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# Information Communication Technology Use and Infrastructural Motivation on the Enhancement of Student Centred Learning among Public Secondary School Students in Bungoma County, Kenya

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***Abstract:***
*The objective of this study was to establish the extent to which Information and Communication Technology (ICT) use and its infrastructural motivation had enhanced student centred learning (SCL)skills among public secondary school students in Bungoma County. Therefore the study hypothesis was derived from the study objectives. The target population was 742 respondents in 71 schools and sample size was 272 respondents selected from 19 schools. The tools used for data collection were Observation Checklist, questionnaire and an interview guide. Cronbach's alpha for reliability test was 0.701. Descriptive statistics such as frequencies, percentages and means were employed while inferential statistics that is correlation and regression analyses were used. Data was analyzed with the help of the Statistical Package for Social Sciences (SPSS). Qualitative data was analyzed through content analysis. The simple linear stepwise multiple regression results indicated that ICT use and its motivation had insignificant impact on SCL. The study's recommendations were: improvement of infrastructural aspects such as diversification of technologies especially embracing the digital technologies. The findings of this study may be used to guide the school managers on the infrastructural motivational requirements in the enhancement of SCL.*

***Keywords:*** *Information communication, technology, motivation, student centered learning, infrastructural motivation*

## 1. Introduction

Information communication technology use has become a key instrument in many fields and sectors of economies and more importantly in the educational sector. The purpose of this study was to evaluate the extent to which technological infrastructure for learning had motivated learners and led to the enhancement of Student Centred Learning (SCL) skills in public secondary schools in Bungoma County. The focal area of the study was the evaluation of the available tools used and how they had impacted on learner motivation and achievement of SCL.The study adopted mixed methods design. Data was collected through observations, questionnaires and interview schedules. Results revealed that computers were the main tool used in most schools and had disadvantaged most learners. The study recommended for diversification of technologies used for learning especially cheap technologies which appeal more to the needs of the learners.

## 2. Background to the Study

Infrastructural motivation is the motivation derived from ICT infrastructure, which comprises of both hardware and software facilities such as computers, radios, laptops, electricity, telephony, rooms, network and implementation. The availability of relevant and adequate ICT infrastructure for learning in schools has motivational potential that can drive learners to achieve their educational goals and self efficacy. In most schools that offer ICT in Bungoma County Kenya, tools used in the teaching and learning process such as computers, projectors, flashes, radios and laptops were present but not enough as per the needs of the learners. According to a study in Malaysia on the extent of ICT use among students in secondary schools, teachers and students made use of ICT infrastructure to a moderate extent; however it was observed that teachers were not fully ICT literate and did not fully use ICT for teaching. The most common tools were projectors and computers (Bee & Chia, 2014). The distribution of these tools to learners was challenging due to their inadequacy.

Therefore the key area of consideration before installation of ICT in schools is to ensure that appropriate rooms are available for the housing of technology. This would motivate learners to learn in comfortable and conducive environments. This was however found to be a challenge in most developing countries where unsuitable rooms were used to house technologies and which also lacked reliable supply of electricity (White *et al.,* 2010).

In most rural areas of Africa wireless technologies such as handheld computers, tablets and smart phones which are confirmed to be the best for fast technology access and whose potential for learner motivation is high are yet to be

realized and exploited on a large scale (Kwapong, 2010). Educational policy makers should therefore study the given choices and select the form of ICT that can motivate learners and lead to SCL in the education system at all levels. ICT use in schools should also follow the use in society where there is a well established service industry for easy maintenance of the software (Breslau & Engel, 2015).

Studies by Churu (2015); Kiptaalm et al., (2010) & Namulanda (2011) on 1CT use in secondary schools in Botswana and Kenya respectively, revealed that high cost of PCS, lack of reliable electricity in many rural areas and high charges for internet usage were serious challenges affecting ICT use in schools hence undermining the exploitation of ICT infrastructural motivation among learners. Cheaper and affordable technologies should be preferred to replace the expensive computers and target a larger student population to benefit from technology use motivation.

*2.1. Statement to the Problem*

The use of ICT in enhancing learning should be geared towards empowering the learner to steer his/her own learning at a desirable pace. One of the key challenges in the achievement of SCL is lack of adequate tools (Kiptalaam, 2010). The main technology used for learning in most African countries is the computer. Computers are expensive and only few schools can afford them. This has therefore greatly undermined the attainment of SCL among learners. In Bungoma county Kenya, lack of the necessary tools has greatly undermined SCL (Shihundu, 2014).

*2.2. Objectives of the Study*

Specific objective of the study was to establish the influence of ICT infrastructural motivation on the enhancement of SCL skills among public secondary school students in Bungoma County.

