actively participate in society (Alsuliman et al., 2019). It can thus be said that people require education to effectively accomplish their socio-economic obligations in life.

It is essential that citizens are provided with quality education given that it is a significant predictor of socio-economic development of nations (de Mouraa & Bispo, 2019).

Nyakan (2018) contends that quality education can only be provided if learning institutions are headed by competent administrators and managed well. Managing education or educational management is therefore central to realization of purposes and aims of education. Management has been defined as coordination of people's efforts in businesses and organizations for purposes of accomplishing some specified outcomes through efficient use of available resources (Ali & Abdalla, 2017). Resources encompass human, financial, technological and natural materials deployed and manipulated to accomplish the specified goals and objectives of a business or organization. Management is usually considered as a process since it entails creating and maintaining an environment in which employees perform given tasks in groups to achieve specified objectives (Okafor, 2014). This is achieved through creation of formal structures within the organization to support its vision, mission, objectives and drive its operations. Effective management requires competencies in utilization of human capital, public relations and delegation of authority (Hwa & Leave, 2021). Communication, decision-making, problem solving and skills in managing change are also essential for effective management. Further, effective management should be grounded on philosophies, theories, rules and regulations to guide its operations in the ever changing business environment (Valero, 2021).

Management in its expanded form comprises of five elements namely planning, organizing, coordination, directing and controlling (Rizescu et al., 2020). The first element, planning, has been defined as the act of preparing a set of tasks directed at achieving specified goals efficiently for future action (Susanto & Kumar, 2022). A plan contains the general aim and specific objectives of the organization and resources required and processes to achieve them. These goals and objectives should be comprehensive enough to cover all aspects of the organization and flexibility enough to accommodate any unexpected future challenges. According to Malik and Kharb (2014), planning is anticipatory by nature, and attempts to provide answers to what, where, by who and how. Planning can thus be considered as generation of a road map for future action and documenting what needs to be done to achieve them.

Organizing refers to the act of combining available human capital and material resources for an efficient and systematic accomplishment of given tasks leading to realisation of set objectives (Muzaqi, 2018). It entails creating hierarchies and relationships, determining span of control and division of work by specialization (Kapur, 2018). Organization thus involves describing roles and relationships that contribute to the specified goals. Work is

arranged, coordinated and directed towards organizational goals by dividing it and assigning individuals duties and responsibilities for efficient achievement of set organizational targets. Even though each worker performs different tasks, they are interlinked with those of their other colleagues. Often, the way an organization is structured is depicted in an organization chart, with job descriptions and statements of work flow (Kabiru et al., 2018).

Coordination is the management function that entails setting up relationship among various sections of an organization so that they all pull together in their endeavour to achieve the set objectives (Dessein et al., 2020). It refers to sequencing of tasks, activities and operations of an organisation by managers as a way of enhancing unity of action and achievement of set organisation aims (Vanagas & Stankev, 2014). Coordination is thus the act of synchronizing and unifying organizational resources and actions of workers with a view of improving chances of achieving set organizational targets. It is through coordination that managers ensure that an organization has all parts that move together as a functioning entity, not an assortment of separate activities. Lack of co-ordination on the other hand results in confusion amongst the workers as well as in their duties and responsibilities (Waweru, 2016).

Directing as a dimension of management focuses on ensuring that employees are guided by their leaders through work processes leading to cost effective realisation of objectives of organisations (Al-Ababneh & Alrhaimi, 2020). It is about explaining to employees what should be done and ensuring that the directive is implemented well. It involves assigning subordinates' jobs and explaining and clarifying what is to be done, guiding them in job performance and motivating workers so that they work with commitment and dedication (Mahalat, 2021). Directing thus involves communicating and motivating workers and providing leadership. It is considered a key element of the management process since it influences the action of the subordinates and ensures that they perform tasks assigned in a manner that leads to efficient implementation of plans and realisation of organisational goals (Ali & Abdalla, 2017).

Controlling is an aspect of management that in concerned with building relationships among components of an organisation as a way of ensuring that they pull together (Susanto & Kumar, 2022). It is a systematic process that involves setting standards, measuring performance and comparing it with the set standards, analysing for any deviation and taking corrective action (Beegum, 2022). Controlling can be considered as a process whereby actual performance is compared with a reference value and any significant differences noted.

Corrective actions are then put in place to address the observed differences and prevent such occurrences in the future. Controlling by its nature is a continuous process; goal oriented, is forward looking, and performed at all levels (Kavika, 2022). This function plays a key role in enhancing organisation's performance and total quality management (Pekkolay, 2021).

Educational management is a component of management that is concerned with setting up and running functional educational systems. Kavika (2022), contends that educational management is a fairly wide discipline as it aims at connecting society and education. These could be achieved by:

i. Constructing schools, colleges and related infrastructure such as water and sanitation facilities, accommodation for students, operating and maintaining them
ii. Planning and organizing for instruction, and implementing curricula.
iii. Assessing learners at various levels of education using a variety of evaluation tools and maintenance of learners' records.
iv. Maintenance of learning institutions' asset inventories.
v. Creating and maintaining a conducive school climate in learning institutions by enforcing discipline and looking after safety, health and wellbeing of both staff and students.
vi. Planning and engaging in co-curriculum activities within and outside the institutions such as sports, competitions, and shows.
vii. Mobilizing funds and preparing and implementing budgets.
viii. Organising and facilitating teachers' further education, attendance of in-service training and skill up-grading workshops/conferences.

Given the wide scope of activities, for efficiency, education managers should explain to employees who work under them what should be done and processes to follow for achievement these objectives. Further, education managers should also put in place mechanisms for ensuring employees can recognize indicators which show that task given to them have been successfully completed.

Educational management and educational administration are terms that are sometimes used interchangeably (Yeomans-Cabrera, 2022). Technically, the two terms are not similar as education administration is a dimension of education management. Education administration is concerned with efficient and effective use of human capital, financial and material resources available in institutions for the intended purposes (Inyango, 2021). Educational administration is concerned with ensuring that educational institutions operate efficiently

(Malik & Kharb, 2014). It is the responsibility of administrators to develop the goals and mission of education in their institutions, mobilize available human and material resources, create and conducive work environment and ensure that the set organizational goals are accomplished (Kabiru et al., 2018). Education administration is thus about implementation and ensuring that education systems work efficiently for realization of their aims. Effective education administration thus ensures that learners who are the main stakeholders obtain maximum benefits from it.

2.3 Management of Secondary schools Education in Kenya

Secondary school education is that level of formal training that follows primary school and precedes higher education (Behlol et al., 2019). This level of education is considered the most important stage of learning because it motivates primary school pupils to remain in school (Lessa et al., 2018). It also feed colleges and universities with trainees. Further, it provided the formal and informal sector with labour. The current system of education in Kenya is the Competence Based Curriculum (2-6-6-3) (Ndemwa & Otani, 2020). The government started replacing the 8-4-4 education system with the Competency Based Curriculum (CBC) (2-6-6-3) one in 2019. The CBC system has fewer subjects and more practical skills. This curriculum puts more emphasis on skills acquisition and technical subjects like computer studies, Home Science and agriculture so as to help students identify their career paths early enough and specialize (Muchira et al., 2023; Otukho et al., 2017).

The general objectives of secondary school education in Kenya are to equip learners with knowledge and skills thus preparing them to contribute positively to development of self and the nation (Otani & Ndemwa, 2020). Its beneficiaries are also expected to be respectful, self-reliant, patriotic and disciplined. Further, secondary school graduates are expected to advocate loyalty to the nation and promoters of peaceful coexistence of various ethnic communities in Kenya.

Effective and efficient management of secondary schools is essential given its central role in feeding colleges and universities with trainees and the world of work with labour (Chu, 2017). School management is a component of general education management. It encompasses all the activities which take pace in schools during planning, organisation and instruction (de Mouraa & Bispob, 2021). It also includes resources management, staff and students welfare issues, facilitating engagement in co-curriculum activities, creating and maintaining the link between integration between school and community. According to

Nzioka and Orodho (2014), education management in a secondary school setting is concerned with applying management principals to design, develop and used available resources to achieve some specified objectives. Education management is deemed effective based on the ability of a school to realise its objectives and meet societal expectations. The expectations include imparting knowledge, values, attitudes and skills to learners with the ultimate goal of enhancing their contributions to society (Beegum, 2022).

Education in Kenya is mainly provided by the national and county governments, and private entities (Waweru, 2016). Governments therefore play a central role in management of schools given that they are the main stakeholder. The government supports provision of education through the Ministry of Education (MoE). The ministry is headed by a cabinet secretary who is assisted by a principal secretary. At the county level, directors of education are in charge; they coordinate all education operations, and are the link between the Ministry of Education and counties. The roles of the national government in provision of education are budgetary allocation, policy formulation, supervision and regulation as well as provision of primary and secondary education (Republic of Kenya, 2023). The roles of County Governments on the other hand are provision of pre-primary education (preschool, early childhood education [ECDE]) and vocational training centers (Ndemwa & Otani, 2020).

Private secondary schools in Kenya are managed by their owners while government owned ones are managed by Boards of Management (BoM), which comprise of members, with the principal as the secretary (Wanjala, 2021). The principals, who are appointees of TSC, are also the heads of the institutions (TSC, 2011). They are thus the persons charged with the responsibility of managing schools, which include students', facilities, teachers and support staff. The deputy principal, who is also an employee of the TSC is the second in command and assists the principal in running the school (Musyoka, 2018). Secondary schools have heads of departments, who coordinate operations of departments. Schools also have Parents' Associations (PA), which contribute significantly towards management of schools by assisting in maintenance of discipline, mobilizing funds for constructing physical facilities, purchase of instructional equipment and materials (Nyakan, 2018). Prefects are part of school management since they are the link between school administrators and learners and play a key role in maintenance of students discipline (Kabugi, 2013). They are students' leaders who are elected or appointed and given responsibilities by school administrators (Tskati & Magagula, 2019). The responsibilities of prefects in a school setting include

enforcing rules and regulations, presenting student issues to school administrations for action, management of daily school routines among others (Yusuph & Abich, 2017).

School managers are tasked with shepherding institutions to achieve set goals by directing and coordinating all parties involved in provision of education (Sunaengsih et al., 2019). Principals being in charge of schools should have management skills to facilitate teaching-learning processes besides administrative responsibilities as the school head. The administrative tasks include conceptual duties such as planning, resources mobilization, controlling and deployment of staff and other resources (Hallinger & Kovacevic, 2019). The other tasks are managing human relations, policy formulation and staff development. Principals also control and direct information flow and coordinate responses to it. Effective management demands that principals perform these tasks well.

Allowing teachers to participate in management of schools is one of the indicators of effective management (Pekkolay, 2021). This calls for inclusivity, fairness, sincerity, honesty and setting up effective communication channels. Muzaqi (2018) contends that teacher motivation is also another characteristic of effective school management. Inyanga (2021) argues that it is not realistic to expect success from teachers who are demotivated. The way principals go about performing their duties and responsibilities is a measure of their competencies and a clear portrayal of their management skills. Principals should also possess abilities to manage school resources efficiently. This is essential because most schools face resource constrains with regard to teacher shortage, inadequate infrastructure and instructional materials (Hwa & Leaver, 2021). It is therefore essential practices that promote cost efficiency are adapted in schools for them to efficiently transition educational inputs into societally desired outputs.

2.4 Cost Efficiency in Secondary Schools

Most learning institutions have limited resources, coming up with strategies to meet their unlimited educational needs is one of the challenges they face (Dearden et al., 2014). Given that most schools have limited resources, it is imperative that they choose education delivery alternatives that are least costly or that have the largest impact per unit cost. This calls for cost efficiency, which is the act of changing what is being produced or processed so as to save money (Menon & Phalachandra, 2018). Cost efficiency in schools has been defined as their ability to facilitate achievement of set learning outcomes (e.g. examination results) for all students at costs that are affordable and sustainable. Cost efficiency is concerned with production of learning outcomes using inputs. It assists in the understanding the link between

inputs of production and the outcomes, by mimicking a production function. According to Care International (2021), most organisations strive to be cost efficient since doing so enable them to produce more for a given set of inputs or produce the same quantities using less resources.

Cost efficiency originated from engineering relations where a technical process is considered efficient when the desired mix of output is maximized for a given level of inputs or when inputs are minimized for a desired mix of outputs (Kosor et al., 2019). When transposed to the field of education, there seems to be no consensus on the definition and measure of cost efficiency (Barra & Zotti, 2016). Olatunji et al. (2017) consider cost efficiency as achievement realisation of stated educational goals using the least possible costs or using inputs to produce same quantity of outputs. From this definition, determination of cost efficiency thus requires availability of input and output data. However, there is no consensus on what constitute an input and output, due to the complex nature of education (Barra & Zotti, 2016; Tellis, 2017; Wirtz & Zeithaml, 2018). According to Gralka et al. (2019), inputs refer to all the resources required to manage a learning institution such as school infrastructure, instructional materials, teachers and support staff. OECD (2017) considers labour, capital and technology used in the teaching-learning process as education inputs. Educational outputs on the other hand include knowledge and skills acquired by students, performance in examinations and/or pass rates, learners attitudes, discipline and behaviour among others (Alsuliman et al., 2019).

Various methods are used to determine cost efficiency because of the controversy over what constitute education inputs and outputs (Kosor et al., 2019). Educational expenditure approach is among the methods used to determine school cost efficiency. This approach involves computing the cost of all inputs and outputs of an education system and expressing them as a ratio (Nauzeer et al., 2018). The ratio ranges between 0 and 1 when the constant returns to scale (CRS) or variables return to scale (VRS) methods are used to determine cost efficiency (Abramo et al., 2018). The nearer the ratio to zero the higher the cost efficiency (Azar et al., 2016). Roszko-Wojtowicz (2018) used the educational expenditure method to capture data on what was spent on inputs and output as measured by international PISA test results and determine cost efficiency. Agasisti et al. (2017) defines cost efficiency optimum utilisation of educational inputs to realise maximum output. Kiveu (2018) determined cost efficiency by examining expenditure incurred as secondary school students progressed from the time they joined form one to the point of exit upon completion of the four years cycle.

Most schools have limited resources, this forces them to adopt management strategies that are cost efficient (Bhowmik et al., 2018). Controlling maintenance, administrative and tuition costs and excluding activities that do not add value are among strategies adopted by schools to reduce expenditure and enhance cost efficiency (Bendlin, 2017). OECD (2017) conducted a study in Europe which confirmed that benchmarking was an effective tool for enhancing cost efficiency in institutions of higher learning. To enhance cost efficiency, OECD recommended that institutions of high learning should develop guiding policies, promote competition and come up with effective education provision monitoring strategies. Johnes et al. (2017) on the other hand, recommended lowering expenses by reducing wastage of resources.

Bold et al. (2017) assert that cost efficiency can be achieved by reducing expenditure using strategies such as bulk purchasing and improving efficiencies across all departments of a learning institution. A research carried out by Ahmad et al. (2019) showed that some of the effective methods of reducing expenditure and enhancing savings were outsourcing some services, usage of energy saving appliances, staff exchange programmes and matching enrolment with school capacity.

Bendlin (2017) investigated management of resources in universities in the United States of America. The study aimed at finding out strategies for reducing cost of managing educational processes, making universities more competitive and enhancing their growth. The results of the study showed significant reduction in maintenance, administrative and tuition costs but increase in quality of educational services offered. The study concluded that offering quality teaching at affordable costs by universities enhanced efficiency and did not affect the quality of teaching and learning. Similar observations were made by DeAngelis (2021) who noted that exclusion of activities which did not add value reduced costs of education in Universities. DeAngelis concluded that reducing expenditure in educational activities that add little value to teaching and learning improves cost efficiency of learning institutions.

Bowden and Davies (2020) contend that schools should pursue cost efficiency strategies as many of them .are facing financial challenges, which has been magnified by the COVID-19 pandemic and ever increasing inputs to education. Budget cuts by school sponsors have made matters worse. The severity of budget cuts, especially of public schools and irregular flow of funds has a significant impact on school operations and cost efficiency. This calls for solutions such as cost cutting and saving strategies. Usman's (2016) study in Nigeria underscores the essence

of improved productivity and wastage reduction through optimum utilisation of resourced for maximum outputs. Nyangia and Orodho's (2014) study in Kenya proposed various cost saving solutions that can be used by schools to enhance their cost efficiency. These are outsourcing services, setting up income generating, optimum utilisation of available labour.

Many schools have adopted cost efficiency strategies, however, majority have not been successful in reducing cost and saving. Azar and Dufrechou's (2017) study in Latin America found that the huge spending on teachers' motivation and supervision of learning activities was not commensurate to cost efficiency. Quite a number of countries in Europe, which include Finland, Switzerland, Spain, and Portugal have already adopted strategies which aims at minimizing costs of education in higher learning institutions (Pordata, 2016). Literature on cost efficiency in education in Asia allude that higher education is expensive (Akareem & Hossain, 2016; Wong & Deng, 2016). The scholars noted that mobilising resources to fund the ever increasing school enrollment has placed significant strain on both governments and higher education institutions across many countries in Asia.

Iwedi et al. (2018) study carried out in Nigeria established that cost efficiency of most schools were low. It noted that majority of school managers were aware of strategies that can be used to enhance cost efficiency. However, only a few of these managers apply them to address cost efficiency challenges in their institutions. This behaviour was attributed to lack of motivation, funds and cooperation among staff. Iwedi et al. recommended that these school administrators be facilitated, through training, to acquire requisite competencies in cost efficient management of learning institutions.

Kolawole and Ogbiye (2020) examined cost efficiency in schools with regard to utilisation of physical resources in the production of graduates. The study found that most schools were not cost efficient. This observation was attributed to high repetition and dropout rates experienced in schools that led to wastage. A study in Cameroon identified shortage of staff, limited physical facilities and instructional materials as challenges which impacts negatively on cost efficiency of schools (Ensongo's, 2017). The study noted that instructors rarely utilized available technical resources, such as computers, to improve cost efficiency in their schools. Mbiti's et al. (2019) conducted a study in Tanzania which examined the impact of physical facilities, curriculum, teacher incentive and class sizes on learning outcomes. The findings of the study showed cost efficiency was low since increasing expenditure in education did not lead to a significant improvement on learning outcomes.

A study by Nauzeer et al. (2018) conducted in Mauritius showed that cost efficiency of schools ranged between 0 to 1 and averaged 0.872 when the CRS method was used and 0.909 on a variable return scale (VRS) using Tobit model. The study concluded that cost efficiency of secondary schools was low. Mwikya et al. (2019) examined cost efficiency with regard to what is spend on a learner to transition from primary to secondary school education level in Kenya. The results indicated the money allocated to each learner could not cater for their needs and was often not disbursed in time. This was a major impediment to ability of schools to offer educational services to learners efficiently. A study by Kiveu (2018) noted that secondary schools in Kenya face cost inefficiencies due to unaffordability of the cost of education by parents. Other causes of cost inefficiency identified by the study were low primary to secondary school transition rates and high dropout rates at both levels of education. Further, inefficiencies were experienced in schools due to poor payment of school fees, pregnancies and disciplinary issues.

Studies show that many public schools in Kenya, including those in Bomet are inefficient in their use of educational resources (Chepkwony et al., 2020; Chirchiret al, 2019; Kitur et al, 2020; Koriyow, 2017; Kosgei et al., 2017; Kosgei et al., 2018). Ministry of Education (2018) records at Bomet County Education Office show inefficiencies in schools as evidenced by difference between average expected unit cost and actual expenditure incurred between the years 2014 and 2017. The records show difference is variance efficiency, which is the difference between hypothetical value of inputs required to produce a single unit of output and actual value of one output unit (Flores, 2017; Messer, 2016). Despite the cost inefficiencies experienced in schools there is dearth in literature on possible causes and influencing factors. The current study was carried out to address this gap.

2.5 Correlates of Cost Efficiency in secondary schools

Studies have associated cost efficiency in schools with many factors (Pekkolay, 2021; Sunaengsih et al., 2019). Training and experience have been cited as one of the factors related to ability of principals to run schools cost efficiently. Nyakan (2018) contends that principals training in school management enhances their skills and enables them perform their administrative tasks cost efficiently. Menon and Phalachandra (2018) is of the view that school managers require high management competencies to run institutions cost efficiently because it assists school managers reduce costs, save by changing services offered to learners and school process. They argue that training and experience equips school managers with

technical skills to adopt and implement strategies that reduce costs and enhance savings and realize the set learning outcomes.

Ndolo et al. (2016) conducted a study on influence of free secondary school policy on cost of managing schools in Suba and Mbita, Kenya. It noted that the policy was significant predictors of cost of managing schools. There was a significant increase in enrolment in government owned school due to the policy, without corresponding increase in capitation from the government. As a result, resources in large and small schools were overstretched leading to ineffective instructional process.

Principals' financial management skills have also been associated with cost efficient management of schools (Ithibutu, 2017). Bibi et al. (2019) defines financial management as the art of mobilising financial resources, using them prudently, reducing losses and increasing profit margins. These skills include financial records keeping and complying with the various existing financial management policies formulated by the government. Damka et al. (2021) contend that school principals should possess financial management skills such as financial mobilisation, budget preparation and implementation and auditing. Such competencies enable school administrators optimize utilisation of available resources, adopt cost cutting procurement strategies, and maintain accurate and up to date assets records. This leads to reduced wastage, savings and enhanced cost efficiency in schools.

However, studies show that most school heads do not possess these skills. A study in Zambia by Katungu (2016) observed financial management challenges in schools as evidenced by poor financial resources mobilization skills and wastage of resources through funds diversion from intended purposes. Odigwe's (2020) study in Nigeria also noted that school managers did not have the competencies to mobilize and utilize resources efficiently.

Echazarra and Radinger (2019) examined learning in rural schools in European Union countries found that practices in rural schools such as teaching techniques, assessments, arrangement of space and time, and use of appropriate instructional materials affected development of efficient learning environments. The study concluded that issues shaping cost efficiency in rural schools include teaching and learning environment, financial and material resources, school programmes, student specialized support and after school activities, adequate staffing of schools with trained teachers, teachers' preparation, learning and support, school leadership, school community relation, and communication and technology.

Evidence in literature reveal that cost efficiency in schools has been associated with principals' commitment to work (Estigoy & Sulasula, 2020). This relationship is attributed to

the fact that committed principals demonstrate stronger affiliations to their schools, are dedicated, diligent, and cognizant of the fact that achievement of institutions' objectives depends on them and perform their responsibilities effectively. Motivation has also been cited a correlate of adoption of cost efficiency practices in learning institution (OECD, 2014). Motivation refers to the desire for something and the drive to continuously pursue that desire (Rapiudin, 2019). It can be considered as internal processes within the individual that triggers and steers human behaviour (Tokan & Imakulata, 2019). Motivation does not only influence the desire to do something but also impacts on the behaviour of the learner.

Availability of funds has also been associated with cost efficient operation of learning institutions (Gavurova et al., 2017). Gavurova et al. argue that availability of adequate funds that can be accessed whenever required enable school administrators to plan, budget and use cost saving measures such as bulk purchasing. School characteristics have also been associated with cost efficiency of secondary schools (Kwarikunda et al., 2020).

2.6 School Characteristics and Cost Efficiency

Studies show that school characteristics affect inputs and outputs of education and expenditure per students in learning institutions (Egalite & Kisida, 2016; Kareem et al., 2019; Van Hek et al., 2018). School characteristics can be considered as the features and conditions in a learning institution (Ching et al., 2015). These include location, gender composition of learners, students' accommodation status, policies, rules and regulations, physical facilities, instructional materials, teaching-learning processes and co-curriculum activities, social environment and students' population. School characteristics affect cost efficiency because they influence education inputs and outcomes. Gavurova et al. (2017) demonstrated that the amounts spent in education depended on population of a school, enrolment, staff salaries planning organizing and content delivery. These features are unique to each learning institution and affect inputs of education and expenditure on them, and outputs and cost efficiency.

The link between school characteristics has been observed by several scholars. Gatama et al. (2023) noted cost inefficiency in resource usage in secondary schools, as an observation that was attributed to poor principals' instructional leadership leading to inefficient use of school resources. Lack of effective leadership in a school can thus be considered as its characteristics. Lee et al. (2018) study carried out in the USA, Japan, South Korea and Taiwan using school characteristics, parental involvement and resources as inputs and

students' behaviour as output; found that these factors significantly influenced the outcome in the East Asian countries. The results also revealed that school size did not predict school students' behaviour in USA. The results further revealed that learners in both mixed and single sex institutions showed less attachment to the schools, thus, influencing their behaviours in USA and East Asian schools.

