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Utilization of School Infrastructure and Its Influence on Students' Academic Performance in Public Secondary Schools in Makueni County, Kenya

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Abstract

School infrastructure forms a major part of housing learners in learning institutions. Utilization of school infrastructure in sheltering students against harsh weather conditions facilitates better attainment of school goals. Academic performance of learners in public county secondary schools in Makueni County was low a reason to carry out this study. The purpose of this study was to determine utilization of school infrastructure and its influence on academic performance in secondary schools in Makueni County. The objective of this study was to establish the level of utilization of school infrastructure and its influence on student's academic performance in public county secondary schools in Makueni County. The study adopted a mixed methods research design, specifically a convergent parallel research design and was supported by Education Production Function Theory. Research instruments were questionnaires and interview schedules. Validity was achieved through expert judgment and reliability by test-retest technique. The target population was 60 county secondary schools, 60 principals and 1004 teachers. Simple random and stratified sampling techniques were used to select the schools while systematic and purposive sampling was used to sample teachers and principals. The selected sample was 30 county schools, 30 principals, and 286 teachers. Total number of respondents was 316. Descriptive and inferential statistics (means, percentages, and multiple regression) and thematic analysis worked out the level of utilization of school infrastructure on students' academic performance. Multiple regression showed that Utilisation of school infrastructure showed moderate means of 3.86, which revealed moderate influence existed between its utilisation and students' academic performance. Qualitative data revealed different themes meant that effective utilization of school infrastructure positively influenced students' academic performance in county secondary schools in Makueni County. Major conclusion was that there was needed to ensure effective utilisation of school infrastructure in order to improve academic performance. This study would provide important information useful to education policy makers in formulating additional policies leading to effective utilisation of school infrastructure in secondary schools.

Keywords: *Utilization, school infrastructure, students' academic performance*

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1. Introduction

Resource utilisation is the examination of the effectiveness of resources provided in an institution and is expressed in a percentage (Kitowska, 2018). Resource utilisation is vital in the functioning of schools because it is key to ensuring projects' success and helps to reduce waste, it ensures smooth running of operations and enhances better achievement of institutional

goals. It is also crucial in making sure students attain quality' academic performance (Kapur, 2019). Resources-utilisation in educational institutions is justified by both economic and social returns reaped from investment in education (Woodhall, 2004).

Investing a lot of money in educating the population is important in nurturing the next generations and is necessary for poverty reduction and helps to stop preventable ailments to a great extent (Education, 2022). Investing in education is essential in enhancing the survival rates of mothers and children for minority groups and vulnerable populations living in slums and remote areas. Some researchers have shown that approximately 420 million human beings could be raised from poor living standards if all adult people finished their education in secondary schools. Further, this lessens the total number of people living in poverty by three-quarters in the whole world. Moreover, one more year of schooling improves the earnings of the male population by not less than 10% and that of the female population by at least 20% (Education, 2022).

Globally, Education stakeholders and policy makers have overly continued to stress how to improve both the quantity and quality of education provision. This new administration has comprehensively considered Goal 6, of the Framework for Action embraced at the 'World Education Forum on Education for All (EFA)' which happened in Dakar, Senegal, in April 2000.

Upgrading all matters of education quality and guaranteeing excellent performance of all learners, enables attainment of relevant and effective learning achievement by all, particularly in English, math, and basic life skills (UNESCO, 2000:43).

Thus, many education decision makers have continued to pay strong emphasis on the quality of schooling achievement. The outcomes of educational achievement are connected to several school elements such as the surrounding school community or the actual learning in the classroom. Also required are the teachers, physical resources for teaching, and real instructional practices. The association between these four key areas in examining education quality of a learning institution, or the whole sector of education has therefore been outlined in the model grounded on System Theory (Scheerens, 2000).

Several scholars have operationally defined education quality in different ways as stated by UNICEF (2000), detailed in Education for All (EFA) context, education quality would involve attributes like: - health of the pupils, good feeding and getting support from their families and the society. Moreover, secure learning environments, equity and equality in the education sector, sufficient education resources, and qualified educators also matter greatly in improving education quality. Besides, facilitation of effective assessments and application of good education programs are fundamentals for acquisition of skills in reading, mathematics and basic life skills. Further, information on prevention of diseases including HIV/AIDS, improved nutrition and fairness improve students' academic achievement.

There are myriads of challenges experienced in majority of the developing nations that inhibit effective achievement of the Sustainable Development Goals and especially goal 4 in education, some of which include low enrolments, lack of adequate institutional resources, poor standards of education as well as low learners' academic performance (Clark, 2013). To minimize the provision of low-quality education in Sub-Saharan African countries UNESCO (2014) advocates that these challenges should be addressed by increasing access to educational institutions, and providing adequate teaching and learning resources. The UNESCO (2015) in Sustainable Development Goal 4, urges countries to make sure that their people attain education of good quality and the opportunity for lifelong learning. Access to good quality

education in children improves their welfare by making it possible to grow well, have successful lives and develop with positive attitudes and capabilities. They gain authority to handle daily challenges and make informed decisions. According to UNESCO (2015), Sustainable Development Goal 4, one of the targets, reveals that education is a basic human right for everyone and by 2030, all countries should ensure that every child complete free equitable and education of high standard in basic education that contributes to improved academic outcomes. As they finish their basic education, they attain good standards of ability and skills in linguistics and arithmetic. Therefore, there is increased demand for secondary education witnessed in many developing countries. For this reason, the issue of resource utilization in relation to academic performance becomes vital (UNESCO, 2011).

The Global Monitoring Report (2014) showed that the cost of 250 million learners in the whole world failed to achieve the minimum proficiency in learning, interpreting this as a loss of an approximate calculation of $129 billion. Overall, 37 states were at a loss of approximately half the amount used on elementary education as pupils were failing to learn. On contrary, information revealed that making sure there was inclusive, standard education for all learners, gave rise to very economically stable citizens and improved state's gross domestic product per capita by 23 % in 40 years.

In the wealthy nations, the systems of education were unable to meet the expectations of the minority groups. In New Zealand, majority of the learners from the rich and the well to-do socio-economic backgrounds attained at least minimum proficiency in learning and mathematics in the 4th and 8th grades, and only two-thirds of the disadvantaged learners achieved the minimum standards. The migrants in developed nations also failed to achieve quality education: in France, given as an example, less than 60 % of the settlers had achieved the minimum proficiency in reading.

The same information disclosed that to attain education of high value for every student, nations should supply adequate qualified instructors and construct spacious and permanent classrooms, good dormitories, adequate lavatories and provision of balanced food, safety and medical care. The same information also called for the necessity to deal with violence against gender in learning institutions, a key obstruction to provision of inclusive and quality education. This also paid special attention to the plans that enhanced effective assessment and inclusion of all learners in learning (UNESCO, 2014).