*2.3. Hypotheses of the Study*

The hypothesis of the study was derived from the specific objective of the study:

- $H_{O:}$ ICT infrastructural motivation has no significant influence on the enhancement of SCL Skills among public secondary school students in Bungoma County.

*2.4. Methodology*

This study adopted both qualitative and quantitative research methods where descriptive survey and inferential research designs were used to increase the validity of the findings and for the purposes of achieving optimal results (Saunders, Lewis & Thornhill, 2009). Descriptive survey design enabled the researcher to define new relationships between variables without manipulating them while the inferential design enabled the researcher to investigate population characteristics and also test the hypothesis of the study. Data was collected through questionnaires, observations and interview guide and analyzed through SPSS.

*2.5. Target Population*

The target population of this study was all the 600 form 3 students, 71 ICT teachers and 71 school managers in all the 71 public secondary schools that offer computer studies in Bungoma County. The total target population was therefore 742. Table 1 shows the target population of the study.

| Category | Population | Percentage |
|---|---|---|
| Students | 600 | 100 |
| Teachers | 71 | 100 |
| Principals | 71 | 100 |
| Total | 742 | I00 |

*Table 1: Target Population*
*Source: Ministry of Education Bungoma County (2018*

*2.6. Sampling Techniques and Sample Size*

From a list of 71 public secondary schools offering computer studies in Bungoma County, the researcher purposively selected schools that meet the minimum population and sample size of 10 respondents systematically. According to Research Advisors (2006), minimum population and sample size of 10 respondents is acceptable threshold for any study. Saturated sampling technique was used to sample 2 national schools. The target population of 600 form three students drew a sample size of 234 respondents through simple random sampling technique. The first 19 schools on the list with minimum sample size of (10) and above were purposively selected for the study. For schools with a population of 10 respondents, saturated sampling technique was used, while schools with population of more than 10 respondents were sampled through simple random sampling technique. Therefore 19 ICT teachers and 19 school managers were selected. Table 2 shows the sample matrix.

| Category | Population | Sample size | Percentage |
|---|---|---|---|
| Students | 600 | 234 | 39 |
| ICT teachers | 71 | 19 | 26.76 |
| School principals | 71 | 19 | 26.76 |
| Total | 742 | 272 | 36.65 |

*Table 2: Sample Matrix*
*Sources: Field Survey (2018)*

**3. Results and Discussions**

This section focused on response rate, respondents' demographic background, distribution of types of schools and ICT teachers' level of training

*3.1. Response Rate*

The researcher distributed 234 copies of questionnaire to student respondents, 19 copies of questionnaire to ICT teachers and also conducted interviews through interview guides with 19 school managers. Two schools which had participated in the piloting phase were excluded from the main study. The students' response rate was 234 (100 %). The ICT teachers' and school managers' response rate was 19 (100 %) each respectively. The overall response rate for research tools used was acceptable as the proportion represented over 50 % of the research tools used in the study which according to Rogelberg (2006), is sufficient.

*3.2. Respondents' Demographic Background*

The study sought to establish characteristics of the respondents that are ICT student respondents and ICT teacher respondents. The student characteristics were based on age, gender, type of school and level of the school while the teacher characteristics were based on the age, sex, level of qualification and experience of the teachers.

*3.3. Age Distribution of the Student Respondents*

The study sought to investigate the respondents' age distribution. The results are presented in Table 3

| | | Frequency | Percentage |
|---|---|---|---|
| Valid | 10 -14 yrs | 11 | 4.7 |
| | 15 – 18yrs | 193 | 82.5 |
| | 19 – 21yrs | 30 | 12.5 |
| | Total | 234 | 100 |

*Table 3: Age Distribution of the Student Respondents*
*Source: Survey Data (2018)*

Table 3 shows age distribution of the student respondents as follows: 10-14 years (4.7 %), 15-18 years 193 (82.5 %), 19-21 years (30 %), and above 21 (0 %). Majority of the student respondents were in the age bracket of (15-18) years. This constituted mature and suitable respondents for the study because they deemed to be familiar with ICT use and its motivation on learning and therefore may have given the best responses for this study. Respondents aged (10-14) years, constituted 4.7 % of the respondents. These may have been young and not well experienced in technology use for motivation, while respondents aged above 21 did not exist.

*3.4. Gender Representation of Student Respondents*

The study sought to investigate the gender representation of the student respondents. Table 4 presents the results.

| Gender Population % | | | |
|---|---|---|---|
| Valid | Male | 136 | 58.1 |
| | Female | 97 | 41.5 |
| | Total | 233 | 99.6 |
| | Missing System | 1 | .4 |
| | Total | 234 | 100 |

*Table 4: Gender Representations of Student Respondents*
*Source: Survey Data 2018*

Table 4 shows that most of the student respondents 136 (58.1 %) were males. The females constituted 97(41.6 %), and 1 (0.4 %) was missing in the system. This implies that more boys than girls participated in the study and therefore the expected results would favour more boys than girls in terms of participation.