2.6.1 Accommodation status of students and schools' Cost Efficiency

Accommodation status of students refers to whether students are provided with boarding facilities, are day scholars or some board while others are day scholars in learning institutions (Opiyo, 2019). The boarding facilities may be within or off the school compound and include rooms, meals, bedding, water and sanitation and recreation facilities. Accommodation status of students in schools are categorised as boarding, day, and boarding and day (Mbunde, 2018). Majority of schools in America, Europe, Asia, Africa, and Kenya are day schools (Mtani & Nuhu, 2019).

Studies have indicated that accommodation status of schools affected their cost efficiency since boarding institutions post better examination results than their day counterparts (Chiguvi & Ndoma, 2018; Zotorvie, 2017). Behaghel et al. (2017) examined the effects of availability of boarding facilities to learners on their academic achievement in France. The results indicated that cost per student in institutions which offer accommodation was twice as high as that in day schools. The high cost per student in boarding schools was attributed to accommodation inputs and staff salaries. The inquiry also established that students provided with accommodation benefited from small size classes, had more time to study, interacted frequently with their instructors and were less exposed to disruptions. This resulted to boarding school students performing better in examinations than their colleagues who are day scholars. The study attributed the high performance to support given to learners by the teachers after official school hours, a study environment which motivates students, and studying together with peers after classes. It concluded that even though providing accommodation to students had cost implications, it enhanced their academic performance.

Clark and Bono's (2016) study revealed that boarding schools in the United Kingdom posted better examination results, which they attributed to involvement in their children education and support. Parents with students in boarding schools frequently visit them, monitor their progress more frequently and give them support whenever necessary. This motivates them to learn and perform well in their examinations. Hendrayana et al. (2019)

who found that cost saving was in schools that provided students with accommodation in Indonesia. Such institutions tend to employ cost cutting strategies and produce higher educational outputs.

Commuting is an aspect of day schools and involves students traveling to school and back to their places of residence (Opiyo, 2019). This aspect of day schools is among inputs of education that has been associated to school cost efficiency, given that it influences performance and outcome of education. A study in Brazil by Tigre et al (2017) that examined the influence of commuting on students' academic achievement established that it impacted negatively on the outcome, thus affecting efficiency of schools. The findings were attributed to prohibitive commuting costs, time spent on roads by students travelling from home to school and back, and day scholars limited access to learning resources available in schools. These observations are in harmony with those of Mutegi and Muriithi (2017) that identified distance from home to school and cost of transport as factors which affected cost efficiency of schools in Kenya. Mutegi and Muriithi recommended construction of more day schools near students' homes to mitigate the prohibitive commuting cost and enhance efficiency by lowering the cost of transport from home to school.

Provision of boarding facilities to students is considered as an essential input component of learning institutions as it provides students with ideal environments for learning (Ndungu, 2015). Kolawole and Boluwatife (2016) assessed factors influencing students' choice of accommodation in Nigeria and noted that its availability enabled learning institutions to attract large numbers of students, thus enjoying economies of scale. The study observed that when learning institutions provided good accommodation, it attracted large numbers of students, hence lowering the per student costs. The authors however, noted that increase in students' enrolment which overstretched existing boarding facilities caused overcrowding and led to increase in unit costs. The research proposed that school administrators should allocate more resources' to accommodation in order to reduce prohibitive commuting costs associated with day schools and also use available resources optimally. Githaka et al. (2019) contend that such practices would assist in reducing cost of operations, enhance saving and boost the ability of school managers to achieve set educational outcomes such as achievement in examinations.

Maina and Aji (2017) investigated the effects of accommodation on students' academic achievement in higher education in Nigeria. The study established that accommodation significantly influenced students' achievement in tests and examinations.

The good performance of students provided with accommodation was attributed to provision of basic amenities like clean rooms that were not crowded, electricity and adequate water supply. The study also showed that students who resided within educational institutions performed better than day scholars in academics. This study provided evidence that inputs such as accommodation facilities, which are comfortable and meets the needs of learners affect academic achievement, which is one of the key outputs of education. However, lack of or poor accommodation conditions impacts negatively on performance. This was confirmed by Chiguvi and Ndoma (2018) in Botswana and Zotorvie (2017) in Ghana which showed that accommodation in tiny and poorly ventilated rooms, noisy environments, lack of study area, high accommodation fees and erratic electricity supply affected academic performance.

Makewa (2015) analysed boarding schools in relation to academic achievement in Tanzania. The study observed that boarding schools enhanced achievement as they provided students with an ideal learning environment with regard to a friendly climate, clean accommodation, regular meals, caring and committed teachers. Similar observations were made by Baguma (2018) whose findings indicated that boarding schools in western Uganda saw improved academic performance because learners had more time to study while staying on school grounds under the supervision of teachers. However, both Makewa and Baguma noted that offering boarding facilities and maintaining teachers to supervise students who reside within the learning institutions increased per student costs significantly.

Mbunde (2018) adopted utilization of school resources approach to analyze costs of maintaining students in boarding schools. The study found that by implementing cost saving strategies, the financial resources spent on capital and recurring expenses in Kenyan boarding schools could instead be used to double enrolment in day schools. These strategies included making school farms self-sustaining, routine upkeep of school infrastructure, removal of outdated equipment, bulk purchasing of supplies, and opting for affordable transportation and communication methods. Other strategies identified were allowing students to carry out specified manual work, adopting study programs that enhanced cost saving, harvesting rainwater, multitasking staff, hiring out school resources and using energy-saving bulbs. The study also observed that sharing of resources among schools, rationalization of unit cost per student, accountability and transparency and a rational mixture of both day and boarding schools optimized costs of learning. Mbunde's findings imply that having a blend of day and boarding status in a school enables institution managers to adopt cost saving strategies and enhance cost efficiency. They are in tandem with Hendrayana et al. (2019) assertion that it is

possible to boost saving by employing cost-cutting strategies in schools and produce higher educational outputs.

Kosgei et al. (2018) carried out an investigation on trade-offs between access and efficiency in day and boarding schools in Kenya. The results revealed that despite costs associated with boarding schools, they generally had good learning facilities, received more professional and supervisory support. Students in boarding schools also had more time for studies and performed better in academics due to availability of learning facilities, support and guidance of teachers and time for private studies. The study also revealed that daily commuting to school by students who are day scholars and live with their parents had negative effects on their academic performance. The study concluded that day schools were more inefficient than boarding schools as indicated by significant difference in students' academic performance in favour of boarders. The findings are consistent with those of Makewa (2015) who showed that boarding secondary schools exhibit higher efficiency levels in Tanzania.

Ngetich et al. (2018) assessed the influence of unit cost on students' academic performance in day and boarding secondary schools in Nandi County in Kenya. The authors noted that rising costs of education, inappropriate allocation of resources, poor management of financial resources and poor academic performance escalated the unit costs in public day and boarding secondary schools. These results confirmed that the substantial amount of financial resources committed to public secondary schools by the various stakeholders did not lead to improvements in cost efficiency. The study recommended adoption of cost saving strategies and need to prioritize expenditure in the acquisition of teaching and learning resources in schools in order to enhance efficiency.

Mutegi and Muriithi (2017) examined policies related to unit cost of secondary school students in Kenya. The results revealed that high unit costs in boarding and day secondary schools was due to pocket money, motivational tokens, remedial, boarding and development fees and other levies. The results also revealed that day school students spend more money on transportation than their boarding school peers. The results further revealed that cost of commuting, which is dictated by the distance a student has to cover between homestead and school, was an important predictor of cost efficiency levels in day secondary schools. The study concluded that the financial support allocated per student to public secondary schools by the government is not enough to meet the expenses required for their schooling, for instance, resources like textbooks, facilities, teacher salaries, and other educational materials

and services. Consequently, schools required parents to cover extra costs such as motivation, boarding, and building fees along with other payments. These financial constrains faced by schools often lead to cost inefficiency since managers of the institutions cannot operate within their budgets. The study recommended allocations of more fund to schools by the government to alleviate the financial impacts on parents caused by additional charges imposed on their children.

A study by Wasike (2020) examined the impact of school development levies, lunch programmes and provision of uniforms and other basic requirements to students and academic achievement. The findings show that parents could not afford the expenses related to school development, such as providing lunch, uniforms, and other essential needs for students, making schools expensive. Additionally, the study found that boarding schools offered students more time to concentrate on their studies compared to day schools. The study also found that poor performance, which impacts negatively on cost efficiency, was due to the fact that students did not take academic work seriously in both boarding and day secondary schools. The findings imply that accommodation status of students is not a determinant of cost efficiency if academic performance is used as the education output. The study suggested that the government intervene by offering free or subsidized lunch programmes, uniforms and textbooks, while also increasing allocations per student to schools. The results are similar to those of Wambugu and Mokoena (2017) whose findings showed that high cost of operating day and boarding schools compel school management to send students home frequently to collect school fees in Limuru Sub County in Kenya. This led to time wastage, promoted dropouts and repetitions and make school operations inefficient.

Wastage in the form of dropouts and repetition has also been associated with increase in cost of education. Orwasa and Orodho (2018) conducted a study on wastage in public day secondary schools in Kericho County, Kenya. They discovered that factors such as child labour, absenteeism; peer pressure and lack of parental involvement in school development projects contributed to wastage and impeded the achievement of efficiency. The study suggested that parents, communities, leaders and education stakeholders be encouraged to support children in their pursuit of education. Additionally, the study recommended that Board of Management of schools should put in place mechanisms of cushioning those who have challenges paying school fees and potential dropouts, as one of the strategies of enhancing both internal and cost efficiencies. Musangi et al. (2017) also noted high wastage

rates, in form of dropouts and repetition, in public secondary schools in Machakos County despite the subsidies provided to learners by the government. Wastage impacts negatively on cost efficiency since when students drop out of school and repeat classes, their learning is affected, human capital available in schools in the form of teachers and non- teaching staff and school facilities are under-utilized.

Safety of students, staff and school facilities is essential for effective teaching and learning (Maobe et al., 2019). Gituru (2018) used safety, teaching and learning to analyze efficiency of day, boarding and day and boarding schools in Nairobi and Nyeri counties. The study found that public secondary schools were adversely affected by insecurity. School physical infrastructure was not secure because the doors and windows did not conform to safety standards set by the government. In addition, the results indicated that meaningful instructional processes in schools were highly influenced by the school safety. The study recommended that the government enforce compliance with the safety manual for schools, and re-structure teacher training curriculum to include emerging safety issues. In addition, the study recommended increased investment in resource allocation to enable schools comply with the safety guidelines provided by the ministry of education, particularly on physical facilities and social surroundings as these create the power to have important effects on cost efficiency of the schools. Nyabuti (2018) agrees with these proposals by asserting that safety in schools is essential as it provides learners with opportunities to exploit their full potential to grow and develop.

Mwangi and Muturi (2018) investigated the influence of educational subsidies on efficiency of public day secondary schools in Kitui County in Kenya, as measured by completion rates. They established that funds allocated to each student for the whole year were inadequate and documents needed to track the impact of school expenditure, which are essential for computing cost efficiency, were missing. The analysis also found that materials for teaching and learning were insufficient. The study concluded that increased funding of day secondary schools improved retention rates and lowered dropout rates. The study recommended that the government should increase funds to public day secondary schools in order to enhance completion rates. The study also recommended that school management should enhance record keeping given that such documents are essential for computing and monitoring cost efficiency in schools. Öborn et al. (2017) concurs with these recommendations by arguing that well-kept records are essential for effective management of schools.

Mwikya et al. (2020) explored the relationship between school fees as input and transition rates as the education outcome in Machakos County, Kenya. The study established that increased school funding by the government through the Free Day Secondary Education programme had increased enrolment and transition rates and lowered dropout rates of students in public day secondary schools. The authors noted that the secondary school cycle still faced several obstacles, including high dropout rates for learners. In addition, the study observed that the failure to pay school fees due to poverty was one of the continually recurring causes of dropouts in secondary school education. The study suggested increment in the amount allocated per child by the government. The study further recommended that the government should remove additional burdens from the parents by eliminating some of the levies imposed on parents. The results agree with Öborn et al. (2017) who found that the tuition waiver had a positive impact on cost efficiency of day secondary schools. Tuition waiver notwithstanding, parents were still expected to meet other requirements such as construction of physical facilities, lunch and transportation for their children who are day scholars and boarding fees for those students in boarding schools.

Ngure and Karuru (2017) examined the link between accommodation status of secondary school students and provision of education in Kenya. The findings of the study indicated that day schools were considered cheaper and draw more students than those with boarding facilities. Day schools offered basic requirements in the provision of education such as teachers, instructional materials and classrooms at lesser costs. The findings also indicated ineffective use of resources in boarding and day schools. The study recommended optimal utilization of available resources as a solution for addressing cost inefficiency. The recommendations are in tandem to Usman's (2016) contention that maximum utilization of educational resources in secondary schools could mitigate cost inefficiency and enhance realization of educational goals and objectives. Schools should therefore consider adopting these cost efficiency strategies given that most of them face financial challenges as well as discrepancies in distribution of basic resources required for running learning institutions.

The foregoing discussions have shown that there is a link between accommodation status of students and cost efficiency. However, there were contradictions in the findings of the studies discussed. Mukewa (2015) and Baguma (2018) established that boarding schools tended to be more efficient while Ngetich et al. (2018) was of the view that day schools, if managed well were more cost efficient as they did not levy boarding fees and attendant accommodation expenses. However, Mutegi and Muriithi (2017) and Wasike (2020) were of

the opinion that cost efficiency of both day and boarding schools were unsatisfactory. These contradictory results call for further investigations. Further, even though the studies reviewed were on cost efficiency, they did focus on selected school characteristics and were not conducted in public secondary schools in Bomet County. This literature gap was one of the motivators of the current study.

2.6.2 School Size and Cost efficiency

Extant literature shows that school size is associated to cost efficiency to a large extent. School size refers not only to the land and physical infrastructures of a learning institution but also the number of staff and students enrolled (Agasisti et al., 2016). School size is often expressed in terms of student numbers in an institution or number of streams, which is the number of classes for each given year of study (Owuor, 2020). Antoniou et al. (2024) study which utilizing data from over 21,000 schools across 80 countries, revealed critical thresholds at a school size of 801 students and a class size of 27 students. Beyond these points, size increases were associated with unpredictability and decreased school readiness to execute its mandate of providing education efficiently.

Data from the Ministry of Education (2022) show that the sizes of publics schools in Kenya have been fluctuating over the last couple of years. The average size of public schools when expressed in terms of numbers of enrolled student for the years 2017, 2018, 2019, and 2020 were 342, 321, 341 and 374 respectively. The data also shows that school size fluctuations were observed in private schools during that period. The average size of private schools for the years 2017, 2018, 2019, and 2020 were 142, 137, 141 and 130. When a school size is expressed in terms of classes (streams), the recommended size of a regular class in public secondary schools is 40 learners (Ministry of Education, 2007). However, studies show that often classes in most public schools have far more that the recommended 40 learners (Ndethiu et al., 2017). The number of students in some of these classes range between 50 and 65. According to Gray-Lobe et al. (2022), Class size in Kenyan public secondary schools is generally in the range of 40-59 students per class.

School size has been cited as one of the determinants of cost efficiency because the number of enrolled students affects inputs required in provision of education and management of learning institutions, as evidenced in various studies (Turner et al., 2019). School size is an important factor in determining resource requirements, allocation and utilization. Schools with higher enrolment enjoy economies of scale in operations, while

those with lower enrolment stretch their operational resources, often leading to cost inefficiencies (Johnes et al., 2017). Many different arguments have been offered as to why school size affect cost efficiency. One of them is attainment as measured by examination results, larger schools appear to do better up to some optimal school size. It is argued that larger schools are able to offer wider curricular and extra-curricular opportunities and a concomitant increase in teacher specialization (Newman et al, 2006). Against this, it is argued that smaller schools are able to offer a more personalised learning environment and that this facilitates greater interaction and participation by students and teachers in the teaching-learning process leading to good performance.

Grosskopf et al. (2016) revealed that reducing sizes of classes resulted in higher operational costs and technical efficiency. However, allocative efficiency of schools decreased with increase in size due to work overload on teachers and pressure on facilities. As a result, there was no significant relationship between school size and cost efficiency. That being the case, it means that class size reduction is not a strategy that can be used to enhance cost efficiency in schools even though it enhances technical efficiency and realization of set educational outcomes. Besides, most governments face financial difficulties of meeting the demands for secondary school education and therefore may not recommend reducing class size that attracts additional expenditure in the form of more physical facilities, instructional materials, teaching and support staff cost at the expense of cost efficiency (Mathis et al., 2016).

A study by Mucharreira et al. (2019) on the financial implications of reducing class sizes in Portugal revealed that the primary obstacle for public schools was funding. The study found that lowering the number of students per class demanded increased financial resources, posing a challenge for schools. Fewer students per class meant more classes were needed leading to additional costs for facilities, equipment, and the hiring of more teachers, administrators and support staff. Reducing class sizes in secondary schools also meant increasing per student expenses to cater for the needed additional facilities and personnel. However, decreasing the number of students per class enhanced effective teaching and learning and performance. The study concluded that small class sizes were efficient in producing academic results. Thng (2017) was also of the view that class size reduction had more economic benefits that outweigh related costs, given it enhances chances or realizing the aims and goals of education.

Richards (2017) observed that school size significantly influenced cost efficiency of learning institutions. This observation was attributed to economies of scale which led to a reduction of unit cost and running of schools. Similarly, Ekaette et al. (2020) also linked the school size to the cost efficiency through the mediating influence of the economies of scale. Ekaette et al. noted that the large size schools in the United States of America, enjoyed economies of scale, which led to reduction of cost per head in service provision.

A research conducted by Isuku (2016) found that aspects of school size such as enrolment, average number of students in a class and student-teacher ratio influenced recurring unit costs of public secondary schools in Nigeria. The study observed that high recurrent unit costs were due to insufficient and relatively declining funding compounded by the inefficient use of limited resources. It was also observed that optimizing enrolment, class size and student teacher ratio significantly reduced costs. The study concluded that increase in size significantly boosted cost savings that led to a decrease in unit cost of education. Mbunde (2018) also noted that raising the school size, as measured by students' numbers, to the optimal level generated savings, which compensated for the limited capitation given to schools by governments. The implication is that optimal enrolment levels, average class size and student teacher ratio and savings enhance cost efficiency.

Crouch et al. (2020) investigated cost efficiency of schools in Uganda and identified over-enrolment, repetition, and dropouts as major challenges. The high enrolment caused deficiencies in teaching and learning facilities and classrooms, cases of over worked teachers and over-aged learners were also noted. Age is closely associated to students' repetition and dropouts and waste since the older ones tend not to complete their education (Kabay, 2019). These challenges adversely affected efficiency of schools. The study suggested that the government should put more investment on learning infrastructure to synchronise students' enrolment levels as this would alleviate the challenges related to repetition and dropouts and reduce wastage. The study also proposed that mechanisms for managing entry of over-aged learners in schools and their progression be put in place.

A study conducted by Ndethiu et al. (2017) examined the association between class sizes and provision of education. The results of the study showed that large classes, which generally fall between 40 and 59 students, negatively affected teaching and learning due to heavy workload of teachers in terms of marking. The study also showed that students in large classes were not given individual attention, teaching and learning resources were inadequate and the pedagogical approaches used were inappropriate. The authors observed that effective

management of large classes had cost implications such as recruiting more qualified teachers, decreasing class sizes and the number of lessons per teacher, incorporating ICT into teaching and learning, and availing the requisite instructional resources. However, most schools did not have funds to engage in such ventures. The study concluded that schools with large classes were not cost effective since objectives of education were not realized due to inadequate resources. Similar views that large class sizes were an impediment to attaining classroom efficiency were also expressed by Wadesango et al. (2016).

Ngure and Karuru (2017) conducted a study in Nairobi County in Kenya that investigated strategies on cost efficiency in secondary schools. The study found that single stream schools were linked to inefficient resource use. This conclusion was based on the observation that the number of streams reflected the student enrolment, and schools with multiple streams could handle more students without straining their resources. The study suggested that having at least two or three streams would enable more efficient use of schools' resources. Expanding the number of streams in a school could also help reduce high per student costs by better utilizing existing resources. The development of more streams in a school could be a solution to high per student expenses using existing resources. However, these results contradict Simiyu's (2016) observation in Bungoma that expansion of secondary schools to three streams per class was limited due to an acute shortage of teachers. Increasing the number of streams compelled the government to hire more teachers at a cost, so as to be in line with the set students-teacher ratio.

Results of a study conducted in Mbita and Suba sub counties in Kenya revealed that free secondary education policy had a significant influence on the cost of running schools (Ndolo et al., 2016). This is so because enrolment drastically increased due to the policy, without corresponding increase in capitation from the government. As a result, resources in large and small schools were overstretched leading to ineffective teaching and learning. The study recommended that the government should increase capitation by 100 percent, hire more teachers, develop infrastructural facilities and where possible merge small sized and medium sized schools. Merging small and medium size schools, enables them to attract more students, expand and maximize cost efficiency. Simiyu (2016) supports these recommendations by advocating for expansion of public secondary schools in Kenya to three streams per class and corresponding increase in financial resources, teachers, facilities and teaching materials. However, Simiyu cautions that the additional resources increase cost of education, which must be justified by attaining optimal cost efficiency.

Kyambi (2019) to investigate the effect of pupil-teacher ratio on curriculum implementation practices in public primary schools in Kenya. The study noted that the over enrolment and high student teacher ratio were a common phenomenon in the majority of schools. The study established that pupil teacher ratio had statistically significant influence on teachers' workload, teachers' lesson attendance, the rate of formative evaluation and supervision and students. The study concluded that schools had a higher pupil to teacher ratio that substantially influenced academic performance and cost efficiency adversely. The study recommended that Teachers Service Commission and Board of Management of schools should hire more teachers. Ndethiu et al. (2017) also opined that teachers' professional development, workload reduction and increased resources were a panacea for mitigating inefficiencies characterizing large class sizes in large schools.

The foregoing discussions have highlighted various dimensions of school size such as number of students, streams, teacher-students ratio, and how they relate with efficiency in schools. Grosskopf et al. (2016) focused on class size reduction and technical and allocative efficiency. Isuku's (2016) study in Nigeria was on aspects of school size such as enrolment, average number of students in a class, students-teacher ratio and recurring unit costs. Crouch et al. (2020) study was on over-enrolment, repetition and dropouts and cost efficiency in Uganda. The findings of these studies gave mixed results, for instance scholars like Mathias et al. (2016) found that school size was a significant correlate of cost efficiency. However, the findings by Ndethiu et al. (2017) showed that cost efficiency was not related to school size but other factors such as leadership, teacher professional development, workload rationalization and availability of resources. There was need for further investigation given that these studies yielded mixed results. In addition, none of these studies examined the association between school size and cost efficiency from school principals' perspective. Further, none of the reviewed study were conducted among secondary schools in Bomet County, hence the need for this study.

2.6.3 School Type and Cost efficiency

There is evidence in literature that school type is a significant predictor of cost efficiency (Dustman, 2017). Gender composition of learners is what is sometimes used to classify schools into types (MOEST, 2018). The population of a school may comprise of males only, females only or a combination of both. An institution with only female or male learners is categorized as single sex schools while those with male and female students are referred to as mixed sex schools.

Studies on type of secondary schools have mainly focused on bullying and exclusion with little attention to cost reduction and saving and per student expenditure (Rani & Panda, 2017). However, it is important to note that bullying and exclusion are linked to cost efficiency since they affect operations of schools. A study by Dytham (2018) examined cross-gender bullying and found that girls teased, bullied and intimidated fellow students, both verbally and physically in mixed sex secondary schools in England. The study noted that the unbecoming behaviour of the students cost money and considerable teachers' time at the expense of academic activities. The disruptions affected teaching and learning, and lowered academic performance, which is a precursor to lose of financial resources invested in education. Jenkins and Ueno (2017) also observed that disruptions in classrooms undermined the quality of teaching and learning, and at times caused the destruction of costly learning facilities. The findings of these studies confirm that students' behaviour, whether male or female has cost implications. It is imperative that school administrators put in place mechanisms that minimize such unbecoming behaviour of students.