Among many Sub-Saharan African and Asia countries, it was approximately that 84% of classes had more than 40 students per instructor, thus the learner-teacher ratio was more than 40:1 in these growing states, which was a disturbing situation (UNESCO, 2006). Sub-Saharan Africa was leading with the highest learner-teacher ratios in the following states: Ethiopia and Malawi with 70:1, Mozambique 67:1, Rwanda 65:1, Mali 55:1 and Congo with a student-instructor ratio of 54:1 in that descending order. Afghanistan had the greatest pupil-educator ratio of 83:1 among the South Asian countries followed by Bangladesh 50:1 and Cambodia 50:1. (UNESCO, Institute of Statistics, 2008). The elevated student teacher ratios in majority of the growing countries were caused by escalation of enrolments in pursuit of attaining free universal basic education and the enlarging shortfall of teachers. This shortage of teachers and enlarging admissions of pupils contributed to the teachers coming across acute problems of managing congested classrooms, which were uncontrollable besides educators' inability to include all learners in the teaching and learning process. These great enrolments had led to underutilization and inefficiency of school buildings in our learning institution which was a major cause of learners performing dismally in majority of the public basic education institutions in the growing nations (UNESCO, 2006).

According to the GoK (2019) the basic education statistical booklet, revealed that all classes in primary and secondary schools were 213,786 and 68,541 respectively. The mean number of pupils per class in primary schools was 40 and those in secondary schools were 45 students per class. From this information, the Kenyan government appeared to be above the approved student-to-class ratio, when compared to the OECD countries standard of a mean of 23 students in a class. Nevertheless, discrepancies seemed to prevail in the total number of students in a class at secondary level in Kenya. Other countries which had accessible information of classrooms with less than 20 learners, included the Russian Federation, Latvia, Finland, Poland, Lithuania and Estonia. Furthermore, there was also data from Japan and Costa Rica with over 30 learners in a classroom (OECD, 2021). This data showed that some developed countries too, had similar issues of congestion in classes in their learning institutions, leading to over-utilization of the number of teachers employed.

In this regard, Kenya is not an exception in having over-crowded classrooms and inadequate qualified teachers, especially this time when she is implementing the policy of one hundred transition from primary to secondary schools. This had compromised high enrolments with provision of good quality education. The Government of Kenya (GoK) (2007) asserts that under-utilization and over-utilization of resources exist side by side with several learning institutions having few registered learners and others with many registered learners. Researchers like PRLog (2012) have maintained that much research needs to be conducted on utilization of education resources and the quality of learners' academic outcomes in public secondary schools. As a result, this research was determined to ascertain if utilization of institutional infrastructure influenced learners' academic performance in Makueni public county secondary schools.

According to Organisation for Economic Cooperation Development (OECD) (2021), provision of quality education in particular is a matter of supplying suitable professional expertise, gender equality, providing the right school physical facilities and instructional resources and awarding schooling grants.

1.1 Problem Statement

In Kenya, information from KNEC has shown that there had been a declining number of candidates who had attained the minimum university entry grade, i.e., C+ and higher from 2016 to 2019. In 2016, those who managed to score C+ and above were 15.41%, which dropped further to 11.38% in 2017, in the year 2018, candidates who achieved the minimum university entry grade formed 13.69%. The performance by both sexes was almost alike, for example in 2018, only 16% of the boys and 12% of the girls attained the C+ and higher to join universities. However, there was a slight improvement of 18.04% in 2019. Additionally, in the year 2019, many learners who had scored an E score dropped by 5.39%., which had more male students than female ones (Ministry of education, 2020). This tendency of students achieving dismal performance as shown by many secondary students in Kenya needed to be addressed, taking into consideration the high amounts of funding has been allocated and utilised in the education sector. Therefore, it is from this proposition that this present research was put down to determine how utilisation of institutional infrastructure constructed in the schools could influence students' academic performance in public secondary schools in Makueni County.

1.2 Objective and Research Hypothesis

To establish the level of utilisation of school infrastructure and its influence on student's academic performance in county secondary schools in Makueni County.

$H_0$1. Utilisation of school infrastructure has no significant influence on students' academic performance in county secondary schools in Makueni County.

2. Literature Review

2.1 Theoretical Framework

This study adopted Education Production Function Theory whose proponent is Samuel Bowles of 1970. Education production Function Theory states that there is a connection between the inputs provided in institutions of learning, which through some process, are related to the measure of the school outputs produced i.e., students' academic achievement. School inputs that are considered in this study include text books, school infrastructure, teachers, and instructional materials. When these resources are exposed to certain processes and activities, the outputs produced are the function of the school environment, the suitability of the instructional materials, the quality of the teacher resources, the quality of the teaching services provided including their qualifications and teaching experience, variables which represent the ability of students, entry behavior, influence of out of school factors and the period learners have used the inputs. The theory outlines how students access institutions of learning with different characteristics and from various socioeconomic statuses to learn, and then through the activities and processes of teaching and learning, they graduate with the knowledge, skills and other important attributes. This knowledge enables them to survive satisfactorily in society, making informed decisions, knowing their rights and engaging in both social, technological, and economic growth. The government provides the resources, while the community provides the learners, so through the process of utilisation of these resources (infrastructure) in schools, students learn and attain many good qualities which enable them to comfortably join the world of work and live better lives.

The Education Production Function reveals that the number of minutes a teacher has been in class interacting with the learners and supervising them is a function of the amount of knowledge and concepts that have been internalized by those particular learners. This is linked to quality growth in student attainment. This theory is linked to using different school inputs that give rise to a given set of school achievements (for example students finally acquiring educational success in examination results) (Harris, 2010). Thus, KCSE students' academic results improve after some length of time of effective utilisation of institutional resources.

2.2 Empirical Review

2.2.1 Utilization of school infrastructure and its influence on students' academic performance

Kapur (2019) in his study on development of infrastructure in schools confirmed that the word infrastructure is very broad and there are several features considered when defining it, they include-: computer centres, playgrounds, equipment library resources, laboratories, technology, classrooms, machinery, and tools.

