

The Influence of Availability of Computer Facilities in Public and Private Secondary Schools on Students' Choice of Computer Studies as a Learning Subject in Machakos Sub-County, Kenya

Daniel Komo Gakunga (PhD)¹, Kithungu Rose Mwikali²

¹Lecturer - Comparative and International Education, University of Nairobi

²PhD Candidate-University of Nairobi

Abstract: *The main purpose of this study was to investigate factors that influenced students' choice of computer studies in both public and private secondary schools in Machakos Sub-County, Kenya. The objective of the study was to establish how, availability of computer facilities influenced students' choice of computer studies as a learning subject in public and private secondary schools in Machakos Sub-County, Kenya. The study reviewed related literature that provided findings from previous researches on factors influencing students' choice of computer studies in public and private secondary schools based on the availability of computer facilities. The study used descriptive survey research design. The study embraced census sampling technique to select the sample size of the computer studies students, computer studies teachers and the head teachers of secondary schools. Data was collected through questionnaires as the main research instruments. Data was analyzed using descriptive statistics and processed by use of SPSS programme. The results of data analysis and interpretation were presented in frequency distribution tables and percentages. The results indicated that, availability of computer facilities in both public and private secondary schools highly influenced students' choice of computer studies. However, private secondary schools were found to be better equipped with computer equipment /facilities compared to public secondary schools. Therefore, the study recommended that schools especially public secondary schools should be equipped with adequate computer facilities in order to enable more students choose computer studies and ensure quality of the skills impacted. This implied that availability of computer facilities would ensure that the students were adequately exposed to computer projects/practical, for easy interaction and adaption to the work environment. In view of this paper computer studies should be made a compulsory subject in the Kenyan education system.*

Keywords: Students' choice, computer facilities, computer studies, public and private Schools

1. Introduction

The Information Communication Technology (ICT) driven economy requires highly skilled educated and globally competitive workforce with skills and aptitude in the application of ICT for sustainable development. The Kenyan government through the Ministry of Education Science and Technology (MES&T) introduced computer studies as a learning subject in the Kenyan education curriculum in 1994 to facilitate the acquisition of computer skills (MOE, 2000). Computer studies is classified as a technical subject and is important because it is a major source of skills, abilities, attitudes, work habit, knowledge and information required for individual and economic development (Kavagi, 2001). The introduction of computer studies in the Kenyan secondary school curriculum in 1994 was a step towards the realization of vision 2030 and national education aspirations (MOE, 2002).

Kenyan secondary schools that have adopted the country's official education system 8-4-4 offer a diversified curriculum comprising of 24 examinable subjects (KNEC, 2008). The Kenyan secondary school curriculum consists of five major groups of subjects. Group I-comprises English, Kiswahili and Mathematics Alternative-A/Mathematics Alternative-B. Group II- comprises; Biology, Physics, Chemistry and General Science. Group III-comprises History and Government, Geography, C.R.E, I.R.E and H.R.E. Group IV-comprises Home science, Art and Design,

Agriculture, Aviation Technology and Computer studies. Group V- comprises French, German, Arabic, Music, Kenya Sign Language and Business studies. Candidates are required to select at least seven subjects which includes all the three subjects in group I (Either Mathematics Alternative A or B), at least two subjects from group II one from group III and at least one subject from groups II, III, IV and V. Candidates can sit for a minimum of seven and a maximum of nine, the extra one or two subjects can be selected from any of groups III, IV and V (KNEC, 2014). Group IV consists of five optional subjects and students' are required to choose at least one amidst subjects from groups two, three and five.

The choice of technical subjects especially computer studies by students is often a product of the availability of infrastructural facilities to ensure that the students are adequately exposed to projects/practical work (Erickson, 1986). Olubor (1998) pointed out that effective teaching and learning required equitable and wide access to learning materials. He added that high costs of computer installation, internet connectivity and constant updating of the existing infrastructure limited public and private secondary schools from offering computer studies. Internet connectivity in schools facilitated the teaching of computer studies through the provision of information vital for the education process (Kiptalam & Rodriquez, 2010).