Garcia and Donoso-Vázquez (2016) carried out a comparative analysis of achievement between mixed and single-sex schools in Spain. Even though the study did not directly explore the link between school type and cost efficiency, it had inputs and outputs. The study inputs were gender composition of schools and teaching practices while the outputs were self- concept and performance. The study found that girls in single sex schools had a significantly higher achievement and mathematics self-concept than students in other school types. These results suggested that school type affects cost efficiency given the statistically significant relationship that was observed between the inputs and outputs of the study. It would therefore be prudent to preserve existing single sex schools and even encourage their development in areas where such institutions do not exist because of the positive influence on learning outcomes.

Karibo (2016) analyzed the impact of school type on test scores in Trinidad and Tobago. The results showed that there was cost advantages associated with providing education to a more homogeneous (single sex) students' population. The study attributed the findings to teachers spending less time preparing lessons for a single audience instead of two distinct audiences as in the case of mixed sex schools. The results also showed high costs in adopting mixed teaching strategies that favour boys and girls in mixed sex schools. The results further showed that mixed sex schools performed poorly in test scores owing to inability of the schools to provide individualized attention to students of both sexes. The

study concluded that provision of education through single sex schools was a low-cost way of improving students' performance. These findings resonate with those of a study in Jamaica by Spencer-Ernandez and George (2016) which examined students' academic performance across school type. They noted that teaching single sex classes was cost effective because it only required instructional materials and adoption of pedagogical methods that meet the needs of students were either male or female. They also noted that single sex schools had higher pass rates than mixed sex ones.

Spencer-Ernandez and George's (2016) study examined academic performance across school type in secondary schools in Jamaica. The results showed that single sex schools had lower wastage and higher pass rates than co-educational institutions. Provision of education in single sex institutions was cost effective because it required resources and a school climate for either boys or girls. The study concluded that school type affected cost efficiency since single sex institutions tended to be more cost efficient. McCarey (2017) noted that single sex secondary schools were more cost efficient than coeducational schools. Single sex schools are more cost efficient along measures of students' personal and academic outcomes to peer effects, decreased classrooms distractions, increases in female role models and reductions of stereotype threats than coeducational schools.

Research shows that gender segregation in education in the form of single sex and mixed sex schooling has been institutionalized as a way of enhancing learning and students' social development (Dytham, 2018). Wong et al. (2018) investigated the influence of school type on students' personal outcomes in China. The outcomes were social interactions, peer effects and mental health of the learners. The study found that students of single sex schools were more aware and sensitive to gender issues, anxious when in mixed gender situations and had fewer other gender friends. The study also found that students in mixed sex schools required more support as they were less confident and more stressed with social issues of life such as relationships. These results suggest that school type affects cost efficiency since giving support to learners in mixed sex schools has cost implications.

Schools have guidance and counselling needs which dependent on the gender of learners (Chirwa et al., 2016). These difference in guidance and counselling needs by gender have cost implications. For example, issues such as defilement, early marriages and negative cultural practices, affect the girl child more than the boy child. Female students require protection against sexual violence and discipline related challenges which manifest themselves differently with respect to gender. Further, students in mixed sex schools tend to

exhibit anti-social behaviours which necessitate use of expensive interventions which come with costs (John et al., 2020).

Ozuome et al. (2020) investigated the influence of mixed sex institutions on academic performance of secondary school students in Nigeria. The study indicated that girls did not have equal opportunities as boys in developing the potentials in mixed sex schools. There was also a tendency in mixed sex schools to exert pressure on boys to outshine the girls in academic achievement. The results of the study indicated that classroom interactions between student and student, teacher and student influenced academic performance. The results further indicated that single sex schools; whether boys only or girls only, performed better than mixed sex ones. These results suggest that single sex schools are more cost efficient given that they perform better in examinations. Dustman's (2017) study in South Korea also yielded similar results as it established that students from single-sex schools outperformed those from mixed sex schools. The study attributed the difference in performance by school type on the disruptive behaviour of students in mixed sex schools. The findings were also attributed to presence of girls in mixed sex schools, which distracted boys from engaging in academic activities, even if they were not in the same cohort with the females.

The gender composition of students in schools influences the variety of issues that the school management must address, along with the necessary resources. In girls' schools, challenges such as teenage pregnancies and cultural factors contributing to the likelihood of girls dropping out are highlighted by various scholars, including Preez et al. (2019) in South Africa, Ossai et al. (2020) in Nigeria, and Sagnia et al. (2020) in Gambia, amongst others. Additionally, safety and discipline concerns differ based on gender resulting in varying administrative costs for schools.

Cost of education and efficiency of schools may differ by learning institution type due to gender specific needs of students (Wong et al., 2018). Similar sentiments were expressed by Mutegi and Muriithi (2017) who analyzed unit cost differentials by school type in Eastern Kenya. The results of the study revealed that the unit cost for expenses like uniforms, pocket money, transportation, incentives and boarding fees was higher for girls compared to boys. This indicates that girls' schools are more likely to face challenges in achieving cost efficiency than boys' schools. The research also found that some girls left school due to pregnancy, and a few of this category of learners were readmitted after giving birth. This enhanced chances of enrolling over-aged girls in schools and boosted wastage. Naylor and Gorgen (2020) suggested implementation of policies to support girls in education, such as

lowering the direct cost of items like sanitary facilities, uniforms, meals and examination fees. These measures could offer a solution to the high expenses linked to girls' education.

Literature shows that repetition and dropping out of school constitute wastage of educational resources and increase cost of education (Kiveu, 2018). A study conducted in Narok South Sub County in Kenya by Njuguna (2018) examined efficiency in public secondary schools. The study noted that quite a number of girls dropped out of school and cited the reasons for this as pregnancy, negative attitudes towards education, and the economic background of the students' families and parents' lack of awareness of the value of education. It means that resources invested in learners who repeat and drop out of school go to waste and consequently raise the cost of schooling. The results also revealed that completion rate of girls' schools were much higher than for boys' schools. This observation was attributed to the cultural practices of the Maasai, which considered boys who have undergone circumcision as men, who should not be in school. The study recommended strengthening guidance, counselling, and career advisory programmes in secondary schools to reduce repetition and dropout rates. These mechanisms can save loss of resources invested in education of students who fail to complete their studies. The study further recommended sensitization of parents on the value of enrolling children in school notwithstanding their gender and incidences of poverty. Okurut (2018) who noted that repetition and dropout rates were higher among schools with female students in Uganda also advocated for enactment of policies and mechanisms of reducing wastage and unit cost of providing education to female students.

Cost efficiency is about utilisation of resources for optimum outputs. A more efficient system achieves better outputs for a given set of resources, or achieves comparable outputs using fewer resources (Care International, 2021). Use of utilization of resources approach has also been used in studies to examine how their utilisation affects cost saving and cost reduction in secondary schools. Musyoka (2018) conducted a study to explore the relationship between availability of teachers, physical facilities and headteachers' supervisory roles on academic performance in single and mixed sex secondary schools in Tana River County in Kenya. The results indicated library and laboratory facilities were insufficient, the principal rarely vetted lesson notes of teachers and seldom appraised teachers. The findings also found out that academic scores of the students in the county had been declining over the years. The results further showed that there was a positive and significant relationship between availability of teachers, physical facilities and headteachers' supervisory and

students' academic performance in both single and mixed sex secondary schools. These results suggest that there were inefficiencies in the schools given inadequacies in resources, which often lead to low grades in examinations. The results also suggest that school type was not a factor since significant relationships was observed in both single and mixed sex schools.

Wasike (2020) conducted a study which explored the state of women's education in Western Kenya using samples drawn from mixed sex public secondary schools only. Wasike noted that display of masculine power and harassment of female students was rampant in classrooms making the climates in them not conducive to learning. The study found that established mixed sex schools often attempted to support learners in need, particularly the females. The support was mostly in the form of scholarships, food, sanitary towels and learning materials. The support was however not adequate and regular due to financial constrains that is faced by most schools. The study noted that the challenges faced by learners influenced their academic performance, school attendance and even their retention rates. These findings show that there are certain characteristics of mixed sex schools that promote wastage, which impacts on cost efficiency of schools.

A study conducted by Mwikya et al. (2019) examined the influence of cost of girls' education on transition rates in Machakos County in Kenya. The study established that most schools lacked finances to accomplish their obligations. The study also established that the high cost of education was still a challenge in public girls' secondary schools. Purchase of school uniforms, pocket money, tuition and transport and motivation fees paid to schools for remedial classes raised the unit costs of learning institutions. The study found that cost of education was unaffordable to most parents and funds released to schools by the government were inadequate and never reached schools in time. The delay further aggravated schools' ability to use their limited resources efficiently. These results show that gender composition of a school affects its cost efficiency given that unit costs of girls' only schools tend to be higher. Principals and the government should be cognizant of this in order to adopt strategies to address these challenges such as initiating income generating projects and increasing capitation to schools. These strategies may assist given that, as Gigliotti and Sorensen (2018) observed, sustained financial investment in education helped schools maintain efficiency in New York State.

There is evidence in literature that cost efficiency may vary according to school characteristics such as gender-mix of schools (Garcia & Donoso-Vázquez, 2016). Muriuki et al. (2017) examined efficiency in girls' secondary schools in Bomet County and found that

high indirect costs of educating girls were associated with low completion rates. The low completion rates were attributed to the inability of parents to raise the required school fees and maintenance expenses to sustain their girls and ensure their children complete school within the stipulated four years. The authors observed that the high unit cost of educating girls was the source of inefficiency in girls' education. It means that direct and indirect education costs are critical factors for determining the level of cost efficiency in girls' secondary schools. The results were consistent with the results of Jacobson et al. (2019) study which showed that inefficiency of girls' education in India was due to parents' disillusionment to pay the school fees and in meeting expenses such as books, stationary, uniforms and transportation.

The foregoing review shows that scholars have utilised gender composition of students in schools and outputs measured using proxy indicators of education such as completion rates, performance in examinations and self-concept, to analyze efficiency of schools. Most of them seem to lean towards internal rather than cost efficiency. In addition, the reviewed publications did not clearly bring out the link between school type and achievement of stated education objectives at the lowest possible cost or achievement of better outputs for a given set of inputs. Further, none of the reviewed works examined the association between school type and cost efficiency based on principals' perspective in public secondary schools in Bomet. It is this dearth in literature which the current study attempted to fill.

2.6.4 School Location and Cost Efficiency

Literature shows that school location influences its cost efficiency (Barra et al., 2018; Gralka et al., 2019). Location has been defined as the place where something happened or is situated (Collin's English Dictionary, 2018). Eugene and Ezeh (2016) refer to it as a particular place in relation to other areas in the physical environment where something is found or situated. Schools may be located in rural or urban settings. Those in urban areas are situated in towns or cities while schools in rural areas are situated in the country side. School location affects cost efficiency because it impacts on inputs of education such as availability of social amenities like accommodation, water, electricity; transport (Tao et al., 2019).

Echazarra and Radinger (2019) conducted a study on organization of teaching in rural schools in European Union countries. The study established that most of them had reorganized their operations as a way of reducing costs and enhancing savings. The strategies adopted during the re-organization included ensuring adequate staffing of schools with

trained teachers, maximum utilization of available human and physical infrastructure, time management, adoption of effective teaching approaches, support systems for learners, effective school leadership, enhance school community relation, and adoption of communication and technology. The study noted that the re-organizations ensured that inputs to education were available, reduced wastage of resources and the environments in schools were conducive to which effective teaching and learning could take place.

A study conducted in England by Gibbons et al. (2018) examined the impact of resources on students' achievement in rural and urban schools. Expenditure on school resources was the input of the study while students' achievement was the outcome. The study found that the expenditure on each student in urban schools was lower than that of rural schools. It was also noted that achievement of students in urban institutions was higher than that of their counterparts in rural schools. These observations were attributed to the high number of students in urban schools, better facilities and availability of social amenities like water, electricity and roads. The study also found that there was a significant difference in achievement between students in urban and rural schools, in favour of those in urban institution. Even though the study did not use factual cost efficiency measures during the investigation, the observed differences in expenditure per student and achievement suggest that school location influences cost efficiency.

Mudra (2018) conducted a study in Indonesia that examined educational resources and performance in rural schools. The study found that teachers faced acute shortage of basic instructional materials, learners' motivation and parental support were low. These inadequacies led to inefficiencies as teachers were not able to implement the curriculum effectively and unsatisfactory performance in schools in rural settings was an indication of inefficiency.

Ngo and Dustan (2019) examined the effects of targeted conditional cash transfer program in public high schools in Mexico City on efficiency using choice of schools, test scores and graduation rates as outcomes of education. The study was based on the premise that cost inefficiency in urban schools was due to financial constrains that lead to high student drop-out and repetition rates, and low completion rates. The results showed that effects of the programme on selection of high schools were minimal. The results also showed that high school examination scores were unaffected by the cash transfer programme. The results further showed that the programme had no significant effect on students' completion rates. The study concluded that liquidity constraints were not a key driver of wastage and cost

efficiency in urban high school was low. These results show that cash alone cannot improve education outcomes and cost efficiency in schools in urban settings. Du Plessis and Mestry (2019) opine that financial support enhances schools' ability to acquire education resources such as teachers, classrooms, instructional materials, libraries and laboratories. However, realisation of educational outcomes and cost efficiency, requires, proper planning, organisation, local communities' involvement and management of all school activities, beside funds.

Literature shows that teachers and students' characteristics and facilities are among significant determinants of cost efficiency (Barra et al., 2018). Mudra (2018) carried out a study on teachers and students' characteristics on learners' academic performance in examinations. The study revealed that teacher qualification and experience, classroom management competencies, the teaching approaches adopted and mode of assessment affected performance. The study observed that there were variations in these characteristics by school location. These variations, especially teacher attributes, had cost implications, for instance, the remunerations of qualified and experienced teachers tend to be higher. The study also revealed that students' attributes like motivation affect their drive to learn and perform. Most schools in Kenya organize coaching for this category of students at a cost, since teachers who run the sessions are compensated for the extra workload. This also affects the cost per student.

Kolbe et al. (2021) conducted a study in Vermont, USA, which examined additional cost of operating rural schools. The results of the study revealed that schools in rural areas often have higher operational costs associated with their geographical remoteness and sparse populations. The schools were thus not able to benefit from economies of scale in their operations. In addition, they had challenges accessing basic amenities like good roads, reliable power supply and communication networks. These challenges, which were location specific, affected the unit cost.

Batool and Chaudry (2019) carried out a study which determined cost efficiency in public secondary schools located in rural and urban areas in Pakistan. The inputs of the study included students' enrolment, teachers' qualification, average experience of teachers and number of classrooms while output were grades in national examinations and pass rates. The findings showed that teachers' qualifications and experience had a significant positive impact on cost efficiency of secondary schools. The results also showed that the influence of utilisation of facilities such as library and computer laboratories had an insignificant

influence on cost efficiency. The findings further showed that the difference between cost efficiency in schools situated in rural areas and those in urban areas was not statistically different. The study concluded that school location did not influence cost efficiency of schools.

Factors within a school locality such as availability of transport, communication, housing and social amenities have been associated with cost efficiency of schools (Education for All, 2015). Darma (2017) examined the effects of school location on academic performance. The results revealed that school location significantly influenced costs of operating secondary schools in Nigeria. Operational costs in rural areas tend to be higher due to scarcity of basic education inputs like electricity, water, sanitation, communication and accommodation. There were also issues to do with unwillingness of teachers to be posted in rural schools, and supervision, inspection and monitoring by relevant Ministry of Education bodies due to remoteness of some schools. The results of the study also revealed that there was a difference in academic achievement between rural and urban secondary schools in favour of the later. This means that besides high unit cost of students in rural schools their performance in examinations was dismal. On the basis of these findings, the study concluded that location affected cost efficiency.

Isa (2018) conducted a study in Nigeria on the relationship between per student cost and school location. Cost efficiency was determined using physical facilities, teachers, instructional materials and provision of basic amenities as inputs and students' performance in mathematics as the output. The study noted that urban secondary school students performed better in mathematics than their counterparts in institutions located in rural areas. The high performance was attributed to availability of physical facilities and the fact that teachers preferred working in schools located in urban areas than in rural areas. The cost per student in urban schools was lower compared to those institutions in rural areas. The high per students cost in rural schools was attributed to limited facilities and their inability to attract many students. These findings are an indication that cost efficiency of rural schools is low compared to the urban schools. School location thus influences cost efficiency.

A study conducted by Adnan et al. (2018) to investigate the correlation between school location and students' performance in science in Nigeria. The study established that students in urban schools performed better compared to their counterparts in rural areas. The study attributed the poor performance in rural secondary schools to inadequate facilities and lack of interest in schooling among some learners. The study also established that there was a

statistically significant relationship between school location and performance. These results suggest that the schools in rural areas were cost inefficient given that inputs to education did not translate into good grades. This may or may not be true given that the study did not provide empirical evidence of a comparative analysis of unit costs of rural schools and urban based ones. It means that further investigations need to be done to confirm whether cost efficiency of schools is influenced by their location.

School location has been associated with cost efficiency because each learning institution has a unique social setting, requirements and challenges (Gralka et al., 2019). Du Plessis and Mestry (2019) investigated the perceptions and experiences of teachers in rural schools in South Africa. The study confirmed that rural schools faced challenges that were peculiar to their environments that had cost implications. The study identified lack of parental interest in children's education, insufficient funding from the state, lack of water, sanitation facilities and electricity, under qualified teachers, and multi-grade teaching as the main barriers to effective provision of education in majority of the rural schools. The findings also showed that classrooms were in deplorable conditions. These challenges impacted negatively on effective teaching and learning. Morgan et al. (2017) contends inadequacies in physical facilities and social amenities in rural schools force them to look for alternatives at extra cost. This adversely affects cost efficiency of the institutions.

Okurut (2018) examined cost efficiency in relation to school location in Uganda. The study found that repetition and dropouts rates were higher in rural schools than those located in urban areas. The study also identified teachers' absenteeism, lack of basic social amenities like water, and electricity, inadequate facilities as the other common challenges faced in rural schools, these impact negatively on provision of quality education. The study concluded that lack of social amenities, repetition and dropouts led to wastage of educational resources and increased unit costs in schools located in rural areas. These findings imply school location influences cost efficiency given that inputs such as teachers, facilities and social amenities, and outputs like performance in examination depend on whether an institution is situated in an urban or rural area.

Studies have shown that class size and pupils-teacher ratio vary by school location, with institutions in urban areas recording higher numbers (Agasisti et al., 2016; Tao et al., 2019). These school characteristics not only affect performance in examinations but also cost of education. Waita et al. (2016) analyzed the impact of class sizes and student teacher ratio in rural and urban schools on students' academic achievement in Kenya. The study

established that there was over enrollment in both urban and rural schools. The study also established that there was a shortage of teachers in rural schools, a challenge which was not as pronounced in urban schools. The study concluded that school characteristics influenced cost dynamics in both rural and urban schools. The conclusion was based on the fact that academic achievement was higher in institutions with small classes, while academic achievement in schools with high student teacher ratio was low. Further, lowering the student teacher ratio to enhance academic performance increased cost of education as it meant employing additional number of teachers. The results of this study confirm that class size, pupil teacher ratio and school location are associated with cost of education. This is consistent with the findings of Kyambi (2019) who found that rural and urban schools in Kenya had higher pupil-to-teacher ratios, which had a significant impact on unit cost. Student-to-teacher ratio can thus be used to strike a balance between improving academic attainment and unit costs by reducing or increasing class sizes.

The reviewed literature examining school location in relation to cost efficiency was mixed and inconclusive. Studies by scholars such as Gibbons et al. (2018), Okurut (2018) and Waita et al. (2016) showed significant relationship between school location and cost efficiency. However, Ngo and Dustan (2019) and Batool and Chaudry (2019) among other scholars established that school location did not affect cost efficiency. Besides mixed results, the studies were done elsewhere, not done in Bomet and did not focus on school location and cost efficiency. This dearth in literature partly motivated this current study.

2.7 Principals Perceptions and Cost Efficiency of Secondary Schools

Perception is the process by which people organize and interpret stimuli and give meaning to their environments (Shaikh & Nawar, 2018). Perception has been defined as the cognitive process by which an individual selects, organizes and gives meaning to environmental stimuli obtained through hearing, seeing, smelling, touching and tasting (Haridas et al., 2021). It thus involves use of senses to generate signals from the environment. And use sensory and cognitive processes to appreciate the world around us. It is a unique way of understanding phenomena by interpreting sensory information based on experience, processing information, and forming mental models. Pokharel (2019) contends that perception is contextual and can be altered by appropriate changes in the environment. Perception is automatically activated in memory during the natural course of events and guide people's judgment, attitudes and behavior without being aware of such influence.

Perception is a process that consists of three stages, namely selection, organization, and interpretation (Qiong, 2017). Selection is the process of choosing only part of the information from the environment on aspects of occurrences or situations that are essential to what is being done (Nwakaego et al., 2021). After selecting information from the outside world, it is organized in some way to give meaningful patterns. The organisation stage entails putting things or people into categories (Nesa et al., 2021). Once the selected stimuli have been categorized into structured and stable patterns, it is interpreted. This involves making sense of these patterns by assigning meanings to them. It should be noted that different people may give different interpretations of the same stimulus (Agbo & Okanazu, 2021). For instance, the arrival of a police officer at a scene of crime can be interpreted differently. The victim may regard it as soothing and relief-giving, but the criminal will be frightened by it.

Studies show that perceptions significantly influence how people view the world, communicate and behave (Quadros et al., 2015; Sarwar & Muhammad, 2020). For example, Korir (2022) established that perceptions affected both teaching and learning since they influenced methods of instruction adopted by teachers and learning strategies adopted by students. Perceptions thus affect behaviour of both the teacher and learners; this explains why it affects teaching and learning. Perceptions impact on students' ability to learn because students' acquisition of knowledge and skills is affected by interaction between pre-existing beliefs about learning and knowledge.

Perceptions also influence workers' attitudes and how they perform tasks assigned to them (Aan et al., 2015). It means that principals' adoption of cost efficient strategies in management of schools could be related to their perceptions of it. It also means that principals with positive perceptions are more likely to adopt management strategies to enhance cost efficiency in schools.

Studies also show that perceptions of employees affect their behaviour and performance at work (Bos-Nehles & Veenendaal, 2019). Perceptions affect behaviour because they are interpretations of the environment and how employees interact with it (Wu et al., 2022). Pombo and Gomes (2019) argue that perceptions influence workers behaviour because those who perceive that their supervisors are supportive are more satisfied, dedicated and feel encouraged to work hard to accomplish the organization's objectives. Li's et al. (2019) study concluded that employees' perceptions of fairness influenced their dedication and commitment to work, performance of an organisation as well as its competitiveness. The

scholars argued that employees who are treated fairly are often more committed and dedicated to their work.

Korir (2022) also observed that perception affected teachers' behaviour as it influenced how they planned and organized for instruction, delivered content and evaluated learners. A study conducted in Kenya among Savings and Credit Cooperative Organization (SACCO) members on consumer perceptions and behaviour toward credit usage by Ntwiga and Wanyonyi (2020) showed that the dynamics of its utilisation was shaped by consumers' perceptions. The foregoing studies provide evidence that perceptions are associated with behaviour and performance at the place of work. It is therefore essential to examine principals' perspectives on cost efficiency given that they are managers of secondary schools. One of the main challenges of school principals using limited resources at their disposal to provide quality education (Ndamwe & Otani, 2020). Cost efficiency is among the strategies adopted by principals to manage schools given that they always face deficiencies in resources (Nzioka & Orodho, 2014). Such strategies involve either changing the product or adopting new ways of producing it. Cost efficiency is the act of saving money by changing a product or process to work in a better way. Adoptions of cost efficiency strategies boost chances of realizing institutions' educational objectives by decreasing expenditure and enabling them to manage their operations using available resources (Menon & Phalachandra, 2018). Per unit cost in schools can only be realized in schools if principals have positive perspectives of it.

