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RESEARCH ARTICLE

INFLUENCE OF TEACHING AND LEARNING RESOURCES ON QUALITY OF SECONDARY SCHOOL EDUCATION IN KENYA: A CASE STUDY OF MIGORI COUNTY

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ABSTRACT

Studies worldwide have revealed that teaching and learning resources invested in the school system do enhance quality of education. In Kenya quality of education is measured by students' performance in education, availability, adequacy and utilization of resources. The extent to which teaching and learning resources influence performance in Kenya Certificate of Secondary Education is at variance. Thus in Kenya there are differences in the quality of education as some students perform better than the others. This study was based in Migori County, Kenya. Migori County was chosen among 5 counties surveyed because it had the lowest average mean score of 4.530 (D+) and between 2011and 2017 it varied from C- in 2011 to D in 2017 exhibiting poor quality education. The average national Kenya Certificate of Secondary Education examinations mean score from 2011 to 2017 varied from 5.207 (C-) in 2011 to 5.173 (C-) in 2012 and declined to mean score of D+ between 2013 to 2015. The national Kenya Certificate of Secondary Education mean score dropped to a mean score of 3.980 (D) in 2016 and declined to 3.734 in 2017 resulting in an average national mean score of 4.617 (D+) over a seven year period which indicated declining quality education. The objective of this study was to determine the influence of teaching /learning resources on quality of secondary school education in Migori County, Kenya. The study was anchored on Psacharopolous production function theory in education which relates inputs in education like teaching /learning resources to outputs in form of achievement measured by student performance. The study established that teaching/learning resources contributed 61.8% to quality of secondary school education as signified by the Adjusted R square coeficient 0.618. This means that teaching /learning resources played a significant role in the enhancement of quality secondary education.

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INTRODUCTION

Provision of quality education is a key ingredient in achieving Kenya's Vision 2030 and making her a middle income country by the year 2050. Republic of Kenya (2014) describes quality education as adequately and equitably resourcing education institutions and programmes with core requirements of safe, environmentally, friendly and easily accessible facilities, motivated and professionally competent teachers and books, other learning materials and technologies that are content specific, cost effective and available to all learners. The challenge is that quality must be continuously sustained at a specified standard through adequate resourcing. Investments in secondary school education can be justified on grounds of provision of knowledge and skills that enhance the human resource to contribute social, cultural and economic development. Investment in the secondary education subsector improves human capital which results in greater returns to the individual and the society (Psacharopolous & Patrinos, 2002). Investments in the secondary sub-sector fans access which if not matched by additional resourcing results in deterioration in quality of secondary school education. The World Bank (2005) supports the human capital development perspective as it observes that it brings about benefits on democracy, better citizenship, crime reduction and improvement of living conditions. Human capital development improves productivity, enhances competences, stimulates economic development, raises standards of living, reduces poverty and uplifts quality of secondary education. There are many factors that influence quality of secondary school education. These factors include entry behaviour, physical facilities, teaching/learning resources, teacher characteristics, income generating activities, home background, free secondary school education policy, teacher attitude, student attitude, learning environment,

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location of schools, security, school community, principals leadership styles, school culture, legal framework and retention rates. Literature has shown that the first five factors of entry behaviour, physical facilities, teaching/learning resources, teacher characteristics and Income Generating Activities are the factors that greatly influence quality secondary school education. The African Union (2006) has identified institutional inputs of physical and infrastructural resourcing for learning environment, learner characteristics teacher qualification, competence, motivation, relevance of subject matter and of teaching and learning material and professional support for teachers. The choice of institutional inputs for the study finds justification on many grounds. Entry behaviour which refers to the academic ability of the students who is admitted to secondary school on attaining a particular Kenya Certificate of Primary Education score was chosen as an institutional input because it is a resource the institution uses just like teaching and learning resources. Most studies have often focused on effect of home background or socio-economic factors on performance in Kenya Certificate of Secondary Education. Oghuvbu (2007) in a study on family history in Nigeria as a tool for adequate management of pupils and students in schools found out that home background influenced students academic achievement. Donkor (2010) in Ghana found out that family's structures influenced achievement, Ogalo, Simatwa and Okwach (2013) in a study in Nyando and Muhoroni districts on socio-economic challenges faced by principals on providing quality education found out that parental sickness like HIV and AIDs affected the students performance. Other studies like Jagero (2013) and Ondima et al (2013) focused on influence of Kenya Certificate of Primary Education scores on Kenya Certificate of Secondary Education performance but did not link this to other institutional inputs influence on quality of secondary school education. The methodology and analysis of Jagero and Ondima studies were limited to linear regression and did not use multivariate analysis to show the contribution of entry behaviour to quality of education when compared to contribution of other institutional inputs like physical facilities, teaching/learning resources, teacher characteristics and Income Generating Activities which the Migori study showed. Neither have other studies integrated qualitative and quantitative analysis to breathe greater insight into the relationship between institutional inputs and quality of secondary school education in Migori.

Teaching and learning resources refers to the inputs used to facilitate the learning process. These are textbooks, stationery, computers, library, laboratory, workshop and equipment. Teaching and learning resources was chosen because most studies have focused on limited teaching and learning resources. Mingaine (2013) focused on Information Communication Technology implementation in secondary school in Kenya but did not tackle the influence of other teaching and learning resources. These studies have also not focused on the contribution of each teaching /learning resource to the quality of secondary school education which the Migori study on institutional inputs did. Koviner and Punpling (2012) use of a longitudinal research design was a good choice as it gave trend analysis and perspective and clarified relationships between student outcomes and their family and community data collection. Discrete time hazard rate was used because it measured a single group of participants over multiple time period. This method is more flexible and robust than the other tools of analysis.

