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THE IMPACT OF ICT CAPACITY ON ORGANIZATIONAL PERFORMANCE OF PUBLIC SECONDARY SCHOOLS IN KISII COUNTY, KENYA

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Abstract

In Kenya, the government acknowledges that integration educational technology the curriculum and educational processes in public schools presents an opportunity for improving organizational performance of the schools through efficiency and effectiveness. As a result the government over the years has made concerted efforts in funding for ICT integration projects in public schools with aim of building the necessary capacity for successful implementation of the technology. Although progress has been made in equipping public schools with ICT infrastructure, public secondary schools in Kisii County are still faced with operational inefficiencies, traditional teaching and learning methods and declining academic outcomes. This can be attributed to lack of institutional capacity for change and individual ICT capacity to use the technology which is necessary for successful implementation of ICT integration in schools. The study therefore examined the impact ICT capacity and organizational performance of public secondary schools in Kisii County that have been funded by the government through the

Economic Stimulus Programme (ESP). The study examined the role of human resource ICT capacity (X1), school ICT infrastructure (X2) and institutional ICT environment (X3) on organizational performance (Y). The research findings show that all the three explanatory variables had a positive and significant influence on the dependent variable. The study recommends that stakeholders in the education sector should invest more on ICT capacity building in learning institutions for effective utilization of ICT in order to realize its full potential.

Keywords: ICT Capacity, ICT integration, Effectiveness, Efficiency, Organizational Performance

INTRODUCTION

Performance of organizations has been of great interest in academic research. Introduction of ICT in organizations is expected to enhance proper utilization of resources, reduced workload, increased efficiency and productivity (Kimaro, 2016). According to Rasul and Sahu (2011), information technology has revolutionized operations in organizations through new ways of collecting, storing, retrieving, processing, and disseminating information by use of electronic means. In a world characterized by mass higher education, fewer resources, and increasing competition, technology seems to offer a myriad of ways to help institutions to manage scarce resources efficiently, enhance efficiency and effectiveness in the teaching and learning processes (Alderete and Formichella, 2016).

Educational planners and technology advocates believe that ICTs will empower school managers and teachers in transforming school management and educational processes. Among the challenges facing the teaching profession today is the ICT pedagogical and methodological issues. Information and Communication Technology (ICT) has brought into the educational system newer instructional delivery tools. According to Kawade & Kulkarni, (2012) ICT use in administration and management of schools is becoming popular due to its capabilities in performing administrative tasks such as financial management, collecting pupil test scores, monitoring progress in pupils' scholastic achievements, reporting the pupil education outcomes to the parents and sharing information among the teaching.

According to Al-Qahtani and Higgins (2012) the expansion of technology to educational institutions has come up with the main intention of enhancing the overall effectiveness of a school and the levels of academic performance. Khan, Hasan and Clement (2012) asserts that adoption of ICT in schools has the potential to promote better access to information, student critical thinking and communication skills, sharing of educational resources, increased student

motivation, improved teaching and learning process, increased efficiency and improved quality of services.

Consequently, the use of ICT in educational institutions is rapidly gaining ground while ICT infrastructure investments has been one of the key priorities of education policy in most countries during the last decade (De Witte & Rogge, 2014). ICT usage has been increasingly incorporated into school processes with a view to improve efficiency and effectiveness (Shah, 2014; Prokopiadou, 2012). The development of ICT in schools however is progressing unevenly across countries, within schools and technologies. While some schools seem to be contented with achieving the government's targets in terms of number of computers and connectivity, others are being highly innovative, attempting to capitalize on the benefits that ICT has been shown to bring (Becta, 2007).

In Europe, even though responsibility for education lies with member states, the European Union (EU) has played an important role in scaling up innovation in EU member states' education systems. The Digital Education Action Plan (DEAP) which was adopted in January 2018 set out how education and training systems can make better use of innovation and digital technology to support the development of relevant digital competences needed for life and work in an age of rapid digital change (European Commission, 2018). Innovation in education systems has been argued to have a great potential to significantly improve learning outcomes, enhance equity and improve efficiency in EU member states. In Malaysia, the use of ICT in school management show that positive changes including better accessibility of information, more effective administration and higher utilization of school resources.

In Kenya, access to secondary education has continued to expand rapidly. This is due to implementation of a government initiative for free tuition secondary education that was introduced in 2008. The initiative was expected to improve access for secondary education whose demand had increased as a result of another government initiative for free primary education. According to the education sector report for 2013, secondary school enrolment increased from 1.7 million students in 2007 to 1.9 million students in 2011 (ROK, 2013). This has led to the need for government to look for some intervention through technology so as to improve access to quality education in public secondary schools. The Kenya Vision 2030 policy singles out education and training as an avenue to make Kenya a middle-income economy (ROK, 2009). Consequently, the government acknowledges the use of ICT as a tool to revolutionize management in schools by enhancing more effective organizational structures, effective teaching processes and empowering learners with skills necessary for independent learning.

Despite the apparent benefits of the use of ICT in schools, research shows that many schools are not implementing it, thus depriving teachers, learners and the school community from accessing the potential of ICT (Manduku, Kosgey & Sang, 2012). A study by Higgins, & Moseley, (2011) revealed that inability of teachers to understand why they should implement ICT in teaching and how exactly to implement it was an impediment to its implementation. Dzidonu (2010) observed that in many African countries, most public schools lacked qualified personnel to manage available systems, develop and use information communication technology facilities for schools' management, teaching and learning processes.