*3.5. Distribution of Types of Schools*

Respondents were asked to indicate the types of their schools basing on day, boarding, mixed, boys and girls. The results are presented in Table 5

| | | |
|---|---|---|
| Infrastructural motivation | Pearson correlation | .001 |
| | Sig 1( tailed)<br>N | .498<br>16 |

*Table 5: Distribution of Types of Schools*
*Source: Survey Data 2018*

Table 5 shows the distribution of sample size with respect to type of schools as follows: mixed day 23 (9.83 %), boys' boarding schools 114 (48.7 %), girls' boarding schools 96 (41.03 %) and mixed boarding schools 1 (0.4 %). Single sex boarding schools gave the highest proportion of the sample size (boys boarding 48.7 % and girls boarding 41.03 %) compared to mixed day and boarding schools (mixed day 9 % and mixed boarding 0.4 %.). Boys' boarding schools had the highest number of student respondents 48.7 %. This implies therefore that boarding schools were more involved in the study than any other type of schools. Gender Distribution of ICT Teachers

The study sought to establish the gender representation of the teacher respondents. The results are presented in Table 6

| | | **Frequency** | **Percentage** |
|---|---|---|---|
| Valid | Male | 12 | 75 |
| | Female | 4 | 25 |
| | Total | 234 | 100 |

*Table 6: Gender Distribution of ICT Teachers*
*Source: Field Survey 2018*

Table 6 shows that male ICT teachers constituted 12 (75 %) while female ICT teacher respondents were 4 (25 %) in the study. Therefore this implies that more male teachers than female teachers participated in the study.

*3.6. Age Distribution of ICT Teachers*

The study investigated the age distribution among the teacher respondents. Table 7 presents the results

| | | **Frequency** | **Percentage** |
|---|---|---|---|
| Valid | 25-30 | 7 | 43.8 |
| | 31-35 | 6 | 37.5 |
| | 36-40 | 2 | 12.5 |
| | 46 and above | 1 | 6.2 |
| | Total | 16 | 100 |

*Table 7: Age Distribution of ICT Teachers*
*Source: Field Survey 2018*

Table 7 shows the distribution of the sample size with respect to age for the ICT teachers as follows: 25-30 years (43.8 %), 31-35 years (37.5 %), 36 – 40 (12.5 %) and 40 and above (6.2 %). Majority of the ICT teacher respondents were in the age bracket of (25 - 30 years). This implies that majority of the teacher respondents were fairly young and were expected to be aware of technology use for motivation and current trends in education hence suitable to meet the objectives of the study.

*3.7. ICT Teachers' Level of Training*

The study sought to establish the respondents' level of training. The results are presented in Table 8

| | | Frequency | Percentage |
|---|---|---|---|
| Valid | Certificate | 1 | 6.2 |
| | Diploma | 11 | 6 8.8 |
| | Graduate | 4 | 25 |
| | Total | 16 | 100 |

*Table 8: ICT Teachers' Level of Training*
*Source: Field Survey (2018)*

Table 8 shows the educational level of the ICT teacher respondents distributed as follows: untrained (0 %), certificate 1 (6.2 %), diploma 11 (68.8 %), and degree 4 (25.4 %). Majority of teacher respondents were therefore diploma holders 11

(68.8 %). This therefore implies that there was a qualified workforce personnel in the ICT teaching fraternity in public secondary schools who were expected to deliver on ICT use motivation and enhancement of SCL skills among learners.

*3.8. Distribution of ICT Teachers' by Teaching Experience*

The study sought to establish the respondents' teaching experience. The results are presented in Table 9

| | | Frequency | Percentage |
|---|---|---|---|
| Valid | 1 – 5yrs | 10 | 62.5 |
| | 6 – 10yrs | 4 | 25.0 |
| | 11 -18yrs | 2 | 12.5 |
| | 19 and above | - | 0 |
| | Total | 16 | 100 |