A study done by Adede (2012) on 'Impact of school infrastructure on provision of quality education in public secondary schools of Nyakach sub-county', Kenya, used a descriptive survey design. A target population includes 3361 form three students and 48 school managers. 351 respondents formed the sample size. Proportionate sampling was used to choose the sample size, and both quantitative and qualitative data were involved in the study. The research showed that school plant is a major foundation in provision of quality education in all categories of learning institutions. School infrastructure include the following: science laboratories, dormitories, classes, the computer laboratory, sanitation facilities, the halls, and the school

library. Classrooms are utilised every day for instruction, group discussions, and in doing class assignments. The libraries are used for individual study and for students to search for information. The fields are made used for ball games, athletics and other activities. Teachers and students use the other school infrastructure for the right uses. School infrastructure is very important in providing shelter and comfort when teaching and learning is taking place and in enhancing the standards of education provision. Different learning institutions have various levels of buildings that are used for effective implementation of the curriculum. The study alleged that increased learners' test score is related to optimal utilization of the available well-built school infrastructure. According to Irfran (2014), school infrastructure are resources that are available in an institution in the form of buildings.

In accordance with Teixeira, Amaroso & Gresham (2017) in their study on why Infrastructure in Education for Learning Matters referred it to be laboratories, buildings, equipment and classrooms. Infrastructure in schools are pivotal components that create a conducive environment for learning in both basic education and higher institutions of learning. There is compelling confirmation that standard well-built school buildings improve teaching and learning and minimize the rate of dropping out, amidst many other advantages. For instance, research done recently in the U.K. revealed that both a conducive learning environment and well-designed components of the institutional infrastructure made a 16 % improvement in pupils' academic performance in primary schools. This study also revealed that school buildings designed in style impacted positively on learning in three interconnected elements namely: the natural environment, school beauty and willingness to provide a conducive environment for learning.

In consonance with UNESCO. IIEP Learning Portal (2005) utilisation of classes is computed by dividing students' entries by the total number of classrooms. The capacity in a class is hard to designate when teaching and learning hours are arranged with few learners in groups that can vary in size based on the studied topics. In upper secondary schools, where learners could be organised in various classes determined by classroom computation, a contrast between classroom capacity and field of study should be studied with care.

Several schools in various groups of houses in rural areas were persuaded to willingly unite so that they could stick to the least learner-classroom ratios in primary schools and ensure quality education is provided (Giordano, 2008: 82).

Conforming to Teixeira, Amaroso & Gresham (2017), learning institutions in Romanian poverty-stricken zones encountered significant investment requirements in the nation, which implicated those learners going to these learning institutions were twice as underprivileged. Such learners mostly hailed from poor and countryside households that accessed ill-equipped schools. For example, country side secondary schools that did not have laboratories for science subjects formed 72% and almost 40 % of them lacked internal lavatories. Nevertheless, despite the institutions of learning being in municipalities that had more education facilities than those in agrarian zones, a majority had congested classrooms. The ratio of students was 1:4 in town regions who accessed congested learning institutions, mostly with alternating work timetables. Classrooms that were overcrowded, led to underutilization of instructional practices. This study by Teixeira, Amaroso and Gresham was in agreement with current research which was set to establish the extent to the utilisation of education resources and students' academic performance. Barrett and Shmis (2019) reported that having school buildings that was adequate and with spaces in desirable condition, encouraged children and youth living in remote areas to enhance attendance, motivated both learners and instructors and led to expected academic results.

According to the EFA Global Education Monitoring Report Team (2005), there were several concerns about what made contrasts in increasing education quality in learning institutions. A single deduction was that there were remarkable opportunities that enhanced the methods in which people and physical resources were supervised and utilised in institutions of learning, admitting that educational institutions are a complicated society that works inside a broader physical, social, and political setting.

According to Collins dictionary, a classroom is a room, as in a school or college, where classes are held. It is any place where one learns or gains experience. Teachmint (2020) defined Classroom as a specially planned room where students can be taught with no interference. It is expected that learners remain quiet and obedient in class. A classroom also utilizes adaptive learning technology techniques to improve the standards of education for the students. It makes learners who have been deferred to catch up easily with the learning.

According to Organization for Economic Cooperation and Development (2021), in primary schools, the mean class -to- pupil ratio was 1: 21 pupils in OECD nations. There were less than 28 learners in classrooms in almost majority of the states with data available, apart from Chile which had 31 learners per class. In junior secondary schools, the mean class -to- pupil ratio was 1: 23 learners in OECD states. A round all nations with data available, it differed from less than 20 students in a classroom in Latvia, Estonia, Poland, Finland, Lithuania and the Russian Federation to more than 30 students in a classroom in Japan and Costa Rica. In both primary and lower secondary schools, students in one classroom had a tended to grow. Learners in Costa Rica increased by 17 in one classroom. Alternatively, in the United Kingdom and, to a smaller extent Hungary, Chile, Australia, and the Russian Federation, the ratio of learners to classroom declined in both primary and junior secondary learning institutions.

The number of students in a classroom is an element put into consideration by parents when selecting a learning institution for their youngsters. Therefore, the contrast in the mean size of a class in both public and private education institutions (and amid various categories of particular schools) could increase the number of students in one class.

A study done in South West Nigerian Vocational and Technical colleges by Ibukun et al (2011) established that a relationship existed between hours, rooms and utilisation of physical materials as viewed by student learning achievement. The study adopted the descriptive survey research design. The sample size for the study was 687 learners. Simple random and stratified sampling techniques were used in choosing the sample. A questionnaire for learners was the tool used for data gathering. The data gathered were analysed by use of Pearson Product Moment Correlation and Multiple Regressions. The four hypotheses were computed at a 0.05 significance level. The study showed that physical and material resources were very few and lacked enough and standard workspace like classrooms, workshops, laboratories, lecture theatres for training the students. The research also alleged that majority of the physical infrastructure was optimally used, which improved the learners' academic performance. A significant relationship between utilisation of materials and students learning achievement existed. There was a significant relationship between hours, capacity, and physical facilities use as viewed by learners learning achievement. This study was of the same accord as that of Niklas, Hogstrom, & Wallin (2022) who indicated that regular laboratory utilisation significantly enhances science subjects' skills and knowledge. Additionally, Laboratory use acts as a catalyst to improve understanding of science concepts which improves test scores in the subjects.

There was a dissimilarity between this study by Ibukun et al (2011) and Pareek (2019) who carried out a study to assess the accessibility and usage of laboratory resources for teaching science subjects in public secondary schools in 33 districts of Rajasthan, in India. The method used was descriptive survey design. A stratified random sampling design was used to sample the study subjects which included principals, teachers, and students. A total of seven public secondary schools were selected from 33 districts. Questionnaires and focus group discussions (FGDs) for principals, teachers, and students were utilised to collect data. The result of the study showed that majority of the learning institutions that took part in the study none, had isolated laboratories for science. Further, the study acknowledged that majority of the educators had challenges while doing science practicals because classrooms were congested and science resources were insufficient. More reports affirmed that evaluation of science laboratory practical activities was hardly done. Such activities failed to link directly to the high value of learners' academic achievement in science subjects.

