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Teacher Training and its Effects in the Adoption of ICT in Public Secondary Schools in Machakos County Kenya

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ABSTRACT

Information Communication Technology (ICT) is a strategic communication tool that improves the firm performance, allowing cost reduction and permitting the firm competitiveness and effectiveness. There are currently over 8000 public secondary schools in Kenya due to the recent massive increase in primary school enrolment. The free primary education programme is putting pressure on the demand for and access to quality secondary education. This study sought to establish the effects of teacher training in the adoption of ICT in public secondary schools. Descriptive survey design was employed in this study. The target population for the study consisted of 23 Principals, 23 deputy principals and 92 teachers of compulsory subjects from public secondary schools in Kangundo Sub-County. The sample size was 103 respondents of the target population. Stratified random sampling was used to allow full participation of teachers. This study employed questionnaires in the data collection. In this study, a pilot study was carried out in two schools in Kangundo Sub-County which were not included in the actual data collection. Descriptive statistics was used to show the frequencies and percentages of each response. Qualitative data analysis was done simultaneously with data collection. The Qualitative data collected was organized into categories and themes using Statistical Package for Social Sciences (Version 25). The study established that most of the respondents regarded teacher training as strategies which affect ICT adoption. In addition, slightly more than three-quarters of the respondents revealed that ICT adoption was affected to a great extent by teacher training. The study concludes that teacher training positively and significantly affects ICT adoption. Based on the study findings, the study recommends that teachers need to be trained on data processing, word processing, presentation software and use of internet to use them in creating lesson plans, analyzing and setting students' tests. The study suggests a need for comparative study for both rural and urban areas using a complete model of factors which affects ICT adoption to be conducted to ascertain the study findings and policy recommendations as an area for further research.

Keywords: Teacher training, Information communication and technology (ICT), Adoption

I. INTRODUCTION

1.1 Background of the Study

The world today is experiencing technological revolution in the sphere of information and communications commonly referred to as information, communication and technology (ICT) or simply computerization. Computerization has increased speed in communication, storage, retrieval and processing of information. It has also facilitated online delivery of services in public service, training, e-government, online transaction of business and commerce or e-commerce. Computerization is known to improve efficiency in all aspects of the organizations in terms of the speed of transactions, accuracy and convenience. No sector can afford to ignore such mammoth technological change because the cost to the economy and social inconvenience will be enormous. It is appreciated that significant measures have been taken to extend and modernize the ICT sector the world over. However, Kenya is far from fulfilling the IT requirements of its citizens and thus computerization is still a great challenge for many organizations. Further, whatever progress that has been made has clearly been in favor of urban areas while the rural population has remained outside the computerization revolution [2].

By its very nature ICT phenomenon is relatively poorly adopted in the developing world. Available data, suggest that the majority of developing countries such as Kenya in Sub-Saharan Africa are lagging behind in the information revolution [20]. Not surprisingly, the pursuit for adoption of ICT in Educational management has been

problematic and will require fundamental shifts in the regulatory environment, as well as renewed attention to public- private partnerships and social services. For example, developed countries have 80 percent of the world's internet users, while the total international bandwidth for all of Africa is less than that of the city of Sao Paulo, Brazil. There is little doubt that Sub-Saharan Africa's populations are missing out on the boons of information and communication technology (ICT) in educational management. As a region lagging behind in adoption, use and innovation in the ICT sectors, its people

are missing out on a better education and well managed education systems and entities. ICT has contributed greatly to educational management in schools worldwide [20].

However, in Kenya schools hardly use ICTs to manage the quality of output or to raise teacher productivity, or to reduce costs through analyzing spending. This is attributed to a myriad of challenges facing most schools in Kenya which regard to adoption of ICTs in educational management. This has resulted to a slow rate of adoption of technology despite its promise and potential for use in educational management in schools. Most schools in Kenya have only adopted computers as a technical subject and not integrated its use in teaching, learning and management. The use of ICTs in educational management is greatly under emphasized. As such, a more holistic approach requires that schools be receptive and open to the changes ICTs may make, and to the ongoing evaluation of these changes for the schools 'purposes [10].