*Table 9: ICT Teachers' Teaching Experience*
*Source: Survey Data (2018*

Table 9 shows ICT teachers' experience in the use of ICT for learning, distributed as follows: 1-5 years (62.5 %), 6-10 years (25 %), 11-18 years (12.5 %) and 19 and above years (0 %). Majority of the workforce (62.5 %) had teaching experience of between (1-5) years only. This could be attributed to the fact that the subject had not been taught for many years in most schools that embraced it especially the county and sub county schools.The results for the distribution of tools are presented in Table 10

| Facility | Present/Absent | Quality | Frequency | Percentage |
|---|---|---|---|---|
| Computer Rooms | Present | Good | 12 | 75 |
| | Present | Poor | 4 | 25 |
| | Total | | 16 | 100 |
| Computers | Present | Good | 15 | 93.8 |
| | Present | Poor | 1 | 6,2 |
| | Total | | 16 | 100 |
| Audiovisual materials | Absent | | 9 | 56.2 |
| | Present | Good | 7 | 43.8 |
| | Total | | 16 | 100 |
| Television | Absent | | 3 | 18.8 |
| | Present | Good | 13 | 81.2 |
| | Total | | 16 | 100 |
| Radios | Absent | | 7 | 43.8 |
| | Present | Good | 9 | 56.2 |
| | Total | | 16 | 100 |
| Laptops | Absent | | 3 | 18.8 |
| | Present | Good | 13 | 81.2 |
| | Total | | 16 | 100 |
| Smartphone | Absent | | 16 | 100 |
| Whiteboards | Absent | | 8 | 50 |
| | Present | Good | 6 | 37.5 |
| | Present | Poor | 2 | 12.5 |
| | Total | | 16 | 100 |
| Network | Absent | | 3 | 18.8 |
| | Present | Good | 13 | 81.2 |
| | Total | | 16 | 100 |
| Electricity | Absent | | 1 | 6.2 |
| | Present | Good | 12 | 75 |
| | Present | Poor | 3 | 18.8 |
| | Total | | 16 | 100 |
| Policies | Present | Good | 13 | 81.2 |
| | Present | Poor | 3 | 18.8 |
| | Total | | 16 | 100 |
| ICT Use Programmes | Absent | | 4 | 25 |
| | Present | Good | 10 | 62 |
| | Present | Poor | 2 | 12.8 |
| | Total | | 16 | 100 |

| Facility | Present/Absent | Quality | Frequency | Percentage |
|---|---|---|---|---|
| ICT Use Motivation | Absent | | 5 | 31.2 |
| | Present | Good | 9 | 56.2 |
| | Present | Poor | 2 | 12.5 |
| | Total | | 16 | 100 |
| ICT Use Guides | Absent | | 6 | 37.5 |
| | Present | Good | 8 | 50 |
| | Present | Poor | 2 | 12.5 |
| | Total | | 16 | 100 |
| ICT Use Regulations | Absent | | 10 | 62.5 |
| | Present | Good | 5 | 31.2 |
| | Present | Poor | 1 | 6.2 |
| | Total | | 16 | 100 |
| ICT Motto | Absent | | 6 | 37.5 |
| | Present | Good | 7 | 43.7 |
| | Present | Poor | 3 | 18.8 |
| | Total | | 16 | 100 |

*Table 10: Distribution of Various Technologies and Related Materials in Schools*
*Source: Survey Data (2018)*

Table 10 indicates that 12 (75 %) of the teachers confirmed presence of good quality computer rooms while 4 (25 %) confirmed that their computer rooms were of bad quality. Most computer rooms used were therefore of good quality. The teacher respondents (93.8 %) confirmed that the computers available in their schools were of good quality while 6.2 % confirmed that they had poor quality computers.

The ICT teacher respondents (56.2 %) confirmed that they lacked audiovisual materials for learning while 43.8 % had good audio visual materials. On television facility, 18.8 % of the respondents registered no facility at all, while 81.2 % of the respondents confirmed presence of good television sets. Radios were not available in some schools as observed by 43.8 % of the teachers while 56 % of the teachers confirmed the availability of the same facility. Laptops were not available according to 18.8 % of the respondents while
81.2 % of the respondents confirmed presence of the facility in their schools. Smart phones were not available at all for use in all the schools.

The use of interactive whiteboards was not available according to 50 % of the teachers but 37.5 % of the respondents confirmed use of good interactive whiteboards and 12.5% confirmed use of poor whiteboards. The network absence was registered by 18.8 % of the respondents while 81.2 % of the respondents had good network coverage implying that there were minimal difficulties caused by lack of network. Problematic electricity was observed by 6.2 % of the respondents while 93.8 % of the respondents observed regular flow of power in their schools hence electricity was not a major hiccup in technology use.

