

# Influence of Principals' Maintenance Of Information Communication Technology Equipment On Usage Of Information Communication Technology For Teaching And Learning In Secondary Schools

**Kagutu Joseph Otieno**

PhD Candidate, Department of Educational Administration & Management, Jaramogi Oginga Odinga University of Science & Technology

**Dr. Jack Odongo Ajowi**

Department of Educational Administration & Management, Jaramogi Oginga Odinga University of Science & Technology

**Dr. Calleb Owino Gudo**

Department of Psychology & Educational Foundations, Jaramogi Oginga Odinga University of Science & Technology

*Abstract: The objective of the study was to evaluate the influence of principals' maintenance of ICT equipment on usage of ICT for teaching and learning in secondary schools in Kisumu County, Kenya. Concurrent triangulation within mixed methods research design was used. Disproportionate stratified random sampling was used to select 99 principals from a study population of 132 in order to administer questionnaires on them. Furthermore, 28 principals, 28 deputy principals and 35 Heads of Department (HODs) were interviewed. Questionnaire reliability was ascertained at  $(r) = 0.739$  using the split-half technique. Results revealed that principals' performance in maintenance of ICT equipment was above average and statistically significant ( $\alpha = .287$ ;  $p < .05$ ). It was concluded that principals' maintenance of ICT equipment significantly influenced usage of ICT for teaching and learning in secondary schools in Kisumu County. It was recommended that principals should ensure ICT equipment is well maintained and repaired regularly in case of damage so that it serves the intended purpose in teaching and learning.*

*Keywords: Influencing, Information Communication Technology, Performance, Teaching Learning, Maintenance*

## I. INTRODUCTION

### BACKGROUND TO THE STUDY

Buoyed by the realization that Information Communication Technology could be used to enrich the teaching and learning process, many countries globally have taken bold steps to initiate reforms aimed at integrating technology into school curricula. The Government of Kenya was not left behind as it promulgated the National ICT Policy with a specific component of the policy addressing technology

mainstreaming in education (Republic of Kenya [RoK], 2016). In this regard, Zuppo (2012) noted that in education, ICT is a vehicle for teaching and learning through active application. Furthermore, it was also observed that school leadership has to play an active role towards supporting ICT usage for teaching and learning (Ottestad, 2013). Therefore, this implies that school principals must be seen to be proactively engaged in efforts deliberately geared towards embedding technology the classroom in line with the Government ICT policy on education.

The Kenya Government developed the National ICT Policy (RoK, 2016) to address integration of technology in education in compliance with the Vision 2030 (RoK, 2007). Moreover, local studies in Kenya have also indicated that maintenance of ICT gadgets influenced usage of ICT in teaching and learning (Goko, 2012; Gikundi, 2016).

In a bid to help achieve this goal, Teachers Service Commission (TSC) which is the employer of teachers in Kenya, requires that principals promote digital learning process and ICT integration in schools through performance contracting for principals (RoK, 2018). Therefore, it is worth noting that principals are expected to play an active role for institutions to attain technology adoption. In spite of the measures in place, data at Kisumu County Education Office showed that integration of ICT for teaching and learning in public secondary schools was generally below average since only 32 schools out of 224 representing 14.29% reported average ICT usage while 192 schools or 85.71% had below average usage (RoK, 2016). Therefore, the objective of this study was to evaluate the influence of principals' performance in maintenance of ICT equipment on usage of ICT for teaching and learning in secondary schools in Kisumu County, Kenya.

#### STATEMENT OF THE PROBLEM

The goal of the Government of Kenya as articulated by the National ICT Policy (RoK, 2016) vide objective 16.2 (a) and section 4.2.6 of the Vision 2030 (RoK, 2007) is to integrate ICT for teaching and learning with a view to improving the quality of education. Nevertheless, ICT integration remains generally low as reflected by 2016 Kisumu County Education Office data showing that 32 schools (14.29%) had an average rating while 192 (85.71%) rated below average on ICT integration (RoK, 2016). The Government in 2010/2011 under the ESP commenced sensitization and training of 1021 principals. ICT champions were also sensitized, trained and posted in 210 sub-counties to ensure continuous ICT training and awareness creation for principals and teachers.

Part vii, section B2 of the mandatory TSC performance contract (PC) expects principals to play a leading role to promote digital learning process and ICT integration in schools. Apart from this, section C6 (iv) of the contract expects principals to monitor and report to TSC on implementation of teachers performance appraisal and development (TPAD) regarding ICT integration by teachers (RoK, 2018). Nevertheless, there were limited studies done so far to establish the influence of principals' performance in maintenance of ICT equipment on usage of ICT for teaching and learning in secondary schools in Kisumu County, Kenya, hence the need for this study in order to fill the gap in knowledge.