According to Fibiger (2023), a laboratory is a Place where scientific experiments are conducted, research and development are carried out and analysis is done. Zengele & Alemayehu, (2016) did a study on the level of Secondary School Science Laboratory practicals that enhance the standard of Education in Wolaita region, Southern Ethiopia. The study also aimed to determine the practice and challenges in science laboratory experiments in the secondary institution of Wolaita region, Nationalities and People's Region, Southern Nations. This research was done in five public secondary schools from Wolaita region. A purposive sampling method was used to choose the study respondents which included secondary learning institutions and Woreda education offices. A systematic sampling method was used to pick out teachers in secondary schools while vice principals, principals, and Woreda education supervisor experts were picked by purpose sampling method. Primary data were collected from 114 instructors, 8 laboratory technicians, 10 school heads, and 235 learners by use of questionnaires, interview schedules and observation guides. Secondary data were gathered by use of document analysis. Secondary data collected were laboratory reports, annual plans, and annual reports. The data were analyzed by use of means and percentages. The study findings alleged that the present level of laboratory experiments in Wolaita region secondary learning institutions was below average for instruction of science, and there was low utilization of laboratory equipment and reagents. Moreover, there was a shortfall of training sessions for teachers and trained laboratory technicians, low morale and negative attitude of educators towards regular practicals and poor assessment strategies on science experiments which contributed to dismal learner academic achievement. This study by Ibukum et al (2011) had similar opinions to Zengele and Alemayehu (2016) who showed that both teachers and learners had negative perceptions of the subject and underutilization of science equipment was common, contributing to poor academic results. This is not in line with the current study which had the opinion that effective use of science-related subjects leads to improved students' academic achievement.

Niklas, Hogstrom, & Wallin (2022) did an organised study on laboratory utilisation in secondary learning institutions using a mixed-methods research design specifically a demand-driven approach from 1996 to 2019. The main purpose of the research was to establish the major features leading to effective utilisation of science laboratories in enhancing instructional practices in science subjects in government-sponsored secondary schools. Teachers are sampled as the main respondents. The sample size was 39 studies. The findings of the study recognized that regular laboratory utilisation significantly improved science subjects' skills and knowledge. Additionally, Laboratory use acted as a catalyst to improve understanding of science concepts which improved test scores in the subjects. However, learners were likely to

understand similar science concepts and came across the same problems as they went through additional theoretical learning activities.

On the same note, Hofstein and Lunetta (2004) have indicated that laboratory studies provided vital opportunities for learners that linked scientific knowledge with the theories after having hands-on the equipment and reagents. In agreement was Furtak e t al. (2012) who did a meta-analysis investigation on the effect of using problem-solving technique in teaching and sampled 37 studies out of 22 articles. The research confirmed that teaching using inquiry method had a moderate influence on learner academic achievement. On the same opinion, Heindl (2019) in a meta-analysis of 13 studies researched on the success of a learning process. The study engaged students by making real-life connections through exploration and high-level questioning in learning science subjects and revealed that there was a connection to better achievement of the science concepts. This was due to the use of learning by problem-solving strategy which was in contrast to teacher and chalk pedagogical methods used earlier. The technique of learning by use of inquiry-based strategy was more widely utilised in secondary education than in primary schools, and the largest impact on learning was recognized to bet the time taken in prior arrangement on planning the problem-solving lesson (Heindl, 2019).

A study conducted by Etiubon, & Udoh (2020) on Availability and Utilization of Laboratory Facilities for Teaching Carbohydrates in Senior Secondary Schools in Uyo Education Zone, Akwa'. This research used the descriptive survey research method. Three research questions and three research hypotheses were prepared for the study. Questionnaires were used as the research instruments and a sample size of 215 chemistry and biology instructors was purposively chosen from a study population of 218 in the academic period 2018/2019. The research instruments were validated by expert judgment and reliability through a split-half technique where a coefficient of 0.88 was achieved. Analysis of data was done by use of standard deviation, mean, and independent t-tests. The research findings alleged that limited laboratory materials were obtainable, however, they were seldom used by educators of biology and chemistry. Further, chemistry and biology instructors were to be given advanced training on better utilization of laboratory materials in higher secondary schools in Uyo Education Zone. Majority of the literature reviewed on utilization of laboratory materials showed that many of the researchers adopted descriptive survey methods in conducting their studies while the current study adopted mixed methods specifically convergent-parallel research design.

Laboratory resource utilization is the recurrence of use of the attainable laboratory materials when conducting laboratory practical. The research conducted by Etiubon, & Udoh (2020) had the same opinion as Adebisi, Tewogbade and Olajide (2017) who affirmed that laboratory resources should be supplied in sufficient quantities, however, utilization is hardly ever done when teaching science subjects and hence demonstrated intense necessity to use teaching and learning resources in instruction. Teaching and learning resources also referred to as education materials are means that transfer knowledge and notifications from a (place of origin, broadcasting station, and teachers) to the other edge which accepts (learner). This information was agreed with Anyadiegwu (2018) who investigated the level of laboratory materials usage on learners' academic achievement in science subjects and reported that learners who regularly made use of laboratory resources at the time of teaching and learning science attained better grades than those who had limited knowledge in laboratory exercises. Similarly, Neji and Nuoha (2015) discovered that utilization of equipment in the laboratory in government secondary schools demonstrated that 74 percent of the instructors used laboratory materials in instruction in science subjects, while 26 percent of the educators failed to use laboratory resources. The results once again showed that laboratory materials positively increased

students' academic test scores in science subjects. Majority of studies were conducted by use of descriptive survey design while the literature reviewed has shown that utilization of the laboratory is a key factor in enhancing the achievement of the learning concepts in science subjects, which in the end improves the learner's academic performance. It is from the above studies that encouraged the current study to be done in to establish the extent of utilization of the laboratory resources on academic performance of students in public schools in Makueni County.

A school library is a building within a school where learners, teachers, non-teaching staff and school community can read, borrow, discuss and search for information from various information resources. A library in schools aims to make sure that all members of the society surrounding the school can use the library materials to search for information, do a private reading, have group discussions, and lending of textbooks, and in utilisation technology resources. A school library has both hard and soft copies of different learning resources while others have Wi-Fi and utilize the Internet besides reading books to acquire information. School libraries are different from public libraries as they function as information banks which support the achievement of some learning needs of learners and in supporting some school programs. A school library functions as the focal point in synchronizing all teaching and learning activities done in the learning institutions (Wikipedia, 2020).