Good ICT policies were confirmed by 81.2 % of the respondents while 18.8 % of the respondents observed poor ICT policies. ICT use programs were confirmed absent according to 25 % of the respondents while 62.2 % confirmed good programs whereas 12.8 % confirmed use of poor quality ICT programs. The ICT motivational programs were registered absent as observed by 31.5 % of the respondents as use of good motivational programs was confirmed by 56.2 % and poor motivation programs were observed by 12.5 % of the respondents. ICT use guides were absent as confirmed by 37.5 % respondents, good guides were available as recorded by 50 % of the respondents while 12.5% noted that their ICT guides were of poor quality. Teachers (37.5 %) confirmed absence of ICT motto, 43.8 % of the teachers had good ICT mottos but 6.2 % observed poor ICT mottos in their schools. Lastly on school ICT regulations, 62.5 % of the respondents admitted that they had no ICT regulations, 31.2 % observed good ICT regulations while 6.2 % recorded poor ICT regulation programs.

*3.9. ICT teachers' Responses on the Extent to which ICT Infrastructural Motivation Influence SCL skills*

ICT Teachers were asked to respond to questionnaire statements on a 5 - point Likert scale on infrastructural motivation as follows: very low, lowly, moderately, highly and very highly. Results are presented in table 4.13.

| | | Frequency | Percentage | Mean |
|---|---|---|---|---|
| Valid | Very Lowly | 3 | 18.8 | 0.188 |
| | Lowly | 6 | 37.5 | 0.75 |
| | Moderate | 4 | 25.0 | 0.75 |
| | Highly | 2 | 12.5 | 0.5 |
| | Very highly | 1 | 6.2 | 0.3 |
| | Total | 16 | 100 | 2.488 |
| | Aggregate mean | | | 0.5 |

*Table 11: ICT Teachers Responses on the Extent to Which ICT Infrastructural Motivation Enhanced SCL Skills among Learners*
*Source: Survey Data (2018)*

Table 11 shows ICT Teachers' responses on the extent to which ICT infrastructural motivation had enhanced SCL skills: very lowly 3 (18.8 %), lowly 6 (37.5 %), moderately 4 (25.0%), highly 2 (12.5 %) and very highly 1 (6.2 %). Most of the respondents 6 (25.0 %) indicated moderate extent of ICT infrastructural motivation with (0.75) proportion of the mean. The overall mean was 2.488 while the aggregate mean was 0.5. This implies that to a very low extent ICT was able to enhance SCL skills among learners.

*3.10. ICT Teachers' Questionnaire Responses to Statements on Infrastructural Motivation*

Teachers were asked to indicate their degree of agreement or disagreement on specific statements on Likert scale. Results are presented in table 4.10.

| Statement | Strongly Agree | | Agree | | Undecided | | Disagree | | Strongly Disagree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | F | % | F | % | F | % | F | % | F | % |
| Analogue technologies such as radios and televisions are mostly used for entertainment | 8 | 50 | 5 | 31.2 | | | | | 3 | 18.8 |
| Computers are the main tool for teaching/ learning activities | 8 | 50 | 8 | 50 | | | | | | |
| Digital tools are faster on internet and highly motivating compared to analogue tools | 11 | 68.8 | 5 | 31.2 | | | | | | |

*Table 12: ICT Teachers' Questionnaire Responses on Infrastructural Motivation*
*Source: Field Survey Data (2018)*

Table 12 indicates the following ICT teachers' responses on the statement, ` Analogue technologies such as radios and televisions are mostly used for entertainment': strongly agree 8 (50 %), agree 5 (31.2 %), undecided 0 (0 %), disagree 0(0 %) and strongly disagree 3 (18.8 %). Therefore over 80 % of the respondents strongly agreed and agreed to the statement while only 18.8 % strongly disagreed to the statement. This hence implies that analogue technologies were no longer used for learning and for motivation among learners to enhance SCL skills.

ICT teachers' responses on the statement, 'Computers are the main tools for teaching-learning activities,' were as follows: strongly agree 8 (50 %) and agree 8 (50 %). All the respondents strongly agreed and agreed to the statement. This hence implies that computers were used as the main tool in teaching and learning activities to enhance SCL skills. ICT teachers' responses on the statement, 'digital tools are faster on internet and highly motivating compared to analogue tools,' were: strongly agree 11 (68.8 %), and agree 5 (31.2 %). Therefore all the respondents strongly agreed and agreed to the statement. Table 13 shows the level of schools against the ratio of computers among learners.

| Level of School | Strongly Agree | | Agree | | Undecided | | Disagree | | Strongly Disagree | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | % | F | % | F | % | F | % | F | % | F | % |
| Sub County | 5 | 11.36 | 13 | 29.54 | 4 | 9.09 | 13 | 29.54 | 9 | 20.45 | 44 | 20 |
| County | 14 | 34.15 | 10 | 24.39 | 1 | 2.34 | 12 | 29. 27 | 4 | 9.76 | 41 | 18.64 |
| Extra County | 20 | 23.53 | 22 | 25.88 | 5 | 5.88 | 19 | 22.35 | 19 | 22.35 | 85 | 36.64 |
| National | 7 | 14 | 11 | 22 | 5 | 10 | 9 | 18 | 18 | 36 | 50 | 22.73 |
| Total | 46 | | 56 | | 15 | | 53 | | 50 | | 220 | 100% |