Literature on perceptions has contributed significantly towards identification of factors which affect efficient management of organisations (Ahmed, 2019; Jomah, 2016). Management competencies and organisation administrators' views on inputs and output costs in a production process are considered influence adoption of cost efficiency in education systems. Ahmad et al. (2019) noted that school heads that had positive perceptions of cost efficiency were more aware and likely to adopt cost cutting and saving strategies. These strategies were outsourcing non-essential services, use of energy savers and taking into consideration unit cost when enrolling students. They further noted that chances of these categories of school heads adopting such cost saving strategies were higher.

A study in the European Union by Roszko-Wojtowicz (2018) indicated that institutions which embraced Information and Communication Technologies (ICT) based school management and instructional technologies enhanced cost efficiency in schools as it reduced per student expenditure, but boosted students' academic performance. The study

noted that the probability of adoption of these technologies was higher if they were perceived to enhance instruction and general school administration.

The foregoing discussions show that various strategies are adopted by school heads to improve cost efficiency. Estermann and Kupriyanova (2019) opine that optimizing use of finance, facilities, and available human capital use enhance cost efficiency. Bendlin (2017) underscores the importance of school managers in ensuring that available finances can cater for administrative and maintenance costs and still provide quality education to learners. Jacobson et al. (2019) is of the view that efficient utilization of teaching/learning materials, and exclusion of school activities that do not add value to teaching and learning reduces costs and enable institutions to provide more and better educational outputs. These strategies can be adopted by principals to enhance cost efficiency in schools. However, this can only be done if principals have positive perceptions on cost efficiency and strategies to affect it, given that perceptions influence behaviour and how workers perform their duties and responsibilities.

2.8 Theoretical Framework

The research grounded on the cost function theory which is a component of the education production function theory. A production function in the context of economics, links inputs to outputs of a process (McCombie, 2019). It describes technically the association between inputs and outputs expressed in terms of quantities produced. It is believed that Wicksteed, a professor in economics was the person who developed the formula that relates inputs to outputs in 1894. The formula is $P = f(x_1, x_2,\ldots x_n)$ (Steedman, 2018). The production function is widely used as an analysis tool by many neoclassical economists (Okorie, 2017). A production process uses resources to create outputs in the form of goods or services that is suitable for use or exchange in a market situation. The output volumes realised depends on the quantity of inputs and technical constrains brought about by processes employed (Baqaee & Farhi, 2019). One of the primary roles of the production function is to determining the best mix of inputs for maximum outputs is (Brabec, 2017).

In businesses, the production function is used for determining how much output should be produced given a specific item's pricing and what mix of inputs they should employ to produce given the cost of capital and labour. The production function gives output specifications of an organisation, industry or the entire economy for all input combinations (Hanushek & Ettema, 2017). In the context of education, function is derived from economic

production theory. It refers to the sum of all inputs required to produce a specified set of school outputs (Mbiti et al., 2019). In a secondary school setting the outputs are students' academic performance in public examinations, behaviour, discipline level and activities in the society (Elasra, 2016). Inputs include the number of teachers and support staff; physical facilities, instructional materials and supplies and financial resources used to achieve the schools' educational objectives (Jacobson et al., 2019). Resources such as textbooks, notes, learning materials, handouts, technology, library services, and laboratory services, which are critical in improving students' academic performance are also considered as inputs. Although schools are not profit making firms, the theory treats them as production units, with outputs for various input combinations (Restuccia & Rogerson, 2017).

The production function theory was deemed appropriate because it aids in understanding the combination of school inputs required for an educational outcome, the costs incurred and savings made (Ntawiha (2016). Studies have used the cost function, which is a component of the education production function to examine the association between educational inputs and outputs. Britton et al. (2017) study which investigated whether there was a relationship between educational inputs, namely, parental investment, school type and resources and outputs, used the education production function model. Ngetich (2019) used the cost function to determine whether unit cost management influenced students' academic achievement in Nandi County, Kenya. Participants in this study were drawn from boarding and days schools only. The theory is deemed appropriate because it helps in determining the best combination of inputs in education for optimum outputs. This study examined the association between selected school characteristics namely accommodation status of students, school type, size and location, which were considered as inputs and an output, cost efficiency.

The study was also informed by the cost function theory since education is considered as a process for producing persons with knowledge and skills. This process utilises finances, physical resources and skilled labour to produce educated persons (Münich & Psacharopoulos, 2018). These resources are scarce and have alternative uses. This calls for promotion of efficiency in the education sector through cost reduction and savings. Cost has been defined as the sum of all that one foregoes to get something (Johnes et al., 2017). Cost is usually expressed in monetary terms and is computed by valuing all resources used during production. The resources are in the form of materials, time, labour, opportunities forgone during the production of goods and services and risks incurred during the process (OECD, 2017). The cost theory stipulates that as the volumes produced increases, the cost of

producing a unit declines (Grosskopf et al., 2016). The returns to scale first increase then stabilize for some time and then decrease. A cost function theory is concerned with calculation of the total cost to a business to produce a certain amount of goods or services. The total cost is determined using a general formula, which is $C(x) = F + Vx$ (Nauzeer et al., 2018).

Where:

F = Total fixed cost

V = Variable costs,

x = Quantities produced

C(x) = the overall cost of production.

The cost function enables organisations, including educational institutions, to determine how changes in production impact on their total production cost, plan and manage their operations efficiently.

The cost efficiency theory was chosen because it aids in understanding the relations between educational inputs and outputs, and controlling the ever escalating cost of education. Understanding the relationship between inputs, outputs and costs is essential for designing policies and strategies on efficient use of educational resources. This is crucial given that most secondary schools are underfunded (Ngware et al., 2018). Further, this study like the cost function theory focused on exploring relationships between inputs, outputs and unit costs with the aim of reducing costs of running schools and saving.

2.9 Conceptual Framework

A conceptual framework presents the interaction among a study variable in the form of a diagram (Imenda, 2015). It is a product of consolidating a multiplicity of findings relevant to a research in narrative or schematically, into a single unit that reveals the position of a study with what exists in literature (Shikalepo, 2020). A conceptual framework links literature to the research objectives, questions and theories (Shishigu et al., 2018). This assists in understanding the problem under investigation and coming up with solutions to address it. The development of this conceptual framework was based on the objectives of the study and theories that guided it.

Figure 1

Conceptual Framework Showing Relationship among Variables of the Study

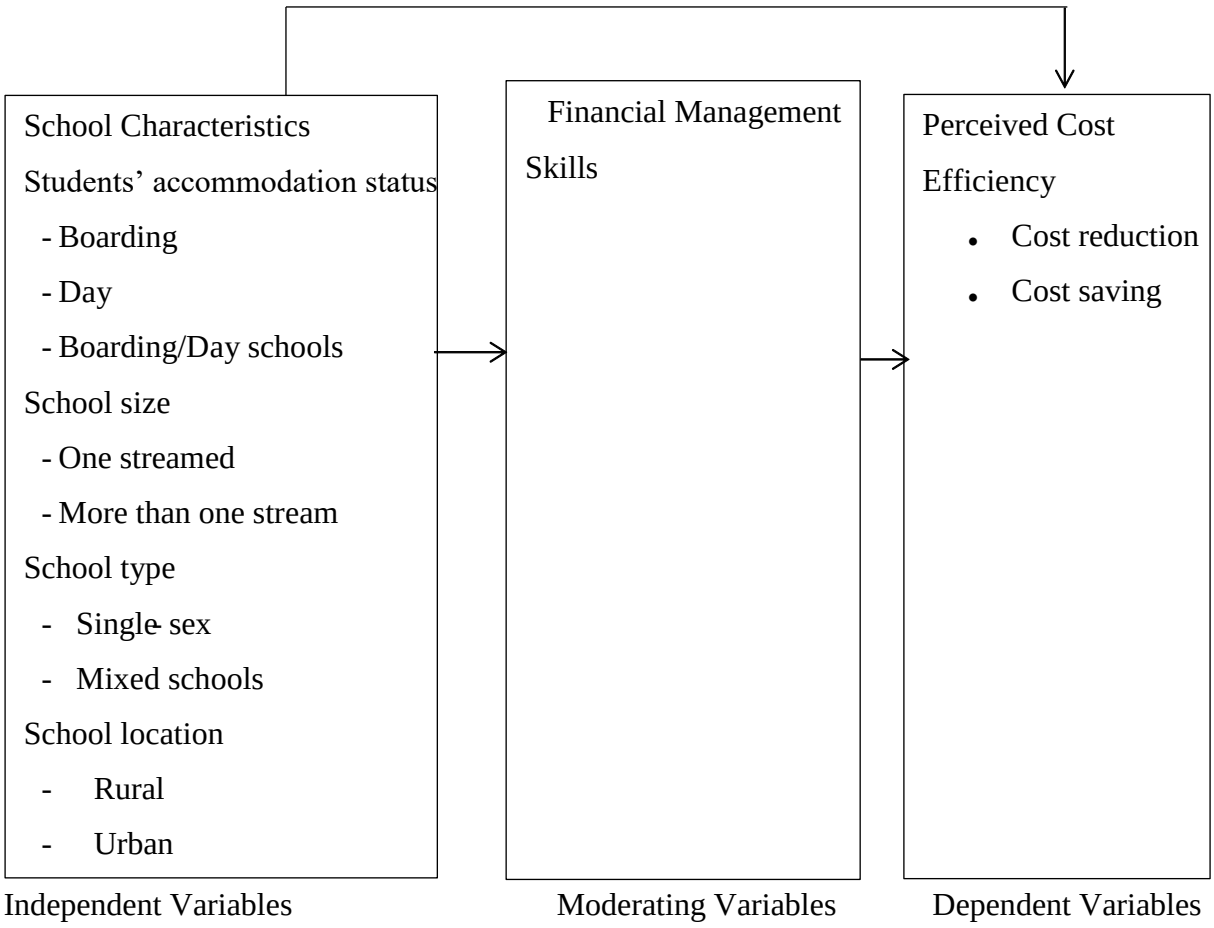

Figure 1 shows that this conceptual framework comprised of three elements, the dependent, independent and moderator variables. The independent variables selected for the study were school characteristics, namely; students' accommodation status, school type, size and location. The dependent variable was perception on schools' cost efficiency while the moderator variable was principals' financial management skills. Figure 1 indicates that under ideal conditions, perception on cost efficiency was totally dependent on the selected school characteristics. However, the link between the selected school attributes and perception on cost efficiency was moderated by financial management skills under dynamic conditions. Possession of financial management skills enables school administrators to utilize resources available in schools efficiently, and deal with challenges common in public schools like inadequacies in finances, unsatisfactory utilisation, and monitoring of available school funds.

A moderator variable is a construct which impacts on the strength or direction, or a combination of the two, of association between a factor and an outcome (Pokhariyal, 2019). The effect of the moderator variable was minimized through randomization and sampling as

recommended by Namazi and Namazi (2016). Attempts were made during the study to involve only principals that had similar characteristics with regard to training in school management and experience. These similarities minimized the effects of the moderator variable.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, the site where the research was conducted, target and accessible population and procedures used to determine the sample size. Also presented in the chapter are instrumentation, methods of collecting and analysis of data, and ethical considerations.

3.2 Research Philosophy

A research philosophy is a term that refers to belief systems which guide how researchers conduct empirical studies. Research philosophies are beliefs about the ways in collecting, analysing and using data of a research phenomenon (Dudovskiy, 2018). A research philosophy guides selection of the strategy used during an inquiry, formulation of the problem, data gathering and analysis methods. Philosophical perspectives are significant because they reveal the suppositions that investigators makes about a research phenomenon. These suppositions influence formulation of objectives, selection of the research design, data collection, methods and analysis methods and interpretation of results (Brown & Dueñas, 2020). The research philosophies commonly used to investigate diverse phenomena in education research include positivism, post positivism and constructivism.

This study adopted the post positivism research philosophy. Selection of this philosophy was based on its flexibility and ability to accommodate use of several data collection tools to effectively examine school characteristics and cost efficiency. Post positivism proponents recommend utilization of both quantitative and qualitative data when examining research phenomena (Gathii, et al. 2019). This research philosophy encourages use of several methodologies. This approach is more effective in addressing research questions as it allows use of diverse data collection methods (Panhwar et al., 2017). The approach allows the investigator to utilize multiple techniques to carry out an investigation, thus, reducing personal biases and prejudices of the researcher and study participants.

Post positivism paves the way for methodological triangulation in which more than one method applies in data collection. Triangulation entails the use of many methods to investigate a phenomenon (Stewart et al., 2017). It paves the way for development of a comprehensive understanding of a research phenomenon using several methods and/or sources of data. Triangulation is a strategy that is used in qualitative research to enhance

validity of findings as they are derived from data gathered using a variety of instruments and sample groups. Post positivism philosophical approach was found appropriate for investigating the association between selected school attributes and principals' perspectives on schools' cost efficiency.

3.3 Research Design

It is recommended that the most appropriate research design be chosen since it assists investigators in integrating components of an inquiry in a logical and a coherent manner, as this ensures that the statement of the problem is adequately addressed (Grinnel, 2016). Lillykutty and Samson (2018) contend that a good research design provides the following merits to findings of a study; objectivity, reliability, validity, representativeness (research sample reflects the characteristics of the wider population) and generalizability (information collected from a specific sample is applicable to the large group). Ansari et al. (2022) are of the opinion that an appropriate research design plays a vital part in guiding a research work, minimizing bias in data and increasing trust in its results.

This study adopted the correlational research design, which is a nonexperimental study which employs relational statistics to explore the strength and direction of association among constructs (Asenahabi, 2019). It is used for investigating links between variables without manipulating them. This design provides a researcher with opportunities to examine how a unit change in a factor affects the outcome (Pawar, 2020). The relationships may either be positive, negative or not related at all (zero correlations).

The purpose of this investigation necessitated selection of the correlational research design. This study involved exploring the relationship between selected school characteristics, namely, accommodation status of students, size, type and location, and principals' perceptions on cost efficiency. Lemboye (2019) is of the view that the design is appropriate when the purpose of an inquiry is to examine relationships among constructs within a population or among variables of different population groups. Further, the design was selected because variables were not manipulated during this inquiry.

3.4 Location of the Study

The site of this study was Bomet County, which is located in Rift Valley region, Kenya. The study area is located between latitudes 0º 29' and 1º 03' south and longitudes 35º 05' and 35º 35' east (County Government of Bomet, 2018). It neighbours four counties, Kericho to

the north, Nyamira to the west, Narok to the south and Nakuru to the east. The county is made up of five sub counties, Bomet Central, Bomet East, Chepalungu, Sotik and Konoin and covers an area of 2,037.4 square kilometers. Temperatures in the county average 18 ^{0}C and rainfall ranges between 1000mm and 1400mm annually (County Government of Bomet, 2015). The annual distribution of rainfall is even, except for short dry spells in January and February.

Bomet County is inhabited by several ethnic communities with the Kipsigis sub-tribe of the Kalenjin tribe being the majority. It had a population of 875,689 in 2019 (Kenya National Bureau of Statistics, 2019). Agriculture is the economic activity in Bomet County, with maize and beans being the main food crops and tea and dairy farming being the major income generators for the residents. The County had 270 public secondary schools when the research was conducted (County Director of Education, 2019).

The location was selected because of increase in reported cases of cost inefficiency in government owned secondary schools. Literature reveals that these schools are inefficient in use of educational resources (Chepkwony et al., 2020; Kitur et al., 2020; Kosgei et al., 2018). A large proportion of funds mobilised from various sources used for financing of secondary school education, yet academic performance at these institutions was not commensurate to the exorbitant cost involved. Ill-developed infrastructure and unaffordable cost of education to the majority of stakeholders compounded the challenges in providing education service in Bomet County (Chirchir et al. 2019).

3.5 Target Population of the Study

Target population has been defined as the whole group of people or things that an investigator generalises their conclusions (Asiamah et al., 2017). It is a collection of things, animals or people with some common features that are being studied with the goal of generalizing the findings. This study targeted 270 principals drawn from government owned secondary schools and 5 Sub County Directors of Education (SCDE)in Bomet. The accessible population comprised of the 275 school heads and the 5 SCDEs. The principals and SCDE were chosen because they possessed adequate information about school characteristics and their cost efficiency. Kamunge (2016) asserts that planning and managing school budgets and achieving the desired educational objectives are the mandates of school principals and SCDEs. Further, the SCDEs were selected because they supervise operations of schools in their areas of jurisdiction. Etikan and Bala (2017) contend that SDCEs are best

placed to provide quality data on schools cost efficiency because of the nature of their work. Further, most of the SDCEs have the ability to express themselves articulately and in a reflective manner. The study accessible population by Sub County is given in Table 3.

Table 3 *The accessible population organised by sub county*

Scale	Characteristic	Sub counties					Total
		Sotik	Konoin	Bomet East	Bomet Central	Chepalungu	
Students' accommodation status	Boarding	16	9	8	9	12	54
	Day	59	32	28	30	45	194
	Boarding/Day	7	4	3	3	5	22
School size	Single stream	62	34	29	31	46	201
	More than one stream	20	11	10	11	16	68
School type	Single sex	12	9	6	6	13	46
	Mixed sex	70	36	33	36	49	224
School location	Rural	72	33	25	29	52	210
	Urban	11	12	14	13	10	60
SCDE		1	1	1	1	1	5

Source: Bomet County Education Office (2019)

Data contained in Table 3 indicates that the number of principals drawn from the sub counties ranged between 39 and 82. The highest number of principals were from Sotik (82) while Bomet East had the least (39). The table further shows that each sub-county had a SCDE. Data in the table confirms that all the 5 sub counties of Bomet were involved in the study.

3.6 Sampling Procedure and Sample Size

Sampling entails choosing a small portion of the target population for purposes of collecting research data (Showkat & Parveen, 2017). A sample is thus a number of participants chosen from the target population that has its characteristics. Zangirolami-Raimundo et al. (2018) contend that often, logistical reasons, time and financial constraints inhibit involvement of the whole target population in a study. These call for sampling.

The formula developed by Krejcie and Morgan (1970) was used to calculate the sample size of the study respondents. The formula is as follows:

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

Where:

S = Required Sample

X = Z- value (1.96 for 95% confidence level)

N = Population Size

P = Population proportion (expressed as decimal) (assumed to be 0.5 (50%)

d = Degree of accuracy (5%) expressed as a proportion (0.05). For categorical data, 5% margin of error is acceptable (Krejcie & Morgan, 1970).

This method was selected because it is recommended for calculating the sample size of a small and finite population (Etikan et al., 2016). The population of the principals was 270; it was categorized as small as per the recommendations of Chaudhuri and Dutta (2018).

The principals' sample size was computed by inserting the required information into the formula where X= 1.96, N = 270, P= 0.5 and d= 0.05 gives:

$$S = \frac{1.96^2 \text{ X } 270 \text{ x } 0.5(1-0.5)}{0.05^2(270-1) + 1.96^2 \text{ x } 0.5(1 - 0.5)}$$

= 158.80 =159 principals.

The calculated sample size was 159.

The calculated sample was increased by 10% based on Guetterman et al. (2015) recommendations to cater for drop-outs, natural attribution and non-responses. The actual number of principals who were involved in the study were thus175.

After determining the sample size of the principals, several techniques were used as a way of ensuring that the samples drawn from the sub counties and schools were representative of the population. Strata were created by organizing the schools by Sub County. Proportional sampling methods were used to compute the number of principals that were drawn from each of the five sub counties, Sotik, Konoin, Bomet East, Bomet Central and Chepalungu. The formula used to compute the proportions was:

$$ns = [Ns/N] \text{ x } n$$

Where:

ns = number of respondents from the sub county

Ns =accessible population of the sub county N = study accessible population

n = sample size of the study

At the Sub-County level, proportional sampling procedure was used to calculate the number of principals by school characteristic (accommodation status of students, type, size and location). Simple random sampling techniques were then used to select the principals who participated in the study. This involved randomly picking principals in the database of school heads at Bomet County Director of Education office for each of the participating sub counties. All the 5 SCDE were included in the study, meaning that the census method was used to select them. Table 4 presents distribution of the sample.

Table 4 *Distribution of the Study samples by Sub County*

Scale	Characteristic	Sub counties					Total
		Sotik	Konoin	Bomet East	Bomet Central	Chepalungu	
Students' accommodation status	Boarding	10	6	5	6	8	35
	Day	38	21	18	19	29	126
	Boarding/Day	5	3	2	2	3	14
School size	Single stream	40	22	19	20	30	131
	More than one stream	13	7	7	7	10	44
School type	Single sex	8	6	4	4	8	30
	Mixed sex	45	23	22	23	32	145
School location	Rural	46	21	16	19	35	137
	Urban	7	8	9	8	6	38
SCDE		1	1	1	1	1	5

Data contained in Table 4 indicates that there was diversity in the characteristics of schools in Bomet county, which were wide enough to cater for the needs of male and female learners. This is important as it provided the study with an opportunity to examine cost efficiency of all school categories and students to join schools of their choice. The data also

confirms that all the school types and categories in Bomet County were represented in the study.

3.7 Instrumentation

Two instruments, a principals' questionnaire and SCDE interview schedule were used to gather data. Ramirez-Trujillo et al. (2021) contend that using more than one tool to gather data enhances the validity and dependability of findings of a study. The questionnaire was chosen because it is an efficient instrument for eliciting information from a large sample looked in a wide geographical area (Sadan, 2017)**.** The instrument offers greater anonymity and is thus ideal for gathering data on topics that are considered sensitive and confidential. Further, data collected using questionnaire is easy to administer, score, and analyze. The interview guide was selected because it utilises less time, and minimizes bias and subjectivity (Doody & Noonan, 2017). An interview guide also enables a researcher to effectively control the topics and format of discussion.

3.7.1 Principals' Questionnaire

The principals' questionnaire was developed using indicators of the constructs under investigation in literature. The instrument comprised of sections A-G as illustrated in Appendix II. Section A generated the bio-data of the participants. Section B was used to gather information on characteristics of the public secondary schools involved in the study. Section C solicited data on perceived cost efficiency of schools. This section had Likert type items based on a five-point Likert scale of 1= Very Small Extent (VSE), 2= Small Extent (SE), 3= Moderate Extent (ME), 4 = Large Extent (LE) and 5 = Very Large Extent (VLE). This section also had open-ended items, which provided the principals with an opportunity to explain their views on cost efficiency. The subsequent sections D, E, F and G also had open ended items that were meant for eliciting data on principals' views on the link between accommodation status of students, school size, type, and location and cost efficiency. The questionnaire thus had both open and close-ended items. The instrument was constructed using closed-ended items because they allow consistent responses and data generated is easy to code and analyze (Canals, 2017). Similarly, inclusion of open-ended items in the questionnaire was based on the fact that they enable collection of additional data by asking follow-up questions (Ramil et al., 2020).

3.7.2 Interview Schedule for the SCDEs

Data from the SCDE was generated using an interview schedule. This instrument was deemed appropriate because it can be personalized to the knowledge level and understanding of the interviewee (McEvoy et al., 2017). Marshall (2016) argues that even though interviews are time consuming, they are ideal for gathering detailed data on perceptions, opinions, and attitudes since they allow researchers to probe for explanations. Interviews also provide researchers with opportunities to interpret respondents' body language and facial expressions and respond accordingly.

The interview schedule was semi-structured and had a preamble, which was used to explain to the interviewee the aim of the inquiry, request for their consent, gather bio-data and explain the modalities of the interview. The instrument also had items for gathering data on the accommodation status of students, school size, type and location and perceptions on cost efficiency. Further, it had items that guided discussions on strategies adopted by schools to save, reduce running costs and generate income.

3.7.3 Validity

The principals' questionnaire and the SCDE interview schedule were validated before they were used to collect data. This was deemed necessary since validating a research instrument ensures that the layout and language are appropriate and contains the appropriate indicators of the variable being measured (Mazur & Kubai, 2019). Only the face and content validities of the principals' questionnaire and the SCDE interview schedule were assessed. Face validity has been defined as the extent to which items in a data collection tool measure what it purports to measure (Mohajan, 2017). It is a subjective assessment of whether the items in an instrument are relevant, reasonable, unambiguous and clear. Content validity is meant for ensuring that the items in an instrument cover all indicators of the construct it seeks to measure. Halek et al. (2017) assert that content and face validity represent the minimum requirement for assessing soundness of a research instrument.