Although the Kenyan government is committed to integration of ICT in the education sector as an avenue for delivering quality education through improved efficiency and effectiveness in school management, teaching and learning processes (Alderete and Formichella, 2016), the technological reforms in public secondary schools in Kisii County are yet to leap benefits of the technology. In a study by Nyang'au (2017) to investigate the influence of ICT in schools' financial management in Kisii County reported that schools' administration had not fully owned ICT projects in their schools due to lack of institutional capacity for change and individual ICT capacity to use the technology. As result, the quality of education in the county has declined over the years despite impressive enrolment rates reported in public secondary schools (Siocha, Onderi & Mwebi, 2017).

All these make it clear that availability of technology in schools while necessary, there are other ICT capacity factors are critical for the success or failure of ICT integration in school processes. Tondeur, Krug, Bill, Smulders and Zhu (2015) in a study on integrating ICT in Kenyan secondary schools concluded that, although getting schools equipped with the appropriate infrastructure was a crucial step towards integration of ICT in schools, ICT capacity at teacher and school level are critical for successful implementation of ICT in schools' operations, teaching and learning processes. Teacher characteristics, their capacity to use ICT and school capacity for change are therefore critical determinants of ICT use in in modernizing schools' operations and enhancing efficiency and effectiveness in teaching and learning processes (Tondeur, *et al*, 2015; Mwawasi, 2014; Newhouse, 2013; Krug & Arntzen, 2010; Heo & Kang, 2009). This study therefore sought to examine the impact ICT capacity on organizational performance of public secondary schools in Kisii County have benefited from ICT integration projects funded through the economic stimulus programme (ESP).

Organizational Performance of Schools

Organizational performance is conceptualized and measured differently by different authors. According Lebans & Euske (2006), organizational performance is an arrangement of monetary and non-monetary markers which offer data on the level of accomplishment of goals and outcomes. According to Alam, Raza and Akram (2011) organizational performance is a construct that is multidimensional in nature. It includes elements of financial and market performance (such as profitability and market position), human resource performance (such as employee satisfaction), organizational efficiency and effectiveness and customer-focused performance (such as customer satisfaction or perceptions on products or services).

Measuring organizational performance in terms of financial indicators alone has however come under increasing criticism because the information contained in them is not comprehensive to conclusively establish organizational performance. Mahdani, Mohammed, Ali and Ismael (2012) argue that measuring organizational performance in terms of non-financial measures such achievement of organizational goals and objectives is preferred since such measures are not affected by biasness. Overall effectiveness focuses on reputation, perceived performance and achievement of organizational objectives and goals.

Kaplan and Norton (2005) tried to address these inadequacies of traditional financing measurement system by introducing the non-financial measures of performance in the balanced scorecard (BSC) approach. Among the performance frameworks, Kaplan and Norton's (1996) balanced scorecard model is the most popular. The model categorizes and incorporates four key aspects in organizational performance measurement which include financial, customer, internal processes and innovation. Alam, Raza and Akram (2011) on the other hand argues that in order to evaluate the organizational performance, one has to consider the nature of an organization and the reasons for which performance is being evaluated to appropriately select the dimension or element to apply in order to determine the performance of that organization.

A school is a form of organization whose core business is learning and therefore various functions within a school setup are designed to support school management, teaching and learning processes. For a school to be able to determine its overall performance consequently requires processes and collective measures that allow all stakeholders to determine the extent to which the school met its expectations. According to OECD (2009), school organizational performance can be defined in different ways. From the learners' point of view, performance would mean students' outcomes. From teachers' perspective, performance would mean effective teaching practice and teachers' role in learners' outcome. For school managers, performance would relate to student discipline entrance rates and reputation ratings from

stakeholders. According to ICT might improve the efficiency of the educational process through reduced time needed for instruction and more efficient administrative processes.

According Maslowski (2011) organizational performance in a school is indicated by the efficiency and effectiveness of the school management, teaching and learning process where effectiveness would mean the success of the school's objectives, while efficiency means the achievement of such objectives in a timely and costly manner. Rudd (2011) argues that measuring the effect of ICT on the overall performance of a school requires extensive consideration of all major factors that can effect performance of teachers, students and the school as a whole. This study therefore adopted the non-financial measures of organizational performance which was operationalised by student attainment, effectiveness in teaching practise and efficiency in educational and school processes for purposes of the uniformity of measurement across public secondary schools in Kisii County.

ICT Capacity

ICT capacity has been of particular attention by scholars interested in understanding the variables that impact organizational performance and despite increased focus in the literature, the concept remains vague. According to Neely (2015), capacity can be defined as the combination of people, practices, technology and infrastructure of an organization that, collectively, represents the organization's ability to create value for its stakeholders through a different part of its operations. Newhouse (2013) defines ICT capacity as the ability to use ICT knowledge and skills to perform relevant tasks. The author argues that effective use of ICTs requires the establishment of user capability, necessary ICT infrastructure and an environment that is supportive of ICT use.