*Table 13: Distribution of Level of School and Ratio of Computers to Students*
*Source: Survey Data (2018)*

Table 13 reveals that 11.36 % of the sub county school respondents strongly agreed and 29.54 % agreed to the statement `the ratio of computers to students is low hence I'm not motivated to practice technological skills well'. The

county school respondents who strongly agreed were 34.15% while those who agreed were 24.39 %. Respondents from extra county schools who strongly agreed to the statement were 23.54 %, while those who agreed were 25.88 %. Respondents from the national schools who strongly agreed were 14 % while those who agreed were 22 %.

*3.11. Diagnostic Tests for Regression of ICT Infrastructural Motivation and SCL*

Diagnostic tests were performed on ICT infrastructural motivation to check for normality, linearity and multicollinearity conditions. Linearity of the relationship between infrastructural motivation and SCL was determined by the inspection of correlation coefficients of the variables. Thus the results were as follows: Pearson Correlation (r) = 001, p <.498 at 2 tailed significance level $\alpha < 0.5$. It was a positive and linear relationship. See Appendix vii. Multicollinearity test was conducted to determine tolerance and Variance Inflation Factors (VIF). The coefficients were as follows: tolerance = 1.00 and VIF = 1.00. Therefore, infrastructural motivation had a VIF of less than 10 and a tolerance value greater than 0.1, annulling any possibility of multi-co linearity, hence the level of multicollinearity in the model could be tolerated (Field, 2009). See appendix vii. The linear regression was thus suitable for estimation in this study, and hence the proposed regression models could be accurately estimated.

*3.12. Regression Analysis of Infrastructural Motivation and SCL skills*

The regression analysis of infrastructural motivation was performed through testing $HO_1$ of the study to determine the influence of ICT infrastructural motivation on SCL. The hypothesis was stated:

- $Ho_2$: ICT Infrastructural Motivation has No Significant Influence on the Enhancement of SCL Skills among Public Secondary School Students in Bungoma County. The regression results are presented in tables 1.14 (a – c)

| Sample | R | R Square | adjusted R | Std Error of the Estimate |
|---|---|---|---|---|
| 234 | .001a | .000 | -.071 | 9.343 |

*Table 14: Goodness of Fit for ICT Infrastructural Motivation on SCL*
*a. Dependent Variable: SCL Skills*
*b. Predictors: (Constant), ICT Infrastructure Motivation*
*Source: (Survey Data 2018)*

Table 14indicates that the adjusted R square was (-0.071) meaning that ICT infrastructural motivation accounted for only - 7.1 percent of the variations in the SCL. This was a weak and negative influence on SCL. The explanation for this result is that the tools used were not appropriate for the enhancement of SCL among students especially the computers. Online tools were mostly sidelined by school authorities (table 4.8)

| | Model | Sum of Square | Degree of Freedom | Mean | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression<br>Residual<br>Total | .003<br>1222.164<br>1222.167 | 1<br>14<br>15 | .003<br>87.297 | .000 | .996b |

*Table 15: ANOVA for the Regression of Infrastructural Motivation on SCL*
*a. Dependent Variable: SCL skills*
*b. Predictors: (Constant), ICT infrastructure motivation*
*Source: (Survey Data 2018)*

Table 15presents an ANOVA summary of F (1, 14) =.000, P = 0.996; where P > 0.05. This implies that ICT infrastructural motivation had an insignificant influence in the variations in the SCL. This confirms that the regression model is insignificant at (P > 0.05). This therefore implies that technologies used in most schools derailed learners from the achievement of SCL.

| Model B | Unstandardized Coefficients | Standardized Coefficients | | T | Sig |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 25.921 | 20.140 | | 1.287 | .219 |
| ICT Infrastructural | .004 | .652 | .001 | .006 | .996 |
| Motivation | | | | | |

*Table 16: Significance of the Regression of Infrastructural Motivation on SCL*
*a. Dependent Variable: SCL Skills*
*b. Predictors: (Constant), Infrastructural Motivation*
*Source: (Survey Data 2018)*

Table 16shows the coefficients of infrastructural motivation and SCL at $\beta = 0.001$, $p = 0.996$, where $P > 0.05$. This implies that the influence of infrastructural motivation on SCL was statistically insignificant. Based on the analysis in the tables 4.12 (a-c), the following model was formulated:

$SCL = 25.921 - 0.71X_1 + e$.....1

Where 25.921 = Y intercept; constant.

- 0.71 = estimate of expected increase in SCL.