School managers need to have basic information on quality of teaching, student and teacher flows probably also of school supplies, and how much the school as a system is spending on various inputs, in order to make the most basic resource allocation decisions. Previous studies [3], [19] indicate that ICT has played an important role in improving management in educational systems for example through availing data widespread to parents and the public at large central administration websites and in some cases through direct access to central databases by school personnel. Managing the use of ICTs is both challenging and rewarding. ICTs have triggered demands for systematic changes in schools; predictably, school managers and teachers feel the pressure to change and must find strategies of implementing and sustaining this technological innovation. There is need to establish the strategies in the adoption of ICT in public secondary schools in Kangundo Sub-County.

The adoption and use of ICTs in education institutions in developing countries remains very limited despite a decade of large investment in information and communication technologies. Kenya like other developing countries struggles with high levels of poverty and this has an effect on the adoption and access to ICT [14]. The initial aim to introduce ICTs in education was primarily at developing ICT skills, the focus has over time shifted to leverage ICTs to address issues of quality and to improve teaching and learning especially at secondary and post-secondary levels. However, availability and use of ICTs at various levels is still patchy.

About 1,300 High schools out of more than 6,000 schools have computers, while most schools with computers use less than 40% of the available infrastructure and very few actually use ICT as an alternative method for curriculum delivery. Kenya ICT survey 2007 observed that many schools teachers are ill equipped to effectively integrate ICT in classroom due to inadequate number of computing infrastructure including computers, communication infrastructure involving telecommunication structures and roads as well as internet connectivity. This shows a very slow integration pace and may lead to all benefits of ICT's un-equitably realized or not being realized in schools in the near future. Many teachers perceive that adoption of ICT in school will render them jobless due to it foreseen benefits such as e-learning and efficiency in the mode of delivery.

1.2 Statement of the Problem

Though the government of Kenya has come up with several policy documents on ICT, all of which recognize an ICT literate workforce as the foundation on which the nation will become a knowledge-based economy, the adoption of ICT in secondary schools remains a great concern. Some of these policies are the E-Government strategy of 2004, sessional paper No.1 of 2005, and the national ICT policy of 2006. In secondary schools where the ICT infrastructure is even available, there is underutilization of ICT resources, thus minimal adoption in management functions, teaching and learning processes. Therefore the ICT resources have not been used optimally in public secondary schools. Many educators perceive ICT as a tool for improving the presentation of material, for making lessons more fun for the learners and for making administration more efficient. The underutilization of ICT has led to inefficiency in management functions, teaching and learning processes.

1.3 Objectives of the Study

The study sought to establish the effects of teacher training in the adoption of ICT in public secondary schools.

1.4 Significance of the Study

The findings and recommendations of this study will be useful to education stakeholders intending to initiate and manage ICT projects in schools by enabling them target their projects effectively. It will also help the researchers and academicians who are involved in the ICT field.

II. LITERATURE REVIEW

2.1 Empirical Literature

The importance of pedagogical integration of ICT in Kenya and globally cannot be overemphasized. It is becoming increasingly apparent that all aspects of people's lives including the way education is taught and delivered are greatly influenced by developments in Information and Communication Technologies (ICTs). In an effort to keep up with these new developments, the Kenyan Government, through its key ministries of Education, Science and Technology and Information and Communication Technology, has developed several policy and strategy documents to guide the integration of ICT in education. These efforts are also out of the realization that there are many initiatives being championed by various government agencies, private sector, non-government organizations and even

individuals, that are not well coordinated, are disjointed, lack focus and sometimes duplicate each other. In the last decade, the Government of Kenya has invested numerous resources in ICT infrastructure including the digitization of educational materials through the Kenya Institute of Education (KIE) and The National ICT Integration and Innovation Centre (NI3C). The e-content being developed for schools at secondary levels is expected to increase access and improve the quality of education in the country. While this is a laudable initiative, the required penetration in schools both in breadth and depth is yet to be realized.

The existing literature on ICT integration in education in Kenya appears to indicate limited knowledge on the quantity and quality of research in the area of pedagogical integration of ICT. Many scholars and practitioners have raised this as a major research need [8], [5]. Recent studies have attempted to fill this gap especially in the African context, which for a long time, was assumed to have insignificant adoption of ICT in education.