The instruments used for data collection were observation, interviews, questionnaires and census. The variety of instruments used enriched the information obtained thus enhancing its validity and reliability. Afolabi, Lijoka and Awolowo (2005) on the relationship between National Common Entrance Examination and Federal Junior Secondary Certificate Examination in Nigeria found out that performance of students in the National Common Entrance Examination compared favourably with subsequent performance at the Junior secondary school level. The correlation of coefficient between National Common Entrance Examination and Junior Secondary Certificate Examination of r is 0.50 at the 0.05 level of significance. This study shows that entry behaviour inform of academic ability had some influence on quality of education. The study comprised 120,000 students from 3 states in South Western Nigeria. Saturated sampling was used which enhanced the reliability of the results. The instrument of data collection was documentary records obtained from computer records which were also reliable. The method of data analysis using inferential statistics gave an in-depth analysis that showed the magnitude of the influence. The study should have used other instruments to support the documentary instrument.

An Economic Corporation and Development (2003) on Greece on student engagement and time spent on learning in secondary schools found there is evidence that teachers spend more time maintaining order and less time teaching than do primary school teachers as 50% of the students said that more than 5 minutes go by at the start of each class without anything being done, 44% said there is noise and commotion and 29% said that students do not listen to what the teachers say. This failure to manage time as a learning resource efficiently in class compromises syllabus coverage and results in poor performance thus undermining the quality of education. Lee and Zuze (2011) in Sub Saharan Africa on school resources and academic performance in sub Saharan Africa established that teacher quality had an influence on student performance of a coefficient correlation of 0.17 at the 0.05 level of confidence which shows a weak positive correlation. Learning resources are logically and empirically associated with school achievement. It reported that access to textbooks is strongly linked to achievement and observed that when parents are expected to purchase textbooks and writing materials achievement gaps between rich and poor students expand. Lee and Zuze (2011) research design was a cross –sectional design which implied various groups of population were sampled and data collected at a single moment in time. The research population sample comprised 4 countries of Botswana, Malawi, Namibia and Uganda and the sampled students were 12,609 and the schools were 707 establish relationship between resources and academic achievement. Data analysis was quantitative and multi level methods were used to establish relationship between resources and academic attainment. Structured questionnaire was used to collect data on relationship between resources and achievement. The studies strength lay in its large size but the limitation lay in the use of only one instrument as it was difficult to corroborate responses. The study did not explore the influence of institutional inputs on the quality of secondary school education which the Migori study on institutional inputs filled. Glewwe, Kuemer and Moulin (2006) on textbooks and test scores in Kenya shows evidence that the only effect of textbooks on performance was among the best students. The report further states that the textbooks were not easy to understand because of inappropriate content, high language

level, lack of illustrations, inappropriate style of questions, lack of activities and lack of precise summaries. Other factors that could have dampened the influence of textbooks on scores could be that the textbooks neither accessible affordable and poorly utilized by the teachers and the students. Glewwe, Kuemer and Marlin (2006) did not investigate the influence of learning resources particularly their availability, usage and influence on the quality of secondary education. The study on influence of institutional inputs on secondary school education in Migori County investigated this knowledge gap. Koech (2013) in Kuria East on head teachers curbing of dropouts found out that 53.3% of the head teachers indicated that parents bought supplementary textbooks but 66.7% of the teachers stated that parents did not buy textbooks for their schools. The study adopted a descriptive survey design which is appropriate as it concerns current state of phenomena of the variables. The target population consisted of 4770 pupils, 57 head teachers and 278 teachers from which simple random sampling was used to select 35 head teachers, 70 teachers and 500 pupils. The use of simple random sampling did not take care of the strata in the education system. The researcher used questionnaires for the headteachers and teachers and focus group discussions with 7 pupils per group. The use of two different instruments enabled corroboration of information. Data was analysed quantitatively and qualitatively. The strength of the study is that it used reliable instrumentation and sampling procedure but lack of inclusion of strata limited in-depth analysis. The study focused only on a few institutional inputs like textbooks but the study in Migori County on institutional inputs that influence quality of secondary school education investigated inputs of entry behaviour, physical facilities, teaching /learning resources, teacher characteristics and Income Generating Activities sought to find out.

Yara (2011) on performance determinants of Kenya Certificate of Secondary Education in mathematics of secondary schools in Nyamaiya division, Kenya, found out a positive relationship of 0.564 at the 0.05 level of significance between learning resources and Kenya Certificate of Secondary Education performance. The sampled population comprised of 151 students and 12 teachers. The study employed a descriptive research design of the ex –post facto type. The instrument used to collect information was the questionnaire on performance determination of Kenya Certificate of Secondary Education in Mathematics because there was no corroboration. The use of only one instrument to gather information did not enhance the reliability of the instruments. The data was analysed using multiple regression analysis which enabled the measurement of magnitude and direction of the relationship. The study on institutional inputs on quality secondary education in Migori explored other inputs like teacher characteristics and income generating activities that affect quality of education. It also explored the contribution of different learning resources to quality of secondary school education. An analysis of Chinese education concluded that teacher characteristics explained a large proportion of the variance in achievement in different subjects (Park & Hammum, 2001). This finding is reinforced by several studies with direct measures of teacher competency which reported strong relationships between teachers subject matter, knowledge and their students achievement (Lee *et* al, 2005). Teacher training and continuous professional teacher in-service enhances teacher competency and performance.

Daffo, Hanna and Ryan (2010) in Rajasttian, India on incentives to work; getting teachers to come back to school in nongovernmental school (Non Governmental Organization), reported that when teachers were effectively monitored and given financial incentives as salaries directly depending on their attendance for at least a day, they did better. The absenteeism dropped by half from 42% to 21%. The teachers measured effort did not decline so students benefited from about 30% more instructions time. The students had a higher exam scores by 0.17 standard deviation after one year and gained admittance in formal government schools. Teachers were randomly selected in half of the schools where students photographed teachers at the beginning of the lesson and after the lesson for each school day. The random selection eliminated bias. The current study filled the knowledge gap by investigating the level of qualification, the teachers experience and integrity in form of attendance and its effect on quality of education in Migori County. Hanushek, Lavy and Hitomi (2006) in Egypt on quality consistent estimates of dropout behaviour in developing countries, established that the correlation of coefficient between teacher characteristics and school attainment was 0.79 at the 0.05 level of confidence. This study depicts a strong positive relationship between teacher characteristics and school achievement. This is inconsistent with some similar studies that have shown a weak relationship between teacher characteristics and the quality of secondary education. The research on influence of institutional inputs on the quality of secondary school education on teacher characteristics will show the contribution of each teacher characteristics such as gender, experience, qualification in report competence and mode of employment on quality of secondary school education.