#### RESEARCH HYPOTHESIS

The study tested the following null hypothesis:

H0: There is no statistically significant influence of performance of principals in maintenance of ICT equipment on usage of ICT for teaching and learning in secondary

schools in Kisumu County, Kenya.

#### CONCEPTUAL FRAMEWORK

The conceptual framework for this study is grounded on the Learning Organization Theory by Senge (1990) as cited in Smith (2001). The proponent of the theory postulates that in the event of change, organizations must learn to adapt to that change for them to survive. Consequently, the emergence of ICT usage in education calls for schools to adopt technology in the classroom. However, to implement this, principals have to perform certain roles to facilitate the technology transition process. Figure 1 illustrates the conceptualized relationship between the variables in this study.

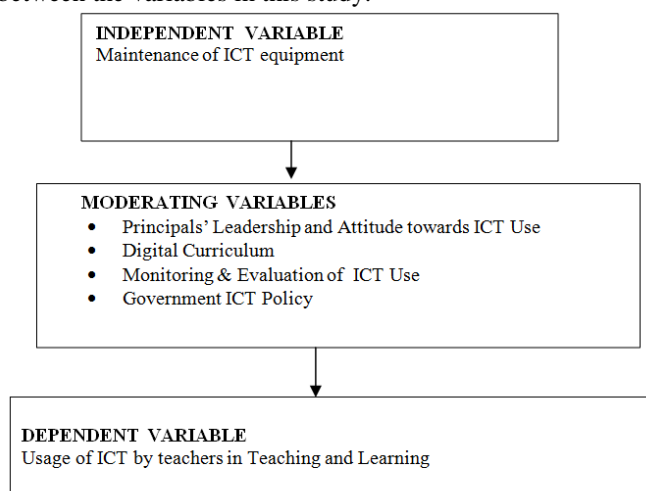


Figure 1: Developed from Leadership Practices for Embedding ICT into Schools (Sharija & Watters, 2012)

Therefore, the review of relevant literature informed the development of the conceptual framework (see Figure 1). As indicated above, maintenance of ICT equipment was the independent variable (IV) in the study and its relationship with the dependent variable (usage of ICT for teaching and learning) was moderated by the performance qualities of principals as shown in the figure.

## II. RESEARCH METHODOLOGY

### A. RESEARCH DESIGN

The study adopted a concurrent triangulation within mixed methods research design to collect both quantitative and qualitative data from principals' questionnaires and interviews with principals, deputy principals and HODs (Cresswell, 2014).

### B. STUDY POPULATION AND SAMPLE

The study population comprised 804 respondents who were 132 principals, 132 deputy principals and 540 HODs. As noted by Barreiro and Albandoz (2001), 99 principals were selected through disproportionate stratified sampling as primary respondents for fair representation of each of the seven strata. Furthermore, saturated sampling was used on 28 principals, 28 deputy principals and 35 HODs for interviews

as suggested by (Guest, Bunce & Johnson, 2010; Mason, 2010).

### C. DATA COLLECTION INSTRUMENTS

The study used both questionnaire and interview schedule for purposes of data collection. The questionnaire was specifically administered on principals; whereas, interviews were conducted with principals, deputy principals and Heads of Department. The data collections instruments were tested for validity and reliability through a pre-testing procedure from a portion of the research population. Specifically, the split-half technique as explained by Kaplan and Saccuzzo (2001) was used to test the questionnaire and a reliability coefficient of 0.739 was realized.

## III. FINDINGS AND DISCUSSION

### A. INFLUENCE OF TRAINING TEACHERS IN ICT ON USAGE OF ICT FOR TEACHING AND LEARNING

The objective of the study was to investigate influence of maintenance of ICT equipment by principals on usage of ICT for teaching and learning in secondary schools in Kisumu County.

### B. VIEWS OF THE PRINCIPALS ON MAINTENANCE OF ICT EQUIPMENT IN SECONDARY SCHOOLS

The principals' views were computed in percentage frequencies, (see Table 3.1).