According to Vichea et al, (2018) defined a library an assemblage of reading resources or journals stored categorically for research work, renting books, references, individual reading, and accessing ICT materials. Several elements of library utilisation are integral in ascertaining the performance of students at a learning institution and hence, this study was set to examine the effect of regular utilisation of the library and the studying approach on learners' academic performance. The questionnaire was the study tool for collecting data and a sample of one hundred respondents were selected. The study adopted a descriptive survey design. The research findings revealed that a positive relationship existed between regular use of the university library and academic achievement of students. Moreover, the findings of the study indicated that the library has many advantages that influence the way of learning and create a positive attitude towards studies.

Several researchers have shown that utilisation of school libraries led to improved learner achievement. Above 60 studies which were done in 19 United States nations and one Canadian province have confirmed that learners in elementary schools who have highly equipped school library programs and qualified school librarians achieved better scores on assessments in reading despite coming from poor environments with most of their parents not employed. Further, another study carried out in Ohio argued that 99.4 percent of learners interrogated had a strong trust that librarians play a key role. A similar information that had the same inference was described in Australia (Lonsdale, 2003).

The school library is important in providing various opportunities for teaching large groups of people and also small groups of individuals whose center of interest is on growth of intellectual knowledge and data on reading. Students and teachers together go to the school library while learning is taking place to occupy and utilise the learning space for students. School libraries function as a central location for all of the information available, and a school librarian functions as the key reading guide to all the resources available in the school library (Felmly, 2010).

Marzoli1 & Papa (2017) carried out research to find out if there was any relationship betweeen school libraries and learner academic performance in Italy using a sample of 9896 in learning

institutions. Majority of the global studies had established that there were many benefits accrued from optimal utilisation of school libraries by students who were studying. Not a long time ago, a survey by the 'IEA PIRLS' had reported a significant association between the performance in reading comprehension by students and the capacity of the collections in the school library. In this particular study, the relationship between the findings of INVALSI examination in Italian and Mathematics - in institution's 5th, 8th and10th grades was based on the availability and utilization of the school library. A questionnaire, which was composed by institutions' principals was used to gather data on the school library during the Self-evaluation review. The findings revealed that improvement was realized in all the grades in the school as well as in the investigated subjects due to optimal library utilisation.

Accordingly, Ogunleye (2016) did research on the utilisation of library and learners' academic performance at Lagos University, Nigeria. A descriptive survey research design was employed for the study and a study sample of 120 learners was randomly chosen. The hypotheses were tested at 0.05ignificance level. The study results alleged that regular use of the university library enhanced academic performance of students. Additionally, the research confirmed that a relationship existed between counseling of students and utilisation of the institutions' library. This study by Ogunleye (2016) had similar opinions as that conducted by Marzoli1 & Papa (2017) which showed that optimal library utilisation led to improvement in learning which was realized in all the grades in the school as well as in the investigated subjects.

Okpa**,** Asibi & Eruvwe (2022) conducted research on library use and its influence on academic performance of students doing bachelor's degrees in chosen university libraries in South-South, Nigeria. This study adopted a descriptive survey research design and three research questionnaires to direct the study. The sample size of the study was 300 students from the selected university. 300 questionnaire copies were supplied to the respondents, however, only 243 questionnaire copies were returned. By use of descriptive statistics an average and percentage mean score of 2.5 and higher and 50 percent were termed as realistic. The study findings showed that examination preparation, studying and research, are some of the advantages of library utilization in the university. Measures to enhance usage of the library to improve academic performance of students included provision of a reliable supply of electricity, availing modern books and provision of training to the students doing undergraduates studies on library utilisation. On the same opinion, Ayanlola (2014) investigated to determine the effect of school libraries on academic performance of students in Iwo Local Government Area of Osun State, Nigeria. Information was collected from records of English Language examinations which were taken by three SSS students. Data were analysed by descriptive statistics and analytical techniques using the t-test. The research findings indicated that there was a significant relationship between supply and use of school libraries in public secondary schools and this increased the quality of academic scores of learners. Thus, it is vital for all learners both boys and girls make regular use of the school library to improve on their learner's academic performance. The study by Okpa**,** Asibi & Eruvwe (2022) concurred with the research done by Ayanlola (2014) which showed that frequent utilization of library resources enhances students' academic achievement. This much reviewed literatures created the interest for a similar study to be conducted in Makueni County to ascertain if there would be a contrast or similarity.

A study conducted in Italy by Marzoli1 & Papa (2017) has concurred with Olajide and Kutu (2020) who did a study on the effect of school libraries on learners' academic outcomes in science subjects in town and countryside zones of Ekiti State, Nigeria. The research aimed to identify the benefits of science subjects to attain the economic development of the country. The

study adopted mixed methods design. The population of the research included school science students, science teachers, and librarians in secondary schools. The instruments for collecting data were questionnaires and observation/and document analysis. Information - West African Examination Councils (WAEC) findings gathered were computed to establish academic achievement of learners in science education in town and countryside regions of the nation, questionnaires were used as instruments to collect data which were calculated by employing 'the Statistical Package for Social Sciences (SPSS)'. The research findings showed that many of accessible and utilization of science library materials that influenced students' academic performance most was the science schoolbooks; and that school sites, being in (town and countryside regions) of the country did not have any effect on the academic performance of the learners. The research has highlighted the irregularity concerning schoolbooks as fundamental library materials in Nigeria, and advised the construction and equipping of more school libraries with textbooks in science subjects, besides daily usage, to achieve the dream of the nation's economic development.

The main purpose of setting up a school library was to assist learners in developing standard reading habits for their leisure, creating a positive attitude of sharing ideas in discussions, doing well in examinations and searching for information on contrasting views on life (George, 2011). A library is a storage of huge volumes and easily accessible information materials in various study disciplines categorically assembled for consumers. A school library is a very vital learning resource centre that helps learners as well as the school community with all-round growth. Users of the library use the library materials for various reasons including; examination preparation, reading for leisure, personal revision, and group discussions, while others use the library when doing assignments. Ogunbote and Odunewu (2008), alleged that frequent utilisation of school libraries enhanced the academic achievement of students as vehemently disagreed when they rarely utilised or even completely never used. It is very vital for students to optimally utilise the school libraries to give a conducive learning environment where learners can come across and grow both their capabilities and aptitudes besides improving their study skills. Accordingly, Busayo (2011) reported that a school library is an important area of the school system that can greatly improve the standards of schooling in every learning institution. It is hence a vital learning entity at all levels of learning. Institutional programs lacking libraries prevent learners from achieving academic excellence and always realize it is hard to carry out research related to education before entry into a tertiary level. Research linking to the relationship between utilisation of library resources and academic performance of learners by Anyadike (2000) found that students enhance their grades when they frequently utilise the institutional libraries than when they failed to. According to a study by World Bank (2008) on school library provision and reference books in secondary education in Sub-Sahara Africa, showed that libraries and textbooks were both insufficient and unfairly dispersed among the country-side and town schools within the locale. This led to underutilization in most of the rural areas and contributed to low grades. This study finding by World Bank (2008) agreed with Jean (2021) who showed that when libraries are not adequate, it leads to disinterest and low reading culture by the students, leading to very limited usage and a declined performance.