Among the various studies carried out to establish the status of ICT integration and the variables influencing it, some have focused on the role of the School Manager, in the adoption and use of ICT in education. Many scholars and policy makers seem to agree that School Principals as institutional managers have a key role to play in the facilitation of educational change [6], [16], [18] especially in this decade when Information and Communication Technologies are increasingly finding application in teaching and learning. It appears that ICTs and especially the computer, has moved from being the object of study to a learning tool in the classroom and teachers are increasingly being expected to have basic ICT skills and able to apply them in their teaching. By playing an active role in the adoption of ICT as an educational tool, principals can create an environment that will benefit their teachers and students.

A number of studies have identified the school principal as a critical and pivotal person for 'establishing and maintaining learning environments compatible with student-centred approaches to teaching and learning with ICT [1]. They are also seen as curriculum and pedagogy leaders and are considered by stakeholders as central figures in leading processes for creating the conditions to teach and learn with ICT. From these arguments, it appears school leadership plays a key role in ICT integration in education. The competence of the School Manager in the use of ICT and a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education is important to the effectiveness and sustainability of ICT integration programmes.

The integration of ICT in school management in Kenyan schools has been driven to a large extent by the corporate social responsibility efforts of organizations that initially made donations of old refurbished computers to schools and diffusion of ICT skills in the labour market. In addition, access to electricity and internet connectivity, introduction of other technologies such as the mobile phone, Nepad e-schools project, Computers For Schools, Kenya (CFSK), popularization of computers by government through removal of duty, thus, making them affordable, and more recently, the entrenchment of ICT integration in education through the launch of the National ICT Strategy in Education (2006) and the launch of the National ICT Integration and Innovation Centre at the Kenya Science Campus in Nairobi have created awareness of the place of ICT in education .

Acquisition of a limited number of computers initially by schools for management purposes appears, to have created the conditions necessary to introduce, albeit gradually, integration of ICT in teaching and learning. It could be argued, therefore, that once management adopts ICT in its practices, it diffuses and spreads to other institutional members and they become interested in its use. As such, even without a plan or designed way of integration, some teachers with the inclination and interest in ICT end up finding innovative ways of using it to enhance their teaching capacities. Initially it may be used for recording and analyzing marks, typing lesson plans and eventually actual teaching and learning by searching for information and displaying learning content. Learners, equally, given the opportunity and access, are able to use ICT to enhance their learning.

Every school has its own unique organizational culture. [7] states that most reforms in schools fail because of flawed implementation. Teachers and administrators see minimal gains and such loss in changes that are proposed. The difficulty associated with facilitating change in people's values, attitudes, and behavior is grossly underplayed and often ignored. [17] states that; there are two reasons why people would want to bring ICTs into schools. The first is the desire of the central planner to the school as modern as the world of tomorrow they conjure into being. [7] details how each new development in the popularization of information and entertainment technology (Radio, film, television computers) in society at large brought with it a corresponding insistence that the deployment of this revolutionary machine into schools would finally bring the classroom out of the dark ages and unto the modern world. This has not been the case. According to [17], the second drive has been standardization by modeling schools on factories with the expectation of uniformity of outcome. The weakest link has been found to be the instructional delivery the teacher who once in the confines of classroom issues of standardization of curricula, of facilities finds very little use of ICTs. This has been the rationale for educational technologists to produce solutions designed not to aid the teacher to recapitulate, or replace the teacher through the introduction of machines or his/her management style.

The result is the likelihood that innovations in ICT will not be well received by teachers and managers of schools due to

conflict with the firmly entrenched traditions. Researchers have found particular cultural norms that can facilitate school management. Norms such as introspection, collegiality and a shared sense of purpose or vision combine to create a culture that supports innovation in educational management. School managers who had adopted more progressive ICT oriented management styles over time felt that ICTs helped them change, but they do not acknowledge ICTs as the catalyst for change; instead they cite reflection upon experience, classes taken and the context or culture of the school [13]. For school managers to implement the use of educational technology in a constructivist manner, they must have opportunities to construct pedagogical knowledge in a supportive climate.

