



# **Influence of Free Day Secondary Education on Textbook Ratio in Mixed Day Secondary Schools in Kenya**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

The present study examined the influence of Free Day Secondary Education on Textbook Ratio in Mixed Day Secondary Schools in Kenya. The study was guided by the Classical Liberal Theory of Equal Opportunity. The study was based on a conceptual framework showing how Free Secondary Education influences quality of education. The study embraced descriptive research design. Target population incorporated 315 subjects: 1 SQASO, 25 Deputy Principals, 25 Directors of Studies and 264 teachers. Simple random sampling was used to select 8 schools and 79 teachers while the SCQASO, 8 Deputy Principals and 8 Directors of Studies were purposively determined. Questionnaires, interview schedules and document analysis were used to collect data. Validity of the instruments was enacted by expert judgment of the University supervisors, while reliability was enacted by piloting. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS). The data was presented using tables, means and percentages accompanied by explanations. Thematic analysis evaluated qualitative data. The data was transcribed, patterns

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identified to deduce major themes. The study therefore concluded that schools had not yet achieved textbook ratio of 1:1 which would be fair to the students. The study recommends that the government through Ministry of Education should ensure adequate funding of free secondary education to ensure adequate resources in public schools including fair textbook ratio.

*Keywords: Free day; secondary education; mixed day; quality education.*

## 1. INTRODUCTION

Textbooks are the crucial resource in the educational process necessary for exceptional learning. Where textbooks are lacking, doing personal reading, assignments or homework are compromised. In Kenyan secondary schools, textbooks are the main teaching and learning tool. Buhere (2011) states that public secondary schools are yet to attain 1:1 student - textbook ratio in the era of Free Day Secondary Education (FDSE). The average student to textbook ratio is instead between 5:1 and 10:1 in some areas. According to UNESCO [1], the shortage of teaching and learning materials undermines learning outcomes in Sub – Saharan Africa. Stellenbosch University economist, Nic Spaull as reported by Veriava [2] measured the impact of access to textbooks on educational performance found that learners with their own textbooks performed significantly better than those who have to share textbooks. Textbooks therefore have a positive impact in learning outcomes.

### 1.1 Background of the Study

Samuel [3] states that to survive in this competitive world and progress, human beings today need to have a specific set of skills. These set of skills refer to education. Krishnarante, White and Carpenter (2013) assert that a child who has obtained remarkable education is more likely to become a greater parent who makes informed decisions, earns a better living, adopts new technologies, copes with crises and be a loyal citizen. The UN Universal Declaration of Human Rights and the UN Convention on the Rights of a Child has enshrined access to education as a primary human right. UNICEF [4] reports that many countries are committed to expanding universal education that include several years of secondary school.

Burns [5] asserts that secondary education has been broadened across Sub – Saharan African countries. These countries have recognized that secondary education expansion directly grants significant public benefits such as high economic

returns, poverty reduction, equity and social cohesion. It also provides private benefits in form of better economic and life outcomes, access to specialized knowledge, higher education and employment in the formal sector. Secondary school enrolment has significantly progressed from net enrolment rate of 11% in 1970 to 32% and 22% in 2018 for lower and upper secondary schools respectively. As secondary education demand continues to soar, the system is striving to meet this growing need.

In Africa, few countries have implemented free education policy [6]. The first country in Sub – Sahara Africa (SSA) to introduce Universal Secondary Education was Uganda. Tanzania implemented Free Education Policy for Secondary Education in 2015 while Ghana introduced Free Senior High School in 2017. In South Africa, free education started as basic education in 2004. In Morocco, education is free from primary to secondary education including in all public universities. It is one of the few countries in Africa with free University Education. In Europe, most countries have free Senior High School Education.