This part has looked at several literature reviews concerning library utilisation and academic performance of students. The studies contemplated various goals from contrasting areas of the globe and each and every study adopted different methods, approaches, and designs, however, a majority agreed that there is a significant relationship between library utilisation and academic performance of students. Conversely, the study aimed at learners in the 4th form in public county secondary schools, adopted a mixed methods approach, specifically convergent-

parallel study design, thus quantitative as well as qualitative methods of data gathering and analysis were employed.

According to UNESCO: UIS, a computer laboratory is a continuous area supplied with computers with pedagogical content; for teaching and learning in a learning institution. Teachers and learners should have authority over credentials to gain permission to access learning materials. A computer lab is a room in which computers connect to internet and provide services to particular people. Academic institutions and public libraries in general offer such services. There are rules and regulations that govern the users for the purpose of gaining access to the computers. There are several items and equipment that should be equipped in a computer lab they include computers, keyboards, monitors, modems, printers, speakers, scanners, disk drives, cameras, and multimedia projectors like Kyan, Chrome books, and Whiteboard (Wikipedia 2022).

Frigaard (2002) carried out a study to find out whether taking part in a computer lab would enhance learners learning outcomes on grammar, listening comprehension, and vocabulary in Spanish in senior schools. Students were involved in various activities in class and also in the computer laboratory. The study was conducted using student surveys in 5 subjects. The target population was the learners. Analysis was done based on information from students. The findings showed that the computer laboratory was advantageous to a few learners much more than others. Some learners' better-liked ground was on computer laboratory activities than on Spanish study Web site and a grammar teacher. Their best-liked activities in class were games and cards with Spanish words. Majority of the learners suggested having a teacher in the computer laboratory to improve their capabilities in learning. Almost all the learners were amused by frequent sessions planned in the computer laboratory. Majority of the students were convinced that their skills in listening in the computer laboratory increased greatly and made learning very enjoyable. Learners said that they liked most learning skills in listening in the computer laboratory and, at the same time, learning grammar and vocabulary in the classroom. Their achievement in learning was assessment marks for four units as follows; the learner survey, study in vocabulary, student survey finding for Spanish 2, and attainment in learner survey for Spanish 3. Thus, utilization of the computer laboratory improved outcomes on grammar and listening skills in Spanish. This finding agreed with the current study that optimal utilization of school resources would improve learning outcomes of secondary students in Makueni County.

A study done by Ibukum et al (2011) on utilisation of resources and the relationship on student academic achievement in chosen Technical and Vocational Education and Training colleges in South West Nigeria. The study employed a descriptive survey study design and a sample size of 687 learners. The sampling strategies used to choose the study sample included simple random and stratified sampling techniques. The tool used for data collection was a questionnaire for the students. Pearson Product Moment Correlation and Multiple Regressions were used to analyze the collected data. The study showed that majority of the infrastructure facilities were used effectively. Hours set aside for different activities in vocational and technical sector were optimally made use of apart from athletics, ball games and the forum for students. Students' academic achievement had improved as was expected. Use of school infrastructure strongly enhanced learning achievement of the learners. Space, time, and utilisation of infrastructure materials had significant relationship between learners academic performance.

2.2.2 Students' academic performance

Students' academic performance in the present study is the dependent variable. Academic performance is the quantification of student scores in different academic disciplines. Officials in education and educators in most cases compute attainment by making use of class achievement, results from standardized assessments and rates of graduation (Ballotpedia, 2023).

Lamas (2015) has reported that students' academic performance is a measurement that helps to show whether an institution is achieving its mission or learning, evidenced by grades. These grade include, cognitive knowledge and skills learners achieved after internal or external examinations. Academic performance of students is shown mostly by the grade achieved by learners after summative assessments, in this case KCSE. S*tudents' academic performance* ensures attainment of learning (*educational* goals). The *academic performance* entails elements such as personality, the level of intellectual value, skills, study behaviors and self-respect.

3. Methodology

3.1 Research Design

The study adopted mixed methods research design, specifically Convergent parallel research design (Creswell, Plano Clark, Guttmann & Harrison, 2003, Tegan, 2021). Convergent parallel research design entails collecting and analyzing data using qualitative and quantitative techniques at the same time in one study and analysis done separately. The research results are then compared, integrated and interpreted so as to confirm and cross-validate findings within the study (Creswell, 2003). The purpose of using convergent parallel research design in the context of this study is, it yields distinct but complementary findings on that topic and gives a better understanding of solving the research problem. The main reason for using mixed methods research design was to corroborate and triangulate the study findings (Creswell & Clark, 2011, Tegan 2021).

The independent variables are utilisation of school infrastructure. The indicators included utilization of classrooms, school library and computer laboratories. Chemistry, physics, and Biology laboratories. The dependent variable is students' academic performance, specifically the Kenya Certificate of Secondary Education (KCSE) results.

3.2 Target Population

The target population was all the public county secondary schools in Makueni County. The total number is 60. Teachers were 1004 and 60 principals. Mugenda and Mugenda (2003) reported that the whole group from where a sample is selected in research is supposed to have known properties that can be generalized to all the other related populations. The study sample was 316 respondents.

3.3 Research Instruments

The study used questionnaires, interview schedules and document analysis to collect data.

4. Results and Discussion

The objective of the study was to establish the utilisation of school infrastructure and its influence on students' academic performance. Information was collected from principals and teachers on utilisation of school infrastructure on students' academic performance.

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4.1 Teachers' responses on utilisation of school infrastructure on students' academic performance

The following responses on utilisation of school infrastructure on students' academic performance were given by teachers. The level of utilization of school infrastructure among the selected secondary schools was assessed through the use of Likert-itemed questionnaire which helped the respondents to rate the utilization of school infrastructure in various subjects. Using the rating on a five-point Likert scale ranging from very highly utilized (5) to very low (1) for utilization, the level of utilization of school infrastructure was gauged per building. For easy interpretation and applicability in inferential analysis, the responses were converted into a continuous scale ranging from 1 to 5, where higher scores represented very high utilization, and vice versa. Table 1 presents the findings on utilization of school infrastructure in mean and standard deviation.