The validation was conducted by experts from the department of Curriculum, Instruction and Educational Management, Egerton University. This is consistent with Taherdoost's (2016) assertion that validation entails theoretical assessment, rating suitability of items, and evaluating their fitness in defining a construct and should thus be conducted by a panel of experts. There has been lack of consensus on the number of experts required to conduct face and content validity evaluation. However, Lam et al. (2018) recommend at least

seven to ten experts. Yusoff (2019) recommends at least six and not more than ten experts for content validity assessment. A team of six experts were involved in the validation exercise as per the recommendations of Yusoff. The experts identified four poorly constructed and two double edged items in the principals' questionnaire, and two items in the SCDEs' interview schedule that were repetitive. These items were rephrased as recommended by the experts before the instruments were used to collect data.

3.7.4 Reliability

The reliability of the principals' questionnaire was estimated before it was used to collect data. Rosendaal et al. (2016) contend that it is essential to estimate the reliability of an instrument before using it to collect data as this ensures it yields similar results consistently. The reliability of the principals' questionnaire was estimated using a sample drawn from public schools in Nakuru County with characteristics similar to those in Bomet. The subjects were drawn from Nakuru instead of Bomet to minimize contamination. The number (15) of principals who were involved in the exercise was determined using Ramil et al. (2020) recommendation of between 12 -25 subjects.

The reliability coefficient of the questionnaire was estimated using the Cronbach alpha formula. The method is based on the formula:

Cronbach Alpha $\alpha = K.c/ [v + (K – 1) c]$ (Institute of Digital Research and Education, 2016).

Where K is the number of items in the test tool c is mean inter-item covariance among the items v is overall mean variance

This method was chosen because it is recommended when estimating the reliability of a data collection tool that has closed-ended polytomous items and is administered once (Taber, 2018). The reliability was estimated using data generated by the close-ended items on perceived cost efficiency of schools in section C, hence the appropriateness of the method. The reliability coefficient of the instrument was .822. It was deemed reliable since it yielded a reliability coefficient that was above the recommended 0.7 threshold (Matheson, 2019).

3.8 Data Collection Procedures

Clearance to conduct the study was sought from the Board of Postgraduate Studies and the Research Ethics Committee, Egerton University. The researcher applied for and obtained a permit from the National Commission for Science, Technology, and Innovation (NACOSTI). After obtaining the permit, permission to conduct the research was sought from the County Commissioner and County Director of Education (CDE), Bomet. The school

principals were contacted through their respective SCDE, and formally requested to participate in the study after explaining its purpose to them. The dates and venues for conducting the interviews and administering questionnaires were set in consultation with the respondents.

Prior to the administration of the questionnaires, the principals were briefed on the modalities of filling them. During the briefing, the principals were reminded that they were free not to fill any item they were uncomfortable with. The Drop-Off and Pick-Up (DOPU) later method was used to administer the questionnaire. The DOPU method was selected because it yields higher response rates (Gathii et al., 2019). Two research assistants assisted the researcher to administer the questionnaires. The principals were given two weeks to fill the questionnaire, after which the completed ones were collected.

The SCDEs were interviewed in their offices as scheduled. The interviews were face-to face exercises that were recorded using both pen and paper, and a video recorder. The SCDE, like the principals, were also briefed on the procedures that were to be followed during the interviews. The items in the interview schedule guided the discussions during the interviews. The researcher also raised follow up questions during the discussions, whenever the situation called for one. The interviews took a round 45 minutes. Data gathered through the interviews supplemented those collected using the principals' questionnaire.

3.9 Data Analysis

Eliot (2018) defines data analysis as systematic utilisation of statistical and logical procedures to assess, describe and summarize data. The gathered data was checked for completeness and errors and then cleaned. The data was coded and a file prepared using the Statistical Package for Social Science version 25. The coded data was keyed into this file. The principals' responses to the close ended items on their cost efficiency perceptions were coded as ordinal data using five points rating scale; 1= Very Small Extent, 2= Small Extent, 3= Moderate, 4= Large Extent and 5= Very Large Extent. The response to each item was scored and its mean computed. The items mean of each respondent were then transformed into the overall perception mean score. The cost efficiency of a school as perceived by the principal was then based on the overall mean score. The cost efficiency was categorized as "low" when the overall mean was between 1.00 and 2.33, "moderate" when the overall mean was between 2.34 and 3.66 and "high" when it was between 3.67 and 5.00. The cost efficiency of a school was thus perceived as either low, moderate or high.

The four study hypotheses were tested using the Chi-Square test of independence, at the critical alpha value set at .05. The Chi-Square test was selected because the hypotheses were concerned with exploring relationships between categorical data, selected school characteristics and principals' perceptions on cost efficiency (low, moderate, and high). Field (2018) contends that the Chi-Square is ideal for establishing relationships among categorical variables. Hall and Richardson (2016) also recommend the procedure for exploring relationships and comparing categorical data from two or more groups.

Qualitative data generated by the open ended items in the questionnaire were analysed thematically by organizing responses in themes pertinent to the study objectives. They were then described and summarized using frequencies and percentages. Similarly, descriptive statistics was used to analyze data collected using the interview schedules. Data gathered from the interviews were transcribed, organized into themes and then summarized using frequencies and presented in charts, tables or as excerpts. Table 5 give a summary of the hypotheses and the statistical procedures used to test them.

Table 5 *Methods of Data Analysis*

Research Hypothesis	Independent Variables	Dependent Variables	Statistical Analysis used
HO1: The relationship between students' accommodation status and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.	Students' accommodation status	Perceived cost efficiency of schools	Frequencies, percentages, chi-square
HO2: The relationship between school size and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.	School size	Perceived cost efficiency of schools	Frequencies, percentages, chi-square
HO3: The is relationship between school type and principals' perceptions on cost efficiency of public secondary schools is not statistically significant.	School type	Perceived cost efficiency of schools	Frequencies, percentages, chi-square
HO4: The relationship between school location and principals' perception on cost efficiency of public secondary schools is not statistically significant.	School location	Perceived cost efficiency of schools	Frequencies, percentages, chi-square

3.10 Ethical Considerations

Effort was made during the study to comply with research ethical standards. The term ethics is a term derived from the Greek word "Ethos", meaning character or custom (McDermott et al., 2019). Ethos is about social codes which convey morality, integrity and value systems. Department for International Development (2019) considers ethics as a way of describing norms of conduct and distinguishing good and bad behaviour. Daka (2022) opines that it is essential that a researcher ensures that the welfare and safety of objects of a study are taken care of, especially if it involves human participants. Ethics, in the context of research, is thus concerned with consent, courtesy, respect, integrity, privacy and safety of the subjects, and treating people equitably.

The researcher was aware of the essence of ethical standards when conducting a study. Consequently, clearance was sought from both the Graduate School and Egerton University Ethics Review Committee (EUREC). A research permit was also obtained from NACOSTI in conformity with the law. After obtaining the permit, clearance to conduct the research was sought from the County Commissioner and Director of Education (CDE), Bomet. The participants were then contacted, the purpose of the study explained to them and their consent to participate in it sought. Seeking consent is important as it is concerned with providing information about the research and ensuring voluntary participation.

The modalities of filling the questionnaire and participating in the interviews were explained to the respondents before commencement of data collection. The participants were informed that they were free to not respond to an item in the instruments that they were uncomfortable with. They were also informed that they were free to withdraw from the study at any stage. Various strategies were used to ensure privacy and confidentiality of the respondents. These included use of codes instead of respondents' names, reporting aggregated data, and restricting information to only authorized persons by locking data safes and use of passwords. Integrity was enhanced by not altering or modifying the collected data or information provided to suit the researcher's opinion. Attempts were made to minimize plagiarism by listing all the sources cited in the thesis in the reference section.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

The results and discussions of this inquiry are contained in the chapter. It is arranged according to the study objectives and comprises of six thematic areas. The first two sections present the instruments response rates and demographic characteristics of the respondents. The subsequent two areas are on relationships between students' accommodation status and school size, and principals' perceptions on cost efficiency. The last two thematic areas of the chapter are on the relationships between school type and location and principals' perceptions on cost efficiency.

4.2 Response Rates

The study data was collected using the principals' questionnaire and SCDE interview schedule. The proposed sizes of the sample groups were 175 principals and 5 SCDEs. Consequently, the same number (175) of questionnaires were administered to the principles while the 5 SCDEs were invited for interview. The response rates of the two instruments were determined, and are presented in Table 6.

Table 6 *The Principals' Questionnaire and SCDEs' Interview Schedule response Rates*

Instrument	Administered/organized interviews	Returned/interviewed	eturn rate in percentage
Questionnaire	175	144	82.25
Interview schedule	5	5	100.0

Table 6 shows that the questionnaire response rate was very high (82.2%). The results further show that all the SCDEs attended the interviews organized for them, giving a 100.0% return rate. This study was not affected by low return rates, which is a common phenomenon in studies which gather data using questionnaires (Lavidas et al., 2022). Low return rates are an indication that the number of participants in a study is below the estimates made during proposal development. Bumgardner et al. (2017) opine that a reduced study sample may impact negatively not only on quality of data but also the findings and conclusions of a research, since it may not be representative of the population. A high response rate on the

other hand, has been associated with a reduction in non-response bias, and an increase in validity of results (Dudovskiy, 2018).

This study was able to achieve a high questionnaire response rate because it utilized the Drop Off, Pick Up (DOPU) later method. DOPU was chosen because it yields high response rates since the method provides respondents with sufficient time to fill questionnaires (Gathii et al., 2019). The observed high rates were partly due to the good rapport with principals and SCDEs created by the researcher, sending reminders, and assuring the respondents that privacy and confidentiality would be maintained throughout the study. The observed response rates were deemed sufficient for use in this study as they were above the 80.0% "excellent mark" set by Bland and Allen (2017).

4.3 Demographic Characteristics of Respondents

An analysis of the participants characteristics was conducted before testing the study hypotheses. The analysis enabled the researcher to ascertain whether the study samples had characteristics of the population. Taherdoost (2021) contends that analysis of respondents' characteristics gives a more holistic picture of the context in which a study was conducted. Korir (2022) is of the view that it is good practice to examine characteristics of respondents in studies that investigate perceptions. This is because social factors like age, education and experiences affect perceptions and behaviour. The principals' attributes examined during the study were gender, highest level of education level, age and experience as a school head. The characteristics are summarized in Table 7.

Table 7 *Profiles of the Principals (n = 144)*

Scale	Characteristic	Frequency	Percentage
Gender	Male	88	61.1
	Female	56	38.9
Age	36 – 40 years	6	4.2
	41 – 45 years	18	12.5
	46 – 50 years	32	22.2
	51 -60 years	88	61.1
Experience as a principal	Less than 5 years	9	6.3
	5 to 10	59	41.0
	11 – 15	48	33.3
	Over 15 years	28	19.4
Highest level of education	PGDE	16	11.1
	Masters	17	11.8
	PhD	2	1.4
	B.ED	96	66.7
	Diploma in education	13	9.0

Table 7 shows that majority (61.1%) of the respondents were males while the rest (38.9%) were females. The results are an indication that there are fewer women in positions of leadership in secondary schools. They suggest bias in employment of principals in public secondary schools in favour of the males. The results support those of a survey by Mutuma et al. (2020) which established that out of a total of 194,961 public servants in middle level management, job cadres M to P, women comprised 24.0% and men were at 76.0%. These results indicate that there is gender imbalance in employment of middle level managers in the civil service. Similar gender imbalance was observed by Nyakan (2018) in a study conducted in Homa Bay. The study revealed that majority of the school principals were males (65.8%) while the rest (34.2%) were females. These results could be due to low number of girls only schools in Bomet that must be headed by female principals. These findings are not in tandem with current best practices at work places that promote gender equality in job opportunities.

The results in Table 7 also show that majority (83.3%) of the principals were aged between 46 and 60 years while the rest were in age ranges 41 and 45 (12.5%) and 36 and 40 (4.2%) years respectively. This means that those who hold the positions of principals in

public secondary schools are relatively old and mature. These findings concur with those of Kinyua's (2016) that were carried out among technical training institutions in Mount Kenya region. It showed that most (83.0%) of the principals were in the 51 and 60 years age bracket. This implies that the management team of colleges was composed of old people and that youth who were young were left out in the management of TTIs. The results concur with those of Richards (2017) who observed that most principals were relatively old due to the mandatory requirement that one must possess some experience before ascending to such administrative positions.

These results revealed that nearly three quarters (73.3%) of respondents had served as a principal for a period of between 5 and 15 years. The others had served as a principal for over 15 years (19.4%) and less than 5 years (6.3%). These results imply that the principals were experienced since majority had been school head for more than 5 years, and were conversant with the school management practices. Experienced principals have a richer background from which they can draw insights and ideas and tend to manage schools more effectively and efficiently. Lipke and Manaseri (2019) assert that principals should have the experience needed to manage schools before taking up leadership roles successfully. Nyakan (2018) argues that experienced principals are effective managers because they can communicate well and are able to work well with school community members. Further, experienced principals are able to respond to diverse interest and need of school stakeholders mobilize and utilize resources efficiently for the success of learners. Al-Ababneh and Alrhaimi (2020) identified principals' experience as one of the measures of their efficiency and effectiveness in performance of duties and responsibilities as it boosts productivity. They argue that the way experienced leaders perform their duties gives staff under them, learners as well as the school community confidence. Therefore, it can be said that experience is necessary, as it helps one build them and avoid trial and error methods of decision making.

The results show that two thirds (66.7%) of the principals were holders of the bachelor of education (BED) degree. The rest of the school heads had a master's degree (11.8%), a PGDE (11.1%), diploma in education (9.0%) or PhD (1.4%) certificates. The results reveal that the respondents had the required qualifications to head secondary schools. This is in accordance with the Ministry of Education requirement that for teachers to be principals, they must be holders of an undergraduate degree and in possession of relevant experience (TSC, 2011). This is essential since principals without the requisite qualifications tend to suffer from inferiority complex (Kinyua, 2016). The inferiority complex is attributed to lack of

confidence in their abilities to manage the schools they head well; this may impact negatively on performance of their duties and responsibilities. Omboto et al. (2022) contends that school principals must possess high levels of education to match the demands of modern educational process. These include digital literacy and inventive thinking skills, effective communication, and ability to use available resources in schools efficiently.

The findings in Table 7 confirm that the principals were qualified and experienced. The expectation is that they would manage school resources effectively leading to cost reduction and savings. However, that was not the case in Bomet as evidenced by cost inefficiency in schools. Given the characteristics of the principals, the cost inefficiencies observed in schools could thus be due to other factors.

4.4 Relationship between Accommodation Status of the students and Principals' Perceptions on Cost efficiency of Schools

Objective one of this inquiry explored the relationship between students' accommodation status and principals' perceptions on their cost efficiency. It involved determining accommodation status of students and principals' perceptions on their cost efficiency. Thereafter, a hypothesis which states that the relationship between accommodation status of students and principals' perceptions on cost efficiency is not statistically significant was tested.

The accommodation status of the students was established by analyzing data gathered using the principals' questionnaire. Table 8 presents a summary of the accommodation status of students from schools which took part in this study.

Table 8 *Accommodation Status of students from public secondary schools that were involved in the research (n = 144)*

School Accommodation Status	Frequency	Percentage
Day	102	70.8
Boarding	25	17.4
Day/Boarding	17	11.8

These results indicate that slightly over three quarters (77.1%) of the students were from day schools while others were from boarding (17.4%) and day/boarding (5.5%) schools. These results confirm that at the time of study, most of the students were in institutions that

did not offer accommodation to learners. Ngetich et al. (2018) and Oyier (2017) attribute high prevalence of day schools to subsidized secondary school education policy which has contributed significantly in sustaining large numbers of this category of schools. The findings support the results of a survey by Owiti et al. (2020) which noted that most secondary schools in Kenya were day institutions. The study attributed this observation to increase in number of primary schools creating secondary school wings to accommodate increased demand for secondary school education. The study also attributed the high number of day schools to the government's 100% transition from primary to secondary school and tuition free secondary school policies.

The high number of day schools could also be due to the inability of new schools to mobilize resources for constructing boarding facilities. The high number could also be attributed to the fact that day schools attract many students from local primary schools whose parents wish them to learn and go home every day. According to Maobe et al. (2019), many parents take their children to the nearest day schools as they are affordable. These findings are consistent with Ministry of Education (2010) policy that promotes expansion and construction of day schools since the cost of maintaining a student in such institutions are lower, making education affordable to households. The findings are in concurrence with the government's recommendation that day wings be introduced in boarding schools (ROK, 2008).

These findings reveal that most of the institutions which took part in the study were day schools, this may have a bearing on their cost efficiency. Tigre et al. (2017) study conducted in Brazil found out that prohibitive commuting costs, time spent on roads by students travelling from home to school and back, limited access to learning resources available in schools not only affected performance of learners in day schools, but also unit cost of educating them. These additional expenses significantly affect per student cost of day schools.

Perceptions on cost efficiency of the public secondary school heads were measured using a set of nine closed ended items. These indicators include performance of select tasks by the students in order to save on school operational costs, staff multitasking as a cost saving measure, undertaking of diverse income generating activities, disposal of obsolete equipment, purchase of food supply in bulk, harvesting of rainwater for cost saving aspects, hiring of school resources and use of energy saving bulbs. The principals were requested to rate the extent to which various cost cutting measures adopted in schools achieved those goals using a

5 points Likert type scale (1=Very small extent, 2= Small extent, 3= Moderate extent 4 = Large extent , 5 = Very Large Extent). The responses to each item were assigned a score, and their means computed as summarized in Table 9.

Table 9 *Principals' responses to items on Cost Efficiency (n = 144)*

Item	Mean	SD
In our school, students perform certain manual tasks that saves on its operational costs	1.52	0.83
Our school encourages staff to multitask as a cost saving measure	1.49	0.85
Our school undertakes diverse income generating activities in order to reduce the operational costs	2.06	0.67
Obsolete facilities in our school are always disposed to generate some income	2.31	0.90
In our school, educational items are purchased in bulk with an aim of reducing unit cost of items	2.40	1.19
Food supplies are purchased in bulk in our school, with an aim of reducing cost per unit item	2.81	0.97
The school harvests large quantities of rain water with an aim of making costs savings on that item	1.76	0.87
School resources, such as the bus, are occasionally hired out to earn income, which assists in maintaining students in school	2.72	0.87
Our school mostly uses energy saving bulbs to reduce cost of electricity costs	1.79	0.78
Cost efficiency overall mean score (index)	**2.10**	**0.28**

Table 9 shows that mean scores of the item used to measure perceptions ranged from M = 1.49 (SD = 0.85) to M = 2.81 (SD = 0.97). The item mean score of items such as 'food supplies are purchased in bulk in our school, with an aim of reducing cost per unit' (M = 2.81 (SD = 0.97) was relatively low given that it was out of 5. The low item mean score implies that schools rarely do bulk purchasing. It means they do not enjoy economies of scale associated with bulk purchasing and additional revenue from income generating activities. This observation concurs with those of Akyeampong et al. (2018) study in Uganda which revealed that only a few schools generated additional funds by engaging in income generating

activities and levying Parents Teachers Association charges. However, these sources were unstable and inadequate, and as a result, cost efficiency of most schools was low. Other studies that have associated bulk with cost efficiency include; those by Yeboah-Mantey (2017) who linked bulk purchases to cost efficiency of small and medium scale business concerns, Kimiti et al. (2020) in the context of small enterprises in milk sector in Kenya; and Munene and Tibbs (2018) in the context of the water firms. While these studies were not based in the education sector, the common underlying theme is that this strategy is applicable in the education sector. Bulk purchases not only reduce procurement costs but also attract discounts. Both Hamed (2017) and Huang et al. (2018) noted that discounts reduce cost of purchasing items. Similarly, purchase of food in bulk enables the realization of quantity discount that leads to cost reduction and hence cost saving in school operations.

Similarly, the mean score of the item 'resources, such as the bus, are occasionally hired out to earn income, which assists in maintaining students in school also posted a relatively low score (M = 2.72, SD = 0.87). This is a pointer that hiring of buses as an income generating activity is not frequent in schools. These results are in harmony with the observations made by Kirui (2016) in a study which was carried out in Kericho Sub County. The findings revealed that public schools engaged in various income generating activities that included vegetable farming, dairy cows farming, maize production, bakery and school canteen to supplement capitation from the government. However, they avoided income generating activities such as the transport sector, which had high maintenance costs and required intensive supervision. These results are not in tandem with those of Mbunde (2018) which found that schools saved a lot on running costs by engaging students in performance of manual tasks. This is a cost saving measure since students are not given any monetary rewards in return to their labour. The findings also contradict those of Odigwe (2020) which revealed that schools engaged in various income generating activities in Cross River State, Nigeria. The activities included hiring out school buses and halls, renting of school assets, sale of agricultural products such as vegetables and animals, art and craft materials and industrial products. The internally generated revenues supplemented government grants and other sources of funds.

Even lower mean scores were recorded by items like 'our school encourages staff to multitask as a cost saving measure' (M = 1.49, SD = 0.85). The multitasking is essential in a school setting as it promotes efficient utilization of available human capital in the institutions. It should be noted that teachers' and support staffs' remunerations are recurrent costs and any

savings on them contributes significantly towards reducing schools' expenditure. These results mean that staffs are rarely encouraged to multi-task and very little are saved on operational costs by engaging students in manual tasks. Lack of encouragement to multi-task could be due the heavy workload of secondary school teachers. A study by Ndambo et al. (2021) showed that the workload of most (64.1%) of the teachers was heavy. These observations were attributed to the fact that besides administrative and professional responsibilities, the teachers were allocated an average of 26 lessons per week and handled large class, whose sizes were well above the recommended 45 students per class mark.

A lower score was also posted by the item 'students perform certain manual tasks that saves on its operational costs' (M = 1.52, SD = 0.83). It means that schools rarely engaged students in performing manual tasks to reduce cost. This could perhaps be due to the fact that most schools focus on covering the syllabus in time and ensuring that their students obtain good grades in KCSE. This demands that the time table is strictly followed for it to be covered within the stipulated 4 years cycle. It could also be due to perception that the secondary school curriculum is too wide, thus the need to focus only on academics. Evidence from literature has shown that the curriculum of the 8-4-4 secondary school education system was perceived to be very wide, this forced teachers to spend a lot of time with learners in class as they attempt to cover it (Githaiga, 2018).

Table 9 further shows that item "the school harvests large quantities of rain water with an aim of making costs savings" (M = 1.76, SD = 0.87) recorded low scores. Harvesting rainwater often leads to reduced water bills and schools' operational costs. These results mean very little effort is put in water harvesting in schools. This is critical since cost of harvesting water and maintenance of the process is nominal (Munene & Tibbs, 2018). It also means that schools do not enjoy the advantage of free water from rain.

The principals' perception on cost efficiency was established by transforming the item mean scores into overall cost efficiency mean. Cost efficiency was categorized as "low" when the overall mean was between 1.00 and 2.33, "moderate" when its mean was between 2.34 and 3.66 and "high" when it was between 3.67 and 5.00. A summary of the perceived cost efficiency levels is presented in Table 10.

Table 10 *Perceived cost efficiency levels (n = 143*)

Level	Frequency	Percentage
Low	107	74.8
Moderate	29	20.3
High	7	4.9

An examination of the results show that close to three quarters (74.8%) of the principals were of the view that the cost efficiency of schools was low while the perspectives of the rest were moderate (20.3%) and high (4.9%). The results in Table 10 confirm that the principals considered cost efficiency of the schools they headed low. These results are in harmony with the findings of a study in Cameroon by Esongo (2017) which established that cost efficiency of secondary schools were low. The observed low cost efficiency was attributed to human and material resources inadequacies, particularly instructional materials such as computers and other related technologies. These findings also agree with the results of a survey by the World Bank (2019) which indicated that about 16% of public finances allocated to education in developing countries go to waste. This wastage leads to escalation of the cost of education. Azar and Dufrechou's (2017) study in Latin America noted that huge amount of money was spend on teachers' motivation and supervision of learning activities that was not commensurate to cost efficiency. Iwedi et al. (2018) study in Nigeria found cost efficiency of most schools was low due to reluctance of teachers to adopt cost cutting and saving strategies in the institutions.