The Sessional Paper No. 1 of 2005 captures ICT as chapter VIII. The government appreciates and recognizes that an ICT literate workforce is the foundation on which Kenya can acquire the status of a Knowledge economy [15]. Education is seen as the natural platform for equipping the nation with ICT skills. The Successful introduction and use of ICT in education and training institutions is seen to play a major role in disseminating skills to the wider society and thus create positive impacts on the economy. In order to change this situation the policy framework states that ICTs have a direct role to play in education and if appropriately used, ICT can bring many benefits to the classroom as well as education management and training processes in general. Its use will provide new opportunities for teaching and learning, including, offering opportunity for teacher-to-teacher, and student to student communication and collaboration, greater opportunities for multiple technologies delivered by teacher, creating greater enthusiasm for learning amongst students, and offering access to a wider range of courses [15].

The Sessional Paper notes a number of challenges currently facing access and use of ICT in Kenya which include high levels of poverty that hinder access to ICT facilities, Limited rural electrification and frequent power disruptions. Where there is electricity, high costs of internet provision, costs associated with ICT equipment, inadequate Infrastructure and support hinder the application of ICT. In order to achieve the objectives stated for the period 2005 – 2010 a number of strategies are proposed among them being to work with stakeholders to develop a strategy on ICT that addresses its use in all educational institutions and neighborhoods, incorporating access, content, training of teachers and supply of ICT to the institutions.

2.2 ICT Adoption

The adoption of learning technologies refers to "the process of determining which electronic tools and which methods of implementation are appropriate for given classroom situations and problems". However, throughout the literature this and other terms are used interchangeably. Strict definitions of these terms refer to a) 'adoption' as dealing with the transfer between an old system to a new system that is more effective, b) 'integration' as combining software or hardware components or both into an overall system, c) 'implementation' as the carrying out or physical realization of something like the installation of new hardware and system software, and d) 'embedding' as causing something, in this case, technology, to be an integral part of a surrounding whole, like the curriculum, for example. Although there are subtle differences between these terms, in the current study they are used more or less synonymously.

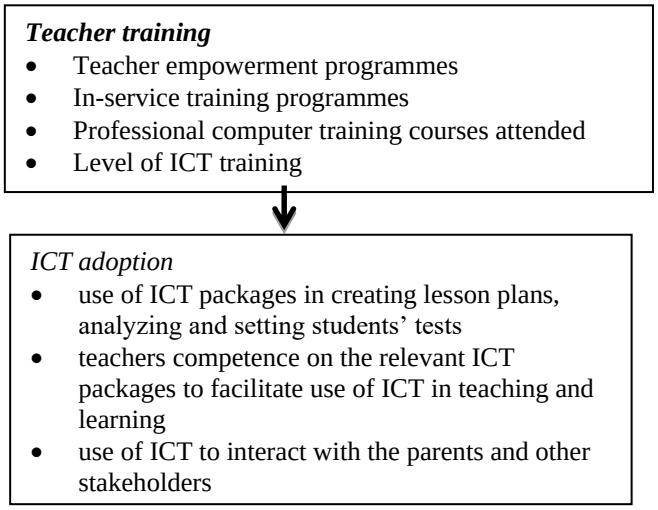
2.3 Effects of teacher training in aiding the adoption of ICT

In a study on teachers' perception on use of technology in the classroom, [4] found that teacher beliefs, confidence and ability to use technology and commitment influence technology integration in the classroom. [20] study on social studies teachers supports that teachers' views influenced their use of technology in the classroom. Most teachers were willing to use technology and expressed positive experiences with technology integration. Training is found to increase their use of technology in the classroom, and to use it more creatively.

Information Communication Technology (ICT) is a strategic communication tool that improves the firm performance, allowing cost reduction and permitting the firm competitiveness and effectiveness. The researcher has established that the literature study indicates ICT has faced a number of challenges in Kenya. However, no study has been done on the strategies in the adoption of ICT in Secondary Schools in Kenya. This study seeks to fill the existing research gaps by conducting a study to establish the strategies used in the adoption of ICT in secondary schools in Kangundo Sub-County. The researcher intends to establish whether the literature study and the field study will yield similar results.

2.4 Conceptual Framework

A concept is a basic building block that captures the essence of a thing. It refers to what extent a researcher conceptualizes to be the relationship between contextual variables in the study and show the relationship graphically or diagrammatically [12]. The relationship describes the association between the independent variables and the dependent variables.