Kavagi (2001) opined that the education sector should consider making computer studies a compulsory subject in secondary schools for Kenyan youths to acquire computer skills for technological innovation as a basis for rapid social economic transformation. The initial candidature for computer studies when it was firstly examined in Kenya in 1998 was 22 candidates. The enrolment has risen over the years to 8,940 candidates by 2014 (KNEC, 2014). The enrolment in candidature and the schools offering the subject have continued to be low compared to candidature in other optional subjects. Lack of understanding of the centrality of computer technology in economic development coupled with disparities in geographical regions, school resources and infrastructure obstructed efforts of making computer studies a compulsory subject in Kenyan secondary schools curriculum. Machakos sub-county has 25 secondary schools which offer computer studies, 12 public secondary schools and 13 private secondary schools. This study arose out of the concern that, there was differential of choice of computers studies by students in private and public secondary schools due to availability of computer facilities.

1.1 Research Question

The study sought to answer the research question; how does the availability of computer facilities in public and private secondary schools influence students' choice of computer studies in Machakos Sub-County, Kenya? Overall, computer technology plays a central role in a country's economic and technological development. The government should ensure computer literacy amongst the young generation for the country's future technological advancement. Computer studies offered in secondary schools, often lead to the acquisition of Information Communication Technology (ICT) skills and expose students to new information and experiences applicable to the world of work. Computer studies being a technical subject should be taught using the guided discovery method because mastery of concepts can be achieved fully through the practical use of computers. Adequately equipped computer laboratories in secondary schools are essential for the teaching and learning of computer studies. This study sought to establish how the availability of computer facilities influenced students' choice of computer studies in public and private secondary schools in Machakos Sub-County, Kenya.

1.2 Research Objective

The main objective of this study was to establish how availability of computer facilities influenced students' choice of computer studies in public and private secondary schools in Machakos Sub-County, Kenya.

2. Brief Review of Related Literature

The study reviewed related literature which provided findings from previous researches on how availability of computer facilities influenced students' choice of computer studies in public and private secondary schools. For example, Lukalo (2008) argued that provision and improvement of infrastructure for teaching technical subjects in schools increased students' participation in the subjects. Though computer technology is entirely viewed as a facilitator for change, many public and private secondary

schools do not offer it due to the high costs of purchase, installation and maintenance of the equipment's (Smyth & Hannah, 2006). According to Smyth & Hannan, (2006), availability of computer facilities in schools would ensure students access materials for teaching and learning for computer studies. Teaching and learning cannot be meaningful without educational materials hence students to a larger extent failed to choose computer studies due to inadequate computer infrastructural facilities Erickson (1986) posited that private secondary schools' proprietors equipped schools with adequate computer facilities hence low ratio of students' to computers which influenced students' choice of computer studies. He further added that public secondary schools lacked adequate funds to provide modern computer equipments, internet connection, installation and subscription expenses which influenced students' choice of computer studies.

Coleman & Hoffer (1989) alluded that majority of the public secondary schools were geographically located in low income minority communities with inadequate internet connectivity and limited resources hence could not offer a wide curriculum which limited students' choice of computer studies. Kiptalam & Rodriquez (2010) argued that many private secondary schools were situated near towns where there was internet connectivity which ensured access to educational information thus influencing their choice of computer studies. The reviewed literature showed that the availability of computer facilities influenced students' choice of computer studies. This study therefore, sought to investigate how availability of computer facilities influenced students' choice of computer studies in public and private secondary schools in Machakos Sub-County, Kenya.

3. Research Methodology

The study adopted descriptive survey research design. The target population for this study included 107 form three computer studies students from the public secondary schools and 110 from the private secondary schools, 12 computer studies teachers from the public secondary schools and 13 from the private secondary schools. It also included 12 head teachers from the public secondary schools and 13 from the private secondary schools. Census sampling technique was employed in choosing the sample size. Data was collected by use of questionnaires. For face validity the study pre-tested the tools and for content validity the instruments were subjected to analysis by experts and specialists in the area of study. The study used test-retest technique to ascertain the coefficient of reliability. Data was analyzed by use of descriptive statistics and processed by use of SPSS programme and presented in percentages and frequency distribution tables.

3.1 Study Findings

The findings of this research were based on the responses of the study respondents who included, computer studies students, computer studies teachers and head teachers.

Out of the 107 and 110 students questionnaires issued to the public and private secondary schools respectively only 100 were returned in each case. The questionnaire return rate was therefore 93 percent and 91 percent for the public and

private secondary schools respectively. This was considered a successful rate of return and hence the data was also considered reliable and representative.