Statement	SD	D	MA	A	SA	Mean	SD
Principal checks ICT equipment for damage	0 (0.0%)	45 (47.4%)	23 (24.2%)	14 (14.7%)	13 (13.7%)	2.95	1.08
Principal ensures damaged ICT equipment is repaired	0 (0.0%)	37 (38.9%)	24 (25.3%)	25 (26.3%)	9 (9.5%)	3.06	1.01
Principal installs computer antivirus promptly	20 (21.1%)	12 (12.6%)	15 (15.8%)	40 (42.1%)	8 (8.4%)	3.04	1.31
Principal ensures computer antivirus is regularly updated	26 (27.4%)	21 (22.1%)	34 (35.8%)	8 (8.4%)	6 (6.3%)	2.44	1.16
Mean Average Maintenance of ICT Equipment						2.87	1.14

Source: Survey Data (2017)

Key: 1-Strongly Disagree, 2-Disagree, 3-Moderately Agree, 4-Agree and 5-Strongly Agree, SD-Standard Deviation

Table 3.1: Principals' Views on Maintenance of ICT Equipment

Table 3.1 reveals that principals' performance in ICT equipment maintenance was rated slightly above average (mean average score=2.87; standard deviation=1.14), with all the indicators recording means ranging between 2.44 and 3.06. The item "principal ensures damaged ICT equipment is repaired" received the highest rating (mean=3.06), with over a third 34 (35.8%) of the principals indicating that they always ensured damaged ICT equipment was adequately repaired, with 24 (25.3%) moderately agreeing. This compares favourably with 29 (30.5%) of the principals who affirmed that they repaired damaged ICT equipment promptly as per the qualitative data from the principals' questionnaires. For

instance, a principal indicated in the open-ended item, "Our ICT equipment is all in fair shape and functional. A technician is in place and on call to respond to our distress call." This state of affairs with regard to the condition of the equipment gives the principal above average rating in terms of discharging his role to repair damaged ICT equipment. However, 45(47.4%) principals rated their performance in repairing damaged ICT equipment as average. With a mean rating of 3.06, this result means that the ICT equipment in schools in Kisumu County is generally in a fairly good and usable condition. This is a clear indication that in deed principals strive to ensure ICT equipment is in fairly good state to enable their use for teaching and learning. Regarding repair of damaged ICT equipment, a principal coded 17 averred:

*"Our ICT equipment is in very good working condition because it is not only repaired promptly but also frequently. The school has an ICT technician whose services are sought whenever the need to do so occurs and the school also has personnel under the technical subjects department who teach computer studies thus helping us detect and report machines that need servicing or repair."*

The principal's response showed that the ICT equipment was generally in good working condition, a fact attributed to prompt and frequent repairs in case of any broke down. This is an above average performance by principals in ensuring their equipment was functioning. On the other hand, at a mean response rate of 2.44 (standard deviation=1.16) the item "principal ensures computer antivirus is regularly updated" was the least rated in regards to ensuring use of ICT for teaching and learning, with only 14 (14.7%) of the principals agreeing that they ensure computer antivirus is regularly updated. However, the results of the survey indicate that many 48 (50.5%) of the principals whose schools had computers were in agreement (mean response=3.04) that they usually install computer antivirus promptly. This finding is consistent with the qualitative data from principals' questionnaire open-ended items which revealed that 48 (50.5%) of the principals indicated that their performance in installing computer antivirus was good while 41 (43.2%) of the principals rated their efforts as average in this regard. On this aspect, a principal remarked, "Computer accessories are part of a running contract to supply with a supplier for one year. It is still in force up to January, 2018. Installation of antivirus is part of the contract." The statement is a sign of a good ICT equipment maintenance plan by the school. This gives the principal a performance rating of above average. About this open-ended item, a principal indicated:

*"My computer lab speaks for itself-ever functional with everything required. There are pens, ink, WiFi bills paid, and every year adding two computers to the lab. There is also a teacher employed and he services and repairs our equipment; he is able to do maintenance and informs me when antivirus expires and I buy a new one immediately."*

The statement shows that there was good organization in terms of maintenance of the ICT equipment is concerned. Therefore, her performance could be rated as above average due to the contingency measures put in place for maintenance. This finding is also consistent with interview results that indicate 20 (71.4%) principals, 15 (53.6%) deputy principals

and 18 (51.4%) HODs agreed that principals installed computer antivirus promptly. Equally, the findings of the study show that some 27 (28.4%) of the principals regularly check ICT equipment for damage, as reflected by a mean average response rate of 2.95 with a standard deviation of 1.08. During the interview, principal 19 remarked:

*“Computer antivirus is installed without a lot of delay so that the equipment is kept in good working condition. I can assure you that this is one area where we don’t have a problem. We have a lot of data that have to be protected by regularly updating the antivirus software we installed in our computers.”*

The interview data above are a clear indication that there were no serious difficulties hindering installation of computer antivirus upon expiry of licenses. His means that the principal performed above average in this case. It is worth noting that a mean of 2.87 on a scale of 1-5 indicates that the performance of principals in maintenance of ICT equipment was slightly above average. Consequently, this above average performance by principals, as revealed by the finding of the study, is an indication that the ICT equipment in schools is in fairly good working condition for purposes of its usage for teaching and learning.