From the several studies, there is a clear indication that adopting and using ICT in schools leads to significant expansion of education and pedagogical outcome which are beneficial to both teachers and students. When used appropriately, ICT can help to strengthen the importance of education to increasingly networked society, raising quality of education by making learning and teaching an active process connected to real life.

Further studies shows that the adoption and use of ICT in schools can promote collaborative, active and lifelong learning, increase students' motivation, offer better access to information and shared working resources, deepen understanding, help student think and communicate creatively [9]. In other words, ICT seems to change the way teaching and learning is carried out in schools. With emerging uses of ICT in schools, teaching could be changed from emphasis on teacher centered to student centered, hence creating interesting and interactive learning environment. ICT facilitates a pedagogical shift entailing an educational interaction between teachers and learners.

However, studies suggest the benefits of adopting and use of ICT in schools all over the world has not been automatic. The effective implementation of ICT in schools is a multifaceted, complex process that just not involves providing the technology to schools but also involves teachers' competencies, schools readiness, long term financing and curriculum restructuring, among others.

In practice, the usual teaching and curricula approaches still remain basically unchanged in many schools, while the technology is typically poorly adopted and underused in classroom. It appears that the emphasis is on students ICT capabilities rather than application of ICT knowledge and skills to other subjects across the syllabus. Despite rapid growth in ICT access by teachers and students both at home and school, and substantially improved school ICT infrastructure (connection to internet, computer labs, availability of educational software, etc.) most teachers are not keen in adapting and using ICT tools during teaching and learning. It appears that their skills and attitudes towards ICT remain a challenge for them to adopt and use efficiently the technology in classroom.

III. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

Descriptive survey design was employed in this study. The major purpose of descriptive research design was to describe the state of affairs as it is at present. According to [11] this type of research attempts to describe such things as possible behaviour, attitudes, values and characteristics. The design was deemed appropriate because the main interest is to explore the viable relationship and describe how the factors support matters under investigation. This design was appropriate for the study as the study sought to establish strategies employed in the adoption of ICT in secondary schools in Kangundo Sub-County.

3.2 Target Population

The target population for the study was 138 consisting of 23 Principals, 23 deputy principals and 92 teachers of compulsory subjects from public secondary schools in Kangundo Sub-County. The population was selected as they were easily accessible to the researcher.

3.3 Sampling Procedures Techniques

Sampling design is that part of statistical practice concerned with the selection of a subset of individual observations within a population of individuals intended to yield some knowledge about the population of concern, especially for the purposes of making predictions based on statistical inference. According to [11], a representative sample is one that represents at least 10% of the population of interest.

3.4 Sample Population

Stratified random sampling was used to divide the target population into several sub- populations (Strata). Items were then selected from each stratum to come up with a sample.

The Slovin formula was used to determine the sample size.

$$n = \frac{N}{1+N\,(e)^2}$$

Where n = Sample Size

N = Target population

e = Margin of error desired (0.05)

To assign the sample size to the strata, the proportionate stratification equation was used.

$$n_h = \left(\frac{N_h}{N}\right) * n$$

Where n_h = Sample size for stratum h

N_h = Population size for stratum h

N = Total population size

n = Total sample size

The sample size was 103 respondents of the target population as shown in table 3.1.

Table 3.1: Sample Size

Target population	No.	Sample Size	
Principals	23	17.166	17
Deputy Principals	23	17.166	17
Compulsory subjects Teachers	92	68.666	69
Totals	138	102.998	103

3.5 Data Collection Methods

This study employed a structured questionnaire in the data collection. This study used the questionnaire since confidentiality was upheld, saves time and it did not provide an opportunity for bias. The questionnaire had two parts. Part one comprised of questions seeking to know demographic information. Part two of the questionnaire had questions enquiring about strategies employed in the adoption of ICT. The questionnaire collected both qualitative and quantitative data.

IV. DATA ANALYSIS AND DISCUSSIONS OF RESULTS

4.1 Introduction

Descriptive analysis technique was utilized which involved use of descriptive statistics and tabulations. Descriptive statistics used included frequencies and percentages. The tabulations were basically frequency tables and the associated percentages. In addition the estimated equations were also included.