Table 1: Utilization of school infrastructure resources

Utilization of school infrastructure resources		5		4		3		2		1		Mean	SD Dev.
		N	%	N	%	N	%	N	%	N	%		
a	Classrooms	106	42.4	66	26.4	24	9.6	53	21.2	1	0.4	3.89	1.182
b	Science lab	103	41.2	55	22.0	26	10.4	65	26.0	1	0.4	3.78	1.244
c	Chemistry lab	105	42.0	55	22.0	25	10.0	64	25.6	1	0.4	3.80	1.243
d	Biology lab	101	40.4	58	23.2	24	9.6	65	26.0	2	0.8	3.76	1.250
e	Physics lab	101	40.4	75	30.0	50	20.0	24	9.6	0	0.0	4.01	0.996
f	School library	122	48.8	96	38.4	17	6.8	15	6.0	0	0.0	4.30	0.842
g	Computer lab	46	18.4	110	44.0	37	14.8	24	9.6	33	13.2	3.45	1.267
	Overall mean											**3.86**	**1.146**

Source: Instruments.

Table 1 above revealed that although many county secondary schools in Makueni County, had not attained a good infrastructural resource, majority of them had an average infrastructural resource to student ratio, as reflected by an overall mean of 3.86 with a standard deviation of 1.146. This implies that, on average, the infrastructure-students ratio among the sampled schools was slightly below 4:5, meaning that about 80.0% of the students' population was accommodated by the available infrastructure.

As concerns the classrooms, the county secondary schools had not achieved good classroom resources which had a mean classroom-student ratio of 3.89 and a standard deviation of 1.182. This suggested that on average, classroom student ratio in the selected county secondary schools was a bit lower than 4:5, meaning that approximately 80% of the learners in the schools occupied the classrooms that were available.

Research done recently in the U.K. revealed that both conducive learning environment and well-designed components of the institutional infrastructure made 16 % improvement in pupils' academic performance in primary schools. This study also revealed that school buildings designed in style impacted positively on learning in three interconnected elements namely: the

natural environment, school beauty and willingness to provide a conducive environment for learning.

These findings agreed with Devi **(**2020) who alleged that in majority of schools that took part in the study, had no isolated science laboratories. Further, a good number of educators had challenges when doing practicals in sciences subject since most of the classrooms were congested with learners besides having limited science resources and reagents. Similarly, Adede (2012) reported that school plant is a major foundation in provision of quality education in all categories of learning institutions. School infrastructure includes the following: science laboratories, dormitories, classes, the computer laboratory, sanitation facilities, the halls, and the school library. Classrooms are utilised every day for instruction, group discussions, and when doing class assignments. The libraries are used for individual study and for students to search for information from the library materials. The fields are used for ball games, athletics and other activities. Teachers and students use the other school infrastructure for the right uses. School infrastructure is very important if providing shelter, comfort, and security when teaching and learning is taking place and in enhancing the standards of education provision.

According to the GoK (2016), In Kenyan public county secondary schools, the recommended classroom student ratio is 1: 41. However, many of the county secondary schools accommodate a higher classroom - student ratio as reflected by an overall mean of 3.86 with a standard deviation of 1.146. This implied that, on average, the classroom - student ratio among the sampled schools was slightly below the ratio of 4:5, meaning that at about 80.0% of the students' population were accommodated by the available infrastructure.

Table 2: Number of students accommodated in each class

	Frequency	**Percent (%)**
Below 41	48	21.8
41 and above	172	78.2
Total	**220**	**100.0**

Source: Instruments

From the above table, majority of the respondents (78.2%, N=172) said that classes in their school had more than 41 students. This implies that classes in county secondary schools of Makueni County are congested. This is as a result of the 100% transition policy. This leads to overutilization which affected effective teaching and had a negative influence on learners' academic performance. It's therefore necessary for the government to build more classes in these schools in order to accommodate the increasing student population.

Principals' responses on utilisation of school infrastructure

The study sought to determine the influence of utilisation of school infrastructure and students' academic performance. The responses were given through document analysis and interview schedule. One of the principals gave these remarks;

> *We have only one lab which is used for the three science subjects and even some of the equipment are in bad condition due to poor storage and mishandling. So, the laboratory is always in use, the classrooms have many students. However, they are trying their level, as their performance is average.* Principal 1.

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These sentiments showed that some of the school infrastructures are widely used and that is likely to have a positive effect on learner performance.

The Statistical Education Booklet by the Ministry of Education revealed that average size of a class is 41 students per class in secondary schools, however, different class sizes were evident in different counties and sub-counties (GoK 2016 p. 18). Most classrooms in Makueni County had more than the recommended class size, more than 41 students per class, probably because of the 100 percent transition that had taken a good course.

4.2 The influence of utilisation of school infrastructure and Students' academic performance in Makueni County secondary schools

H02. *Utilization of school infrastructure had no significant influence on students' academic performance in public secondary schools in Makueni County*.

The objective of the study was to determine the utilization of school infrastructure and its influence on students' academic performance in public secondary schools in Makueni County.

To investigate the influence of utilization of school infrastructure and students' academic performance in public secondary schools, the null hypothesis was determined by a Chi-square **(χ^2)** test, at 0.05 level of significance and 1 degree of freedom. The findings are shown in the table below.

Table 3: Results of the hypothesis

Independent variable	Hypothesis	Chi-sq. value	df	Chi-sq. p value	Sig. Value	Result	Decision
Utilization of school infrastructure resources	H01	201.67	5	0.000	0.05	0.000<0.05	H03: rejected

Source: Instruments

Table 3 indicates that a chi-square test of independence was computed comparing the frequencies of school infrastructure utilization and students' academic performance in public secondary schools in Makueni County. A significant interaction was found (X2 (5) =201.67, p<0.05). If the p-value achieved is less than 0.05, the null hypothesis is rejected and inference is arrived at that there exists a significant difference. If the p-value is larger than 0.05, a firm decision is made that there does not exist a significant difference. The p-value (0.000) is less than the significant level of 0.05. The null hypothesis was rejected and the alternative accepted. Table 4.13 shows that there is a significant influence between school infrastructure utilization and students' academic performance in public secondary schools in Makueni County. This implied that students' academic performance in public secondary schools in Makueni County was statistically influenced by utilization of school infrastructure resources.

However, to estimate the level of influence of utilization of school infrastructure on students' academic performance, a coefficient of determination was computed using the regression analysis and the result was as shown in Table 4.