Research Objective: The research objective was: To determine the influence of teaching and learning resources on quality of secondary school education.

Synthesis of literature on influence of teaching and learning resources on quality of secondary school education: Learning resources can be defined in terms of materials which comprise textbooks and equipment and the human resources which comprise students, teachers and learning time. Glewwe (2002) in a study on schools and skills in developing countries had observed that textbooks are linked to achievement but the benefits depend on appropriate textbook choices and teachers ability to use them effectively. The relevance of the textbooks to the curriculum and how practical the textbook is to the teacher determined how effectively the textbook contributes to student achievement. The reviewed study however did not correlate influence of learning resources to student's academic achievement in secondary school. Chijioke (2007) in a study carried out in South Africa on collaborative partnerships and the transformation of secondary education through Information Communication Technology s in South Africa established that collaborative partnerships integrated Information Communication Technology in education policy for the benefit of quality secondary education. The study established that this was possible because of improvements in the policy framework. The study used two collaborative partnerships Mindset Network Organization and Khanya Education Technology project to understand how collaborative partnerships implement Information Communication Technology in education policy. The study used a case study design. The study used a qualitative research approach interview instrument and personal observations were used as instruments of research. A large set information was got from

the internet materials on mindset and Khanya websites. Qualitative inductive analysis was used to discover critical themes emerging from the data. The study used a multiple of instruments for collecting data which was a strength. The use of only qualitative deductive analysis but not quantitative analysis denied the study the in-depth correlations that may emanate from such a study. The reviewed study did not deal with learning resources as an institutional input that influence quality of secondary school education. The study on institutional inputs in Migori County explored the contribution of a wide spectrum of teaching /learning resources such as textbooks, stationery, library equipment, workshops and laboratory on quality of secondary school education. The Chijioke (2007) study focused on Information Communication Technology and its impact on secondary education student's academic achievement in secondary school. The World Bank (2005) observes that in Denmark and Spain a third of the students and in Canada and Greece, Iceland, New Zealand and Poland over a quarter appear to miss school or skip classes regularly and in Japan and Korea by contrast the low attendance category account for lower than 1 in 10. Regular attendance of classes such as in Japan and Korea results in higher quality education while poor class attendance like in Denmark, Spain, Poland and Canada undermines the student's academic achievement. Studies in developed countries reveal disparities between intended instruction time in the curriculum, actual time allocated in schools, the time the learner spends learning (time on task) and the time they spend in situations where students and learning material are properly matched and learning occurs in a conducive environment. The amount of time decreases from the first to the fourth of these categories especially schools in poor communities (World Bank, 2005 & UNESCO, 2005). Ineffective time management reduces time available for learning comprising syllabus completion and undermining the quality of education.

In a study by Lee and Zuze (2011) in Sub Saharan Africa on school resources and academic performance in sub Saharan Africa it was established that learning materials are logically and empirically associated with quality of secondary school. The study indicated that access to textbooks is strongly linked to achievement. The research further reported that when parents are expected to purchase textbooks and writing materials achievement gaps between rich and poor students expand. The research design was a cross –sectional design. The research population sample comprised 4 countries of Botswana, Malawi, Namibia and Uganda and the sampled students were 12,609 and the schools were 707. Data analysis was quantitative and multi level methods were used. Structured questionnaires were used to collect data. The studies strength lay in its large size but the limitation lay in the use of one instrument. The study on influence of institutional inputs in Migori had a broader focus unlike the Lee and Zuze (2011) study. The study in Migori also compared the contribution of teaching /learning resource to other inputs of entry behaviour, physical facilities, teacher characteristics and Income Generating Activities to determine the influence of each input compared to the ones in influencing quality of secondary education. The World Bank (2002) on World Bank support for provision of textbooks in sub-Saharan Africa has articulated that African students lack adequate access to textbooks and where textbooks have been produced are not always available to students in sufficient numbers. Textbook availability and textbook access and usage does not work out easily and this undermines the quality of education. The above report focuses only on textbook availability but not on influence of teaching / learning resources on student's academic achievement which gap the study on influence of institutional inputs explored. Lauglo (2004) has articulated that because of the importance of Information Communication Technology in the global economy and because of the spread of computer applications as a tool for communication the question in Africa's education is not whether computing still need to be taught but how soon it will be affordable and practicable to teach such skills in secondary school and in what ways it should be introduced. Whereas the above articulation is on challenges of establishing and developing Information Communication Technology infrastructure in secondary education, the study on influence of institutional inputs on the quality of secondary education in Migori County explored the influence of not only teaching /learning resources but of entry behaviour, physical facilities, teacher characteristics and Income Generating Activities .

The World Bank (2008) in a study on the use of Information Communication Technology in schools in Africa established that Information Communication Technology use had many varied challenges such as lack of policy, poor staffing, poor funding and lack of government support. The study used co-relation research design which would adequately bring out the relationship among the variable. A sample of 36 schools and a student population of 60,000 primary and secondary school students were sampled and 3000 teachers were also sampled and 36 head teachers and parents were sampled. This was a large sample and provided reliability. The instrument used for data collection was the structured questionnaire which limited capture of information. Data was analysed using quantitative and qualitative methods. The study only tackled the problem of Information Communication Technology usage but did not focus on the influence of institutional inputs on the quality of secondary school education.

DeFerranti (2003) in a study on education and technology gaps found that the bulk of the difference in computer penetration between Latin America and America and the East Asian Tigers with their significantly wider computer coverage can be explained not only by differences in the share of trade with countries of the organization for Economic Corporation and Development but also and most important by the proportion of the workforce with secondary schooling and states that this explains why the demand for skilled workers has not increased in Brazil which has much lower schooling levels than the other countries in Latin America. The World Bank (2005) on expanding opportunities and building competencies for young people states that in developing countries and especially in Africa shortages of teachers particularly in areas such as mathematics, science and technology pose a major threat to the goals of expanding and enhancing quality of education. The study on influence of institutional inputs showed that teaching and learning resources contributed greatly to the attainment of quality education. A World Bank (2004) study shows that the range in student teacher ratio across the low income countries that usually have per capital income below 880 is wide as it varies from 13.1 to 79.1. This variation is a function of different resource bases that are exhibited in low income countries amplified by different staff needs and variations in enrolments across low income countries.