ICT capacity in the education sector has been conceptualized differently by different scholars. Balanskat, Blamire & Kefalla (2007) identified ICT capacity factors according to levels namely; teacher-level, school-level and system-level. Law, Pelgrum, & Plomp (2008) while reviewing pedagogy and ICT use in schools around the world based on the findings from the SITES 2006 study came up with ICT capacity requirements necessary for successful ICT integration which included leadership, vision & policies, infrastructure, staff development and Support. Ng, Miao, and Lee (2009) in a study to review capacity-building for ICT integration in education noted that before the educational benefits of ICT integration can be fully exploited, it requires a systematic approach to establish the right environment. The authors argue that ICT capacity requires establishment of conditions such as providing infrastructure, maintenance of ICT equipment and training of personnel for the integration of ICTs in school management teaching and learning processes.

In a conceptual framework on ICT use and educational performance, Heo and Kang (2009) concluded that ICT use and its effect on educational performance may be influenced by various factors such as the personal attributes of teachers students and other staff, curriculum and teaching practices at the micro level while school environment and its surrounding factors may affect the use of ICT in educational practice at the meso level. Krug & Arntzen (2010) while investigating ecologies of learning recommended for a more holistic approach to educational technology research that will combine the interconnectedness of personal, instructional and organizational characteristics and their effect on ICT use and institutional performance. Tondeur, Krug, Bill, Smulders and Zhu (2015) in a study using Four-in-Balance (FIB) model to examine specific processes of technology integration within four secondary schools in Kenya, identified vision building, leadership, collaboration, expertise to use technology and access to adequate resources as ICT capacity requirements for successful technology integration in schools.

According to Kennah (2016), ICT capacity requires an established ICT infrastructure with basic ICT resources, users who are equipped with the skills, knowledge and confidence to creatively insert ICTs into schools processes in an environment that appreciates and supports ICT use. In reviewing and consolidating the literature, this study operationalised ICT capacity by taking into account technological, individual and institutional level factors under three distinctive dimensions; human resource ICT capacity, school ICT infrastructure and institutional ICT environment.

Statement of the Problem

ICT in education sector is expected to enhance universal access to education, quality in teaching and learning as well as more efficient and effective management of education systems (Alderete and Formichella, 2016). Traditional methods of teaching, learning and managing of schools are no longer effective in today's digital world and therefore governments and education stakeholders have been under pressure to invest more in technology in order to improve efficiency and effectiveness in school processes. Consequently, education systems have been investing in ICT with the belief that, sooner or later, the technology would be adopted and benefit schools (OECD, 2010). While policy makers and school managers are trying hard to find the best ways to harness ICT for quality teaching, learning and effective management, accomplishments that are convincingly as a result of ICT use are still contentious. A number studies have previously examined the impact of ICT use in learning institutions (Ngeera, Kibaara & Gichohi, 2018; Mutisya and Mwania, 2017; Siocha, Onderi & Mwebi, 2017; De Witte & Rogge, 2014), reported contradicting outcomes.

With the rapid development of emerging technologies, the use of ICT in education has increasingly attracted the attention of educational authorities in Kenya (Evoh, 2013). ICT use in schools is expected to modernize school operations and improve overall efficiency and effectiveness in teaching and learning processes. Although the government through budgetary allocation under the Economic Stimulus Programme (ESP) has been funding ICT integration projects in public schools across the country for over one decade, public secondary schools in Kisii County have failed to tap its potential to improve schools' management, teaching and learning processes.

Despite availability of ICT infrastructure in most public secondary schools in the county, research shows that the technology is not effectively utilized to realize its full potential and as a result most schools are still faced with operational inefficiencies, traditional teaching and learning methods and declining academic outcomes (Nyag'ari, 2017; Alice, 2012). These can be attributed to lack of the necessary ICT capacity required for successful ICT integration in the schools. The study therefore sought examine the impact ICT capacity on organizational performance of public secondary schools in Kisii County.

Research Hypothesis

H01: Human resource ICT capacity has no effect on organizational performance of public secondary schools in Kisii County.

H02: School ICT infrastructure has no influence on organizational performance of public secondary schools in Kisii County.

H03: Institutional ICT Environment has no impact on organizational performance of public secondary schools in Kisii County.

LITERATURE REVIEW

Theoretical Literature

In information systems studies, there are two major research streams linking ICT and organizational performance, that is utilization stream and task-technology fit stream (Irick, 2008). Models such as technology acceptance model, information systems success model and innovation diffusion model fall under the utilization stream and normally predict the adoption of information systems with an assumption that performance outcomes will be felt after the technology is adopted and utilized within organizations. Utilization models are limited in the sense that increased utilization of information technology does not directly translate to higher performance. Task-technology fit (TTF) research stream indicates that organizational performance will be increased when an information system provides functionalities and support

required to fit to the requirements of the task (Goodhue & Thompson, 1995). The study therefore combined both utilization stream and task-technology fit stream streams and was underpinned by the Task-Technology Fit model, Bennett's Hierarchy evidence model (Bennett, 1979), information systems success model (DeLone & Lean, 2004) , information systems impact measurement model (Gable, Sedera & Chan, 2008) and organisational assessment Model (Lusthaus, 2002).

Empirical Literature

Integration of ICT in school does not simply mean acquisition of ICT infrastructure in schools. To attain ICT capacity requires that a school not only has to modernize the technological tools, but also has to change the education process models. According to Sangrà and González-Sanmamed (2010), contribution of ICT to the improvement of school management, teaching and learning processes is higher in the schools that have integrated ICT as an innovation factor and use it effectively. Tondeur, Krug, Bill, Smulders and Zhu (2015) in a study to examine the use of technology in four secondary schools in Kenya established that the objective of incorporating ICT across curriculum had been emulated in the actual use of ICT in schools. The research findings indicated that those involved in the ICT implementation lacked the capacity to develop school ICT policy plans and deciding the type of ICT infrastructure was best for their schools. The study concluded that while getting schools equipped with the appropriate infrastructure was a crucial step for ICT integration, other contextual conditions at the school need to be considered.