These findings are in support with those of a study by Adejumo-Ayibiowu (2018) which concluded that cost efficiency of secondary schools was unsatisfactory. The conclusion was based on the observed decline in students' academic achievement despite increased financial investment in schools. The scholar argues that secondary schools are not cost efficient as they have failed to maximize educational outputs with minimum input costs. Further, the results support those of Mwikya's et al. (2019) study in Kenya which explored the relationship between cost of education and primary to secondary school transition rates. The study noted that cost efficiency of most school was low. The low cost efficiency was attributed to inadequate funds allocate to public schools and their untimely release. These challenges contribute significantly to students dropping out of school, low transition rates, wastage and inefficiencies in provision of educational services. The findings in Table 9 are in

concurrence with the observations made in Uganda by Akyeampong et al. (2018) which indicated that only a few schools engaged in income generating activities. The study pointed out that income sources were unstable and inadequate, and as a result, cost efficiency of most schools was low.

However, the findings in Table 9 are not consistent with the results of a study by Nyangaresi et al. (2018) which found that most schools in Kisii undertook various saving and income generating activities in order to address cost efficiency constraints. The activities included dairy farming, hiring out school halls and buses and poultry farming. Engagement in these activities boosted cost efficiency in such schools. These finding are also not consistent with those of Mbunde (2018) who observed that schools were able to operate efficiently since they engaged in saving and cost cutting activities such as bulk purchasing, sale of obsolete facilities, use of students' labour to perform some manual tasks and optimum utilisation of available financial resources.

Analysis of data on cost efficiency provided by the SCDEs indicated that they were aware of strategies adopted by principals to reduce operational costs and enhance savings in schools such as allocating teachers additional work, students cleaning and weeding instead of hired labour. The sentiments expressed by interviewee 2 in the excerpt below confirm their awareness:

"Using school students other than hiring support staff to undertake certain tasks such as weeding flower beds, cleaning toilets, classrooms and dormitories have an impact on reducing costs".

Similar sentiments were made by interviewee 5:

Some schools generate substantial revenue from their income generating activities such as dairy, horticulture and poultry farming, bee keeping, hiring out school buses and halls. These activities provide schools with food stuff and revenue thus saving on costs. The interviewees 2 and 3 recommended the following income generating strategies:

"Obsolete facilities such as vehicles, computers, printing and photocopying machines should be sold. A lot of costs are incurred in maintaining these obsolete facilities. Disposing them will lead to savings on maintenance costs and also generate income, which could be redirected to other priority areas".

Further, all of them felt that schools should be encouraged to harvest rain water as indicated by the comment of interviewee 1 below:

Schools should be encouraged to harvest rain water as it is free and the associated harvesting and maintenance cost is minimal. This will go a long way in cutting schools' operational costs.

However, the SCDEs did not explicitly indicate how these activities, which aim at cutting on expenditure and hence enhancing saving impacted on schools' cost efficiency levels.

These sentiments of the SCDEs confirm that schools engage in income generating activities among other measures as a means of cost cutting and saving in schools. These findings are consistent with findings by Katungu (2016) in a study based in Zambia, Odigwe (2020) in Nigeria, and Okello (2017) in a study based in Kenya. Odigwe (2020) found that schools across river states engaged in various income generating activities such as renting of school assets, sale of agricultural products such as vegetables and animals, sale of art and craft materials, sale of juice produced and sale of industrial products. The internally generated revenues supplemented the government funds and other sources of funds which are often inadequate. The observed results also agree with Nyangaresi et al. (2018) findings indicated that schools in Kisii County undertook various income generating activities such as dairy and poultry farming and hiring out of school halls and buses to address cost constraints.

The observed use of students to perform manual tasks in order to reduce the cost of running school is in line with observations made by Mbunde's (2018) study which examined savings on costs by utilizing manpower available in public secondary school in Kenya. Mbunde noted that adoption of this strategy enabled schools to reduce running cost. Kirui's (2016) study conducted in Kericho sub-county, Kenya also noted the critical role of income generating activities in addressing budget deficits in secondary schools. The study noted that quite a number of public secondary schools in Kericho county engaged in income generating activities. The activities included vegetable farming, dairy cows farming, maize production, rental houses, bakery and school canteen amongst others as critical in supplementing alternative funding to schools.

The SCDEs were also aware of disposal of obsolete facilities as a source of extra income to schools. Obsolete school facilities may be a good source of income for the school. These items could still be valuable to schools. For example, scrap metals from desks and chairs, that are no longer in use, can be sold to generate additional income to schools. Mbunde (2018) noted that sale of obsolete school facilities assisted schools in meeting their budgetary obligations and smooth running of the institutions.

Cost efficiency is about availability of educational resources and how they are used to realise set goals of educational institutions (Wakoli et al., 2019). The efficiency of schools is deemed to be low when learners drop out of schools and repeat classes due to various challenges. These challenges include poor payment of school fees, pregnancies and disciplinary issues, and large number of students not completing their courses (Jacobson et al., 2019). Non optimum utilization of available human, physical and material resources, school dropouts and repetition also culminate to increased unit costs of learning. It is therefore essential that school principals are aware of these constraining factors and develop and implement management strategies that militate against them, for efficient realisation of educational objectives of secondary schools.

The Chi-Square test was used to determine the relationship between the accommodation status of students and principals' perceptions on cost efficiency. The statistical procedure was chosen because both the dependent and independent variables were categorical data. This procedure is recommended for exploring relationships among nominal or ordinal data (Best & Wolf, 2015; Field, 2018). The accommodation status of students (Table 8) was cross tabulated against principals' perception on cost efficiency levels (Table 10). The results of cross tabulating the two constructs are presented in Table 11.

Table 11 *Counts and Percentages of cross tabulating students' Accommodation Status and Principals Perceptions on Cost Efficiency*

Accommodation status	Count	Perceptions on Cost Efficiency		
Status		Low	Moderate	High
Day	Observed count	73	24	5
	Expected Count	76.3	20.7	5.0
	% Students' accommodation status	71.6%	23.5%	4.9%
Boarding	Observed count	20	3	1
	Expected Count	18.0	4.9	1.2
	% within students' accommodation status	83.3%	12.5%	4.2%
Day/Boarding	Observed count	14	2	1
	Expected Count	12.7	3.4	.8
	% within Students' accommodation status	82.4%	11.8%	5.9%

An examination of the results reveal existence of small differences among perception percentages of day (low = 71.6%, moderate = 23.5%, high = 4.9%), boarding (low = 83.3%, moderate = 12.5%, high = 4.2%) and day/boarding ((low = 82.4%, moderate = 11.8%, high = 5.9%) schools. Table 11 also reveals that small differences were recorded among the observed perception category counts (proportions) for day (low = 73, moderate = 24, high = 5), boarding (low = 20, moderate = 3, high = 1) and day/boarding (low = 14, moderate = 2, high = 1), and the expected counts for day (low = 76.3, moderate = 20.7, high = 5.0), boarding (low = 18.0, moderate = 4.9, high = 1.2) and day/boarding (low = 12.7, moderate = 3.4, high = 0.8) schools. Judging by the small differences between the expected and observed counts, it appears that the relationship between students' accommodation status and perceptions on cost efficiency of schools was statistically insignificant. Whether students' accommodation status and cost efficiency perceptions were significantly related was decided upon using the results of a Chi-Square test. The test results are given in Table 12.

Table 12 *Results of a Chi-Square test results showing the relationship between students' Accommodation Status and Principals Perceptions on Cost Efficiency*

Scale	Value	Df	p-value
Pearson Chi-Square	2.421	4	.659
N of Valid cases	143		
Cramers V = .09			

Table 12 indicates that the relationship between students' accommodation status and principals' perceptions on cost efficiency, as expressed by Cramers V (V = .09**),** was weak. They further indicate that the two constructs were not significantly related, χ^2 (4, N = 143) = 2.121, p > .05. This implies that principals' cost efficiency were not dependent on students' accommodation status. These findings support the first hypothesis, which stated that the relationship between students' accommodation status and principals' perceptions on cost efficiency was insignificant.

Analysis of data gathered using the SCDE interview schedules showed that the respondents were of the view that school accommodation status impacted on cost efficiency. Two of the interviewees had this to say:

Interviewee 1:

"Accommodates status of students has cost implications as it affects implementation of school budgets. Schools that offer boarding facilities tend to have higher unit costs as they have to provide services whose costs are ever increasing."

Interviewee 2 had this to say:

"Boarding schools, unlike day ones incurred huge food related expenses and maintenance cost because of high rates of breakage rates".

The sentiments of these SCDEs imply that they were of the view that there were differences in cost efficiency by accommodation status of students. They felt that managing a boarding school required more resources, whose costs keeps on changing making the budget implementation process a challenge. They thus perceived that accommodation status affected cost efficiency. These perspectives underscore the impact of accommodation status of students on schools' cost efficiencies.

The findings in Table 12 show that cost efficiency was not associated with accommodation status of students. This is in tandem with the results of a study in Indonesia by Salikin and Joni (2019) which noted an insignificant relationship between students'

accommodation status and cost efficiency. The study attributed the findings to the many demands of educating a learner and high cost of running schools, whether day or boarding. These findings are also in harmony with results of Mutegi and Muriithi (2017) study which established that accommodation status of students was not related to cost efficiency. This study revealed that cost efficiency challenges in day schools and institutions that offer accommodation to students was mainly due high cost of education. The high cost was caused by the many levies imposed by schools such as motivation, remedial, boarding and development fees besides the personal needs of learners like uniforms, transport and pocket money. Further, the scholars were of the view that the money allocated to students by the government was inadequate. This forced schools to compel parents to pay other levies like development and boarding fees. Wasike (2020) examined the impact of development levies, lunch programmes and provision of uniforms and other basic requirements to students in day schools and academic achievement. Wasike found that most parents had challenges providing their children with uniforms, lunch and other basic requirements and the extra levies demanded by schools. This made schooling a costly entity irrespective of whether a student was a boarder or day scholar

The results in Table 12 contradicts the findings of a research carried out in Brazil by Tiegre et al. (2017) which established that accommodation status of students in schools mattered. The study concluded that day scholars faced a wider range of challenges compared to their counterparts in boarding schools. These included prohibitive commuting costs, time spent on roads travelling from home to school and back, limited access to learning resources available in schools, this not only affect performance of learners in day schools but also unit cost of educating them. These results are also contrary to those of the study by Anikoh and Ayuba (2019) conducted in boarding schools in Nigeria which observed that security required in such institutions had cost implications. The additional costs were for construction and maintenance of a fence around schools, installation of security lights, and adequate number of staff to respond to any security challenges throughout the 24 hours of a day.

These results are however not in concurrence with Baguma's (2018) study which indicated that students' accommodation status was an insignificant predictor of cost efficiency. Baguma noted that boarding schools in Western Uganda were cost efficient as they performed well academically. The good performance was associated with the environment which borders enjoy under the supervision of their teachers after normal classes.

The results contradict the findings of Kosgei et al. (2018) which showed that accommodation status of students was associated with cost efficiency. The study noted that day schools were more inefficient than boarding institutions as indicated by poor students' academic performance. An empirical study in Nandi County by Ngetich et al. (2018) linked accommodation status of students to schools' cost efficiency. The study noted that on average, the unit cost for day and boarding secondary schools in Nandi County were Ksh. 22,263 and Ksh. 54,828 respectively. The difference in unit cost was attributed to students' accommodation status.

The results contained in Table 12 confirms that accommodation status of students was not a determinant of cost efficiency. This means that cost efficiency of schools is related to other factors. Among those highlighted in literature is need for enhanced mobilization of resources and efficient usage of the same by secondary school administrators (Kibirige et al., 2021). School administrators should therefore be reminded that achieving the aims of secondary school education can only be realised at optimal costs if available resources are used optimally.

4.5 Relationship between School Size and Principals' Perceptions on Cost efficiency of Schools

The second objective was about establishing whether school size was related to principals' perception on schools' cost efficiency. School size has been cited as one of the correlates of cost efficiency by scholars such as Kimiti et al. (2020), who demonstrated that unit costs of services in school fall as the number of students increases. This objective was achieved by establishing school sizes and relating it to principals perceived cost efficiency of schools.

Data on school size was analyzed by categorizing them by streams. The schools were categorized into three groups namely, single, two, and three and above streams. Frequencies and percentages were then used to summarize the groups.

Table 13 *School Sizes of Institutions which participated in the study (n = 144)*

Size	Frequency	Percentage
Single Stream	106	73.6
Two Streams	29	20.1
Three and above Streams	9	6.3

The results show that majority (73.6%) of the principals who took part in the study were heads of single streams schools. The rest of the principals were either from two (20.4%) or three streams and above (6.3%) schools. The high percentage of single stream schools has been associated with the creation of secondary schools from local primary schools in the study area. These schools often attract limited number of students from neighbouring communities and adjacent primary schools.

The results reveal that most schools in the study area were single streams, which means such institutions may not realize economies of scale since the number of students in such institutions are generally low. Mbunde (2018) contends that single stream schools are unlike those with high number of students, which have higher chances of running their institutions efficiently through economies of scale, cost reduction and savings strategies. The strategies are bulk purchasing, use of available large pool of students' labour for manual work and allocating teachers multiple tasks. Richards (2017) in a study in Saint George, Grenada observed that operating large schools saved managers a lot of money in diverse operational areas and acknowledged the importance of the economies of scale in reducing costs of running institutions. Agasisti et al. (2016) argue that size of a school is related to its cost efficiency, particularly when available human and other resources are adequate and fully utilized. According to Mucharreira et al. (2019) school size is associated with cost efficiency because provision of education and management of learning institutions are affected by the number of enrolled students.

Ndethiu et al. (2017) study also confirm that class size was associated with cost efficiency. They demonstrated that large class size negatively affected cost efficiency. They attributed this observation to heavy teacher workload; students are not given adequate attention, shortage of instructional materials and inappropriate teaching methods. The study concluded that large class sizes attracted higher unit costs as they required more qualified

teachers, physical facilities, instructional materials and adoption of emerging ICT technologies to support provision of education to large student numbers.

The relationship between school size and principals' perception on cost efficiency was established after determining school sizes. The association between the two variable was explored using the Chi-Square test. School size was cross tabulated against perceived cost efficiency. The frequency and counts of the cross tabulation is contained in Table14.

Table 14 *Counts and Percentages of cross tabulating school size and principals' perceptions on cost efficiency*

School size	Count	Principals' perceptions on cost efficiency		
		Low	Moderate	High
Single Stream	Observed count	80	19	6
	Expected Count	78.6	21.3	5.1
	% within school size	76.2%	18.1%	5.7%
Two Streams	Observed count	20	8	1
	Expected Count	21.7	5.9	1.4
	% within school size	69.0%	27.6%	3.4%
Three streams and above	Observed count	7	2	0
	Expected Count	6.7	1.8	.4
	% within school size	77.8%	22.2%	0.0%

Table 14 shows that the distribution of perceptions categories of single (low = 78.6%, moderate = 21.3%, high = 5.1%) two (low = 69.0%, moderate = 27.6%, high = 3.4%) and three and above (low = 77.8%, moderate = 22.2%, high = 0.4%) streams schools were comparable. The similarity in the distributions suggests that school size is not associated to cost efficiency perspectives of principals. Table 14 also shows small differences between the observed perception category counts of single (low = 80, moderate = 19, high = 6), two (low = 20, moderate = 8, high = 1) and three streams and above (low = 7, moderate = 2, high = 0), and the expected counts of single (low = 76.2, moderate = 18.1, high = 5.7), two (low = 21.7, moderate = 5.9, high = 1.4) and three streams and above (low = 6.7, moderate = 1.8, high = 0.4) schools. The small differences suggest a weak association between school size and

perceived cost efficiency of schools. Further analysis was done to confirm this using the chi-square test results. The test results are in Table 15.

Table 15 *Summary of Chi-Square outputs relating school sizes and principals' perceived cost efficiency*

Scale	Value	df	p-value
Pearsons Chi-Square	1.905	4	.753
N of Valid Cases	143		
Cramer's V = .082			

The Chi-Square results show that there was a weak relationship (Cramer's V = .082) between school size and perceived cost efficiency. The test results also show that the relationship was statistically insignificant, χ^2 (4, N = 143) = 1.905, p > .05. These results support hypothesis two, which stated that school size was not related to principals perceptions on schools' cost efficiency.

Analysis of data on school size and cost efficiency from SCDEs' interviews yielded mixed reactions. Some of them felt that school size affected cost efficiency while others did not. This is what interviewee 3 said with regard to school size and cost efficiency:

"Large public schools can enjoy economies of scale since they have many avenues that can be used to cut costs and save such as bulk purchasing, large student populations and large grants from the government. These strategies if adopted lead to a decrease in average fixed and variable costs".

However, interviewee 5 held a contrary opinion as contained in the excerpt below:

"There are cost disadvantages when size of a school increases without corresponding human, physical and financial resources as is the case in most school. Such a situation leads to inability of schools to provide basic inputs of education and failure to realize set learning outcomes are a precursor to cost inefficiency".

These views of the SDCEs imply that school size affects cost efficiency only if strategies that exploit large student populations are adopted and available resources are utilized well.

Studies have been conducted which express school size using indicators such as students-teacher ratio, number of students enrolled and class sizes, and used them to determine schools' cost efficiencies (Kyambi, 2019; Ndethiu et al., 2017). The results of these studies like perceptions of the SCDEs have yielded mixed results. A study conducted

by Mucharreira et al. (2019) concluded that schools with small classes were more cost efficient as they posted better results in tests and examinations. On the contrary, Thng (2017) noted that reducing students' numbers in a class led to an increase in per student cost occasioned by the need for more streams, physical infrastructure, teachers and teaching-learning materials.

The opinions of the SCDEs that school size affects cost efficiency are in concurrence with the results of a study by Ngure and Karuru (2017) on cost efficiency strategies in secondary schools in Nairobi County. The study found that inefficient use of resource in single streamed institutions is widespread. This observation was based on the fact that single stream institutions were not like multiple streamed schools which could support more students through optimum utilization of available resources.

Hypothesis two test results are evidence that school size does not affect cost efficiency perceptions. These results are in line with Akyeampong et al. (2018) contention that school size may not be a significant predictor of cost efficiency since many activities with cost implications take place in these institutions. These include construction of physical facilities, ensuring instructional materials are available, provision of support services to school community, administrative work and teacher professional development. These findings support those of Grosskopf et al. (2016) which showed that school size was insignificantly related to cost efficiency in the United States of America. These scholars established that the impact of school size on cost efficiency was insignificant since increase in school size led to an increment in technical efficiency, but a decline in allocative efficiency.

These results support Simiyu's (2016) argument that school size does not affect cost efficiency if the number of students and streams in public secondary schools correspond to available resources in terms of facilities, instructional materials and funds. The findings is in line with those of a study by Wadesango et al. (2016) which established that the influence of school size on cost efficiency was insignificant when teachers were trained on how to manage large classes and ICT was incorporated into teaching and learning processes.

These results contradict the observations made by Ekaette et al. (2020), which indicated that large schools were associated with low unit costs as they enjoy economies of scale. Economies of scale assists in reducing unit cost in delivery of educational services in schools. Richards (2017) also noted that school size influenced cost efficiency, and attributed the observation to economies of scale and head teachers' management competencies. Kyambi

et al. (2019) study noted that over enrolment and high student-teacher ratio were challenges that are faced in most schools. The study concluded that school size impacted on cost efficiency since student-teacher ratio; enrolment and class size were critical educational inputs.

These results are contrary to the findings of Waita et al. (2016) study which examined the impact of student teacher ratio on students' academic performance in Kenya. The study established that student teacher ratio significantly influenced cost dynamics in schools. It found that academic achievement was higher in schools with small class sizes. The study also established that there was an inverse relationship between student-teacher ratio and academic achievement. Waita et al. concluded that lowering the student teacher ratio in order to enhance academic performance, consequently increasing the cost of education as it entails employing additional teachers to cater for extra streams being created. Further, these results contradict the findings of Crouch et al. (2020) which noted that over enrolment, repetition, and dropouts were major challenges in schools in Uganda. The high enrolment led to inadequacies in teaching and learning facilities, and overworked teachers. These challenges adversely affected provision of inputs and achievement of educational outcomes and cost efficiency of schools.

Most secondary schools face financial, human, and capital and other resource constraints (Mackatiani et al., 2023). Cost efficiency analysis assists these institutions in choosing courses of action among alternatives when resources are limited. Cost efficiency as shown by these findings is not related to school size, this means that there are other factors which are its determinants. Ithibutu (2017) cites management skills such as financial records keeping and complying with the various existing financial management policies formulated by the government as predictors of cost efficiency. Ndethiu et al. (2017) are of the view that factors such as leadership, teacher professional development, workload rationalization and availability of resources are the main determinants of cost efficiency. Estigoy and Sulasula (2020) study demonstrated that cost efficiency in schools was related to principals' commitment to work while Rapiudin (2019) identified motivation as one of the correlates of cost efficiency. Other factors cited as predictors of cost efficiency are availability of funds (Gavurova et al., 2017) and policies (Ndolo et al., 2016). What this means is that school managers need to have a broad perspective of determinants of cost efficiency, for them to come up with cost optimization strategies in schools.

4.6 Relationship between School type and principals' cost efficiency Perceptions

The third objective sought to find out if school type was related to perceived cost efficiency levels of schools. In Kenya, schools are classified according to gender composition of leaners (MOEST, 2018). Literature shows that school type is a determinant of cost efficiency. To achieve this objective, school type was determined and then related to perceived cost efficiency. Data on school type provided by the principals was analyzed using qualitatively techniques. The outputs of the analysis are tabulated in Table 16.

Table 16 *Types of Schools that took part in the study (n = 144)*

School Type	Frequency	Percentage
Single Sex	15	10.4
Mixed Sex	129	89.6

A majority (89.6%) of the principals were from mixed sex secondary schools while the others (10.4%) were from single sex. Mixed schools posted the higher percentages, an observation that could be attributed to the fact that such schools branch off from nearby primary schools, and admit students of both sexes before changing over time to single-sex institutions (Kitur et al., 2020). The observed high percentage concurs with Owiti et al. (2020) results, which showed that mixed secondary schools were the majority. The observation was attributed to perceived low cost of operating mixed schools as majority of them do not offer boarding facilities (day schools).

The results in Table 16 revealed that most schools were of mixed sex type; this could have implications on cost efficiency. A number of studies have demonstrated that cost of providing education varies by school type due to gender specific needs (McCarey, 2017; Sari, 2017)). Studies in Uganda done by Okurut (2018) recorded higher repetition and dropout rates in girls' only schools, a precursor for cost inefficiency. Mutegi and Muriithi's (2017) study conducted in Kenya showed that the cost of maintaining a female student in school by providing her with basics of school life like uniforms, sanitary facilities and related school levies was higher than that of a boy. They concluded that the chances of managing a girls' only schools efficiently was lower compared to boys' only and mixed schools. These differences suggest that school type is associated to cost efficiency.

The relationship between school type and perceived cost efficiency was determined by testing the third hypothesis using the Chi-Square. This hypothesis stated that school type and

principals' perceptions on schools' cost efficiency was insignificant. The results of cross tabulating school type and perceived cost efficiency are shown in Table 17.

Table 17 *Counts and Percentages of cross tabulating school Type and Perceived Cost Efficiency*

School type	Count	Perceptions on cost efficiency		
		Low	Moderate	High
Mixed Sex	Observed count	96	26	6
	Expected Count	95.8	26.0	6.3
	% within type of school	75.0%	20.3%	4.7%
Single Sex	Observed count	11	3	1
	Expected Count	11.2	3.0	.7
	% within type of school	73.3%	20.0%	6.7%

The cross tabulation outputs show that the proportions of perception on cost efficiency categories of principals from mixed (low = 75.0%, moderate = 20.3%, high = 4.7%) and those from single (low = 73.3%, moderate = 20.0%, high = 6.7%) sex schools were comparable. Table 17 also reveal that the observed (low = 96, moderate = 26, high = 6) and expected (low = 95.8, moderate = 26.0, high = 6.3) perception counts of principals from mixed sex were similar. The table further reveals that observed (low = 11, moderate = 3, high = 1) and expected (low = 11.2, moderate = 3.0, high = 0.7) perception counts of principals from single sex were similar. The similarities as shown by the proportion distributions in Table 18 suggest that the relationship between school type and perceptions on cost efficiency was weak.