The student teacher ratio is not perfectly correlated with average class size but it can be taken as a proxy on the target student teacher ratio value for the education for all successful countries is around 40.1 a figure supported by research studies

on class size (Galabawa, 2003). When student teacher ratio is low, quality education can be attained as student /teacher contact is enhanced. While the intended annual instructional time for sub Saharan Africa at the junior secondary level seems to be the highest in the world amounting to 965 hours the time on task seems to be significantly reduced for a number of different reasons like low allocation of teachers, working time, late coming of students or teachers, teacher and learner absenteeism for a variety of reasons, non-teaching, classroom shortage, lack of learning materials, lack of discipline, difficulty in maintaining learners attention or co–curricular activities (Benavot, 2004). Since time on task is significantly reduced it implies time is not efficiently used as a resource due to poor management of learning time and absence of learning materials. This lowers the quality of secondary education. World Bank (2008) states that remedies to increase instructional time need to target the complexity of national policies, organization, better school management and accountability and enhancing the teaching and learning efficiency of instructional time and by increasing the length of the school days. The World Bank report gives a broad approach that can be used to enrich learning time in the long-term. The report is however silent on how to optimize learning time in secondary school using specific approaches that would focus on decongesting the curriculum overload, integrating assessment in the learning process, upgrading the environment for learning through provision of equipment, innovation, technology and resources and also through increasing time spent on task. When time spent on task increases the quality of secondary school education improves.

Experience gained from boarding schools in Sub-Saharan Africa and from other Economic Corporation and Development countries like Chile indicate that, full day schooling benefit students learning although changes to a full school day require highly complex changes in the political and financial sector (Leyendecker, 2002; Cox, 2004). Empirical studies on time to learn have focused on teacher and learner absenteeism by World Bank (2005), poor school management World Bank (2008) and lack of learning materials by Benavot (2004), but not on quality of secondary school education. The studies reviewed did not focus on institutional inputs that influence quality of secondary school education in Migori County. In particular they did not tackle influence of teaching and learning resources on quality of secondary school education. This is the knowledge gap that the study on influence of institutional inputs on quality of secondary school education in Migori County investigated.

Table 1 shows enrolment, schools, teachers and student teacher ratio in secondary schools from selected years for the period 1963 to 2013. The secondary school education sector has undergone massive expansion in the last 50 years as enrolment increased from 30,120 students in 1963 to 1,914,823 students in 2013. The number of teachers increased from 1530 teachers in 1963 to 59,273 teachers in 2013. In primary school it varied from 41.1:1 in 2013 to 43.1:1 in 2014 which shows the quality of education worsened in both primary and secondary school. The student teacher ratio was 19:1 in 1963 and stood at 32:1 in 2013. Secondary schools have also increased from 15 schools in 1963 to 8197 schools in 2013. The quantitative increase in the number of schools and the increased number of students have overstretched teaching /learning resources and physical facilities and lowered the quality of secondary school education. The increase in the number of schools from 15 to 8197 enabled enrolment to rise from 30,120 in 1963 to 1,914,823 students in 2013 in the number of school age children who are currently out of school and are not able to access quality basic education for all which is their constitutional right (Abagi, 2013). There is need to enhance access to secondary education and also to improve the retention capacities of secondary schools. Public secondary schools have limited infrastructure and there is also an acute shortage of teachers to attend to the students (Abagi, 2013). Secondary schools have resorted to the temporary employment of teachers who are paid by the board of management to fill the gap left by the Teachers Service Commission employment of teachers. Enrolment of students have risen without commensurate expansion of classrooms and other learning and teaching resources as empirical studies show that textbooks were being shared at the rate of one textbooks to five pupils (Aduda, 2012). The World Bank (2005) underscores the centrality of investing in the quality of education through securing adequate textbook and supplies. However such textbooks to bring maximum benefits to the learning process must be relevant, simple to understand and be used effectively by teachers and students. The study on influence of institutional inputs in Migori showed how textbooks and other teaching and learning resources such as library equipment, laboratories, workshops and computers contributed to quality of secondary school education.

Cheesman (2015) articulated that Kenyan students still struggle for access to textbooks as only 17.8% of students had sole use of textbooks compared to 63.4% in Botswana and 87.7% in Mauritius. Thus access to sole use of textbooks is very low and compromised the quality of teaching and learning due to lower performance and compromise quality of education. Miheso and O'Connor (2005) in Kenya on the relationship between interactive teaching and the acquisition of high order thinking skills in mathematics in classrooms found out that higher achievement was evident for students who shared a textbook between two students or had individual books than for those who shared a textbook between three or more students. Gender effect was found to favour girls and class size was found not to be significant. Classrooms where interactive teaching was practised performed better in higher order skills irrespective of gender and class size and interactive learning was found to be higher where two students shared a textbook than in classes where each student had their own textbook meaning sharing a book between two resulted in relatively better performance. The study used a sample of 10 public secondary schools in Nairobi chosen using random sampling. The sampled students were 570 and 20 teachers were also sampled. The major variables in the study included achievement dependent variables (cognitive development levels), classroom factor variables, class size, teaching methods and textbook availability and other opportunity to learner variables. Textbook availability and adequate influence student outcomes and the quality of secondary school education. The instruments used were classroom observation and the administration of an achievement test. A multivariate analysis of variance was used to analyse the data. The design was descriptive survey design. However, to determine the magnitude of the relationships between classroom factors and the respective cognitive levels as correlational design would have been appropriate. The instruments of data collection were few as the interviews would have expanded the range of information. The sample taken was adequate and reliable and the findings clear for policy information and implementation.