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Table 4: Model Summary on Regression Analysis of Influence of Utilization of School infrastructure on Student's Academic performance

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.536[a]	.287	.261	.93844

a. Predictors: (Constant), school infrastructure

Source: Instruments

The model summary revealed that the level of utilization of school infrastructure accounted for 28.7%, as signified by coefficient R^2 =.287, of the variation in students' academic performance. This finding implied that variation in the level of utilization of school infrastructure explains about 28.7% of the variability in students' academic performance. This infers that other factors not studied in this objective contribute to 71.3% of student's academic performance in the county. This therefore meant that there were factors other than utilization of school infrastructure that contributed to students' academic performance in the county. To check how well the sample data fit in the regression model, an *F* value was obtained. The model summary of ANOVA is shown in Table 5 below.

Table 5: Goodness of Fit Summary for utilization of school infrastructure resources

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	68.753	7	9.822	11.153	.000[b]
	Residual	170.851	194	.881		
	Total	239.604	201			

Dependent Variable: School mean in 2022 KCSE

Source: Instruments

Predictors: (Constant), Computer lab utilization, Classrooms Utilization Biology Lab Utilization, Science lab Utilization, School library Utilization, Physics lab Utilization, Chemistry lab Utilization.

Table 5 above showed that utilisation of school infrastructure helped to explain variation in student performance. This was demonstrated by *F* value $F(7, 194) = 11.153$, $p < .05$ indicating that the model was justifiable for the regression equation. Accordingly, R^2 which was 28.7% was significant. A multiple regression check was done to examine the effect of utilisation of school infrastructure on student performance in Makueni County. This is shown in Table 6 below.

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Table 6: Multiple Regressions on utilization of school infrastructure and students' academic performance

Coefficients [a] Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.868	.615		6.292	.000
	Classrooms Utilization	.228	.171	.142	1.334	.184
	Science lab Utilization	.194	.157	.137	1.237	.218
	Chemistry lab Utilization	.023	.153	.018	.151	.880
	Biology lab Utilization	.039	.087	.042	.453	.651
	Physics lab Utilization	-.494	.108	-.497	-4.566	.000
	School library Utilization	-.553	.111	-.512	-4.990	.000
	Computer lab Utilization	.690	.148	.529	4.673	.000

a. Dependent Variable: School mean in 2022 KCSE

Source: Instruments

The standard beta coefficients in Table 6 above indicated that utilisation of classrooms explained 14.2% of variation in student performance holding the other factors constant. Utilisation of science laboratory explained 13.7% of variation in student performance holding the other factors constant. Utilisation of chemistry laboratory explained 1.8% of variation in student performance holding the other factors constant. Utilisation of biology laboratory explained 4.2% of variation in student performance holding the other factors constant. Utilisation of physics laboratory explained 49.7% of variation in student performance holding the other factors constant. Utilisation of school library explained 51.2% of variation in student performance holding the other factors constant. Utilisation of a computer laboratory explained 52.9% of variation in student performance holding the other factors constant.

The table further explains when the utilisation of classrooms (x1) increased by 1 unit, the academic performance (Y) increased by 4.096 units (3.868+0.228). When the utilisation of science laboratories increased by 1 unit, the academic performance (Y) increased by 4.062 units (3.868+0.194). When the utilisation of chemistry laboratories increased by 1 unit, the academic performance (Y) increased by 3.891 units (3.868+0.023). When the utilisation of biology laboratories increased by 1 unit, the academic performance (Y) increased by 3.907 units (3.868+0.039). When the utilisation of physics laboratories increased by 1 unit, the academic performance (Y) increased by 3.374 units (3.868-0.494). When the utilisation of school library increased by 1 unit, the academic performance (Y) increased by 3.315 units (3.868-0.553). When the utilisation computer laboratories of increased by 1 unit, the academic performance (Y) increased by 4.558 units (3.868+0.690). There is a need to enhance utilisation of school infrastructure to improve students' academic performance.

From the findings, it was revealed that utilisation of school infrastructure resources, influenced students' academic performance. From hypothesis two, it was realized that utilisation of school infrastructure had significant interaction ((X^2 (5) =201.67, $p<0.05$)). There was a positive

influence between utilisation of school infrastructure and students' academic performance in public secondary schools in Makueni County. Therefore, utilisation of school infrastructure affected students' academic performance in public secondary schools in the County.

4.3 Summary

The findings revealed that majority of the study respondents agreed that there is moderate utilization of school infrastructure in county secondary schools with a Mean 3.86, SD=1.146). This was from the teachers responses. According to the Likert scale rating, a mean of 1.0-2.9 is termed as low, 3-3.9 is rated as moderate, and a mean of 4.0-50 is termed high. Therefore, a mean of 3.86 was moderate in utilisation of school infrastructure among the candidates in county secondary schools in Makueni County. Utilization of school infrastructure had weak positive significant relationship with students' performance ((X^2 (5) =201.67, $p<0.05$). The R square value of 0.287 represents a simple correlation. It indicated a relatively weak degree of correlation. The adjusted R Square value of 0.261 indicated how much of the dependent variable, 'students' performance', could be explained by utilization of school infrastructure. In this case, 28.7% of student's performance variability could be explained to as a result of utilization of school infrastructure in public county secondary schools in Makueni County. The R square and adjusted R squared had minimal difference, implying that utilization of school infrastructure resources predicated students' performance. That meant that 71.3% of the variation in student performance could not be explained by utilization of school infrastructure. This infers that factors other than utilization of school infrastructure resources influenced the academic performance of the students in the county. Hypothesis 2 which stated that utilization of school infrastructure resources had no significant influence on students' academic performance in public secondary schools in Makueni County, was tested using a chi-square (χ^2) test at 0.05 significant level at 1degree of freedom. The results revealed that a significant interaction was found ((X^2 (5) =201.67, $p<0.05$), the p-value (0.000) was less than 0.05 therefore the null hypothesis was rejected and the alternative hypothesis accepted that there was a significant positive influence of utilization of school infrastructure resources and students' academic performance. Thematic analysis indicated that there was moderate utilization of school infrastructure in public secondary schools in Makueni County.

5. Conclusion

The findings confirmed that utilisation of school infrastructure in public secondary schools in Makueni County had a statistically significant influence on students' performance. The conclusion was that utilisation of school infrastructure was moderate in county secondary schools in Makueni County.

6. Recommendations for Policy and Practice

School infrastructure has been moderately utilised, and it was important for international bodies like GPE (Global Partnership for Education) together with MoE to improve and increase school buildings to enhance utilization and improve students' learning outcomes.

A similar study to be conducted on utilisation of school infrastructure resources in private schools to investigate the same objectives whereas another study should be done on utilisation of instructional materials as the findings showed moderate utilization and compare the findings.

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