### 1.2 Importance of the Study

The outcomes of the study could be used by the government re-enforce access and retention to education. The legislators could use the results of the study in ensuring adequate funding and prudent utilization of resources in secondary schools. This would give all students an undeniable equal opportunity in joining secondary schools, reducing dropout rates while enjoying improved physical facilities. Secondly, the parents will be made aware of the scope of the government support towards FDSE and eventually get them prepared to meet their obligations towards education of their children. The school may use the outcomes from the study to evaluate status of FDSE, address the challenges and the required modification on the same. Education planners and Quality Assurance Officers may use the results of the study to provide guidance to school managers on the excellent approaches of handling the

emerging challenges while implementing FDSE program.

### **1.3 Research Objectives**

Research objectives were to:-

- (i) Examine effect of student textbook ratio on quality education in mixed day secondary schools in Kenya in the era of Free Day Secondary Education policy.
- (ii) To make appropriate recommendations that can be employed to improve quality education with reference to textbook ratio in mixed day secondary schools in Kenya.

## **2. LITERATURE REVIEW**

### **2.1 Theoretical Framework: Classical Liberal Theory of Equal Opportunity**

The study was navigated by Classical Liberal Theory of Equal Opportunity. Equal opportunity warrants that all interested individuals have the same ability to access and the chance of receiving particular resources; for instance, employment, housing, or education, without discrimination based on peripheral factors such as age, race, gender or religion. A liberal society must be one that gives each of its members an equal chance to get what they want out of life. Horace Mann, famously called education the "greatest equalizer of the condition of men." Education allows inclusion. It allows everyone to have a voice and to become a contributor to society, instead of being marginalized. According to Horgan [7], education guarantees a good – paying job as well as a secure future. To help people join the workforce and build a better life for themselves and their future, it is therefore imperative to give them the opportunity to get basic education so as to learn the skills that they will need in the field. Governments are making long – term investments for their economies and their futures by investing in education and opportunity for people.

### **2.2 Impact of Educational Resources on Quality Education**

Acquisition of knowledge is determined by numerous components, for instance: costs, proximity to educational establishments and availability of appropriate physical amenities such as school laboratories, libraries, classes and adequate instructional materials (Keriga and

Bujra, 2009). According to Sherman and Poirier [8], inputs are the educational resources used to educate children. Resources are of particular interest in instances where they may affect outputs or outcomes. Onderi and Makori [9] found inadequate learning facilities as a common denominator in many schools and this can affect the efficient access and participation in secondary education.

Iqbal [10] conducted a comparative study on leader's leadership styles, management practices and physical facilities provided in public and private secondary schools in Lahore City, Pakistan. Findings of the study were that public schools are enriched with fitter amenities, spacious buildings, highly qualified teaching staff and people oriented management styles as opposed to private schools. Arshad, Qamar and Guzar [11] investigated a study to determine the effects of physical amenities in public schools on students' achievement in Punjab Pakistan. The inquiry showed that ventilation, playgrounds and First Aid Medical Box significantly influenced students' achievement. The study divulged that physical amenities contributed towards students' academic achievement by about 15.4%. Okyere – Kwakye [12] carried out a study on the availability of imperative school amenities in Junior High Schools within New Juaben Municipality, Eastern Region of Ghana. Results revealed that furniture for pupils, urinals and toilet facilities as well as classrooms, were not adequate. Also noted was that schools were deficient in computer laboratories, library books, staff rooms and teachers' accommodation. An investigation carried out by Owoeye and Yara [13] on facilities provision in relation to students' academic performance in Agricultural Science in Ekiti State of Nigeria. 1990 – 1997 West African School Certificate Examination (WASCE) results of 50 secondary schools in both rural and urban areas. Results revealed that there was no notable performance of students between rural and urban secondary despite availability of library and laboratory facilities as well as textbooks. The study proved that facilities are influential in students' high academic achievement. Ekiti State Government should provide adequate material resources to rural and urban locations in order to enhance teaching and learning process.