4.2 The effects of teacher training in the adoption of ICT in public secondary schools

Table 4.2: Effects of teacher training in the adoption of ICT

		Gender		Highest education level attained				
		Male	Female	Postgraduate	Degree	Diploma	Form four	Total
Yes	*f*	63	38	10	86	4	1	101
	%	61.17	36.89	9.71	83.50	3.88	0.97	98.06
No	*f*	1	1	1	0	1	0	2
	%	0.97	0.97	0.97	0.00	0.97	0.00	1.94
Total	*f*	64	39	11	86	5	1	103
	%	62.14	37.86	10.68	83.50	4.85	0.97	100.00

Table 4.2 presents the effects of teacher training in the adoption of ICT. The number of respondents who stated that teacher training affects the adoption of ICT in public secondary schools was 101 out of the total 103 respondents interviewed. This represented 98.06 per cent of the respondents indicating that most of the respondent's regarded teacher training affects the adoption of ICT. Further analysis of the data revealed that male and female respondents comprised 64 (62.14 per cent) and 39 (37.86 per cent) of all the respondents interviewed. The males who said that teacher training aids the adoption of ICT were 63 representing 61.17 per cent of all the respondents while female respondents regarding the important role played by teacher training on the adoption of ICT were 38 (36.89 per cent).

The data was further disaggregated by the highest level of education of the respondents interviewed with a view of establishing whether education level was related to teacher training and its effect on the adoption of ICT. The surveyed data revealed that only one (0.97 per cent) of the respondents had attained secondary education level up to form four, while those who had attained diploma, degree and post-graduate education were five (4.85 per cent), 86 (83.50 per cent) and 11 (10.68 per cent) respectively. The respondents who noted teacher training affects the adoption of ICT and had attained form four level of education was only one, while those who had attained diploma education were four (3.88 per cent) of the all the 103 respondents interviewed. The respondents who had attained degree and post-graduate level and viewed teacher training as affecting the adoption of ICT were 86 (83.50 per cent) and 10 (9.71 per cent) of the total number of respondents' interviewed respectively. This shows that none of the respondents who had attained either form four or degree level did not regard teacher training as playing an important role in influencing the adoption of ICT.

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Regarding the extent of teacher training in aiding the adoption of ICT shown in table 4.3, 32 (31.07 per cent) of the interviewed respondents said that teacher training aid the adoption of ICT to a very great extent, while 49 (47.57 per cent) of the respondents noted that adoption of ICT was affected to a great extent by teacher training.

Table 4.3: Extent of teacher training in aiding the adoption of ICT

Teacher training	Frequency	Per cent
Very great extent	32	31.07
Great extent	49	47.57
Moderate extent	20	19.42
Little extent	2	1.94
Total	103	100

The interviewed respondents who stated that teacher training affected adoption of ICT to a moderate extent were 20 (19.42 per cent). Only two respondents representing 1.94 per cent of the respondents viewed the effect of teacher training on ICT adoption was to a little extent. This shows that most (78.64 per cent) of the respondents revealed that ICT adoption was affected to a great extent by teacher training. The findings are in line with those established by [20].

Teacher empowerment programmes affected ICT adoption according to 94 (91.26 per cent) of the interviewed respondents. Specifically, teacher empowerment programmes affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 93 (90.29 percent) of the respondents. An equal number added that teacher empowerment programmes affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and

learning. Moreover, 81 (78.64 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected by teacher empowerment programmes.

Training through in-service courses offered during school holidays affected ICT adoption according to 84 (81.55 per cent) of the interviewed respondents. Specifically, training through in-service courses offered during school holidays affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 87 (84.47 percent) of the respondents. Furthermore, 89 (86.41 per cent) respondents added that training through in-service courses offered during school holidays affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and learning. Moreover, 78 (75.73 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected by training through in-service courses offered during school holidays.

Training through seminars/ conferences during in-service courses affected ICT adoption according to 73 (70.87 per cent) of the interviewed respondents. Specifically, training through seminars/ conferences during in-service courses affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 88 (85.43 percent) of the respondents. Furthermore, 93 (90.29 per cent) respondents added that training through seminars/ conferences during in-service courses affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and learning. Moreover, 81 (78.64 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected training through seminars/ conferences during in-service courses.