3.1.1 Students’ response on the adequacy of computer equipment’s in secondary schools

The study sought to establish students’ views on whether their schools had adequate computer/facilities equipment for teaching computer studies. The results were as presented in Table 4.1 below

Table 3.1 Students’ response on the adequacy of computer equipment’s in secondary schools

Responses	Computer studies students Public schools n=100		Computer studies students Private schools n=100	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	8	8	34	34
Adequate	48	48	60	60
Not adequate	44	44	6	6
Total	100	100	100	100

Data analysis in Table 4.1 revealed that 34 percent and 60 percent of the students from private secondary schools were of the opinion that facilities for teaching computer studies were very adequate and adequate respectively compared to 8 percent and 48 percent of their counterparts from public secondary schools who felt the same. To the contrary 44 percent of the students from public secondary schools were of the opinion that computer equipment’s were not adequate compared to only 6 percent from private secondary schools. This implied that public secondary schools in Machakos Sub-County were less equipped with computer facilities/equipment compared to private secondary schools. These findings concurred with Wikeley & Stables (1999) who posited that public secondary schools depended primarily on county and national governments for funds which are inadequate and whose disbursement is often delayed which made acquisition of sufficient computer equipment’s impossible hence high ratio of students’ to computers which affected their choice of computer studies.

3.1.2 Students’ response on the extent of their exposure to computer projects/practical

The study also sought to establish whether students were adequately exposed to computer project/practical activities as a mechanism of enhancing their computer skills. The results were as summarized in Table 4.2.

Table 3.2: Students’ response on the extent of their exposure to computer projects/practical

Responses	Computer studies students Public schools n=100		Computer studies students Private schools n=100	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	20	20	34	34
Adequate	58	58	60	60
Not adequate	22	22	6	6
Total	100	100	100	100

Data contained in Table 4.2 indicated that only 6 percent of the students from private secondary schools were not adequately exposed to computer projects as opposed to 22 percent from public secondary schools. This could be attributed to the findings that private secondary schools had more computer facilities compared to public secondary schools. Students from both public and private secondary schools were relatively adequately exposed to computer practical at 58 percent and 60 percent respectively. This implied that computer studies should be taught using the guided discovery method because mastery of concepts cannot be achieved fully without the practical use of computers. Thus, well-equipped computer laboratories influenced students’ choice of computer studies in both public and private secondary schools. This finding affirmed the views of Olubor (1998).

3.1.3 Students’ response on the influence of availability of computer facilities on their choice of computer studies

The study further sought student’s views on the influence of various computer facilities on their choice of computer studies. They were requested to indicate their responses as; **LI=Less Influential, I=Influential, and VI=Very Influential.** The results were as presented in Table 4.3.

Table 3.3: Students’ response on the influence of availability of computer facilities on their choice of computer studies

Responses	Computer studies students n=100 Public schools						Computer studies students n=100 Private schools									
	LI F	I %	I F	I %	VI F	VI %	LI F	I %	I F	I %	VI F	VI %				
Computer laboratory	0	0	40	40	60	60	100	100	0	0	42	42	58	58	100	100
Source of power	0	0	33	33	67	67	100	100	0	0	31	31	69	69	100	100
Availability of desktops	0	0	35	35	65	65	100	100	0	0	30	30	70	70	100	100
Availability of laptops	42	42	30	30	28	28	100	100	25	25	39	39	36	36	100	100
Availability of tablets	97	97	2	2	1	1	100	100	42	42	48	48	10	10	100	100
Availability of smart phones	96	96	4	4	0	0	100	100	40	40	52	52	8	8	100	100
Availability of I pads	70	70	30	30	0	0	100	100	40	40	55	55	5	5	100	100
Availability of modems	40	40	30	30	30	30	100	100	30	30	40	40	30	30	100	100

The data captured in Table 4.3 revealed that 60 percent, 67 percent and 65 percent of students from public secondary schools felt that, computer laboratory, source of power and availability of desktops were very influential towards their choice of computer studies. While 58 percent, 69 percent and 70 percent of students from private secondary schools felt the same respectively. This implied that availability of

computer facilities highly influenced student’s choice of computer studies in both public and private secondary schools. Other facilities that were less influential on student’s choice of computer studies were availability of lap tops, modems, tablets, I pads and smart phones respectively in both public and private secondary schools. These results concurred with the findings of the study conducted by

Lukalo (2008) who argued that provision and improvement of infrastructure for teaching technical subjects in schools increased students' participation in the subjects. Students to a larger extent failed to choose computer studies due to inadequate computer infrastructural facilities; teaching and learning cannot be meaningful without educational materials (Smyth & Hannan, 2006).

3.1.4 Teachers response on the adequacy of computer facilities/equipment in secondary schools

The study sought views of computer studies teachers' on the adequacy of facilities/equipment for teaching computer studies. Out of the 12 and 13 teachers questionnaires issued to the public and private secondary schools only 11 and 12 were returned respectively. The questionnaire return rate was 92 percent for both the public and private secondary schools. The results were as presented in Table 4.4.