Mingaine (2013) in Kenya on challenges on level of adequacy and implementation of Information Communication Technology in public secondary schools in Kenya found out that limited supply of qualified teachers and high cost of infrastructure were impediments to the implementation of Information Communication Technology . A descriptive survey design was adopted in the research. However because the study also involved determining the magnitude of the relationships between dependent and independent variables correlation design should have also been adopted in the study. Out of 350 public secondary schools in Meru County, 105(30%) were sampled for the study. A total of 315 respondents were sampled through stratified and simple random sampling. Stratified random sampling was appropriate as it took care of the various strata of mixed day and boarding schools, girls' and boys' schools and also boarding schools. Questionnaires were used as the instrument for data collection. Although questionnaire can effectively be used to gather data but if other instruments are not used to gather data then data variety is limited. Data analysis employed both inferential and descriptive statistical technique. The study did not deal with many variables which limited its depth but its strength lay in identifying key factors of trained personnel that hinder Information Communication Technology implementation. The reviewed study did not deal with learning resources as an institutional impact that influences quality of secondary school education.

Republic of Kenya (2012) asserts the centrality of Information Communication Technology in teaching and learning so as to fulfill Vision 2030 of providing quality education by creating conditions to ensure teaching of science, technology and that Information Communication Technology establishment should take place in all schools by 2022 yet less than 4% of the public primary schools have access to computer studies and only 800 out of 4,000 public secondary schools had computers and only 2037 or 10% of the primary schools had electricity connections. This undermined the quality of secondary school education. The lack of computers is not confined to secondary schools but pre-primary and primary schools lacked computers. Begi (2002) in Kenya indicated that only a few pre-schools and primary schools were using computers in teaching as in Nairobi province out of 1708 pre-school and primary schools only 132 pre-schools and primary schools were using computers in instruction. This investigation revealed not only lack of resources to acquire computers but also lack of strategy to incorporate Information Communication Technology in the learning and teaching process. The reviewed studies did not tackle the influence of institutional inputs on the quality of secondary school education. The research on institutional inputs filled the gap by focusing on more parameters. UNESCO (2006) notes that the student teacher ratio in secondary education was 18:1 for Kenya while that for Ghana was 19:1 and for Senegal was 26:11. This shows that the quality of education was higher in Kenya followed by Ghana but in Senegal the quality of education was declining. The student teacher ration may vary with the type of school, the gender and even the region or it may vary depending on whether a school is day or boarding or whether a school is mixed or girls or boys (Republic of Kenya, 2012).

There is need to redistribute teachers from schools with low student teacher ratio to those with high student teacher ratio. Odhiambo (2006) on the shortage of teachers in Kenya reported that if the student teacher ratio in Kenya was reduced from 40:1 to 25:1 by employing more mathematics teachers then this would result in improved teaching of mathematics and improve performance. Teachers would give students more specialized attention. The reviewed studies have not dealt with the influence of institutional inputs on quality of secondary school education. Orodho (2002) on enhancing access and participation in secondary school education established that time was greatly wasted in secondary school with time loss percentage of 17.5% nationally and 15.83% for Coast, 9.49% for Central, 14.69% for Eastern, 12.79% for Nairobi, 7.5% for Rift Valley and 13.76% for Western and 15.75% for Nyanza and 21.4% for North Eastern and the wastage was on travelling to school, time lost during the first week of opening on activities like staff meetings, developing timetables, cleaning the compound by students and rampant absenteeism by teachers and students on grounds of looking for funds. Teaching and learning resources consists of time which if wasted reduces learning time and undermines quality of education. The study adopted an exploratory study using descriptive design of the cross-sectional type. The design was suitable for capturing in depth analysis between the variables. Lottery sampling was used to choose 4 provinces and purposive sampling was used to choose the districts. The sampling procedure yielded primary school teachers, secondary school teachers, 28 primary school head teachers, 28 secondary school head teachers, 20 parents and 80 opinion leaders were selected resulting sampling matrix of 604. The use of purposive sampling can introduce bias into the study. Time is lost on internal examinations on the first week and last two weeks. This forces most secondary schools to ask parents to pay tuition money to help pay teachers for remedial studies to complete syllabus coverage. The Ministry of Education has prescribed the official school hours for all public and private day primary and secondary schools to be from 8am to 3.30pm and 3.30pm to 4.45pm as time for co-curricular activities of games and clubs and 7pm to 9.30pm for preps time for week days (Ministry of Education, 2015).

Molochi (2008) in Kuria West district found out that secondary schools lacked basic facilities like libraries. It was established that the books in the library were outdated and there were very few relevant books as the library had no furniture to be used Chacha and Zani (2015) on impact of Free Primary Education on pupil teacher ratio in Kuria East community established that after the introduction of Free Primary Education there was no commensurate increase in school facilities like books and desks. The study reports a great shortage of books and furniture. Moreover the scarcity of textbooks, the inadequacy of current and relevant reference books and insufficient reading materials is compounded by limited use of computers and internet to provide information. The problem is further aggregated by inadequate science equipment and very few stationery which undermines quality of secondary school education. Koech (2013) in Kuria East district found out that 53.3% of the head teachers indicated that parents bought supplementary textbooks for their children but 66.7% of the teachers indicated that parents did not buy books for their children and 90% of the head teachers indicated that parents should buy materials. The study adopted a descriptive survey design which is appropriate as it concerns current state of phenomena of the variables. The target population consisted of 4770 pupils, 57 head teachers and 278 teachers from which simple random sampling was done to select 35 head teachers, 70 teachers and 500 pupils. The use of simple random sampling may not have taken care of the strata in the education system. Questionnaires were used for the headteachers and

teachers and focus group discussions with 7 pupils per group. The use of two instruments provided variety. Data was analysed both quantitatively and qualitatively. The strength of the study is that it used reliable instrumentation and sampling procedure but lack of inclusion of various strata limited in-depth analysis. The reviewed study did not deal with influence of institutional inputs on the quality of secondary school education. Molochi (2008) in Kuria West established that secondary schools lacked computers, trained teachers and computer laboratories. There were many students but the teacher numbers did not increase in the same ratio. The study on the influence of institutional inputs on quality of secondary school education in Migori county investigated the influence of teaching /learning resources and other inputs on quality of secondary school education.