Makori and Onderi [14] conducted a quantitative research on learning resources in secondary schools in Kenya. Findings revealed that some schools lacked laboratories, libraries and

workshops. FDSE funding was ascertained to be inadequate and unreliable. The study revealed that low quality amenities negatively affect the students' attainment in their academic process. Jagero [15] presented findings whose aim was to validate the degree to which school inputs affect education quality in day secondary schools in Kisumu County, Kenya. From the findings, dominant inputs that exerted influence on performance of day secondary schools included the availability of supplied educational materials and laboratory equipment expenditure. The study recommended that PTA should be strengthened so as to chip in the provision of physical resources with a view to upgrade education quality in day secondary schools.

### **2.3 Educational Policies and Their Outcomes**

Holland, Alfaro and Evans [16] examined the relationship between longer instructional time and students learning in Uruguay. The study found that there were positive impacts in the implementation of extended school day programs, namely; improved learning outcomes, reduction in crime and pregnancy rates. The study concluded that longer school days should therefore be embraced by policymakers. Siddhu [17] investigated factors influencing parental decision-making with regard to children's secondary schooling in rural area of Uttar Pradesh. The study found that education costs, distance to the nearest secondary school, membership in traditionally marginalized social groups, and being a girl child have a significant effect on a child's chance of transition.

Adu-Gyamfi, Donkoh and Addo [18] conducted a study on the Ghanaian government's provision for free senior high school education, capitation grants, free lunch, and COVID – 19 personal protective equipment for all schools, however, the government is unable to come up with implementation strategies that can sustain them. The study recommended that educational policymaking should be left to educational philosophers and not politicians. Further, the study recommended that educational facilities and equipment should be provided to sustain educational development. Falisse, Brandt, Mukengere, Gupta, Kanyerhera, Marion and Matabishi [19] reported how the new policy abolishing tuition fees which was implemented in September 2019 by the Democratic Republic of Congo was affected by COVID – 19 which resulted to a total lockdown. The study was

conducted in schools in South Kivu area which is also affected by armed conflict. Due to the closure of schools as a result of the pandemic in 2020, teachers quit their profession as a result of financial hardships negatively affecting the sustainability of free education.

Kakuba, Nzabona, Asiiimwe, Tuyiragize, and Mushomi [20] explored the 2007 universal secondary education policy in Uganda. Despite free education, access to and equity in secondary schooling enrolment targets have remained elusive. Mutegi, Muriithi and Wanjala [21] presented a study on the associations between gender, age, enrolment and the cost of secondary education using data from Tharaka South Sub – County, Kenya. The results showed that the cost of girls' school uniform was 12% higher than that of boys resulting in differences in enrolments between girls and boys. Also observed, was the unit cost of educating girls is higher than that for boys in boarding schools, that is; Ksh. 52, 474 for girls and Ksh. 49, 194 for boys.' This situation is however reversed in day schools where the unit cost for boys is higher than that of girls, that is; Ksh. 31,323 for boys Ksh. 29,863 for girls. The study concluded that school fees may be a hindrance to middle level education in countries where the burden of educating children is bravely borne by households than by governments.

### **2.4 Previous Studies on Textbook Availability and Educational Quality**

According to Macharia [22], an acceptable access to textbooks is a fundamental indicator of educational quality. 1:1 textbook per student ratio is ideal since each student has access to core textbooks, namely; English, Mathematics and Science. Improved learning achievement and school effectiveness is attributed to availability of textbooks which in turn promotes learning and retention of information. Xie and Luthy [23] assert that textbooks were for decades viewed as the bedrock for instruction in schools in America. However, today students' experience is much different since technological advancements and increase in digital curriculum materials have accelerated the movement away from books. Fewer textbooks are bought by schools and are more often than not using them only as classroom or library reference material or to teach special topics. Dockx, Bellens and De Fraine [24] sought to establish whether textbooks availability affected pupils' academic performance and engagement in reading

comprehension in primary education in Flanders, Belgium. The results showed that students' that engagement in reading comprehension is not affected by availability of textbooks. Pulse of the Nation [25] found that without textbooks and with overcrowded classes, quality of education was not being achieved in South Africa. Attakumah [26] showed that textbooks of core subjects were insufficient in Volta Region of Ghana. The study established that there was a positive correlation between textbook availability and academic achievement. Mogaka, Kariuki and Ogeta [27] discussed textbook availability and utilization on students' academic achievement in public day secondary schools in Kisii County, Kenya. The study found that students' academic achievement heavily relies on the textbook availability and utilization. Ambogo (2013) showed that, availability of textbooks, revision books, lab chemicals and equipment were more available in better in the high performing schools than in low performing schools. None of the low performing schools had a library.