According to Shaheen, Naqvi and Khan (2013), organizations with skilled, talented, innovative, and creative employees achieve return on investment which makes them assured of improved efficiency and organizational performance. According to Khandekar and Sharma (2013), organizations with resilient human resource capabilities are assured of sustainable competitive advantage and thus superior performance. However, most ICT integration projects are still beginning with the technology rather than the human resource capacity. This poses a major challenge whereby those involved in the implementation process lack the required ICT capacity that is necessary for proper utilization the new technologies.

In a study to evaluate the success of the NEPAD e-learning pilot project for schools in Kenya, Lumumba (2007) established that lack of ICT skills in schools, inadequate ICT infrastructure and lack of positive attitude towards ICT were the main causes of unsuccessful implementation of ICT integration projects in public secondary schools in Kenya. In another study using cross-sectional survey, Mboroki, Mulwa, Kaylo and Bowa (2012) examined the relationship between human resource capacity and e-learning adoption in public secondary

schools in Kitui District. The study revealed that there a relationship between institutional factors, human resource capacity and readiness to adopt e-learning however the relationship was not significant on the latter. The study also revealed that, although e-learning was relevant to the schools' curriculum, its adoption is likely to face resistance from most of the schools due to over emphasis on the examination and traditional way of teaching and learning.

In a study by Kiptalam and Rodriguez (2010) on internet use in some secondary schools in Kenya reported that schools which had invested more on ICT had higher internet access rates. Wambiri and Ndani (2017) investigated the preparedness of lower primary school teachers in implementation of teaching with ICT and established that teacher beliefs and attitudes, computer competence, and computer self-efficacy had influence on ICT adoption by teachers. The authors concluded that that provision of computers and other ICT infrastructure in schools will not necessarily guarantee that teachers will integrate ICT in schools and therefore recommended ICT training for the teachers.

Arinze and Okonkwo (2012) in a study on the use ICT in secondary schools using descriptive survey examined availability of ICT facilities, skills, competence of students and the effect of ICT use on student performance in social sciences. ICT use was found to have an influence students' interest in learning and their performance in social studies. The researchers concluded by recommending for equipment of schools with necessary ICT facilities for improvement on student performance not only in social sciences but other subjects. Kidombo,Gakuo and Kindachu (2011) in a research to find out whether the secondary school teachers in Kenya were using ICT effectively to deliver curriculum content concluded that integration of ICT in curriculum delivery in secondary schools in Kenya depended on schools' leadership, professional training of the teachers in ICT, school manager's level of ICT skills competence and presence of school ICT policy.

Successful ICT integration is also related to actions taken at the school level, such as the development of an ICT plan, ICT support, and ICT training (Tondeur & van Keer, 2008). The role of school leaders in building the capacity of the people to support and facilitate ICT integration in school processes is therefore very important. Vanderlinde and van Braak (2010) while examining the e-capacity of primary schools noted the need to empirically explore such relationships between school level conditions and the teachers' actual use of ICT in the classrooms. In another study to explore teachers' perception on the influence of school policies on the ICT use in teaching and learning, Tondeur, Van Keer, Valcke, and van Braak (2009) established that school policies correlated significantly with ICT use in the classroom. The outcome points out the need for schools to have in place proper policies and plans on ICT implementation for successful integration of ICT in schools.

Teachers are also considered as important agents who significantly influence the process of ICT implementation and educational change (Teknikdelegationen, 2010). Teacher's characteristics and abilities to respond to this change and innovation is an essential factor for success. In study by Ayot, Ogembo and Ondigi (2015) investigated teachers' willingness to integrate ICT tools in classroom teaching among primary school teachers in Msambweni Sub-county Kwale County, Kenya. The study sought to find out if demographic factors such as age, gender, years of teaching experience and the teachers area of specialization influenced teachers' willingness to integrate ICT as well as the extent of the contribution of contextual factors such as teachers' level of education. The study findings revealed that while age and having access to an internet enabled phone were a negative significant predictor of teachers' willingness to integrate ICT, gender, teacher's level of education, teaching experience and teachers' area of specialization were positive insignificant predictors. Teachers are the people at the centre of the implementation ICT in schools and therefore their characteristics are an essential factor for success. Teachers' gender, age, teaching experience and level of educations are expected to influence the use ICT in improving performance of schools.

It is believed that ICT has the potential to benefit the efficiency of the school administrative and teaching processes. Specific benefits of ICT use in teaching and learning depend on the course subject and the willingness of teachers to innovate (Sagrà and Gonzalez-Sannamed, 2010). While a number of previous studies confirmed that ICT has a positive effect on school and student performance, other studies that came up with contradictory outcomes. For example, Aristovnik (2012) in a study using non-parametric analysis to examine the efficiency and effect of ICT use on educational performance at country level from a sample 27 European Union countries and some OECD countries concluded that there was a significant variance on efficiency of ICT use across the countries and despite the assertions on ICT capacity to transform educational systems, there was little effect on educational outcome. Wittwer & Senkbeil (2008) while using PISA survey data in Germany to examine the influence of students' computer use for games on their performance established that there was no relationship between ICT use and the students' performance.