The regression coefficient of (-0.71) implies that a unit increase in the ICT infrastructural motivation leads to (-0.71) increase in SCL.

*3.13 Correlation Analysis of ICT Infrastructural Motivation and SCL Skills*

The correlation analysis of ICT Use and SCL Skills was performed through SPSS to establish the strength and direction of the relationship between ICT infrastructural Motivation and SCL skills. The results are presented in table 1.15

| Infrastructural Motivation | Pearson Correlation | .001 |
|---|---|---|
| | Sig 1( tailed) | .498 |
| | N | 16 |

*Table 17: Correlation Analysis of Infrastructural Motivation and SCL*
*Source: Survey Data (2018)*

Table 4.13 shows the correlation analysis of ICT infrastructural motivation and SCL. The relationship between ICT infrastructural motivation with SCL was at (r= 0.001, p = .498). This was a very weak correlation. The explanation for this result is that the relationship between tools used and SCL was a weak one and not significant.

*3.14. School Managers' Responses on ICT Use and Infrastructural Motivation*

Qualitative data on ICT infrastructural motivation was obtained through responses to interview guides for the school managers. The results revealed that majority of the school managers (90 %) cited that inadequate tools were the main challenge facing ICT Use in schools. On the purpose of offering ICT course in schools some of the managers (50 %) stated acquisition of ICT knowledge, few said the subject was marketable and none said ICT motivated learners in the learning process. See appendix vi. This reveals that managers had no specific objective for introduction of ICT use and whose outcomes were neither clear to them. This implies that even ICT policies were not clear.

The analogue technologies such as radios and televisions were used for entertainment programs but not for motivation and active learning. These are affordable technologies which every school should afford for learning, apart from being used for entertainment. The digital technologies such as audiovisual, laptops and smart phones were least embraced in most schools. For instance 56.2 % of teacher respondents confirmed absence of audiovisual cassettes for learning, 81.2 % of teacher respondents confirmed presence of laptops, however not readily available for use if all computers were in working condition. See table 4.8. This was a policy issue where direction on use of digital technologies was not available in the school system unlike in the USA where policies on use of digital technologies were well articulated in the national educational policies (US Department of Education, 2010). Smart phones were not available for learners in all schools, while 50 % of the respondents confirmed absence of interactive whiteboards in schools.

The problem with use of computers was found to be that they are costly to install and use, not portable and also slow on internet. Therefore over reliance on computers as the main teaching and learning tool in most schools dragged ICT use and the achievement of SCL among learners. Schools should diversify technology to quicken its access among learners especially use of learner friendly technologies which are affordable.

On the extent to which ICT infrastructural motivation had enhanced SCL, the findings indicate a total mean for extent (2.5) but with the aggregate mean of 0.5 which was very low. Basing on the composition of the sample size (majority drawn from extra and national schools), this was below the researcher's expectation. This could be attributed to the fact that essential tools for motivation and achievement of SCL were inadequate. The few which were present may have caused facilitation difficulties among teachers leading to low level of satisfaction among learners. Therefore given that most of the schools were drawn from Extra County and national schools, the extent was not satisfactory implying that a lot more should be done to improve on the diversification of the technologies in all schools. Portable technologies are highly recommended in this study to enhance learner use of technology anytime anywhere.

Results on the ratio of tools to the type of schools indicate that the highest percentages of student respondents who strongly agreed and agreed to the statement: `the ratio of computers to students is low hence I'm not motivated to practice technological skills well' were from county schools (34.15 %) and sub-county schools (29.54 %). The least percentages of student respondents were from the Extra County (23.54 %) and national schools (14 %). The results generally show that county and sub county schools were disadvantaged by the shortage of tools whereas the extra county and national schools had fair distribution of the same tools. School managers had therefore failed to support ICT infrastructural development due to lack of funds because computers are costly to install and maintain. However national and Extra County schools may have set a little more resources on the development of ICT infrastructural aspects than county and sub-county schools due to school statuses, high level of commitment and support by the stake holders in those schools.

On use of digital tools, internet use was deliberately avoided by the school managers so that they may save on funds for other basic school operations; yet it was a key component of collaborative learning. Other reasons may have been: lack of commitment by school managers, little information on ICT use and absence of readiness to manage the ICT facilities. Over 37 % of the respondents in the study, confirmed absence of ICT use guides, ICT school motto and ICT regulations. Presence of ICT regulations was only confirmed by 10 % of the of the ICT teacher respondents. See appendix

vii. These are key ICT aspects which constitute the technological environments for SCL and motivation and without which no meaningful motivation and SCL can be achieved.