### C. RELATIONSHIP BETWEEN PRINCIPALS’ MAINTENANCE OF ICT EQUIPMENT AND USAGE OF ICT FOR TEACHING AND LEARNING

Correlation between maintenance of ICT equipment and usage of ICT for teaching and learning was done in order to test the null hypothesis below and results were as shown in Table 3.2 below.

$H_0$ : There is no statistically significant influence of principals’ maintenance of ICT equipment on the usage of ICT for teaching and learning in secondary schools in Kisumu County.

		Maintenance of ICT Equipment	Usage of ICT for Teaching and Learning
Maintenance of ICT Equipment	Pearson Correlation	1	.498**
	Sig. (2-tailed)		.000
	N	95	95
Usage of ICT for Teaching and Learning	Pearson Correlation	.498**	1
	Sig. (2-tailed)	.000	
	N	95	95

\*\**. Correlation is significant at the 0.01 level (2-tailed)*  
Source: (SPSS Output, 2017)

Table 3.2: Correlations between Principals’ Maintenance of ICT Equipment on ICT and Usage of ICT for Teaching and Learning

Table 3.2 shows that there was a statistically significant positive ( $r=.498, n=95, p<.05$ ) relationship between principals’ maintenance of ICT equipment and usage of ICT for teaching and learning. Given that the p-value was less than .05, the hypothesis that, “there is no statistically significant relationship between principals’ maintenance of ICT equipment and usage of ICT for teaching and learning” was rejected. It was therefore concluded that principals’

maintenance of ICT equipment was significantly correlated to the usage of ICT for teaching and learning in secondary schools in Kisumu County.

### D. REGRESSION ANALYSIS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.521 <sup>a</sup>	.271	.247	.73201	1.518

a. Predictors: (Constant), Facilitation of Training of Teachers in ICT, Development of School ICT Policy, Providing ICT Equipment & Maintenance of ICT Equipment  
b. Dependent Variable: Usage of ICT for Teaching and Learning

Table 3.3: Regression Analysis Model Summary Output

From the model summary, the multiple correlation coefficient  $R = .521$  indicates a good level of prediction of usage of ICT for teaching and learning by the model. Equally, the value of Adjusted R Square (.247) indicates that the model explains 24.7 percentage of the variance in the influence principals’ performance had on usage of ICT for teaching and learning. However, to assess the statistical significance of the result it was necessary to look at the ANOVA results shown in Table 3.4.

Model		Sum of Squares	DF	Mean Square	F	Sig.
1	Regression	18.656	4	4.664	8.697	.000 <sup>b</sup>
	Residual	48.262	90	.536		
	Total	66.918	94			

a. Dependent Variable: Usage of ICT for Teaching and Learning

b. Predictors: (Constant), Provision of ICT Equipment, Development of School ICT Policy, Maintenance of ICT Equipment, Facilitation of Training of Teachers in ICT

Table 3.4: Principals’ Performance and Usage of ICT for Teaching and Learning

The ANOVA was used to test the null hypothesis that multiple R in the population equals 0. Table 3.4 indicates that the model reached statistical significance [ $F(4, 90) = 8.697, R^2 = .247, sig. < .05$ ], implying that the model was highly significant and adequate enough to explain the variance in usage of ICT for teaching and learning in secondary schools in Kisumu County.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	1.138	.424		2.686	.009		
	Maintenance of ICT Equipment	.265	.174	.287	1.522	.031	.225	4.452
	Development of School ICT Policy	.019	.134	.024	.144	.086	.294	3.404
	Facilitation of Training of Teachers in ICT	.309	.199	.338	1.554	.024	.170	5.893
	Provision of ICT Equipment	.169	.175	.134	.965	.037	.414	2.418

a. Dependent Variable: Usage of ICT for Teaching and Learning

Table 3.5: Coefficient Output: Influence of Performance of Principals on Usage of ICT for Teaching and Learning



Results in Table 3.5 showed that maintenance of ICT equipment had the second largest beta coefficient of .287 ( $p < .05$ ) implying that it made the second strongest contribution to explaining the dependent variable. Therefore, a one standard deviation increase in facilitation of training of teachers in ICT leads to a .287 standard deviation increase in predicted usage of ICT for teaching and learning with the other variables held constant.

#### IV. CONCLUSION AND RECOMMENDATION

It was concluded that principals' maintenance of ICT equipment significantly influenced usage of ICT for teaching and learning in secondary schools in Kisumu County, Kenya.