Hussain and Suleman (2017) also investigated the effects of ICT on the students' academic achievement and retention in chemistry at secondary level. The researchers noted that ICT was found more compelling, effective and valuable in teaching of chemistry when contrasted with conventional techniques of teaching. Although the study tried to link ICT use and student performance, the role of ICT use on student performance is not only difficult to isolate from other determinants of academic performance but it is also argued that academic performance alone does not reflect the overall school performance. A school is a form of

organization and therefore calls for a holistic approach while evaluating the overall performance of schools. While some studies found that ICT-based instruction influenced positively student learning other studies provided diverse outcome and therefore established that there was no conclusive empirical evidence to support claims that the use of ICT in schools would improve performance.

Conceptual Framework

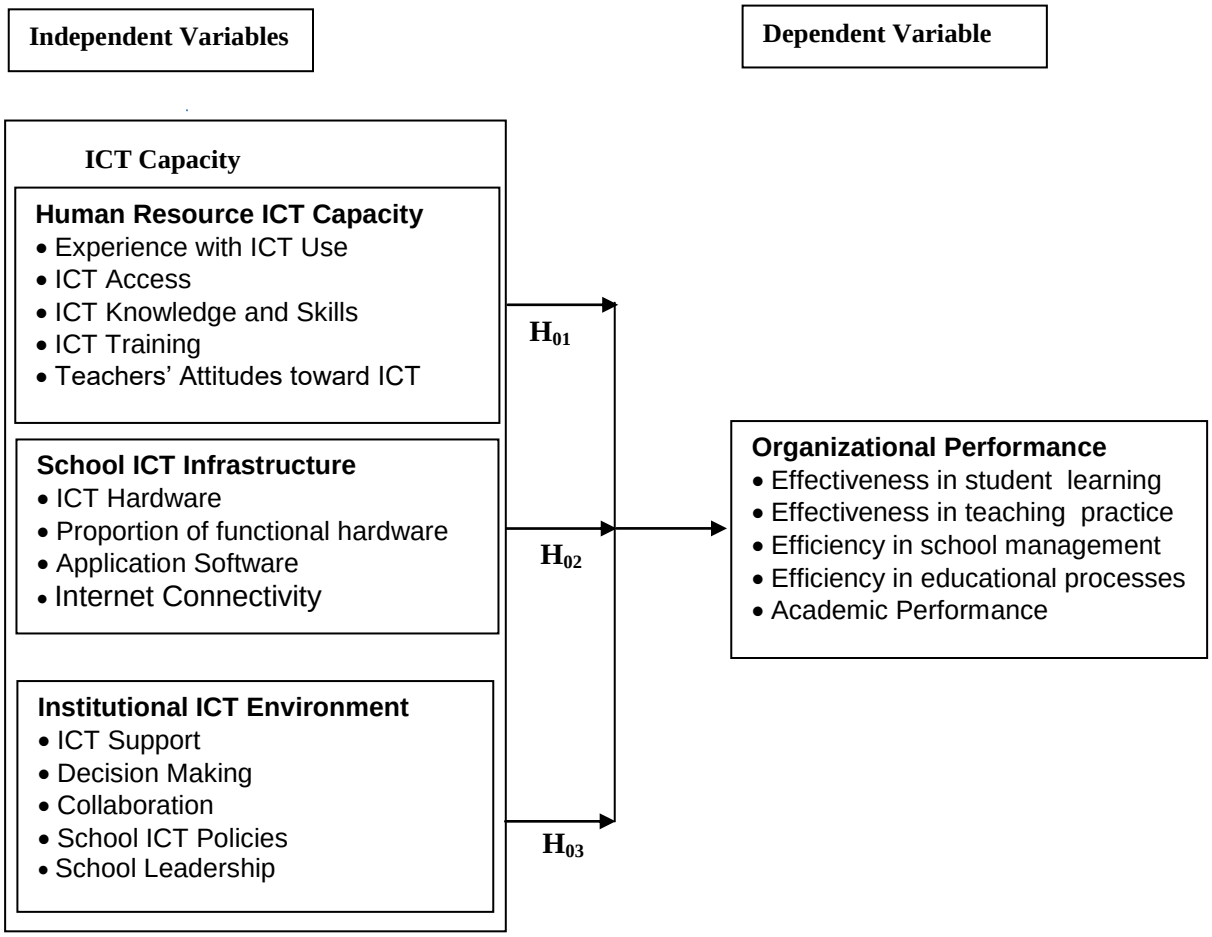

Figure 1: Conceptual Framework

Human resource ICT capacity was conceptualized as a composite factor which comprised of teachers' experience with ICT, ICT access, ICT knowledge and competence, ICT training and teacher attitudes towards ICT. The rationale of this variable was to establish the extent to which the attributes that identify human resource ICT capacity influenced organizational performance of public secondary school in Kisii County. School ICT infrastructure was the second composite variable under the study. The government and school management have invested in ensuring

schools are equipped with not only adequate ICT infrastructure but also facilities that are functional. This is to ensure that all ICT users have access to necessary ICT facilities that are required to complement their roles so as achieve school objectives. The school ICT infrastructure variable comprised of ICT hardware, application software, internet connectivity and connectivity speed. Institutional ICT environment was the third composite variable of the study. Institutional ICT environment reflect how ideal the school environment is for successful implementation of ICT integration. Schools' management are expected provide good and supportive leadership to the all the stakeholders involved in the implementation process. Therefore institutional ICT environment comprised of school leadership, ICT coordination, school ICT policy, decision making and collaboration.