Over 81 % of the ICT teacher respondents confirmed that ICT policies used were good; nevertheless, the policies were only good for the maintenance of good student discipline while using technology but not to foster high level SCL skills among learners. Lack of ICT regulations and failure to use digital technologies greatly undermined the programs put in place. Absence of regulations may have given learners a leeway to misuse technology which derailed them away from SCL. Most schools therefore depended mainly on computers which have been few over the years; hence ICT classes were constantly small.

The finding on the ICT teachers' responses on the statement, ` Analogue technologies such as radios and televisions are mostly used for entertainment was confirmed by majority of the respondents. Analogue tools were not used for learning in most schools but have potential as educational media remain relevant for learner motivation in schools. There are important programs that can be offered through radio and TV programs in schools to break teacher monotony in class and enhance self directed learning. The abandonment of analogue technologies for learning implies poor management and commitments in making use of the available technologies and resources for learner motivation.

The finding on the questionnaire statement, 'digital tools are faster on internet and highly motivating compared to analogue tools were that ICT teachers strongly agreed and agreed at 68.8 % and 31.2 % respectively. Therefore the problem with use of computers was that they were too expensive to install and use and also slow on internet, hence undermined technology exploitation in schools for learning and motivation. Therefore being important tools for enhancement of SCL, digital tools were basic and necessary for learner motivation.

The qualitative data analysis on digital tools especially on mobile technologies also indicate that majority of respondents (managers) were still installing internet services in their schools, few had installed and yet others had no plans to install. This is an issue of policy problems on ICT implementation in schools.

The findings on the regression analysis of the influence of ICT infrastructural motivation on SCL, was statistically insignificant. Therefore the study fails to reject $HO_1$ at $\alpha = 0.05$ and concludes that ICT infrastructural motivation had no significant influence on SCL. The school managers also confirmed that they had not digitalized learning in their schools due to high cost of installation of internet.

Discussions on the current study findings on infrastructural motivation focus on several issues on technologies available for learning in schools which are supported by several authorities. The findings on nature, availability and distribution of tools in the current study is in agreement with the findings of Smith (2015); Gulati, (2008); Alam & Islam, (2008), Kiptalaam *et al*. (2010) & United Nations, (2008), which reported that in most developing countries, technologies used for learning in secondary schools were old, inadequate and mostly there was over reliance on old computers as the main tool. Analogue technologies such as radios, and televisions were being phased out of use while computers were slow on internet and costly to install compared to digital tools. The ratio of students to computers remained high in most African secondary schools, yet they were still relevant technologies in education. Regarding use of digital tools which are more appealing to the motivational needs of the learners, they were least embraced.

This finding is also in agreement with the findings of BECTA report, (2009) and Bee & Chia, (2008) who found that the digitalization of learning in most developing nations was slow. Lastly ICT use may have failed to a large extent to motivate learners due to lack of clear policies and objectives in the implementation of ICT integration in education based on the analysis of technologies for learning (Mwawasi, 2011). The findings above are also in agreement with Tavakolizadeh & Ebrahimi-Qavam (2011) who found out that if technology cannot be used appropriately for learning it has great potential for derailing learners from the achievement of SCL skills and its motivational potential would be minimal to cause adequate arousal.

This finding of the study on technologies used is also in agreement with studies by Mwanazumbah & Magoma (2016), Churu (2015) & Namulanda (2011) on 1CT use in secondary schools in Botswana and Kenya respectively which revealed that high cost of PCs and high charges for internet usage were serious challenges affecting ICT use in schools in Africa thus limiting the affordability of the devices in most schools. Lastly results on correlation analysis reveal that the relationship between the ICT infrastructural motivation and the SCL was at ($r= 0.001$, $p = .498$). This was a very weak correlation however the direction was positive. Further information show that school managers were faced with problems with installation of digital tools especially the internet facility hence derailed to a large extent the exploitation of infrastructural motivation and SCL among learners.

**4. Conclusion**

The objective of the study sought to establish the extent to which ICT infrastructural motivation had enhanced SCL. ICT infrastructural motivation did not have a relationship with SCL. Regarding the hypothesis of the study there was no significant influence of the ICT infrastructural motivation on SCL because of the missing online environments. The study therefore fails to reject the null hypothesis $H_O$ of the study and concludes that there was no significant influence of the ICT infrastructural motivation on SCL skills among students in public secondary schools in Bungoma County, Kenya.

**5. Recommendations**

Regarding the objective of the study focus should be directed at improving `online environments' for learners to be motivated and be able to exploit the abundant internet based resources. This will increase SCL activities among learners. County and sub- county schools should be assisted through government support and that of other financial organisations to acquire modern ICT facilities. Affordable technologies can reduce the costly burden of purchasing the

expensive computers. The study finally recommends the diversification of technology for maximum benefits to the learners.

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