Further analysis was conducted using the Chi-Square to ascertain whether the influence of school type on cost efficiency perceptions was statistically significant. The correctional analysis results are as shown in Table 18.

Table 18 *Chi-Square test results relating School type and Perceived Cost efficiency*

Scale	Value	Df	p-value
Pearson Chi-Square	.113	2	.945
N of Valid Cases	143		
Cramer's V = .028			

The Chi-square test results show a weak (Cramer's V = .028) relationship between school type and perceptions on cost efficiency. The relationship between school type and principals' perceptions on cost efficiency was insignificant as seen from the results, χ^2 (2, N = 143) = .113, p > .05. They imply that principals' cost efficiency perceptions do not depend on school type but on other factors. Hypothesis three is supported as it states that school type and principals' perceptions on cost efficiency are insignificantly related.

Analysis of data provided by the SCDEs during the interviews showed that they were of the opinion that school type was a correlate of cost efficiency perceptions. In that regard, interviewee 5 said the following:

"The unit cost of single sex schools is lower compared to that of mixed institutions due to many gender specific requirements with cost implications. For example, security, particularly that of girls in co-education institutions makes the unit costs higher"

Similar views on the link between school type and cost efficiency were held by Interviewee 2, as summarized in the excerpt below:

"School type influences the unit cost due to diverse basic needs of girls. Unlike boys, girls require several sets of, a regular supply of sanitary pads and enhanced security. Mixed schools are technically two schools in one in terms of day to-day operations. For instance, mixed schools have to sponsor two different teams, boys and girls, whenever they are engaged in one activity".

These results indicate that the SCDEs were of the opinion that school type is related to cost efficiency of schools. The opinions of the SCDEs support the findings of Mutegi et al. (2017) an empirical study which established that cost of education differed by school type due to gender specific needs of learners. The study showed that the unit cost of girls was higher compared to that of boys due to their gender specific needs, such as additional security and sanitary facilities. The study concluded that boys only institutions had better chances of recording higher cost efficiency. Karibo (2016) also noted that cost advantages associated with providing education to a homogeneous student population obtain. Karibo attributed the

observation to teachers spending less time preparing lessons for a single audience instead of two distinct audiences in mixed gender institutions.

These views of the SCDEs were not in concurrence with those of the principals, which indicated insignificant relationship between school type and cost efficiency. These differences could perhaps be due to the fact that principals encounter many challenges (delayed release of grants, inadequate facilities, staff shortage) in their day to day school management activities, which SCDEs may not be aware of.

The results in Table 18 are a confirmation that school type is not associated with principals' cost efficiency perceptions. These findings concur with Gavurova et al. (2017) observation that cost efficiency was a common issue in schools that experience low enrolment and high dropout rates and post below average grades in examinations in spite of higher costs. They concluded that achieving cost saving in such situations was unachievable and thus did not depend on gender composition of schools. The findings also support those of Chalkidou and Culyer (2016) and Perry et al. (2017) who noted that school type was not a significant predictor of cost efficiency when operational budgets are low, cost of operations is high and available resources are not utilized well.

The findings in Table 18 conflict with those of Karibo (2016) which indicated that single sex schools in Trinidad and Tobago recorded lower cost per students compared to co-education institutions. the study confirmed that learners in single sex institution had higher chances of obtaining high mean scores in national examinations at minimum costs compared to coeducation ones. This difference was an indicator that school type was related to cost efficiency.

These findings are not in harmony with those of Abuzied and and Ali (2020), Chirwa et al (2016) and Isokon et al. (2020), who established that school type influenced cost efficiency since the costs of operating girls' schools was higher than those of boys' only institutions. These scholars attributed the escalated cost in girls' schools to high costs of administration, gender security issues that promote wastage such as inequity in access to education, retrogression cultural practices such as early marriage among others. Similar observations were made by Dytham (2018) who noted prevalence of cross-gender bullying in mixed sex secondary schools in England. The students' misbehaviour had cost implications as they interrupted teaching-learning, and impacted negatively on achievement of set school goals. Garcia and Donoso-Vázquez (2016) analysed achievement and mathematics self-concept of students in single and mixed sex schools in Spain. The effect on gender was significant as the

girls obtained higher achievement and mathematics self-concept mean scores. These results suggest that school type affects cost efficiency given the relationship between inputs and outputs of this study.

The results in Table 18 confirm that school type is not a predictor of principals' perceptions on cost efficiency in Bomet County. They contradict those of Dytham (2018) who found that girls teased, bullied and intimidated fellow students in mixed sex secondary schools in England. This behaviour disrupted teaching and learning, and lowered academic performance, and were precursors to lose of financial resources invested in education. Examination of related literature reveal mixed results that, in some situations school size is related to cost efficiency, in others it is not. The insignificant relationship between school type and perceived cost efficiency could perhaps be due to the fact that most schools operate on low budgets, have high operational costs, and do not use available resources optimally as observed by Perry et al. (2017).

4.7 Relationship between school location and principals' perceptions on cost efficiency of public secondary schools

Objective number four sought to find out whether school location and principals' perception of cost efficiency of public secondary schools were related. Location refers to a place where something happened or is situated (Collin's English Dictionary, 2018). A school may be located in a rural or urban setting. To achieve this objective, location of the schools was categorized as rural and urban. Frequencies and percentages were then used to summarise location as shown in Table 19.

Table 19 *School Location (n = 144)*

School Location	Frequency	Percentage
Rural Schools	110	76.4
Urban Schools	34	23.6

An examination of the results in the Table reveal that most (76.4%) of the schools were located in rural areas while the rest (23.6%) were situated in urban settings. These results confirm that most schools in Bomet County are located in rural settings. The high number of schools in rural settings could be due to subsidized secondary school education policy advanced by the Government, which led to increased demand for secondary school

education (Oyier, 2017). It could also be due to the increasing number of primary schools spread all over rural areas creating secondary school wings to accommodate increased demand for secondary school education (Owiti et al., 2020). These findings are in harmony with those of a study by Kitur et al. (2020) which established that majority of schools in the county were based in rural areas.

Location of a school may or may not affect cost efficiency. Darma (2017) argues that differences in environmental factors such as mode of transport, roads, availability of electricity and water supply, between rural and urban do influence cost efficiency in schools. Education for All (2015) contends that factors within a school locality such as availability of transport, communication, housing and social amenities affect education inputs and cost efficiency of schools. Similarly, Ganiyu and Babalola (2016) study in Nigeria demonstrated that location significantly influenced costs of running secondary schools in Nigeria. The study attributed this observation to limited resources in rural schools, as a result, they tend to perform poorly in examinations. In addition, rural schools often faced with staff shortage challenges due to unwillingness of teachers to be posted there as they are perceived to be in remote areas and lack basic social amenities. However, empirical findings based on data gathered from public school in Pakistan indicated that no cost efficiency differences existed between schools sited in a rural setting and those located in urban areas (Batool & Chaudry, 2019). This was attributed to homogeneity of public schools in terms of resources and management.

Additional analysis was carried out to determine if school location was related to principals' perceptions on cost efficiency. This involved testing the fourth hypothesis which stated that the relationship between school location and principals' perception on cost efficiency of schools was not statistically significant. The hypothesis was tested at the .05 significance level using the Chi-Square technique. The results of cross tabulating school location and principals' perception on cost efficiency of schools are shown in Table 20.

Table 20 *Percentages and Counts of School location and Principals Perceptions on Schools' Cost Efficiency*

School location	Count	Principals' perceptions on cost efficiency		
		Low	Moderate	High
Urban	Observed count	44	19	1
	Expected Count	47.9	13.0	3.1
	% within school location	68.8%	29.7%	1.6%
Rural	Observed count	63	10	6
	Expected Count	59.1	16.0	3.9
	% within school location	79.7%	12.7%	7.6%

The outputs of the cross tabulation in Table 20 reveal differences between cost efficiency perception categories of principals from urban (low = 68.8%, moderate = 29.7%, high = 1.6%) and rural (low = 79.7%, moderate = 12.7%, high = 7.6%) schools. Table 20 also reveals difference between observed (low = 44, moderate = 19, high = 1) and expected (low = 47.9, moderate = 13.0, high = 3.1) perception counts of principals from urban schools. The results further indicate that the observed (low = 63, moderate = 10, high = 6) and expected (low = 59.1, moderate = 16.0, high = 3.9) perception counts of principals from rural schools were different. The observed differences suggest that school location and principals' perceptions on cost efficiency are related.

Further analysis was carried out to determine whether the association between school location and cost efficiency perceptions was statistically significant. The relationship between the two variables was determined using the Chi-Square test. The outputs of the test are summarized in Table 21.

Table 21 *Results of the Chi-Square test relating School Location and Perceived Cost Efficiency*

Scale	Value	Df	p-value
Pearsons Chi-square	8.256	2	.016*
N of Valid Cases Cramer's V = .240	143		

The Chi-square test results show a moderate (Cramer's V = .240) relationship between school location and perceptions on schools' cost efficiency of schools. A statistically significant relationship was observed between school location and principals' perceptions on

cost efficiency was, χ^2 (2, N = 143) = 8.25, p < .05. These results are evidence that principals' perceptions on cost efficiency are related to school location. These results do not support the hypothesis four, which stated that school location is not significantly related to perceptions on cost efficiency of school. It was thus rejected.

Data provided by the SCDEs on the link between school location and perceptions on cost efficiency was also analysed. The interviewees also added their voices on the association between school location and costs of running schools. The view on interviewee 5 was:

"Many rural schools face challenges that stem from inadequate resources, and difficulties in hiring and retaining teachers. These challenges lead to low savings behaviours and high costs of education in rural areas."

The views of interviewee 5 imply that resource constrains limit the ability of schools in rural areas to generate additional income, save and manage the institutions efficiently. Similar sentiments were expressed by interviewee 4, as shown in the below excerpt:

"Schools in urban areas are usually larger, allocated more resources, less likely to experience staff shortage, have better students to teacher ratio than institutions located in rural settings. They are therefore most likely to save costs than schools located in rural areas."

The sentiments of the interviewee 4 suggest that urban schools are advantaged because they have better resources. The chances of such institutions being managed efficiently are higher given that they also have the required human and material resources.

Analysis of data from both the principals and SCDEs showed that school location was related to perceived school cost efficiency. These findings are in tandem with those of Echazarra and Radinger (2019) who found that practices in rural schools which shape cost efficiency such as organizing for instruction, classroom and time management staffing, instructional materials availability and their use for teaching, and assessment in European Union countries were not similar to those in urban schools. Based on these observed differences, it was concluded that school location was not a predictor of schools' cost efficiency.

These findings are in concurrence with those of Ganiyu and Babalola's (2016) study which indicated that challenges in rural schools like inadequacies in physical facilities and teaching-learning materials, high students-teacher ratio, unfairness in the distribution of resources across rural and urban secondary schools were reasons why rural secondary schools tended to be more inefficient. A study in Uganda by Okurut (2018) also found that repetition

and dropouts, which are precursors of increased unit costs, were higher in rural schools than urban ones. Similarly, a study by Nyangi and Orodho (2014) also showed that school location was associated with cost efficiency since institutions in urban settings were able to devise cost saving measures because of proximity and their numbers. These measures included sharing facilities with neighbouring institutions and assigning staff multiple tasks, amongst others. These results concur with those of Darma (2017) who established that location related environmental factors such as road, electricity and water supply affected secondary schools' cost efficiency in Nigeria. The study observed that schools in urban areas were better endowed in terms of roads, electricity and water supply and other social amenities compared to their counterparts in rural area. Availability or lack of these resources had an impact of the unit cost of maintaining a student in school.

The results in Table 21 are also in tandem with those of Du Plessis and Mestry (2019) study on distribution of resources between schools in urban and rural areas in South Africa. It revealed that majority of rural schools lacked water, sanitation facilities and electricity. The findings also showed that classrooms were in deplorable conditions. These challenges impacted negatively on efficient teaching and learning. Morgan et al. (2017) also noted that limited water supply; poor sanitation and low levels of hygiene in schools negatively affected achievement of set outcomes and cost efficiency among the rural schools in Kenya, Ethiopia, Mozambique, Rwanda, Uganda and Tanzania. They concluded that ensuring ready access to water and sanitation in rural secondary schools had tremendous potential to have a positive effect on educational achievements and cost efficiency of public secondary schools.

The findings in Table 21 contradicts the results of Ngo and Dustan's (2019) study which examined the effects of conditional cash transfer programme in public high schools in Mexico City on efficiency using choice of schools, test scores and graduation rates as outcomes of education. The findings of the study showed that effects of the programme on selection of high schools were minimal. The results also showed that high school examination scores were unaffected by the cash transfer programme. The results further showed a statistically insignificant effect of the programme on students' completion rates. The study concluded that liquidity constraints were not a key driver of wastage and cost efficiency of urban high schools was low.

The findings in Table 21 contradict those of Batool and Chaudry (2019) which revealed that school location had an insignificant impact on cost efficiency of schools. The study observed that no cost efficiency differences existed between schools located in urban

areas and those in rural settings. The study attributed this observation to the selected process, as it targeted only public schools, which are comparable in terms of finances, personnel, facilities and management guidelines. This observation is important as it could be used to mitigate against negative influence of school location on cost efficiency.

A study conducted among rural schools in rural areas in European Union countries found that cost efficiency was not affected by school location when institutions re-organized their operations (Echazarra & Radinger, 2019). The re-organization entailed ensuring school had adequate staffing, maximum utilization of available human and physical infrastructure, time management, adoption of effective teaching approaches, support systems for learners, effective leadership, enhanced school community relation, and adoption of communication and technology. The re-organizations ensured that inputs to education were available, reduced wastage of resources and the environments in schools were conducive to which effective teaching and learning could take place.

These findings confirm that school location is a determinant of cost efficiency. These results are in harmony with those of Serdyukov (2017) who found that efficiency of schools varies by several school characteristics such as size and location. Echazarra and Radinger (2019) argue that location is a significant predictor of cost efficiency because it is shaped by the environment in which a school is located. This environment comprises of classroom environment, finances, physical facilities, programmes, student, support and after school activities, staff, teachers' preparation, leadership, school community relation, and communication and technology. The environments in rural and urban schools differ significantly, and this could explain the influence of location on cost efficiency. Morgan et al. (2017) noted that physical facilities and social amenities in most rural schools were inadequate; this compelled them to look for alternatives at extra cost. Education for All (2015) confirmed that factors within a school locality such as availability of transport, communication, housing and social amenities affect education inputs and cost efficiency of schools. It is therefore imperative that principals are cognizant of the impact of location on cost efficiency in their endeavour to effectively manage their institutions using whatever resources at their disposal.

CHAPTER FIVE

SUMMARY, CONCULSIONS AND RECOMMENDATIONS

5.1 Introduction

A summary of the findings, conclusions and recommendations of the study are given in this chapter. Areas that require further research are also given in the chapter.

5.2 Summary of Findings

Most schools in Kenya have limited resources, the expectation is that they would adopt education delivery alternatives that are least costly or have the largest impact per unit cost. However, majority of these schools do not conduct their operations in a cost-efficient manner. Cost efficiency challenges in schools manifest themselves in the form of inadequate, underutilization and wastage of resources, unaffordable and unsustainable costs of education coupled with low outputs. School characteristics among other factors have been cited as correlates of cost efficiency. The goal of this investigation was to find out whether the selected school characteristics were correlated to school heads perspectives on cost efficiency of public schools in Bomet county, Kenya. The selected characteristics were accommodation status of students, school size, school type, and school location. Four specific objectives guided the study, from which the same number of hypotheses were drawn and tested.

Objective one examined the relationship between accommodation status of students and principals' perceptions on cost efficiency of government owned secondary schools. The findings indicated that majority (77.1%) of public secondary schools in Bomet County when the study was conducted were day institutions while the rest were boarding and day/boarding. The results also indicated that most (74.8%) of the principals were of the view that the cost efficiency of schools was low, given that it was rated at M = 2.10 (SD = 0.28) using a 5 points scale. The results further indicated that the relationship between accommodation status of students and principals' perceptions on cost efficiency, as expressed by Cramers V (V = .09), was weak and not statistically significant, χ^2 (4, N = 143) = 2.121, $\rho > .05$. These findings were in tandem with the first hypothesis, which stated that the relationship between students' accommodation status and principals' perceptions on cost efficiency is not statistically significant.

Objective two established whether there was a relationship between school size and principals' perceptions on cost efficiency of public secondary schools. Analysis of data on school size revealed that majority (73.6%) of them were single stream while the rest had

more than two streams. The Chi Square test results revealed a weak relationship (V = .082) between perceived cost efficiency and school size. The test results also revealed that the relationship between these two constructs was statistically insignificant, χ^2 (4, N = 143) = 1.905, p > .05. These findings supported the second hypothesis, which stated that school size and principals' perceptions on cost efficiency was not significantly related.

The third objective sought to determine whether school type was related to principals' perceived schools' cost efficiency. The results indicated that most (89.6%) of the schools were mixed sex while the rest were single sex institutions. A weak (V = .028) relationship was observed between school type and perceptions on cost efficiency. The association between the two constructs was statistically insignificant, χ^2 (2, N = 143) = .113, p > .05. The findings supported hypothesis three, which stated that the relationship between school type and principals' perceptions on cost efficiency of those institutions is not statistically significant.

Objective four determined the relationship between school location and principals' perceptions on cost efficiency. The findings show that most (76.4%) of the institutions were located in rural areas while the rest were in urban settings. A moderate (Cramer's V = .240) relationship was observed between school location and perceived cost efficiency. The results further showed a statistically significant relationship between relationship between site of a school and on and principal's perceptions on cost efficiency, χ^2 (2, N = 143) = 8.25, p < .05. These findings did not support hypothesis four, which stated that school location does not significantly influence perceptions on cost efficiency.

5.3 Conclusions of the Study

The study made the following conclusions which were derived from the four objectives and related hypothesis tests:

i. Majority of the government owned institutions in Bomet County were day secondary schools. This situation is due to creation of secondary school wings in primary schools in order to accommodate the ever-increasing demand of that level of education. The ever increasing demand was attributed to the government's 100% primary to secondary school transition and subsidized secondary school education policies. The cost efficiency of these institutions was perceived to be low. Students' accommodation status and principals' perceptions on cost efficiency are not related, meaning that there are other factors which affect principals' perceptions. The

conclusion drawn from these findings have implications on cost efficient management of public secondary schools. It means other factors, not accommodation status of students, are significant predictors of schools' cost efficiency. School administrators should focus on these other factors in their endeavour to manage their institutions cost efficiently. These factors include financial management skills, funds, physical facilities and instructional materials among others.

ii. Most of the schools in Bomet were single stream. School size does not affect principals' perceptions on cost efficiency of schools as the two are not related. This implies that principals' perceptions are dependent on other factors, other than school size. These could be other predictors highlighted by the head teachers such as inconsistent payment of fees by parents, amount of funds which do not meet the needs of learners and is not released on time by the national government and ever increasing prices of basic supplies such as instructional materials and food required for school operations. This conclusion has implication on cost reduction and saving strategies adopted by schools. It means that school size does not matter. What matters is the ability of principals to guide their institutions to achieve set goals by directing and coordinating all parties involved in provision of education. In addition, they should be able to choose education delivery alternatives that are least costly or have the largest impact per unit of cost.

iii. Majority of government owned secondary schools in Bomet were mixed gender institutions. Principals' perceptions of cost efficiency were not associated with school type. The insignificant relationship between school type and perceived cost efficiency has implications on cost efficient management of schools. It means that principals' views on cost efficiency were shaped by other factors. Principals therefore need to identify the factors which influence cost efficiency that are sensitive to gender composition of the school. These factors could probably be creating an environment where there are equal opportunities for boys and girls to develop their potentials, reduce wastage in the form of dropouts and repetition, enhance record keeping given that such documents are essential for computing and monitoring cost efficiency, and adopting mixed teaching strategies that are gender neutral. This will enhance their ability to come up with education delivery alternatives that are least costly or have the largest impact per unit cost.

iv. Further, it was concluded during the study that majority of schools in Bomet county were located in rural areas. It was also concluded that school location had an effect on principals' perceptions since those in urban settings were considered more efficient than those in rural areas. This opinion was informed by benefits associated with location in urban settings such as ease of communication, availability of social amenities such as roads, electricity, water and sanitation. This conclusion has implications on school principals' endeavour to achieve set educational objectives at minimum cost or obtaining better outcomes for a given set of inputs. Most schools have limited resources and face cost efficiency challenges that manifest in the form of in inadequate, underutilization and wastage of resources, unaffordable and unsustainable costs of education coupled with low outputs, among others. Some of these challenges are location specific such as availability of transport, communication, housing and social amenities. These location specific factors and variations in distribution and availability of educational resources between urban and rural settings need to be taken into consideration by school managers for cost efficient management of institutions.

5.3.1 Contribution to Knowledge

The findings of this inquiry have contributed to educational management field by confirming that cost efficiency in schools is low. This information is important since it creates awareness that cost inefficient schools may trigger appropriate responses from school principals. This can be in the form of excluding activities that do not add value, identifying causes of high per student costs and putting in place mechanism that would help in reducing expenditure and improving efficiencies across all departments of learning institutions. These strategies if adopted may assist school administrators enhance cost efficiency in their institutions.

The study has also demonstrated that cost efficiency is related to school location but not students' accommodation status, size or type of the learning institution. This contribution is also important because the study identified the specific factors that were the causes of cost inefficiency. It should be noted that it is easy to manage a problem once it is identified. This finding could also assist school managers in enhancing cost efficiency by focusing on location specific challenges that affect cost efficiency such as physical facilities, housing,

water and electricity. Further, the findings of this may bridge the gap in literature and be used as secondary data by education management researchers in the future.

5.4 Recommendations of the Study

The recommendations of this inquiry were:

i) Cost efficiency of schools was perceived to be low; this suggests that principals had challenges running their schools efficiently, perhaps due to limited competencies in management of finances. In that regard, the study recommends that principals in Bomet be equipped with financial management skills through training as a way of enhancing cost efficiency in their institutions. Principals should be provided with training in resources mobilization so that they can be able to source adequate funds, prepare and implement budgets efficiently.

ii) School administrators in Bomet County should be encouraged to collaborate in procurement of goods and services as this would allow them enjoy economies of scale associated with bulk buying. Principals could collaborate and buy goods and services such as instructional materials from one source, incurring lower unit costs.

iii) School location was found to be related to perceptions on cost efficiency. Rural schools that are disadvantaged should consider this when preparing and implementing their budgets. School managers should consider location specific factors and variations in the distributions and availability of educational resources between urban and rural areas for the purpose of rationalization. Schools should consider undertaking cost cutting initiatives such as harvesting and storing rain water, use of solar based energy sources and collaborating with neighbouring schools in procurement in order to take advantage of economies of scale.

5.5 Suggestions for Further Studies

This study investigated the association between selected school attributes and principals' cost efficiency perspectives. Even though it provided valuable findings, some issues arose during the study which calls for further inquiry. Areas that require further investigations are:

i. The study was conceptualized that perceptions were related to school characteristics only. It did not take into consideration other key factors such as head teachers' financial management skills, experience and support of other education stakeholders

(MOE, BoM and PA). Studies, which examine relationship between these other factors and cost efficiency perceptions, would give a more holistic picture.

ii. The study established that cost efficiency of schools was low, further investigations need to be done to find out factors that contributed to the perceived low cost efficiency.

iii. The hypotheses test results indicated an insignificant association between students' accommodation status, school size and type and principals' cost efficiency perceptions. However, the SCDEs felt that these three school characteristics were to school cost efficiency. These contradictions call for further investigation using a large sample as such a study could yield different results.

iv. During the study, principals' financial management skills moderated the association between the selected school characteristics and cost efficiency perceptions. It would be interesting to find out the effects of the moderator on the link between these school factors and the outcome.

v. This investigation was conducted using samples from Bomet and results generalized to the county. The quality of results would be improved significantly if a similar study is conducted using larger samples drawn from all over Kenya.

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APPENDICES

Appendix I: Letter of Introduction to Principals

Philip Kimutai arap Kirui
Egerton University,
P.O Box 536, Njoro.
25th April, 2019.