The number of professional computer training courses attended affected ICT adoption according to 95 (92.24 per cent) of the interviewed respondents. Specifically, the number of professional computer training courses attended affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 84 (81.55 percent) of the respondents. Furthermore, 94 (91.27 per cent) respondents added that the number of professional computer training courses attended affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and learning. Moreover, 88 (85.44 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected by the number of professional computer training courses attended.

Shortage of ICT teachers and other IT professionals affected ICT adoption according to 100 (97.09 per cent) of the interviewed respondents. Specifically, shortage of ICT teachers and other IT professionals affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 98 (95.14 percent) of the respondents. Furthermore, 93 (90.29 per cent) respondents added that shortage of ICT teachers and other IT professionals affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and learning. Moreover, 94 (91.26 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected by shortage of ICT teachers and other IT professionals.

Teacher skills of data processing, word processing, spreadsheet, presentation software and use of internet affected ICT adoption according to 95 (92.24 per cent) of the interviewed respondents. Specifically, teacher skills of data processing, word processing, spreadsheet, presentation software and use of internet affects use of ICT packages in creating lesson plans, analyzing and setting students' tests based on 94 (91.26 percent) of the respondents. Furthermore, 95 (92.24 per cent) respondents added that teacher skills of data processing, word processing, spreadsheet, presentation software and use of internet affect teacher's competence on the relevant ICT packages to facilitate use of ICT in teaching and learning. Moreover, 89 (86.41 per cent) concurred that use of ICT to interact with the parents and other stakeholders is affected by teacher skills of data processing, word processing, spreadsheet, presentation software and use of internet.

Table 4.4: Regression model

ICT adoption	Coefficient	t-statistic	P-value
Teachers training	0.2188*	2.37	0.02
Gender	0.0618	0.81	0.421
Age	-0.0055	-0.65	0.515
Education level	0.1215	1.01	0.317
Length of service	0.0023	0.26	0.797
_cons	0.9120	3.49	0.001
Number of observations	103		
F(8, 94)	1.45		
Prob > F	0.188		
R-squared	0.1096		
Adj R-squared	0.0338		

Note: * indicates 5 % level of significance

Table 4.4 gives the dependent variable (ICT adoption) regressed against the independent variables. The results of the regression model show that teacher training positively and significantly influence ICT adoption. This was deduced at the five per cent level of significance. Hence upon controlling for other independent variables, teacher training positively affects ICT adoption. The current study did not find any statistically significant effect of gender, age, education level and length of service. Moreover, the F-statistic for joint significance with its associated probability (P-value) value of 0.188 being greater than 0.05. This shows that all the included independent variables did not jointly affect the dependent variable (ICT adoption).

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The conclusions which emanate from the established study findings are as follows;

Most of the respondents regarded teacher training as strategies which affect ICT adoption. Slightly more than three-quarters of the respondents revealed that ICT adoption was affected to a great extent by teacher training. Upon controlling for other independent variables, teacher training positively and significantly affect ICT adoption. The F-test for joint significance with its associated P-value was not statistically significant at the 5 per cent level coupled with a low value for the adjusted R^2. This indicates that there are other important variables, which influence the adoption of ICT in public secondary schools in Kenya.

5.2 Recommendations

Based on the findings of the study, the following recommendations were made;

i. The study recommends that teachers need to be trained on data processing, word processing, presentation software and use of internet to use them in creating lesson plans, analyzing and setting students' tests. The training of teachers either through in service courses offered during holidays or by workshop seminars need to be conducted for all teachers irrespective of their gender, age, teaching experience, or educational level.

ii. The school administrators need to provide support in the different aspects of ICT integration. Particularly, in establishing partnerships with relevant stakeholders and giving incentives to ICT innovators.

iii. The ministry of education, science and technology needs to ensure that in every school there is a functional computer laboratory equipped with up to date operational computers and educational software.

iv. Every school needs to have a full-time computer assistant to assist and train other teachers on computer handling skills and ensuring that the ICT equipments are updated with recent educational programs and software's. In addition the administration needs to arrange for regular and frequent repair and maintenance of the equipments.

v. There is need for increased teacher training and improvement in the provision of more technical support in schools with low levels of infrastructure.

vi. A comparative study for rural and urban areas using a complete model of factors which affects ICT adoption need to be conducted to ascertain the study findings and policy recommendations.

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