Teachers' Gender Influence on Adoption and Use of Information and Communication Technology in Public Secondary Schools in Kenya

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Abstract

The purpose of this study was to establish the influence of teachers' gender on adoption and use of Information and Communication Technology (ICT) in public secondary schools in Kenya. The objective was to: Determine the effect of gender on adoption and use of ICT in public secondary schools. Target population was 30,080 teachers under the ICT Economic Stimulus Programme (ESP). Simple random sampling technique was used to obtain 244 teachers. A mixed methods research design inclined towards quantitative strategy was adopted. The study was informed by pragmatic philosophical paradigm. Teachers' gender constituted the independent variable, while adoption and use of ICT was the dependent variable. Data was collected by closed-ended questionnaire and interview schedule, organized and presented using frequency, mean and standard deviation tables. The hypothesis was tested by Pearson's correlation coefficient. The number of male teachers and female teachers was 162 and 82 respectively. However, the use of computers by males had a mean of 3.679 and the female 3.4756 on a Likert scale of 1 to 5. The use of Liquid Crystal Display (LCD) projectors had a mean of 2.5802 for male teachers and 2.4390 for female teachers. Use of printers had a mean of 4.1605 for males and 3.914 for females. Also, use of internet had a mean of 3.3765 for males and a mean of 3.353 for females. All the responses on items relating to adoption were between 4.0 and 5.0 which would mean agreeing and strongly agreeing respectively, hence the teachers were not using ICT in secondary schools. The hypothesis, H_{O1}: There was no significant relationship between gender with adoption and use of ICT, male teachers ranked higher than female teachers on the use of IT for instructional support with mean ranks of 124.03 and 119.47 respectively after testing using Mann Whitney U test. The p value was 0.624 which was greater than P = 0.05 hence the hypothesis indicated that there was no statistically significant relationship between gender with adoption and use of ICT. Findings of this study will provide a framework which will assist school managers make decisions on how to adopt and use ICT in schools. The study recommended that education stakeholders should give clear information on the adoption and use of ICT in secondary schools and establish the source of funds for maintenance, repairs and further acquisition of the necessary infrastructure amid enrolment explosion in public secondary schools. Also, teachers need to be empowered through both pre- service and continuous in-service training.

Key Words: Gender, Information and Communication Technology, Secondary schools.

INTRODUCTION

The idea of adoption and use of Information Communication Technology (ICT) in Kenya is not a new development. With the introduction of computers in the country in the 1970s and later the internet in 1993, great effort has been made to adopt and use ICT in education (Ford, 2007). 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 (National ICT Policy, 2006; Sessional Paper No. 1 of 2005 and Kenya Education Sector Support Programme, 2005-2010). The move by the Government of Kenya (GoK) to fund six secondary schools in every constituency in 2010/2011 financial year was geared towards catalyzing the adoption and use of ICT in secondary schools (Temba, 2012). Additionally, the Kenya government had the initiative of launching the Laptop Project at standard one level in all public primary schools as proposed in the year 2013 (Tarus *et al.*, 2015).

Despite the efforts and multi-investment by the government and other stakeholders, the level of consumption of ICT seems to be lacking in synergy and its adoption and use remains significantly low (Tarus *et al.*, 2015). According to Manduku, Kosgey, and Sang (2012), the education sector was investing heavily in ICT but the technology adoption and use continued lagging behind other sectors. Similarly, a study by Mbithi (2014) on integration of ICT in instruction of English in secondary schools in Matungulu district of Machakos County in Kenya indicated its limited use. Murithi and Indoshe (2014) also found that adoption of ICT was lukewarm despite the existence of a positive attitude by both the teachers and student in secondary schools in North Imenti District of Kenya.

According to Marah (2010) in an article on the integration of ICT in India, countries that are spearheading the use of ICT in education were the UK, Australia and USA. India and other countries were yet to realize that change. The experience of introducing ICT in the classroom and other educational settings all over the world showed that the full realization of the benefits of ICT was not automatic (Tinio, 2002). He further stated that effective integration of ICT in education was a complex and multifaceted process that involves not only technology, but also; curriculum and pedagogy, institutional readiness, teacher competence as well as long term financing. A study on ICT integration in schools in Nepal identified the following as some of the challenges of the process: lack of access to electricity, the majority teachers were information-illiterate and the school level curricular was not updated to embrace the use of ICT in the classroom (Hennessy, Harrison, & Wamakote, 2010). They also noted that although the lack of access was a challenge, its availability does not translate into use because other educational factors also have roles to play.

Janssens-Bevernage, Cornnile, and Mwanki, (2002) noted that a common misconception was that access to technology on its own motivates teachers to apply it in their teaching. This is not the case since ICTs in education are not transformative on their own, but require teachers who can use technology to improve student learning.

A study by Bakr (2011) investigating the attitudes of Egyptian public school teachers towards computers in terms of their gender and years of teaching experience showed that their attitudes were positive and no significant gender differences existed among them. Similarly, reports by Gressard and Loyd (1986), Woodraw (1992), did not display any significant gender differences. Important to note is that there are other studies with contra

opinion indicating that female teachers manifest a higher level of anxiety in their attitude towards computers compared to their male counterparts (Sadik, 2005; Smark 2006; Shapkaa & Ferrarib, 2003; North and Noyes 2007; Balka & Smith, 2000; Brosnan & Lee 1998).