Shiundu [28] asserts that Kenya's former Head of State, President Mwai Kibaki, introduced FDSE in 2008 with intent of making secondary education affordable resulting into increased enrolment. Under Kenya's Constitution, every child has a right to a free and compulsory education. It is therefore obligatory that every Kenyan parent who live in the country to enlist their children for primary and secondary education according to the Basic Education Act 2013. Republic of Kenya (2019) asserts that the Education Sector has advanced in all levels of education, training and research by promoting access, equity and inclusivity, quality, relevance and gender parity. Secondary school enrolment indicated some growth. The GER saw a notable increase to 42.5% from 38.0% in 2007 attributed to the introduction of FDSE. Economic Survey Report (2017) acknowledges that there are 8,592 and 1,350 public and private secondary schools respectively in Kenya. In 2015 and 2016, the total secondary enrolment was recorded as 2.56 million and 2.72 million respectively by Kenya Bureau of Statistics.

The Kenyan government has shown its devotion to the provision of quality education and training as a right to all its citizens through the launching of FDSE in 2008. It has made a significant progress to provide quality education though there are significant variations between the targets the Kenyan government had set out against the achievements made in the education

sector. This is accredited to the large students' numbers transiting from primary to secondary schools against fixed teachers' numbers and fixed facilities available in in secondary schools. Reports from the Director of Education of Kisumu West Sub-County, free education has increased enrolment in secondary schools, however, it has contributed to a shortfall in textbook supply in schools. The study examined the effect of student textbook ratio on quality education in mixed day secondary schools of Kisumu West Sub – County, Kenya.

### **3. METHODOLOGY**

#### **3.1 Research Design**

The study embraced descriptive research design. The main objective of descriptive research design is to determine and report things as they are Mugenda and Mugenda, [29], McCombes [30] further states that descriptive research design answers what, where, when and how. It is an appropriate option if the aim of an inquiry is to identify characteristics, frequencies, trends and categories. It employs a series of both qualitative and quantitative data to collect information to make precise projections about a specific problem. The investigation fitted within the stipulations of descriptive research design since data was gathered using questionnaires, document analysis and interview schedules to gather information so as to put together accurate predictions about the study.

#### **3.2 Sample and Sampling Techniques**

The target population for the study was 25 Mixed Day Secondary Schools, 264 teachers, 25 Deputy Principals, 25 Directors of Studies and 1 Sub - County Quality Assurance Officers (SCQASO) from Kisumu West Sub - County. The sample size for the study will be 30% of the target population. Gall, Gall and Borg (2015) suggested that a sample of 30% of the population is adequate for the study. Simple random sampling was used to select 8 schools (30%) from the 25 mixed day secondary schools and 79 teachers (30%) from the 264 in Kisumu West Sub - County. Purposive sampling was used to select 8 Deputy Principals and 8 Directors of Studies.

#### **3.3 Data Collection Methods**

In this study, questionnaires and interview schedules were used to collect data from the

deputy principals and teachers. Interviews were conducted among 8 Directors of Studies in schools and Sub - County Quality Assurance & Standards Officer. Face validity and content validity of the instruments was ascertained by experts in the area from the Faculty of Education, Jaramogi Oginga Odinga University of Science and Technology (JOOUST). A pilot study was carried out among 3 Deputy Principals, 3 Director of Studies, 26 teachers and the SCQASO using test- retest method to establish reliability. Reliability coefficient was set at 0.70.