Theoretical Framework

The study on the influence of teaching and learning resources on quality of secondary school education was informed by the Production Function Model. The model postulates that educational outcomes are a function of teaching /learning resource (Psacharopoulos & Woodhall, 1985). The formula of production function model is;

A = f (T, B, E.....)(I)

Where;

A -is Achievement
T- is Teacher pupil ratio
B -is books and other materials
E- is Equipment

In this study the education production function model was expressed as

A = f (A, W, P, L, C, T, S.....)(I)

Where;

A = Libraries
E = Workshop
P = Laboratories
L = Books
C = Computers
S = Stationery

When quality of secondary school education was taken as dependent variable (A) and stationery, workshop, laboratories, books computers, libraries and teaching /learning resources are taken as independent variables

$$A = F(X_1, X_2, X_3, \ldots\ldots\ldots\ldots\ldots X_n) \ldots\ldots\ldots\ldots (2)$$

The Education Production Function Model was re-constructed as a regression model thus

$$Y = B_0 + B_1 X_1 + \ldots\ldots\ldots\ldots\ldots + \varepsilon \ldots\ldots\ldots\ldots (3)$$

Where Y was the dependent variable represented by KCSE scores of secondary school education.
X_1 = Libraries
X_2 Workshop
X_3 = Laboratories
X_4= Books
X_5= Computers
X_6 = Stationery
X_7 = Equipment
ε is the Error term.

This model helped the study to focus on the variables of the study and computation of the data that was obtained in order to determine the influence of teaching /learning resource on quality of secondary school education.

RESEARCH METHODOLOGY

This study is anchored on Psacharopolous production function model in education which relates inputs in education like learning resources to outputs in form of achievement measured by student performances. The study adopted descriptive and correlational research designs. The study population was 59,691 comprising of 245 principals, 2,439 teachers, 57,000 students and 7 Quality Assurance and Standards Officers. Fisher's formula was used to select 384 students, 331 teachers and 148 principals. Saturated sampling was used to select 7 Quality Assurance and Standards Officers resulting in total respondents of 870. The data was collected using questionnaires, interview schedule, observation guide, focus group discussion and document analysis guide. Face and content validity of the instruments were ascertained by experts in Educational administration who evaluated the appropriateness of items in the instruments. Their input was therefore included in the final instruments. Reliability of the instruments was ascertained by piloting in 7 schools whereby a coefficients of 0.8, 0.73,0.78 for principals, teachers and students questionnaires were obtained and were above 0.7 at a set p-value of 0.05 and was therefore considered reliable. Inferential statistics were used to determine the influence of teaching /learning resource on the quality of secondary school education. In effect the mean scores were regressed against teaching /learning resource to establish the magnitude of the influence at the 0.05 level of significance.

RESULTS

Research Objective: The research objective was: To determine the influence of teaching /learning resources on quality of secondary school education. To actualize this objective, the null hypothesis "teaching /learning resources has no significant on the quality of secondary school education" was generated. According to findings in Table 2, no school principal rated equipment, stationery, and agriculture workshop over Ksh. 2 million. Even though all schools had equipment and stationery, 89 school principals rated them as less than Ksh. 1 million in value.

Out of 148 school principals, only 80 (54.1%) out of the 148 principals stated that their schools had agriculture workshops. The remaining 68 schools did not have such facilities yet they were necessary to enhance quality of education. From the findings, only 9 out of 123 schools principals rated computer laboratories as excellent because the principals considered the value of the resources as more than Ksh. 2 million; 2 principals in each case rated libraries and laboratories as excellent (over Ksh. 2 million) because of their worth. Five out of 148 principals rated books as over two million shillings.

Table 1. Trends in Secondary Education in Kenya 1963-2013

Years	Schools	Enrolment	Teachers	Student /Teacher ration
1963	15	30,120	1,530	19.0:1
1973	954	174,767	7,388	23.0:1
1983	2,230	493,710	18,860	26:.0:1
1993	2,539	530,577	31,657	16.0:1
2003	2,999	879,956	47,035	18.0:1
2013	8,197	1914823	59,273	32.0:1

Source: Ministry of Education and Economic Surveys 1963-2013

Table 2. Principals- rating Teaching/learning Resources

		Monetary value of teaching/learning resources in Millions					
Teaching/learning Resources		Very high	High	Moderate	Low	Very low	Total
		0.1-0.4	0.5-0.9	1.0-1.4	1.5-1.9	>2	
Equipment	F	39	50	31	28	0	148
	%	26.4	33.8	20.9	19	0	100
Stationery	F	39	50	31	28	0	148
	%	26.4	33.8	20.9	19	0	100
Agric. Workshop	F	33	29	18	0	0	80
	%	22.3	19.6	12.2	0	0	54.1
Library	F	43	48	13	5	2	111
	%	29.1	32.4	8.8	3.4	1.4	75.1
Laboratory	F	52	55	12	4	2	125
	%	35.1	37.2	8.1	2.7	1.4	84.5
Books	F	55	44	29	15	5	148
	%	37.2	29.7	19.6	10.1	3.4	100
Computer lab	F	41	35	23	15	9	123
	%	27.7	23.6	15.5	10.1	6.1	83

Table 3. Sub County Quality Assurance and Standards Officers-Who finances the provision of books to secondary schools?

Sources	Excellent 75%		Good 50-74%		Satisfactory 25-49%		Poor Below 24%		None	
	F	%	F	%	F	%	F	%	F	%
Government	1	14.3	0	0	2	28.6	4	57.1	0	0
Community	0	0	1	14.3	1	14.3	4	57.1	1	14.3
Non Governmental Organization's	0	0	0	0	0	0	7	100	0	0
Donors	0	0	0	0	1	14.3	6	85.7	0	0
Parents	1	14.3	5	71.4	1	14.3	0	0	0	0

Table 4. Regression Analysis of Teaching/learning Resources and Quality of Secondary Education

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.791[a]	.627	.618	.353	.627	13.587	7	140	.000

Table 5. Analysis of Variance of Teaching/learning Resources and Quality of Secondary Education