Table 3.4: Teachers response on the adequacy of computer facilities/equipment in schools

Responses	Computer studies teachers Public schools n=11		Computer studies teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	1	9	2	17
Adequate	3	27	9	75
Not adequate	7	64	1	8
Total	11	100	12	100

The analysis contained in Table 4.4 revealed that 75 percent of the computer studies teachers from private secondary schools felt that their schools had adequate computer facilities/equipment. While, 64 percent of their counterparts from public secondary schools were of the view that their schools had inadequate computer studies facilities/equipment. From computer studies teachers views, this showed that public secondary schools lacked adequate computer equipments compared to private secondary schools which greatly influenced students' choice of computer studies.

3.1.5 Teachers response on the adequacy of computer studies books in secondary schools

The study further sought the views of computer studies teachers on the adequacy of books for teaching computer studies in secondary schools. The results were as contained in Table 4.5.

Table 3.5: Teachers response on the adequacy of computer studies books in secondary schools

Responses	Computer studies teachers Public schools n=11		Computer studies teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	2	18	7	58
Adequate	4	36	5	42
Not adequate	5	46	0	0
Total	11	100	12	100

As indicated in table 4.5, 58 percent of the computer studies teachers from private secondary schools were of the opinion that the computer studies books were very adequate compared to 46 percent of their counterparts from public secondary schools who felt that the computer studies books

were not adequate. This implied that private secondary schools were more endowed with computer studies books than public secondary schools. This attested to the findings of the study conducted by Lippman, Burns & McArthur (1996) who found that the teaching of computer studies had been left to those schools and geographical regions where appropriate infrastructures were available especially in well-structured public and private secondary schools.

3.1.6 Teachers response on the availability of internet connectivity in secondary schools

The other computer facility that supported the teaching of computer studies was the availability of internet connectivity. The teachers were asked to indicate whether their schools had internet connectivity for purposes of enhancing their teaching of computer studies. The results were as summarized in Table 4.6.

Table 3.6 Teachers response on the availability of internet connectivity in secondary schools

	Computer studies teachers Public schools n=11		Computer studies teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Yes	6	55	8	67
No	5	45	4	33
Total	11	100	12	100

The data in Table 4.6 revealed that 67 percent of the computer studies teachers from private secondary schools indicated that their schools had internet connectivity compared to 45 percent of those from public secondary schools who indicated that their schools had no internet connectivity. This meant that more private secondary schools had higher internet connectivity than public secondary schools. These results mirrored studies conducted by Coleman & Hoffer (1989) who alluded that majority of public secondary schools were located in low income minority communities with limited resources hence could not offer a wide curriculum due to lack of access to internet connectivity because of their geographical location.

3.1.7 Head teachers response on the adequacy of computer equipment's in schools

The study therefore, sought the views of the head teachers on the adequacy of computer equipment's in their schools. With regard to head teachers in both public and private secondary schools, out of the 12 and 13 head teachers questionnaires issued to the public and private secondary schools only 11 and 12 were returned respectively. Therefore, the questionnaire return rate was 92 percent for the public and private secondary schools and this was considered satisfactory for data analysis and interpretation. The results were as presented in Table 4.7.

Table 3.7: Head teachers' response on the adequacy of computer facilities/equipment in secondary schools

Responses	Head teachers Public schools n=11		Head teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	1	9	2	17
Adequate	4	36	9	75
Not adequate	6	55	1	8
Total	11	100	12	100

The head teachers' results revealed the same sentiments expressed by the teachers. 75 percent of the head teachers from private secondary schools were of the opinion that they had adequate computer equipments compared to 55 percent of those from public secondary schools who said that the computer equipments were inadequate. These views showed that public secondary schools lacked adequate computer equipments compared to private secondary schools which influenced greatly students' choice of computer studies. In the eyes of the head teachers in public secondary schools, this would have had an effect on the choice of computer studies by students in their schools.

3.1.8 Head teachers' response on the adequacy of computer studies books in schools

The study also sought to establish the views of the head teachers on the adequacy of books for teaching computer studies. The results were as presented in Table 4.8.