Dear Sir/ Madam,

I am currently a post graduate student at Egerton University pursuing a PhD programme in Educational Management. As part of my studies, I am required to undertake a research study. The report obtained would be placed in the university library and copies would be sent to relevant authorities. Therefore, I kindly request you to supply information on all the questionnaire items. The questionnaire is divided into sections, that is, sections A-G. All information would be treated with utmost confidentiality and for that reason do not write your name in this questionnaire.

Yours Faithfully,

Philip Kimutai arap Kirui

Appendix II: Principals Questionnaire

Instructions

The purpose of this research study is to examine **"Relationship between the Selected School Characteristics and Principals' Perceptions on cost Efficiency of Public Secondary Schools in Bomet County, Kenya"**. There are no correct or incorrect answers. Please kindly respond to these sections by putting a tick (√). Do not indicate your name anywhere in this questionnaire. May I assure you that any information given will be treated with utmost confidentiality.

Thank you

Phillip Kimutai arap Kirui

Section A: Bio-data of the respondents

1. Indicate your gender Male [ ] Female [ ]
2. What is your age brackets Less than 35 Years [ ] 36-40 Years [ ] 41-45 Years [ ] 46- 50 Years [ ] More than 50 Years [ ]
3. How long have you served as principal? Less than 5 years [ ] (5- 10 years [ ] 11-15 years [ ] Over 15 years [ ]
4. What is your highest academic qualification? Diploma [ ] Degree [ ] PGDE [ ] Masters [ ] Ph.D. [ ]

Section B: Characteristics of Schools

1) Please indicate the category of the school in which you are the principal in terms of students' accommodation status Day [ ] Boarding [ ] Day/Boarding [ ]
2) Please indicate the category of the school in which you are the principal in terms of school size

   Single Stream [ ] Two streams [ ] Three streams [ ] More than three streams [ ]
3) Please indicate the category of the school in which you are the principal in terms of school type Single sex [ ] Mixed school [ ]
4) Please indicate the category of the school in which you are the principal in terms of school location Rural [ ] Urban [ ]

Section C: Information on cost efficiency of public secondary schools

Indicate the extent to which you agree with the statements on enhancing cost efficiency in your school.

Key:

1= *Very Small Extent* **2**= *Small Extent* **3**= *Moderate* **4**= *Large Extent* **5**= *Very Large Extent*

Items	**Statements on cost efficiency**	1	2	3	4	5
i	In our school, the students perform certain manual tasks that saves on school operational costs					
ii	Our school encourages school staff to multitask as a cost saving measure					
iii	Our school undertakes diverse income generating activities in order to reduce the operational costs of the school					
iv	In our school, obsolete school facilities are always disposed to in order gain some income from such disposal					
v	In our school, educational items are purchased in bulk with an aim of reducing cost per unit item					
vi	In our school, food supplies are purchased in bulk with an aim of reducing cost per unit item					
vii	The school largely harvests rain water for use in school with an aim of making costs savings on water supply					
viii	School resources are largely hired out to earn income thus reducing the cost per student					
ix	Our school largely uses energy saving bulbs to save on the electricity costs					

Explain……

……

……

<u>Section D: Students' Accommodation Status and Cost Efficiency</u>

Please give a brief summary of your views on students' accommodation status and cost efficiency

……..

Section E: School size and **Cost Efficiency**

Explain your views on school size and cost efficiency ……

Section F: School type and cost efficiency

Explain your views ……

Section G: Information on school Location

Your views on school location and cost efficiency ……..

Thank you for taking your time to answer the questions

Appendix III: Interview Schedule for SCDE

Preamble

i. The researcher introduces himself to the interviewee, explain the purpose of the visit and seeks consent to participate in the study

ii. Details of the interviewee are recorded (Gender, experience as a SCDE, Duration in the station) …….

iii. Modalities and procedure of the interview explained to the interviewee ……

Discussions

1. a) In your opinion, how does students' accommodation status influences costs of running a public secondary school in your sub- county?

   .....

   .....

   b) In your opinion, how does accommodation status of students influence cost saving in running public secondary schools in your sub- county?

   ……

   ……

   ……

   …….

2. a) In your opinion, how does school size influence costs of running a public secondary school in your sub-county?

   ……

   ……

   ……

   ……

   b) In your opinion, how does school size influence cost saving in the running of a public secondary school in your sub-county?

   ……

   ……

   ……

   …….

3. a) In your opinion, how does school type influence costs of running a public secondary school in your sub- county?

   ……

   ……

   ……

   …….

   b) In your opinion, how does school type influence cost savings in the running of a public secondary school in your sub- county?

   ……

   ……

   ……

   ……

4. a) In your opinion, how does school location influence cost of running a public secondary school in your sub-county?

   ……

   ……

   ……

   …….

   b) In your opinion, how does school location influence cost saving in the running of a public secondary school in your sub-county?

   ……

   ……

   ……

   …….

5. In your opinion, how does students' performance of manual tasks saves on school operational costs?

   ……

   ……

   …….

6. In your opinion, how does multitasking of school staff save on cost?

   ……

……

……

7. In your opinion, how does the undertaking of income generating activities reduce the cost of running public secondary schools?

   ……

   ……

   ……

8. In your opinion, how does a public secondary school gain some income by disposing obsolete facilities?

   ……

   ……

9. In your opinion, how does purchasing of goods in bulk help to reduce cost per unit item in public secondary school in your sub county?

   ……

   ……

   ……

10. In your opinion, how does harvesting of rain water in school help to save costs of running a public secondary school in your sub county?

    ……

    ……

    ……

11. In your opinion, how does income from hiring out of school resources help to reduce cost per student?

    ……

    ……

    ……

    …….

12. In your opinion, how does the use of energy saving bulb saves on the cost of electricity?

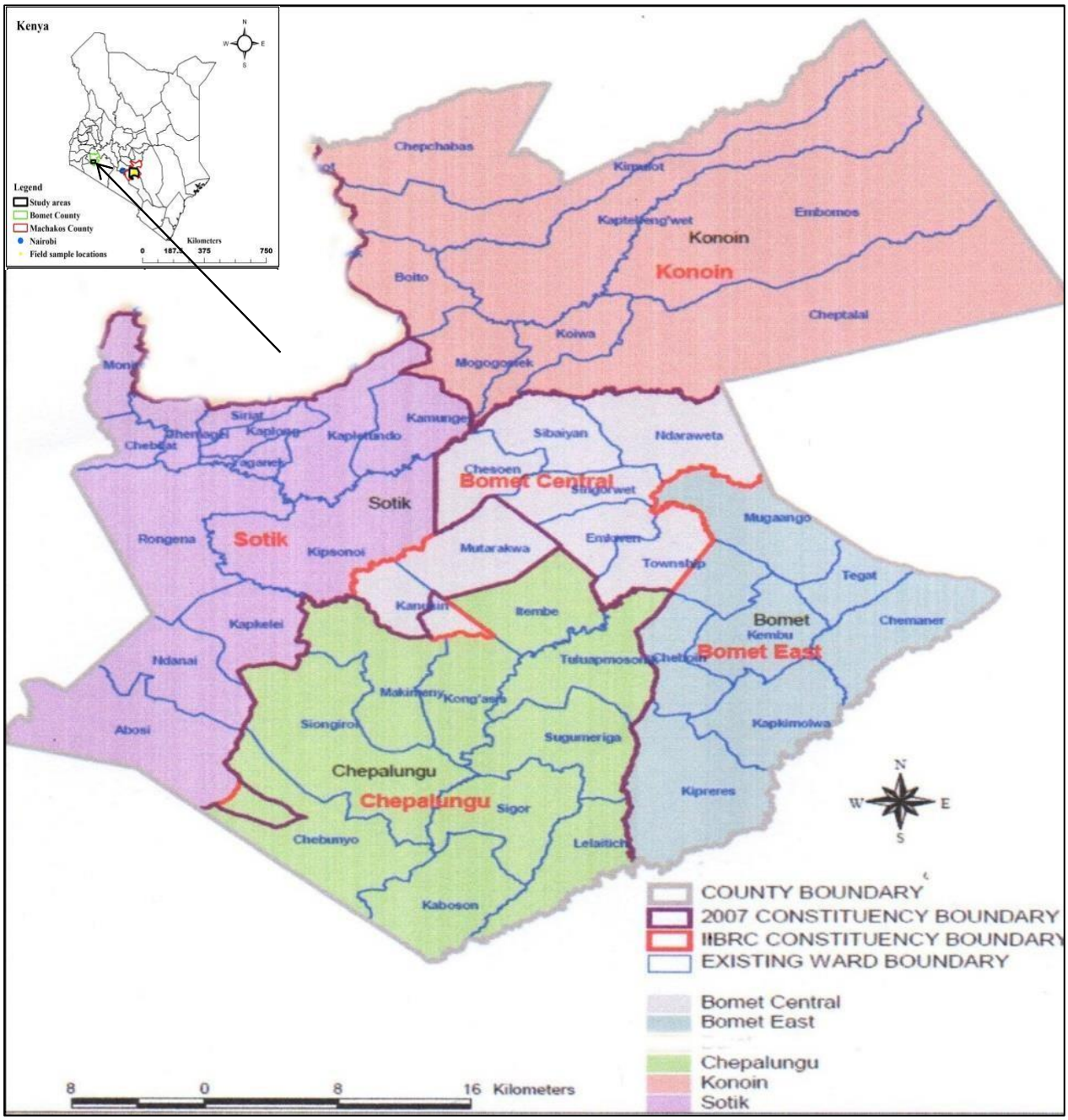
    ……

    ……

    ……

    ……

Appendix IV: Map of Bomet County



Appendix V: Request for Research Permit letter to NACOSTI

EGERTON UNIVERSITY
Tel: Pilot: 254-51-2217620
254-51-2217877
254-51-2217631
Dir.line/Fax: 254-51-2217847
Cell Phone

P.O. Box 536 - 20115
Egerton, Njoro, Kenya
Email: bpgs@egerton.ac.ke
www.egerton.ac.ke

OFFICE OF THE DIRECTOR GRADUATE SCHOOL

Ref: ED15/04063/14 Date: 26th April, 2019

The Director General
National Commission for Science Technology and Innovation,
P. O. Box 30623-00100
NAIROBI.

Dear Sir,

RE: REQUEST FOR RESEARCH PERMIT – MR. PHILIP KIMUTAI ARAP KIRUI REG. NO. ED15/04063/14

This is to introduce and confirm to you that the above named student is in the Department of Curriculum, Instruction & Educational Management, Faculty of Education & Community Studies, Egerton University.

He is a bona-fide registered PhD student in this University. His research topic is **"Influence of Selected School Characteristics on Cost Efficiency of Public Secondary Schools in Bomet County, Kenya."**

He is at the stage of collecting field data. Please issue him with a research permit to enable heim undertake the studies.

Your kind assistance to him will be highly appreciated.

Yours faithfully,

DIRECTOR, BOARD OF POST GRADUATE STUDIES
06 MAY 2019
EGERTON UNIVERSITY, P.O Box 536-20115 EGERTON

Prof. Nzula Kitaka
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

NK/vk

Transforming Lives Through Quality Education

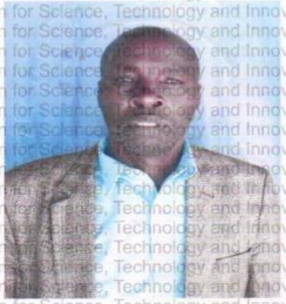
Appendix VI: Research Permit

THIS IS TO CERTIFY THAT:
MR. PHILIP KIMUTAI KIRUI
of EGERTON UNIVERSITY, 540-20406
SOTIK,has been permitted to conduct
research in *Bomet County*

on the topic: *INFLUENCE OF SELECTED SCHOOL CHARACTERISTICS ON COST EFFICIENCY OF PUBLIC SECONDARY SCHOOLS IN BOMET COUNTY, KENYA.*

for the period ending:
19th June,2020

Permit No : NACOSTI/P/19/70854/30322
Date Of Issue : 19th June,2019
Fee Recieved :Ksh 2000



.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 25365

CONDITIONS: see back page

Appendix VII: Research Authorization from NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/19/70854/30322** Date: **19th June 2019**

Philip Kimutai Kirui
Egerton University
P.O. Box 536-20115
NJORO.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Influence of selected school characteristics on cost efficiency of public secondary schools in Bomet County, Kenya."*** I am pleased to inform you that you have been authorized to undertake research in **Bomet County** for the period ending **19th June, 2020.**

You are advised to report to **the County Commissioner, and the County Director of Education, Bomet County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

DR MOSES RUGUT., PhD, OGW
DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Bomet County.

The County Director of Education
Bomet County.

Appendix VIII: Authorization to Collect Data in Bomet County

THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telegrams: "DISTRICTER", Bomet
Telephone: (052) 22004/22077 Fax 052-22490
When replying please quote

COUNTY COMMISSIONER
P.O BOX 71- 20400
BOMET

REF: EDU.12.1 VOL.1II/ (144)

28th June, 2019

The Deputy County Commissioners
BOMET

RE: RESEARCH AUTHORIZATION – PHILIP KIMUTAI KIRUI

The above named person has been authorized to carry out research on **"Influence of selected school characteristics on cost efficiency of public secondary schools in Bomet County"** by the National Commission for Science, Technology and Innovation vide their letter Ref. No. **NACOSTI/P/19/70854/30322** dated **19th June, 2019** for the period ending **19th June, 2020.**

Any assistance accorded to him would be appreciated.

COUNTY COMMISSIONER
BOMET COUNTY
28 JUN 2019
P. O. Box 71-20400, BOMET

Nereah Kotonya
For: County Commissioner
BOMET COUNTY

Appendix IX: Authorization to collect data letter from Bomet County Education Office

REPUBLIC OF KENYA
MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION

Telegrams: "ELIMU",
Telephone: 052-22265
When replying please quote
email:cdebometcounty@gmail.com
Ref/CDE/BMT/ED/AUTH/74/VOL.II/3

COUNTY EDUCATION OFFICE,
BOMET COUNTY,
P.O. BOX 3-20400,
BOMET.

28TH JUNE, 2019

Philip Kimutai Kirui
Egerton University
P.o Box 536-20115,
NJORO.

RE: RESEARCH AUTHORIZATION.

Reference is made to yours from NACOSTI Ref: No NACOSTI/P/19/70854/30322 dated 19th June, 2019 on the above subject.
Permission is hereby granted to carry out research on "***Influence of selected school characteristics on cost efficiency of public secondary schools in Bomet County, Kenya"***; *for* the period ending 19th June, 2020.

Ensure, you present a copy of the research to County Director of Education-Bomet

This letter should be presented to the principal of the schools visited for the said purpose.

COUNTY DIRECTOR OF EDUCATION BOMET P.O. Box 3-20400, BOMET

INDIATSI MABALE
COUNTY DIRECTOR OF EDUCATION
BOMET COUNTY.

CC
DIRECTOR NACOSTI

Appendix X: Authorization to pilot instruments letter from Nakuru County Education Office

MINISTRY OF EDUCATION

STATE DEPARTMENT OF EARLY LEARNING OF BASIC EDUCATION

Telegrams: "EDUCATION",
Telephone: **051-2216917**
When replying please quote
Email:cdenakurucounty@gmail.com
Ref.CDE/NKU/GEN/4/1/21 VOL.VIX/103

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

1st July,,2019

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION – PHILIP **KIMUTAI KIRUI**
PERMIT NO. NACOSTI/P/19/70854/30322

Reference is made to letter NACOSTI/19/70854/30322
Dated 19th June, 2019

Authority is hereby granted to the above named to carry out research on ***"Influence of selected school characteristics on cost efficiency of public Secondary schools in Bomet County, Kenya"*** for a period **19th June, *2020.***

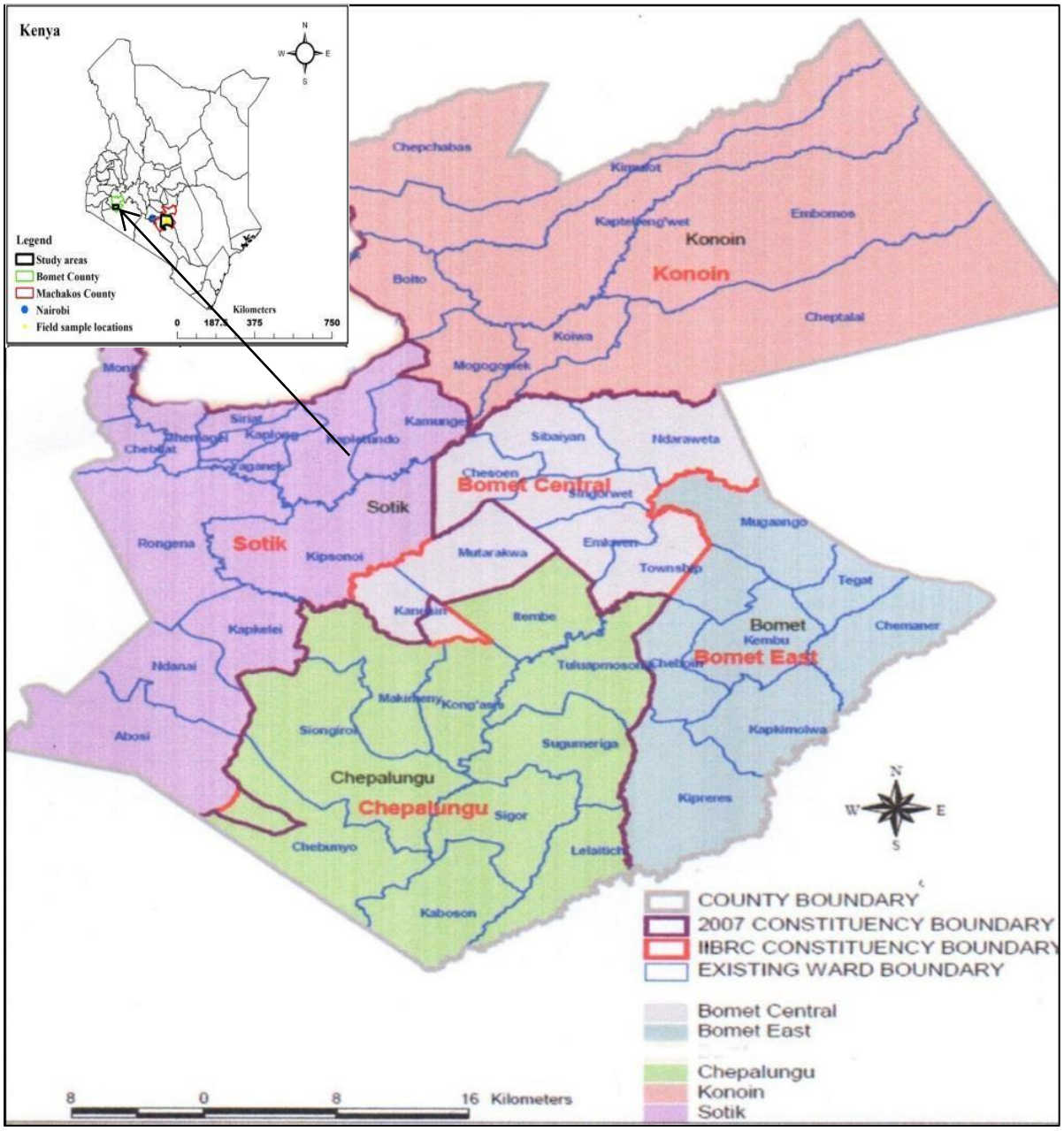
Kindly accord him the necessary assistance.

RUTH KAMAU
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU

Copy to:

- Egerton University
  P.O Box 536-20115
  NJORO

Appendix XI: Map of Bomet County Showing Administrative Boundaries



Appendix XII: Snap shot of Journal Article

European Journal of Education Studies

2501 - 1111
└: 2501 - 1111
Available online at: www.oapub.org/edu

DOI: 10.46827/ejes.v11i7.5432 Volume 11 | Issue 7 | 2024

LOCATION AS A CORRELATE OF PRINCIPALS' PERCEPTIONS ON COST EFFICIENCY IN PUBLIC SECONDARY SCHOOLS IN BOMET COUNTY, KENYA

Philip Kimutai Arap Kirui, David Kuria Wamukuru, Flora Fedha
Egerton University,
Kenya

Abstract:

Most public secondary schools in Kenya do not have adequate funds to meet the demands of providing education to learners. These financial challenges call for cost efficiency management of resources in schools. However, this has not been the case, as evidenced by the low cost of efficiency in schools in Bomet County. The low-cost efficiency could be due to the school's location, given that it has been cited as one of its correlates. This inquiry explored the relationship between school location and principals' perceptions of cost efficiency in public secondary schools in Bomet County, Kenya. The study employed a correlational research design. It utilised purposive, stratified, proportionate and simple random sampling techniques to choose 5 Sub-County Directors of Education (SCDE) and 175 principals who participated in the study. Data was gathered using a principals' questionnaire and SCDEs' interview guide. The Chi-Square test was used to determine the relationship between school location and principals' perceptions on cost efficiency. The findings indicated that over three-quarters (76.4%) of the schools were located in rural areas, while the rest (23.6%) were situated in urban settings. The results also indicated that the majority (74.8%) of the principals perceived that the cost efficiency of schools was low, while the others were of the view that it was moderate (20.3%) and high (4.9%). The SCDEs believed that school principals adopt cost reduction and saving strategies. However, they did not explain how these strategies affected cost efficiency. Further, the results revealed that the relationship between school location and perceptions of cost efficiency was statistically significant, $\chi 2$ (2, N = 143) = 8.25, $p < .05$. The study concludes that most public secondary schools in Bomet County are located in rural areas. Their cost efficiencies were perceived to be low. The study also concludes that school location correlates with cost efficiency perceptions and a pointer that it affects principals' management of school resources.

Keywords: correlate, cost efficiency, location, perceptions
Correspondence: kiruibilly@gmail.com

Appendix XIII: Snap shot of Journal Article

Journal of Education and Practices
http://journals.essrak.org/index.php/education

Journal of Education and Practices
Vol 4 Issue No.1. July, 2024. PP 24-35. ISSN 2617-5444

RELATIONSHIP BETWEEN SCHOOL ACCOMMODATION STATUS AND PRINCIPALS' PERCEPTIONS ON COST EFFICIENCY OF PUBLIC SECONDARY SCHOOLS IN BOMET COUNTY, KENYA

Philip Kimutai arap Kirui, David Kuria Wamukuru & Flora Fedha
Department of Curriculum Instruction and Educational Management, Egerton University, Kenya

Corresponding Author's Email: kiruibilly@gmail.com

Abstract

Public secondary schools in Kenya are expected to operate cost-efficiently. However, the cost of education in many public secondary schools in Bomet County remains high, indicating potential cost inefficiencies. Grounded in the cost efficiency theory and the principal-agent theory, this study investigated the relationship between school accommodation status and principals' perceptions of cost efficiency in public secondary schools in Bomet County, Kenya. The correlational research design was adopted. Purposive, stratified, proportionate, and simple random sampling techniques were used to select five Sub-County Directors of Education (SCDE) and 175 principals. Data was gathered from principals using a semi-structured questionnaire, while information from SCDEs was collected through an interview schedule. The instruments were piloted in Nakuru County, yielding validity and reliability thresholds of 0.822 using Cronbach's alpha. Descriptive statistics, including frequencies and percentages, were used to analyse the data, while the Chi-Square test of independence examined the relationship between school accommodation status and principals' perceptions of cost efficiency using SPSS software. Results showed that 77.1% of principals were from day schools, 17.4% from boarding schools, and 5.5% from day/boarding institutions. Nearly three-quarters (74.8%) of principals perceived their schools' cost efficiency as low, 20.3% as moderate, and 4.9% as high. SCDEs were aware of cost-saving strategies employed by principals but did not explicitly state how this impacted cost efficiency. No statistically significant relationship was found between school accommodation status and perceptions of cost efficiency ($\chi 2$ [4, N = 143] = 2.121, $\rho > .05$). The study concludes that most public secondary schools in Bomet County are day schools, with cost efficiency perceived as low. Factors other than accommodation status likely influence principals' perceptions of cost efficiency. Recommendations include equipping principals with financial management skills to enhance schools' cost efficiency.

Keywords: accommodation status, cost efficiency, perception