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	40.532	7	5.790	13.587	.000[a]
	Residual	48.583	140	.426		
	Total	89.115	147			

a. Predictors: (Constant), equipment, stationery, books, workshop, libraries, laboratories, computers

b. Dependent Variable: Kenya Certificate of Secondary Education mean score

Table 6. Multiple Linear Regression Analysis of Influence of Teaching /learning Resources on Quality of Secondary School Education

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.589	.310		8.340	.000
	Libraries	.374	.076	.461	4.925	.000
	Workshop	.442	.060	.602	7.322	.000
	Laboratories	.567	.092	.287	2.910	.004
	Books	.657	.124	.250	2.079	.003
	Computers	.407	.082	.011	.091	.008
	Stationery	.331	.083	.064	.851	.006
	Equipment	.462	.077	.214	2.116	.030

Dependent Variable: Kenya Certificate of Secondary Education mean score Regression Equation Y= B0+B1X1+B2X2+B3X3……

Out of 148 school principals, 5(3.4%), 4(2.7%) and 15(10.1%) The study established that 219 (57.03%) of the students observed that the number of teachers were adequate while 49 (12.8%) students observed they were not enough but 82 (21.4%) stated the number of teacher was moderate. On teaching aids 151(39.3%) of students said they were fairly used while 73(19%) stated the usage was good but 68(17.7% said the usage was poor. The study established that 174(45.3%) of the students had a fair frequency of laboratory experiment while 74(19.3%) had poor frequency of laboratory experiments and 31(39.3%) of the students also stated that 151(39.3%) of the schools had well equipped laboratories while 89(23.2%) had poorly equipped laboratories and 45(11.7%) had excellently equipped laboratory.

The students observed that 158(41.1%) of the students had very low access of the textbooks while 68(17.7%) had low access of textbooks. The students also stated that 142 (37%) had high availability of textbooks. Students observed that 40(10.4%) had very high availability of stationery and 46(12%) of the students had high availability of stationery and 91 (23.72%) had a moderate availability while 142(37%) had low availability of stationery and 65(16.9%) had very low availability of stationery. The students also stated that 74(19.3%) of the students had an excellent library and 29(7.6%) had a very good library and 82(21.4%) had a good library and 127(33.1%) of the students had a moderate library and 72(18.8%) had a poor library. Upon making a research inquiry on teachers about the ratios of how students share textbooks in class, 129(39%) of the students shared textbooks in the ratio of 1:2 while 76 (23%) teachers observed that students shared textbooks in the ratio of 1:1. Different from that was a group of 74(22.4%) and 52(15.7%) teachers who indicated that students shared textbooks in the ratio 1:3 and 1:4 respectively. According to these results, it is evident that only 23% of teachers indicated that learners used textbook in the ratio of 1:1 meaning one textbook per student. Further, at least 38% of teachers stated that their learners shared textbooks in the ratio of more than 1:3, which meant that such learners did not acquire quality education

Table 3 shows who finances the provision of books in secondary school education

In order to establish the influence of teaching /learning resources on quality of secondary school education data on students' mean scores in Kenya Certificate of secondary education examinations from 2014 to 2017 examination was regressed against data on teaching /learning resources and the results were as shown in Table 4. From Table 4 it can be observed that teaching /learning resources accounted for 61.8% of the variations in the quality of secondary school education as signified by the Adjusted R square of 0.618. The other 38.2% was due to other factors that were not subject to this study. These could include location of the schools, teacher's attitude, students attitude, government policies, school culture among others. The null hypothesis was rejected because the influence of teaching /learning resources was significant as signified by the p –value of 0.00 which was less than the set p-value 0.05. To confirm whether teaching /learning resources were significant predictors of quality of secondary school education, Analysis of Variance was computed and the results were as shown in Table 5. From Table 5 it can be observed that teaching /learning resources were significant predictors of secondary school quality of education ($F(7,140) = 13.587$, $P < 0.05$). This means that teaching /learning resources which include stationery, workshop, laboratories, books, computers, libraries can be relied upon to predict the quality of secondary school education. This is achieved by availing the much needed teaching learning resources to meet the school requirements for purposes of enhancing instructions. To determine the actual influence of teaching /learning resources on quality of secondary education multiple linear regression analysis was computed and the results were as shown in Table 6. From Table 6 it can be observed that teaching /learning resources had different prediction powers. The highest being books with a coefficient of .657. This means that for every one unit increase in books, quality of education improved by .657 units as signified by the coefficient .657. All the seven teaching /learning resources were predictors of quality secondary school education as their p-values were less than 0.05. The regression equation can therefore be represented as follows. Quality of secondary school education = $=2.589+0.374X_1+0.442X_2+ 0.567X_3+ 0.657X_4+0.407X_5+ 0.331X_6+ 0.462X_7+$

Where; X_1= a measure of individual teaching and learning resources. This model can be used to predict the quality of education of a country where income generating activities are undertaken for a similar purpose.

DISCUSSION

School principals rated library, laboratory, and computer laboratories as very good. More than 60% of school principals rated the resources as moderate and very low. One principal observed stated "Construction of a library with sufficient sitting capacity and stocks it in with adequate books and reading materials is a challenge because of scarcity of funds. There are many needs to be met and if any of them is not met school performance deteriorates).

A student in a focus group discussion stated "Laboratories do not have adequate chemicals, equipment and are too small. The teacher's demonstrations on how to conduct experiments is not clear." The study on institutional inputs in Migori County established that laboratories enhance the quality of education. Effective use of laboratory enhances performance in sciences. Republic of Kenya (2014) in education for all has emphasized the strategy of provision of school laboratory and equipment to achieve quality education. Abagi and Ogachi (2014) in a report on 40 years of education in Kenya have articulated that inadequacies of instructional materials such as textbooks, library books, stationery and equipment are rampant and hamper learning. This reduces quality of education. The study on institutional inputs in Migori County established that textbooks, stationery, equipment contributed to quality of secondary school education. A teacher commented inadequate textbooks in English, Kiswahili and mathematics that required daily assignments hampered learning, reduced performance and undermined quality of education. Access to textbooks by students not only enhance knowledge acquisition but also enable students to do assignments and practise learning skills that improve performance and quality of education. In support of the influence of teaching/learning resources on the quality of education in secondary schools. Six Sub County Quality Assurance and Standards Officers indicated that parents shoulder the burden of financing the provision of books to secondary schools. Four half of the Sub County Quality Assurance and Standards Officers stated that the government,