### 3.4 Procedure

Content validity was determined by two experts from Faculty of Education, Jaramogi Oginga Odinga University of Science and Technology (JOOUST). Discussions with the experts assisted in developing as well as revising the data collection instruments. Experts' comments and recommendations were used to refine the tools. Test – retest technique was used to assess the reliability of the instruments. Data tools were piloted in mixed day secondary schools did not form part of the study. 3 Deputy Principals, 3 Director of Studies and 26 teachers were engaged piloting by use of test- retest method to determine reliability of the instruments. Two repeated data collection procedures were done in succession periodically to establish consistency of results. Correlation co-efficient was computed by use of Spearman's Rank Order which was 0.70.

The researcher sought permission to collect data from the National Commission for Science, Technology and Innovation (NACOSTI) through the Board of Post Graduate Studies, at the university. Thereafter, notification letters for data collection was sent to the Kisumu West Sub – County Education Office. The researcher visited the sampled schools, talked to the Deputy Principals, Directors of Studies and the teachers and agreed on data collection dates and time. Thereafter, the researcher visited the schools on the agreed dates to collect data. Before data collection the researcher briefed the respondents and explained to them how to respond and also assured them of confidentiality in the information they had given. The respondents were given about two weeks to respond to the

questionnaires after which the filled – in questionnaires were collected.

### 3.5 Data Analysis Techniques

Quantitative data was analyzed using frequency counts, percentages and means to establish the influence FDSE on quality education in mixed day secondary schools. Tables, pie charts and bar graphs accompanied by comprehensive explanations, discussions and citations were used to present the results. Perceptions and attitudes of respondents towards FDSE were measured by five point Likert Scale. Qualitative data was analyzed using thematic analysis which according to Caulfield [31] is a process of analyzing qualitative research as applied in interviews and transcripts. The process involves six steps, namely: familiarization with the data, coding, generating themes, reviewing themes, defining and naming themes and writing up the report [32].

## 4. RESULTS AND DISCUSSION

The study established the influence of Free Day Secondary Education on textbook ratio in mixed day secondary schools in Kisumu West Sub – County of Kenya [33,34]. Textbooks are an important resource in the teaching learning process a prerequisite for quality learning. Where textbooks are lacking, doing personal reading, assignments or homework is compromised [35]. To determine this Deputy principals and teachers were asked the availability of textbooks in their schools and how they coped with shortages if any.

### 4.1 Availability of Textbooks according to Teachers

Teachers were asked whether textbooks were available to which their response was as displayed in Table 1.

A greater percentage of teachers (75%) accepted that textbooks were available in their schools while only 25% stated that textbooks were unavailable [36]. Textbooks availability in schools is credited to availability of FDSE funds for textbooks purchase by the government.

**Table 1. Textbook availability as stated by teachers**

Response	Frequency	Percentage
Available	44	75
Not available	15	25

#### 4.2 Textbook Availability as stated by Deputy Principals

Deputy Principals indicated textbook availability since introduction of FDSE. The feedback is presented in Table 2.

The results reveal that most Deputy Principals agreed that textbooks were available though a few were undecided as to whether textbooks were available to students or not. Textbooks are available in secondary schools though not adequate. A textbook ratio of 1:1 would be beneficial to all learners.

#### 4.3 Textbook Student Ratio according to Teachers

Teachers were asked to give the textbook student ratios; their response was as presented in Table 3.

Majority of teachers responded that student textbook ratios were 1:3 and 1:4. Very few schools had a ratio of 1:2 and none of the schools had 1:1 ratio. Generally, textbooks are available in most schools though not adequate. This means that students share textbooks in case there is shortage. This may affect their private studies and also make it difficult for them to comprehend the information therein. The

Ministry of Education recommends textbook student ratio of 1:1. Textbooks are important for quality of education. As the population increases due to Free Day Secondary Education the textbook ratio also increases.