Table 3.8: Head teachers' response on the adequacy of computer studies books in secondary schools

Responses	Head teachers Public schools n=11		Head teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Very adequate	2	18	8	67
Adequate	5	46	4	33
Not adequate	4	36	0	0
Total	11	100	12	100

The results presented in table 4.8 showed that 67 percent of the head teachers from private secondary schools indicated that the computer studies books were very adequate. On the contrary 36 percent of the public secondary schools head teachers felt that the computer studies books were not adequate. The finding that private secondary schools had more computer facilities than private secondary schools, agreed with the findings a study by Erickson, (1986) who posited that private secondary schools' proprietors equipped their schools with adequate computer facilities hence high ratio of students' to computers which influenced students' choice of the subject. In this regard therefore, more students in private secondary schools would choose computer studies than in public secondary schools that had less computer facilities according to the head teachers.

3.1.9 Head teachers' response on the availability of internet connectivity in secondary Schools

The other computer facility that supports the teaching of computer studies was the availability of internet connectivity. The head teachers were asked to indicate whether their schools had internet connectivity. The results were summarized in Table 4.9.

Table 3.9: Head teachers' response on the availability of internet connectivity in secondary schools

Responses	Head teachers Public schools n=11		Head teachers Private schools n=12	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Yes	6	55	8	67
No	5	45	4	33
Total	11	100	12	100

The findings revealed that 67 percent of the head teachers from private secondary schools indicated that their schools had internet connectivity compared to 55 percent of their counterparts from public secondary schools. Thus, public and private secondary schools were relatively equally equipped with internet connectivity which enhanced the teaching of computer studies. However, more private secondary schools had higher internet connectivity than public secondary schools. These findings affirmed the study conducted by Kiptalam & Rodriguez (2010) who established that many private secondary schools were situated near towns where there was internet connectivity which ensured access to educational information thus influencing students' choice of computer studies.

4. Study Conclusion and Recommendations

From the findings of the students, computer studies teachers and head teachers, by and large this study concluded that computer facilities highly influenced student's choice of computer studies in both public and private secondary schools. Overall therefor, the study established that private secondary schools were well equipped with computer facilities/equipment, computer studies books and internet connectivity unlike public secondary schools. This therefore meant that students from private secondary schools were adequately exposed to projects/practical activities as a mechanism of enhancing their computer skills compared to their counterparts from public secondary schools. The study recommended that there was need to equip public secondary schools with adequate computer facilities so as to enable more students choose computer studies and ensure quality of the skills impacted. Students whose choose computer studies should be adequately exposed to computer projects/practical, in order to help them interact and adapt to the world work environment that is currently dominated by information technology.

References

- [1] Coleman, J.S. & Hoffer, H. (1987). *Public and private high schools: The impact of communities*. New York .Basic Books.
- [2] Erickson, D. (1986). *Choice and private schools: Dynamics of supply & demand*. In DC. Levy: *Private education: Studies in choice and public policy*. PP.82-109. New York. Oxford University Press.
- [3] Kavagi, L. (2001). *The use of computers in secondary school*. A survey of schools in western province. Unpublished M. Phil. Thesis. Moi University.
- [4] Kiptalam, G.K. & Rodrigues, A.J. (2010). Internet utilization: A case of connected rural and urban secondary schools in Kenya. *International Journal of Computing and ICT Research*, 4(1), 49-63.
- [5] Kenya National Examination Council, (2008). Circular on the K.C.S.E examination to be offered with the effect from 2009.
- [6] Kenya National Examination Council, (2014). K.N.E.C Regulations and syllabuses.
- [7] Lippman, L., Burns, S. & McArthur, E. (1996). *Urban schools. The challenge of location and poverty*. Washington, DC. U.S. Department of Education, National Center for Education & Statistics

- [8] Lukalo, F.K. (2008). *Repositioning computer studies: Cultural context and gendered subject choices in Kenya*. Nairobi: Academy Science Publishers.
- [9] Ministry of Education, (2000). *Effective management of secondary school curriculum – Circular No. 106*. Nairobi: Government Printer.
- [10] Ministry of Education, (2002). *Secondary Education Syllabus Volume 2: Mathematics, Physics, Agriculture, Home science and Computer studies*. Nairobi: Government Printer.
- [11] Olubor, C.I. (1998). *Choice of science and technology subjects among secondary school students*. J. Socsci, 22(3).191-198.
- [12] Smyth, E. & Hannan, C. (2006). School effects and subjects choice. The update of science subjects in Ireland. School effectiveness and school improvement. *An International Journal of Research Policy and Practice*. Vol 17, No 3, September, pp.303-327.
- [13] Wikeley, F. & Stables, G. (1999): *Child career aspirations and family income*. New York. Joseph Rowntree Foundation.