Based on the result of the study, it was recommended that principals should ensure ICT equipment is well maintained and repaired regularly in case of damage or malfunction so that it is in good condition to be used for teaching and learning.

#### REFERENCES

- [1] Barreiro, P. L. & Albandoz, J. P. (2001). Population and Sample: Sampling Techniques. Retrieved on August 26, 2016 from: [optmierung.mathematic.uni-kl.de/mamaeusch/veroeffentlichungen/vertexte/sampling\\_en.pdf](http://optmierung.mathematic.uni-kl.de/mamaeusch/veroeffentlichungen/vertexte/sampling_en.pdf)
- [2] Cresswell, W. J. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th Ed.). Los Angeles: SAGE Publications, Inc. Retrieved on May 7, 2016 from: <https://www.researchgate.net/file>
- [3] Gikundi, Z. (2016). Factors Influencing Integration of Information Communication Technology in Learning and Teaching in Public Secondary Schools: A Case of Tigania West Sub County, Meru County, Kenya. Retrieved on December 14, 2017 from: [erepository.uonbi.ac.ke>handle URI: http://hdl.handle.net/11295/97937](http://hdl.handle.net/11295/97937)
- [4] Goko, A. K. (2012). Factors Affecting the Use of Information and Communication Technology in Teaching and Learning in Secondary Schools in Kangema, Murang'a County. Masters Thesis, Kenyatta University. Retrieved pdf? on March 7, 2015 from: [ir-library.ku.ac.ke/bitstream/handle/123456789/5431/Goko %20Alice%20Karimi.sequence=3](http://ir-library.ku.ac.ke/bitstream/handle/123456789/5431/Goko%20Alice%20Karimi.sequence=3)
- [5] Guest, G., Bunce, A. & Johnson, A. (2006). How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods*, 18 (1), 59-82. Retrieved on December 2, 2017 from: [journals.sagepub.com/doi/pdf/10.1177/1525822X052](http://journals.sagepub.com/doi/pdf/10.1177/1525822X052)
- [6] Kaplan, R. M. & Saccuzzo, D. P. (2001). *Psychological Testing Principle, Applications and Issues*. (5th Ed.), Belmont, CA: Wadsworth.
- [7] Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, 11 (3). Accessed on December 2, 2017 from: <http://www.qualitative-research.net/index.php/fqs/article/view/1428/3027>
- [8] Ottestad, G. (2013). School Leadership for ICT and Teachers' Use of Digital Tools. *Nordic Journal of Digital Literacy*, (8). Retrieved on November 19, 2013 from: [https://www.idunn.no/dk/2013/01-02/school\\_leadership\\_for\\_ict\\_and\\_teachers\\_use\\_of\\_digital\\_tools](https://www.idunn.no/dk/2013/01-02/school_leadership_for_ict_and_teachers_use_of_digital_tools)
- [9] Republic of Kenya. (2007). Kenya Vision 2030. Nairobi: Ministry of Planning and National Development.
- [10] Republic of Kenya. (2016). National Information & Communication Technology Policy. Nairobi: Ministry of Information Communication and Technology. Retrieved on October 22, from: [icta.go.ke>pdf>National-ICT\\_Policy\\_2...](http://icta.go.ke>pdf>National-ICT_Policy_2...)
- [11] Republic of Kenya. (2018). Performance Contract between the Teachers Service Commission and Principals of Secondary School. Nairobi: Teachers Service Commission. Retrieved on April 2, 2018 from: <https://www.tsc.go.ke>category>88-pe...>
- [12] Republic of Kenya. (2016). Public Secondary Schools with ICT Integration Systems in Kisumu County. Kisumu: Ministry of Education, Science & Technology.
- [13] Sharija, A. M. & Watters, J. J. (2012). Innovative Leadership by School Principals: Embedding Information and Communication Technology in Kuwaiti Schools. *Journal of International Education Research*, 8 (4). Retrieved on November 27, 2015 from: [www.cluteinstitute.com/ojs/index.../7358](http://www.cluteinstitute.com/ojs/index.../7358)
- [14] Smith, K. M. (2001). Peter Senge and the Learning Organization. *The Encyclopedia of Informal Education*. Retrieved on August 30, 2015 from: <http://infed.org/mobi/Peter-senge-and-the-learning-organization/>.
- [15] Zuppo, M. C. (2012). Defining ICT in a Boundaryless World: The Development of a Working Hierarchy. *International Journal of Managing Information Technology (IJMIT)*, 4 (3). Retrieved on November 20, 2016 from: <http://pdfs.semanticscholar.org/9c00/ff69df8dc109faccdba154f2768d93193f14.pdf> doi:10.5121/ijmit.2012.4302