METHODOLOGY

The study employed both descriptive and explanatory research designs owing to the fact that it was envisaged that the data to be collected would be quantitative and qualitative in nature. Descriptive research design is advantageous since it offers for capturing population's characteristics and eventually test the hypothesis (Cooper and Schindler, 2006). It minimises biases in the study by limiting the extent to which the researcher can manipulate the variables and therefore it was consistent with the objectives of this study as the researcher had no control over the study variables (both dependent and independent). Explanatory research design scrutinizes interactions between variables in order to establish the causal effect relationship (Saunders Lewis and Thronhill 2003). According to Hair, Money, Samouel and Babin (2003) explanatory research design helps in investigating whether one event causes another and was therefore consistent with the overall objective of this study of examining ICT capacity and organizational performance of public secondary schools in Kisii County. It was anticipated that this design would support the study's desired objectivity, data collection and data analysis required for this study.

To successfully achieve the purpose and objective of the study, self-designed, self-administered questionnaires were used to collect primary data. This was because administered questionnaires normally have a high response rate since they are delivered and collected by the researcher or the assistant (Saunders, Lewis and Thornhill, 2007). Two questionnaires that covered various aspects based on the conceptual framework were used for data collection. The teacher questionnaire collected data on the teacher's characteristics, their ICT capacity, school ICT infrastructure, ICT use and its effect on teaching and learning process. The school management questionnaire which targeted school principals or their deputies collected data on ICT use on school administration processes and its perceived impact on school administration

and management. A five-point Likert scale was used reduce the frustration level of impatient respondents and increase response rate and response quality as recommended by Sachdev and Verma (2004). Secondary data on school academic performance was obtained from the county education office.

The target population for the study included 62 public secondary schools in Kisii County that had benefited from the government funding in regard to ICT integration projects under the Economic Stimulus Program (ESP) which had a total of 881 teachers. Simple random sampling was used to select the sample size of 54 public secondary schools from the target population of 62 public secondary schools where by all the schools in the target population were listed and assigned numbers from which the sample was selected randomly. The researcher opted for this method of sampling as it eliminated bias whereby every school had an equal chance of being chosen and therefore an accurate representation of the population. The school was therefore the research unit of analysis.

Descriptive and inferential statistics were used to analyse quantitative data. Content analysis was used to analyze the qualitative data collected from the open-ended questions in the questionnaires where common themes were grouped together in order to draw inferences based on the themes that emerged. Coopers and Schindler (2006) note that content analysis helps to bring issues into the fore that would not have otherwise been captured through the use of structured questions in the questionnaire. Multiple regression analysis is a statistical method used to assess the effects of multiple predictor variables on the dependent variable (Jackson, 2010). Indicators for various variables were first standardized through the Z-score procedure before they were summed up to give composite variables. Multiple regression analysis was used to generate a weighted estimation equation that could be used to make predictions of the relationships between dependent and independent variables..

The regression models was as follows;

$$Y= \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad \text{..} 1$$

Where:

Y = Organizational Performance

β_o = The intercept

X_1= Human Resource ICT Capacity

X_2= School ICT Infrastructure

X_3 = Institutional ICT Environment

$\beta_1 - \beta_3$ = Coefficients of the independent variables

ε = Error term

RESULTS AND DISCUSSION

Response Rate

The study aimed at obtaining responses from all the school principal and teachers from a sample of 54 public secondary schools in Kisii County that are beneficiaries of government funding on ICT integration through the Economic Stimulus Programme (ESP). Table 1 presents a summary of the response rate.

Table 1: Teacher Questionnaire Response Rate

Responses	Questionnaires for Teachers (Frequency)	Percentage	Questionnaires for Principals (Frequency)	Percentage	Total	Overall Percentage
Administered questionnaires	827	100	54	100	881	100
Unreturned Questionnaires	212	25.63	0	0	212	24.06
Disqualified questionnaires	87	10.51	1	1.85	88	9.99
Returned and correctly filled questionnaires	528	63.85	53	98.15	581	65.95

The results presented in Table 1 show that from the anticipated 881 responses, the study positively managed to get a response of 581 questionnares that were correctly filled. This translates to an overall response rate of 65.95 per cent. The unsuccessful response rate of 34.05 percent consisted of unreturned and uncompleted questionnaires. A response rate of 65.95 percent is acceptable for self-administered questionnaires since it's greater than the threshold of 50 percent (Mellahi & Harris, 2016), thus the 65.95 per cent response rate is adequate for attaining the objectives of the study.

Diagnostic Tests for Regression Analysis

According to Williams, Grajales, and Kurkiewicz (2013), testing of assumptions of multiple linear regressions is mandatory for a researcher utilizing multiple regression. In this regard testing of normality of data, homogeneity of variance, multicollinearity, model specification and adequacy of data were out. A summary of diagnostic test results for regression analysis are shown in the Table 2.