community, donors and Non Governmental Organization's were rated as poor in terms of financing the provision of textbooks in secondary schools. This was an indication that, the government, community, Non Governmental Organization's and donors played a dismal role in supporting the provision of teaching and learning resources in secondary school education. One of the Sub County Quality Assurance and Standards Officers indicated "The burden of providing books and learning materials should be the responsibility of the government as when parents meet the cost of disadvantages learners who come from low income groups as they cannot afford to buy." Although this approach address equity but the financing of education in a context of ever growing demand requires that partnership financing strategy be adopted if other compelling national needs are to be addressed and quality of education improved. Document analysis guide from teaching staff minutes and Board of Management minutes, tender board meetings and audit reports indicate that many schools (60%) spent less than 1.4million shillings in purchasing any teaching and learning resource. for the books and the stationery the teaching staff minutes and Board of Management minutes showed that parents had made book donations and students had brought to school duplicating papers and fullscaps. However the support from parents was not sufficient as many schools did not have enough books, stationery, equipments, computers, library and laboratories.

The study in Migori County established that books and laboratories had the highest contribution to quality of education while and library also influenced quality of education. Aivumbaze and Achoka (2017) on analysing the effects of teaching/learning resources on student academic achievement supports the Migori findings. However the two studies differ in scope as the Migori study was on secondary schools. Poorly stalked libraries and inadequate textbooks and unequipped laboratories hamper the learning process and undermine the quality of education. When textbooks are scarce or if there is limited access to current books for reference and textbooks then the learning process is slowed down as the context delivered cannot be effectively mastered. Indeed if the laboratories are not well equipped and chemicals and apparatus are insufficient comprising the quality of secondary school education is undermined. Stationery in form of exercise books and fulscaps and reams of duplicating paper enhance learning process. Their scarcity means the learning process was hampered derailed. The process of evaluation in terms of giving examinations, Continuous Assessment Tests and assignments will not be effective. When there are adequate exercise books, stationery and more assignments can be done then student performance and teacher effectiveness is enhanced. Kimeu, Tanui and Rotich (2015) on the influence of instructional resources on secondary school achievement complements the Migori study that established that teaching /learning resources influence quality of secondary school education. In such cases, ability of learners to use library resources depended on teachers' would help learners hence compromising students' achievement. Students observed that most teachers did not embrace the practice of teaching using essential resources because the teaching resources were not adequate. However, some of them had a negative attitude towards using teaching aids stating that they wasted time to prepare. Lee and Zuze (2011) on the impact of teaching/learning resources on academic performance in sub Saharan countries established a coefficient of correlation between teaching/learning resources and students' academic achievement was 0.17 at 0.05 level of confidence. The findings in the Migori county study established that the coefficient of correlation between teaching/learning resources and quality of secondary education was 0.791 which supports the Zuze study. Another study by Yara (2011) on the determinants of performance in mathematics in Kenya Certificate of Secondary Education mean score in secondary schools in Nyamaiywa Division of Kisii County, found that there was a coefficient of correlation of 0.564 between teaching/learning resources and academic achievement in Kenya Certificate of Secondary Education. The two studies complement each other as they explore influence on academic performance. However they differ in scope as Lee and Zuze (2011) investigation deal with teaching and learning resources like computers, books, library, laboratories but Yara (2011) investigation is narrower in scope as it tackles factors that affect mathematics performance in Kenya Certificate of Secondary Education. The study on institutional inputs is more robust because it dealt with many inputs like entry behaviour, teacher learning resources, teacher characteristics, physical facilities and Income Generating Activities and their influence on quality of secondary education. The inadequacy of laboratories hindered hamper the frequency of carrying out experiments. The teachers' competence to use laboratories in spite of assistance from laboratory technicians was also low as they reverted to demonstrations. Yet performance of sciences in many schools is very poor. Inadequate equipment further compounds the problem and limits the provision of quality education. The variation in the findings of R of 0.17 in the Sub Saharan Africa and R of 0.791 in Migori County and R of 0.564 in Kisii County was due to variation of context in form of time and place. The variation is explained by the quality and quantity of learning and teaching as with better quality and quantity of resources performance quality of education rose. Students differed as bright ones enhanced quality of education and weak students lowered quality of education. Nevertheless teaching and learning resources need to be complemented with other inputs like entry behaviour, physical facilities, teacher characteristics and Income Generating Activities to achieve quality education. Gudo, Olel and Oanda (2011) found out that inadequate lecture rooms, computers, laboratories, workshops, equipment, books and particularly information on technology affected the quality of teaching and learning at the university. The investigation on institutional inputs in Migori showed the contribution of each of these teaching and learning resources to quality education.

Conclusion

Most schools relied on parents to support them with teaching and learning resources but parents were unreliable sources because majority had huge school fees arrears. Schools that depended on government capitation as the only source of income did not have enough teaching and learning resources. In most schools, learners and sometimes teachers had limited freedom to access and use some of the teaching and learning resources as the school management reserved access and usability, which influenced negatively the attitude and hence quality of education in those schools. Increased students enrolment increased pressure on available teaching/learning resources hence reducing benefit from such resources. The contribution of teaching /learning resources to the quality of secondary school education was high and significantly influenced the quality of secondary school education.

Recommendations

The Ministry of Education should restructure and strengthen the operations of quality assurance and standards officers. This is necessary to enable them contribute to the achievement of quality secondary education through enhancing frequency of monitoring, enriching assessment, boosting supervision and providing guidance on effective use of resources. The Teachers Service Commission should provide adequate teachers to reduce the burden of paying Board of Management teachers. This will also uplift the quality of secondary school education as with more teachers syllabus coverage will be more effective and since the teachers are qualified they will impart more enhanced knowledge and skills to the students that will improve performance in Kenya Certificate of Secondary Education. The Ministry of Education should raise the amount allocated per student under the free secondary education program to boost the provision of quality learning and teaching resources. The Ministry of Education also needs to disburse the funds on a timely basis to allow effective implementation of plans.

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