Kisumu West SCQASO interviewed indicated that textbook ratio had improved performance since the inception of FDSE. In fact, the SCQASO commented that;

*“Textbook ratio has improved since the inception of FSE, almost achieving 1:1 in many schools in Kisumu West Sub – County, this means improved curriculum delivery. It is important for every student to have a course book to make it easier for teachers to give assignments and for students’ private studies. This is because there is a consistent relationship between students’ achievement and availability of textbooks” (SCQASO)*

Many are grateful for the government’s allocation for textbooks however there is dissatisfaction on textbook to student ratio since schools still have a shortfall in supply of textbook. Each student needs a book for homework purposes and change of syllabus. The ratio of 1:1 would be easier for management of students work [37].

**Table 2. Availability and adequacy of textbooks according to deputy principals**

Subject	SA	A	U	D	SD
Mathematics	0	6	0	2	0
English	4	2	0	2	0
Kiswahili	2	5	0	1	0
Chemistry	0	6	1	1	0
Biology	1	4	1	1	1
Physics	6	1	0	1	0
Geography	4	2	2	0	0
History	3	3	0	1	1
CRE	6	1	0	1	0
Agriculture	5	2	0	1	0
Home Science	1	0	3	2	2
Business Studies	4	2	0	1	1
Computer Studies	1	0	3	2	2
<b>Totals</b>	<b>37</b>	<b>34</b>	<b>10</b>	<b>16</b>	<b>7</b>

Where SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

**Table 3. Textbook student ratio according to teachers**

Ratio	Frequency	Percentage
1:2	7	11
1:3	25	42
1:4	22	37
OTHER	6	10

The Deputy Principals were further asked to mention other sources of textbooks in their schools apart from FDSE allocation for textbooks to which they mentioned parents and donors. They however mentioned some of the challenges in the provision of textbooks in their schools as being loss of books by students, replacements of the lost books, students transferring to other schools or dropping out with school books and parents refusal to buy set books for their children believing that FDSE allocation provided for this. The Deputy Principals commented that;

*“Replacement of lost books is a big challenge in our school”* (DP 2)

*“Students leaving the school to others or dropping out with school books”* (DP 8)

*“Parents do not buy set books for their children because they believe FDSE allocation should provide for this”* (DP 6)

From the above responses provision of textbooks to schools will still be a challenge if the above issues are not addressed [38]. Textbooks enact a key part in academic process. Textbook availability and their effective utilization may facilitate productive learning [39].

## 5. CONCLUSION AND RECOMMENDATION

Based on the findings on FDSE influence on student textbook ratio in schools of Kisumu West Sub – County, 75% teachers acknowledged textbooks were available in schools though not adequate. Also mentioned, was that textbook ratio in most schools ranged between 1:3 and 1:4. This supports that textbooks were available although not adequate. That asserts that none of the schools had 1:1 student textbook though the SCQASO mentioned that textbook ratio had improved to almost achieving 1:1 since the introduction FDSE. Further mentioned by Deputy Principals were factors that affect textbooks availability in schools as being loss of books by students, replacements of the lost books, and students who transfer to other schools or drop out with school books.

The study therefore concluded that schools in Kisumu West Sub – County had not as of yet achieved student textbook ratio of 1:1 which would be fair to the students to attain quality education. Based on findings, the government through Ministry of Education should ensure

adequate funding of free secondary education to ensure adequate resources in public schools including fair textbook ratio, however, a textbook ratio of 1:1 would be ideal.

## 6. LIMITATIONS OF THE STUDY

The primary limitation was associated to sample size and generalization of the findings. According to Kamer [40], there were 10,413 secondary schools in 2020 that were disseminated throughout the country in unique geographical, socio – economic and cultural settings. An adequate assessment of the influence of FDSE on quality of education in the country would require a large number of schools, possibly all. However, it was not possible to conduct the study in all secondary schools in the country due to manpower, financial and time constraints. This meant that only secondary schools within Kisumu West Sub – County were engaged in the study. Outcomes were therefore limited to secondary schools in Kisumu West Sub – County which may not be prevalent in all schools in Kenya.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors hereby declare that no AI technologies such as Large Language Models and text-to-image generators have been used during the writing or editing of this paper. The perceptions, findings, conclusions and recommendations conveyed are strictly the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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