Table 2. Summary of Diagnostic test results

Test	Method	Results	Decision	Conclusion
Normality	Shapiro-Wilk test	P>0.05	Fail to Reject Ho	Data was normally distributed.
Homogeneity of variance	Breusch-Pagan /Cook-Weisberg test	P>0.05	Fail to Reject Ho	Variance of the error term was constant across observations (homoscedastic).
Multicollinearity	Variance inflation factor (VIF)	VIF <10	No multicollinearity	Independent variables were not highly correlated
Model specification	Ramsey Specification test	P>0.05	Fail to Reject Ho	Model had no omitted variables

Table 2 shows that diagnostic tests for the multiple regression assumptions were all met. The test for normality of data was carried using Shapiro-Wilk test for normality as recommended by Field (2013). All the variables had p-value greater than 0.05 (P > 0.05). Therefore, the null hypothesis that the research data was normally distributed was not rejected at five per cent level of significance. This meant that ordinary least squares could be applied to the data and reliability tests requiring normality of the data such as t-tests could reliably be used. The test for Homogeneity of variance was carried out using Breusch-Pagan / Cook-Weisberg test. From the results, the p-value was greater than 0.05 (P > 0.05) which means that the null hypothesis that the residuals were homoscedastic was therefore not rejected at five per cent level of significance. Which means the error terms were homoscedastic allowing the use of t-ratios and the standard errors of all the models to test the significance of the slope coefficients.

Another condition for multiple regression is to make sure that the independent variables are not highly correlated which is referred to as multicollinearity. Multicollinearity reduces the reliability of multiple regressions models because the standard error of coefficients increases with increase in collinearity. A variance inflation factor (VIF) of more than 10 (VIF >10) for any of the independent variables would indicate a problem of multicollinearity (Kutner, Nachtsheim & Neter, 2004). The VIF values for all the independent variables was less than 10 VIF < 10 which means the variables were not highly correlated, hence the data was free from multicollinearity problems. Finally the Ramsey test was used for testing model specification and the p-value was also greater than 0.05 (P > 0.05) meaning that the null hypothesis that model had no omitted variables was not rejected at five per cent level of significance and therefore concluded the model was correctly fitted.

Testing of Hypothesis

Multiple regression analysis was used to test hypotheses. For model stability and to avoid parameter estimate precision that is influenced during multivariate analysis, the data was transformed to comparable scales through standardization using Z-score scaling. The sum of the standardized scores of various indicators for each variable formed the composite variables that were used in the regression analysis. The independent the variables were regressed on organizational performance. Table 4.27 shows results of the regression analysis.

Table 3: Regression Results

	Test Statistic		**P-value**
Adjusted R-squared	0.1987		
R-squared	0.2032		
F-statistic (3, 524)	44.55***		0.0000
Breusch-Pagan Test (Heteroskedasticity)	10.81		0.6156
Ramsey Specification test	13.28		0.7724
Regression results			
Variable	**Coefficients**	**t-statistic**	**P-value**
Human Resource ICT Capacity	0.271	4.20***	0.000
School ICT Infrastructure	0.247	3.01***	0.003
Institutional ICT Environment	0.202	4.60***	0.000
Constant	1.222	5.86***	0.000
Key - ** significant at 5 percent *** significant at 1 percent			

Table 3 shows that the F statistic was 44.55 with a corresponding p-value of 0.000 (P< 0.05). The Breusch-Pagan / Cook-Weisberg test for heteroscedasticity had p-value of 0.6156 which is greater than 0.05. Therefore, the null hypothesis that the residuals are homoscedastic was not rejected at five per cent level of significance and therefore homogeneity of variance of the error term was homoscedastic. The Ramsey test for model specification had an F statistic of 13.28 and a p-value of 0. 0.7724 (P > 0.05). This means that that the null hypothesis that model had no omitted variables was not rejected at five per cent level of significance and therefore concluded the model was correctly fitted. This means that the regression model was significant at five per cent level and was therefore adequate in predicting the dependent variable, organizational performance.

The research findings also show that the R-squared was 0.2032 while the adjusted R-squared was 0.199. This implies that the independent variables jointly explained 19.9 percent of the variations in the dependent variable while the rest were explained by variables not fitted into

the model. In other words ICT capacity explained 19.9 percent variation in organizational performance of public secondary schools in Kisii County while the rest were explained by other variables outside the model. The relatively low value of R-squared is attributed to the cross-sectional nature of the data.

The regression results show that human resource ICT capacity had a coefficient of 0.271 and a p-value of 0.000 ($P < 0.05$), school ICT infrastructure 0.247 and a p-value of 0.003 ($P < 0.05$) while institutional ICT environment had 0.202 and a p-value of 0.000 ($P < 0.05$). The coefficients for all the independent variables were positive and statistically at five percent. This implies that there was a positive relationship between the independent variables, human resource ICT capacity, school ICT infrastructure, institutional ICT environment and the dependent variable, organizational performance. The regression equation obtained from the regression model was:

Organizational Performance = 1.222 + 0.271 Human Resource ICT Capacity

+ 0.247 School ICT Infrastructure + 0.202 Institutional ICT Environment

The findings support the argument by Bryan, Sinkovics, and Kim (2008) that ICT capacity has a direct influence on improving organizational processes which in turn contribute to organizational performance. The findings also corroborate with the those of Haelermans and Blank (2012) in a study to assess the influence of innovation on performance of secondary schools in Dutch where it was concluded that innovation in school processes, teaching practice and educational curriculum positively influenced organizational performance. These findings are also consistent with the rationale of organisational assessment model which posits that certain contextual forces drive organizational performance (IDRC, 1999). As per the model, the capacities of an organisation, forces in its environment and the internal factors of the organisation such as the human resource ICT capacity, ICT infrastructure and enabling environment such as leadership, decision making, collaboration, school vison and mission (policy).