There is very little information on teacher factors influencing the adoption and use of ICT in educational institutions in Kenya after the ICT ESP programme was introduced in Public secondary schools in Kenya. Owing to the efforts geared towards adoption and use of ICT in secondary schools and the scanty nature of available data on the influence of gender on adoption and use of ICT there was need for further research to establish the influence of gender on adoption and use of ICT which is the rationale for this study.

RESEARCH DESIGN AND METHODOLOGY

Research design is a plan and procedure to conduct research; it involves intersection of philosophy, strategies of inquiry and specific methods/instrumentation (Creswell, 2009). This study adopted a mixed methods research design and underpinning the study was the pragmatic world view. Pragmatic world view arises out of actions, situations and consequences. There is concern with applications. It is seen in mixed methods type of research design. The researcher emphasizes the research and uses all the approaches available to understand the problem (Creswell, 2009).

The study was carried out in the Republic of Kenya across its 47 counties. Each of these counties had secondary schools that were sponsored by the Ministry of Education in the Economic Stimulus programme (ESP) for adoption and use of ICT in education. Findings of this study will therefore apply to all secondary schools in the country and to other countries having similar characteristics

The study dealt with secondary school teachers in the schools that were funded by the government of Kenya for adoption and use of ICT. At least 20 Secondary schools in each of the 47 counties were funded by the Ministry of Education to enable them jam start the integration of ICT in secondary education. Thus, approximately 940 secondary schools were targeted which sums up to 30,080 teachers.

Secondary schools that were funded in the Economic Stimulus Programme (ESP) to integrate ICT in education formed the area of study. The country was sub-divided into eight regions as was proposed and adopted by the ministry of education. The regions are Metropolitan, Aberdares, Highlands, Mau, Nyanza, Lake, Coastal and Northern. Simple random sampling was done on the regions with Northern region being left out for security reasons- the Alshabab terror group. Based on the Crejcie and Morgan table of sampling, a population of 30000 will have a sample of 391 with sample rule of 30%, two regions were selected. The rule was further applied to the selection of two counties from each of the two regions. Stratified random sampling was then used to pick the six schools from each of these four counties leading to 24 schools. Ten teachers were randomly selected from each of these schools - two per department. A total sample of 244 teachers responded to teachers' questionnaire as shown in the table 1.

Table 1: Sampling Procedure

	Number of teachers	Number of schools from counties	Total number of teachers (sample)
Mathematics	4	24	96
Science	4	24	96
Languages	3	24	72
Humanities	3	24	72
Technical and Creative Arts	2	24	48
Total	16		384

Data was collected using closed ended questionnaire and interview schedule. Section I of the questionnaire was to capture demographic data, gender included while its section II was to capture data on adoption and use of ICT.
Data was cleaned and presented in frequency distribution tables. The Statistical Package for Social Sciences (SPSS) was used in the analysis. The hypothesis was tested by using Pearson's correlation coefficient.

RESULTS AND DISCUSSION

A total of 400 questionnaires were administered to teachers using either of the ways discussed earlier. Out of the 400 teachers, 21 declined to respond for various reasons the major one being with very busy schedules. Among the questionnaire that were returned 82 had missing responses and only 244 questionnaires were duly filled giving a response rate of 64.38 per cent of the expected sample of 379. The rest of the questionnaires could not be retrieved either due to mailing challenges or were lost as indicated in table 2

Table 2: Response rate

Total number of Questionnaires distributed	Questionnaires not filled	Incomplete questionnaires	Lost Questionnaires	Duly filled Questionnaires	Total Response
400	21	53	82	244	244 (64.38%)

The sample for this study was 244 teachers, out of which 162 (66.4%) were male and 82(33.6%) were female as shown in Table 3 below.

Table 3: Gender of Respondents

	Frequency	Percent	Cumulative Percent
Male	162	66.4	66.4
Female	82	33.6	100.0
Total	244	100.0	

The number of male teachers was higher than female teachers. This was in tandem with UNESCO (2002) data on the % of female teachers which decreased when the level of education rose. Thus the % of female teachers was lowest at secondary education and highest at pre-primary education. At pre-primary level of education the % of female teachers was higher than male teachers ranging from 82.2 in the year 2012 to 87.5 in 2005. The % of female teachers was lower at primary level and ranged from 43.6 in the year 2005 to 48.1 in

the year 2012. This implied that the % of male teachers was slightly higher than that of the females. Further the % of female teachers was lowest at secondary level and ranged from 38.2 in 2007 to 41.2 in the year 2012.The records for other years were missing but the deviation looking at the trend would be small and hence insignificant. The % of the teachers who participated in the study would thus represent the population well.

Use of computers by both genders was almost the same with males having a mean of 3.679 and the female 3.4756 as depicted by the table 4. This value is low in both cases and is closer to value 3.0 which means teachers were not sure if they were using ICT in their tasks.