CONCLUSION

The significant role played by ICT capacity towards enhancing organizational performance of public secondary schools in Kisii County has been demonstrated by the findings. This study concludes that capacity dimensions namely ICT infrastructure, human resources capacity and institutional ICT environment have a positive and significant influence on the organizational performance of public secondary schools in Kisii County. It is clear that ICT capacity is a determinant of organizational performance.

The study also concludes that human resource capacity is still a challenge in public secondary schools despite the fact that the variable had a positive and significant effect on

organizational performance. This is supported by the fact that although ICT training had been offered while most of ICT facilities was accessible, majority of teachers were not sure on their ICT experience, attitude towards ICT and ICT knowledge and skills. Public secondary schools in Kisii County are equally not well equipped with ICT tools. The proportion of ICT equipment that were in good working condition in most schools was low while software facilities and internet connection speed were reported as insufficient to support educational requirements.

The study further concludes that despite of the important role institutional ICT environment plays in creating an innovative environment through clear ICT vision, policies and related support from the school management to spearhead adoption of ICT in school processes, the role has not been capitalized by the schools' managers in most schools. The mere availability of ICT facilities is not enough to influence organizational performance. This conclusion is supported by the fact that the other two independent variables, human resource ICT capacity and institutional ICT environment also had a positive and significant influence on the dependent variable, organizational performance.

RECOMMENDATIONS

Recommendations for Policy Implications

The research findings have revealed that enhancing ICT capacity leads to improved organizational performance of public secondary schools. This study recommends that policy makers and school managers should endeavor to strengthen institutional capacity in terms of provision of ICT tools, building human resource capacity and creating innovative environment which supports ICT integration and its effective utilization in order enhance organizational performance. The government through the Ministry of Education (MOE) need to come up with regulations to operationalize the management and governance of schools through the use of ICT. This will eliminate the variances that exist on levels of incorporating ICT use in school processes.

In order to improve the teachers ICT experience, knowledge and skills the ICT integration crusaders and school managers should focus on providing adequate ICT training and workshops that would facilitate intuitive acceptance of ICT by the all those involved in its adoption. It should also be noted that such ICT training should not consist of merely short workshops or training courses but rather focus on providing participants with conceptual and practical tools that can promote real change in enhancing school management, teaching and learning processes. Pre-service and in-service training should also be considered and be provided on a continuous basis to ensure ICT users are up to date with technological developments. The government also needs consider running campaigns on the benefits of ICT

integration in schools.This will in turn lead to improved ICT uptake and change in ICT users' attitude on the adoption of ICT in their roles.

The research findings have also shown that institutional ICT environment is central to organisational performance. A number of success factors at the school level are crucial in setting up an innovative environment for successful ICT integration. This include ICT support, collective decision making, a culture of collaboration and innovation, shared vision and implementation policies. The policy makers and ICT integration crusaders need to come up with programmes that will ensure school leadership fully supports ICT integration. This will inspire confidence among all the stakeholders within the school on the changes that come with ICT integration and the intended outcome. Similarly and as a matter a priority school managers should have clear ICT vision and policies on ICT use in their schools and also have everyone on board of those involved in the implementation process through collective decision making and discussing ICT matters in the school on a regular basis, providing incentives to those adopting and making maximum use of ICT, promoting collaboration among staff to share their experiences on ICT integration, and providing them with time and opportunities for collegial interaction on the use of the instructional resources.

The study has also shown that for ICT resources available in schools to have positive impact on organizational performance it requires effective utilization of such resources. Therefore, teachers and school managers have a fundamental role in ensuring effective utilization of ICT facilities available in schools. The teachers are in control of what is taught in class and how it is taught and therefore it's important that focus should be on building the teachers and school managers' ICT capacity in order to better understand and appreciate the innovative role of ICT in educational processes.

Recommendations for Further Research

The study investigated the impact of ICT capacity on organizational performance of pubic secondary schools in Kisii County. Although the research findings show that ICT capacity had a positive influence on organizational performance, the study relied on self-reporting which is open to a variety of positive biases. The researcher therefore recommends for systematic and robust longitudinal studies to try and provide more insights on ICT capacity, the actual use of the technology and its impact on organizational performance in public secondary schools. One key advantage of carrying out longitudinal studies is its ability to show patterns of a variable over time which is a powerful way through which researchers can learn about the cause-effect relationship in research variables.

Similarly, although the research study has revealed that ICT capacity has a positive effect on organizational performance in public secondary schools, it does not give any indication at what cost. The cost analysis on the implementation of ICT integration projects in schools is important for determining the efficiency and sustainability of such projects. Further research is therefore recommended to carry out a study on the cost benefit analysis on ICT integration projects in schools. This is important for policy makers and the general public in getting an indication on whether the projects are being implemented efficiently against the intended benefits and whether such projects are sustainable in the long run.

Lastly the research examined the availability of various ICT infrastructure, it did not look at smartphones, tablets, portable gaming machines and other handheld devices whose usage is on the rise. The growing adoption of these gadgets/devices by individuals and institutions is building a potentially compelling learning avenue that could be harnessed by a significant proportion to support teaching, learning and management of learning institutions. The researcher therefore recommends for further research to establish how mobile technology can be used to compliment and reinforce the current conventional ICT capabilities in improving organizational performance of schools.

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