Table 4: Gender and Use of Computers

Gender of respondent	Mean	N	Std. Deviation
Male	3.6790	162	1.21918
Female	3.4756	82	1.21945
Total	3.6107	244	1.22056

Similarly, the mean for use of LCD projectors was 2.5802 female teachers and 2.4390 for female teachers. The value is the lowest and clearly shows that both male and female teachers were not using projectors. This status can be compared to the study by Kinyanjui (2007) whose findings established that the computer equipment in the few fortunate schools that had them tended to be underutilized and lacked appropriate educational content. Use of printers was slightly higher for both genders with males having a mean of 4.1605 while females had 3.914. Use of internet was equally low with male teachers having a mean of 3.3765 while female teachers had a mean of 3.3537.There seemed to be very little variation in the use of ICT as depicted in the table 5.

Table 5: Gender and Use of ICT

Gender of respondent		LCD Projectors	Printers	Internet
	Mean	2.5802	4.1605	3.3765
Male	N	162	162	162
	Std. Deviation	1.22970	1.10287	1.34218
	Mean	2.4390	3.9146	3.3537
Female	N	82	82	82
	Std. Deviation	1.30618	1.26882	1.44335
	Mean	2.5328	4.0779	3.3689
Total	N	244	244	244
	Std. Deviation	1.25501	1.16450	1.37407

The mean responses indicated low adoption of ICT by both male and female teachers except for the use of printers. Mean of 2.5802 and 3.3765 for male teachers and 2.4390 and 3.3537 is closer to 3.00 which indicate indecisiveness. Further the standard deviation was also low indicating that there was little variation or the data was not widely spread from the mean. Hennessy et al. (2010) isolated some educational factors such as level of teachers' own education, literacy rates and access to professional development as playing an important role. On the other hand Kozma *et al.,* (2004), found the biggest barrier to the use of computers identified by teachers participating in the 1998-1999 survey, assessing the world links school programme were the lack of time available in classes and in their own schedule for planning and the lack of national policy on the use of computers in schools.

The hypothesis H_{O1}: There was no significant relationship between gender with adoption and use of ICT. Factor analysis was done on the items testing on adoption and use of ICT to test construct validity of the items and reduced the ten items into a smaller number of dimensions. These items were reduced to one dimension represented by 'use of IT for instructional support'.

Table 6 (a): Mann –Whitney U test Gender on adoption of ICT

Ranks

	Gender of respondent	N	Mean Rank	Sum of Ranks
Use of it tools in teaching	Male	162	124.03	20093.50
	Female	82	119.47	9796.50
	Total	244		

Table 6(b): Test Statistics

Test Statistics[a]

	Use of it tools in teaching
Mann-Whitney U	6393.500
Wilcoxon W	9796.500
Z	-.490
asymp. sig. (2-tailed)	.624

a. grouping variable: Gender of respondent

Male teachers ranked higher than female teachers on the use of IT for instructional support with mean ranks of 124.03 and 119.47 respectively. The p value was 0.624 which is greater than p = 0.05 hence insignificant as shown in Table 6 (a) and (b).

The null hypothesis was therefore adopted which meant that there was no significant relationship between gender and adoption and use of ICT in secondary schools. The findings were in tandem with reports by Gressard and Loyd (1986) from their study which indicated absence of gender differences. Similar findings were shared by Woodraw (1992). This observation however contradicts other studies that indicated gender differences (Sadik, 2005, Smark, 2006, Shapkaa & Ferrarib, 2001) Thus gender is not a determining factor on adoption and use of ICT in Public secondary schools in Kenya. Either gender has same capability to adopt and use Information and Communication Technology. This presents strength on strategies to be implemented towards adoption and use of ICT given that teachers belong to either gender and they undergo the same type of training. The Teachers Service Commission will have no alterations on their mode of employment based on gender given that it does not influence adoption and use of ICT.

CONCLUSIONS

The study did not establish any variation on gender and adoption and use of ICT. Both male and female teachers depicted a low rate on adoption and use of ICT. Thus there was no significant relationship between gender and adoption and use of ICT. Both genders have the potential and ability to adopt and use ICT upon empowerment through training and adequate resources. Most teachers were not sure when, where and how to use the ICT infrastructure at their disposal. Some computers had stalled while others were kept under safe custody, may be awaiting direction.

RECOMMENDATIONS

The study recommended that the education stakeholders should give clear information on the adoption and use of ICT in secondary schools. Teachers need to be empowered through both pre-service and continuous in-service training as they grapple with adoption and use of the technology. Teacher training institutions should be involved in ICT integration so as to include ICT in the pre-service and in-service training. In-service training in ICT should allow sufficient support and time for teachers to get grip of the new technologies given the work load in secondary schools.

There is need to establish the source of funds for maintenance, repairs and further acquisition of the necessary infrastructure amid enrolment explosion in public secondary schools. The teachers too need to be made party to any innovations in the sector through active involvement to make them own such well-intended innovations.

SUGGESTIONS FOR FURTHER RESEARCH

A similar study needs to be carried out in private secondary schools to establish the status of ICT adoption and use amid the dawn of technology in secondary education.

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