Teachers' Level of ICT Training and Skills on the integration of ICT in Teaching and Learning of Agriculture in Secondary Schools in Masaba South Sub-County, Kisii County, Kenya

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Abstract: *Information Communication Technology has improved service delivery in many sectors of the economy including the education sector in many parts of the world. However, its integration in teaching and learning of agriculture in secondary schools in Kenya has remained low and limited. Few studies have been carried out to determine the howequippingteachers with ICT skills can influence its integration in the teaching and learning of agriculture in secondary schools. This study therefore investigated how ICT training and skills influence integration of ICT in teaching and adopted a descriptive survey research design. It targeted all agriculture teachers and students in public secondary schools in Masaba South Sub-County in Kisii County, Kenya. Data from the Sub-county education office was used to sample schools with ICT facilities as well as population of form three students taking agriculture. Eighteen public schools were purposively selected because they offered Agriculture as one of the subjects in their curriculum. Further purposive sampling was made to recruit at least one instructor in the subject area, with the teacher who had served longest in the Agriculture department in each school being selected for the study, giving a total of 20 teachers. Stratified random sampling was used to select 20 form three agriculture students giving a total of 360 students. Data was collected by use of two sets of questionnaires, one for the teachers and the other for students) and an observation schedule. Data was analyzed both quantitatively using SPSS version 21 and qualitatively. Most teachers (53.3%) had acquired ICT skills which could be used for integration of ICT in teaching and learning of agriculture.86.6%of schools in Masaba South Sub-county had less than 20 computers for the entire student population. With most schools having a population of 300-600 students, astudent to computer of ratio of 1:40 was established. Most students (82.7%) exhibited skills in use of ICT facilities but only 1.9% of the students used the ICT facilities for learning agriculture. While 60% of the schools in Masaba sub-county had technical support, only 40% had a policy for ICT integration in teaching and learning of agriculture. The results of the study show that there is low integration of ICT in teaching and learning of agriculture in Masaba South Sub-county since only 33.3% of the teachers used ICT for teaching agriculture. With these findings, the study recommended that training institutions and universities include training of teachers on how to integrate ICT in their teaching and learning of agriculture in public secondary schools with the training including the use of ICT facilities such as Smart Boards, PowerPoint, and other related software as part of microteaching training.*

Keywords: Level ICT Training and Skills, integration of ICT in Teaching and Learning of Agriculture, Kisii County

1. Introduction

Information and Communication Technology (ICT) has thus been proved to beaformidable enabling tool for educational change and reforms (Garrison and Anderson, 2003). However, the adoption and use of ICT in educational institutions in developing countries remains very limited despite over a decade of large investment in information and communication technologies. In a quest to foster integration and use of ICT in Kenyan schools, the ministry of education launched the ICT policy in 2005 (Farrel, 2007);however, most teachers still use the traditional methods of teaching such as talk and chalk. This has been attributed to limited and uncoordinated approach to exposing appropriate ICT skills and competencies to instructors in Africa and Kenya in particular (GoK, 2012; Kamau, 2012). Studies have been conducted; however, not many have focused to determine how the ICT skills and competencies by teachers translate to teaching Agriculturein secondary schools in Masaba South Sub-County, Kisii County(Monyoro, 2013).

Studies show that all over the world, different countries have consistently rolled out programs to foster teacher's adoption and use of ICT in their day- to-day teaching and learning process in school(Hennessy, Harrison and Wamakote, 2010). According to Jimoyiannis and Komis (2007) countries like U.K, Singapore, China, Australia and European Union have established programs that aim at enhancing adoption and integration of ICT in teaching and learning. In an attempt to emulate the developed counties, the Kenyan government acknowledges the impact of ICT in making the country a center of economic excellence envisaged in Kenya vision 2030. Efforts to implement ICT in schools have been first initiated through Sessional paper no.1 of 2005 in which ICT was given prominence. The concept was to equip public secondary with ICT resources and combine it in current curriculum so as to meet the challenges of ICT inside the society. The paper stated that in each school; teachers, student and communities around were to take part in acquiring ICT capabilities acceptable to advance a knowledge-based economy by 2015. Learning and teaching in schools was to be transformed to embrace ICT capabilities suitable for the 21st century (GoK, 2005).

Kenya's ICT policy was implemented in January 2006 after many failed attempts (Waema, 2005; Kariuki, 2009). The countrywide ICT coverage for training and schooling aimed to combine ICT training and promotion oftraining reforms

(MoE, 2006). The vision was to create an e-enabled and expertise-based society by the year 2015. The ministry of education put in place systems in primary, secondary and tertiary establishments with a purpose to construct an ICT-literate community. ICT has been integrated into teacher training programs and regulatory restrictions to the adoption of ICT technologies have been eliminated (Republic of Kenya, 2009).

Research shows that adopting and using ICT in schools confers great potentialfor academic achievements and pedagogical outcome to both teachers and students. When used accurately, ICT can assist to reinforce the significance of schooling to an increasingly networked society, elevating the excellence of education by making studying and teaching a lively process linked to actual societal occurrences (Zaman, Shamim & Clement, 2011). In addition research displays that the combination and use of ICT in schools can promote collaborative, energetic and lifelong learning, increase student's motivation, offer improved access to facts and shared resources, deepen understanding, and assist students to be more creative (Khan, Hasan& Clement 2012). Therefore, ICT appears to change the manner teaching and studying is achieved in schools.Against this backdrop, the present study sought to investigate the influence of teachers' ICT training and skills on the integration of ICT in teaching and learning of Agriculture in public secondary school in Masaba South Sub-County.

2. Methodology

The study employed descriptive analytical survey design. The design enabled gathering of data at a particular point in time with the intention of describing the nature of the existing ICT integration in learning (Orodho, 2004). The study was carried in out in schools in Masaba South Sub-County, Kisii County. The schools were located at a convenient proximity making it easier to access them during administration of the research instruments. Eighteen public schools were purposively selected because they offered Agriculture as one the subjects in their curriculum. Further purposive sampling was made to recruit at least one instructor in the subject area, with the teacher who had served longest in the Agriculture department in each school being selected for the study, giving a total of 20 teachers. Stratified random sampling was used to select 20 form three Agriculture students giving a total of 360 students.Before the actual data collection, piloting of instruments was done in one secondary school based on convenience sampling involving one Agriculture teacher and 20 students. The school did not participate in the final study. Piloting enabled the researcher to test the reliability of the instruments. Data was collected by use of two sets of questionnaires, one for the teachers and the other for students and an observation schedule. Quantitative data was analyzed using SPSS version 21.The responses from qualitative data were organized in themes that were later used to write a narrative on how the teachers' knowledge and skills onICT training influence integration of ICT in teaching and learning of Agriculture in secondary schools in Masaba South Sub-county.

3. Findings

3.1 Teacher ICT Training and Skills and the Integration of ICT

The study first sought to find out respondents' years of experience in the use of ICT in teaching and learning. Figure 2 below represents the teachers' experience in years on the use of ICT teaching.
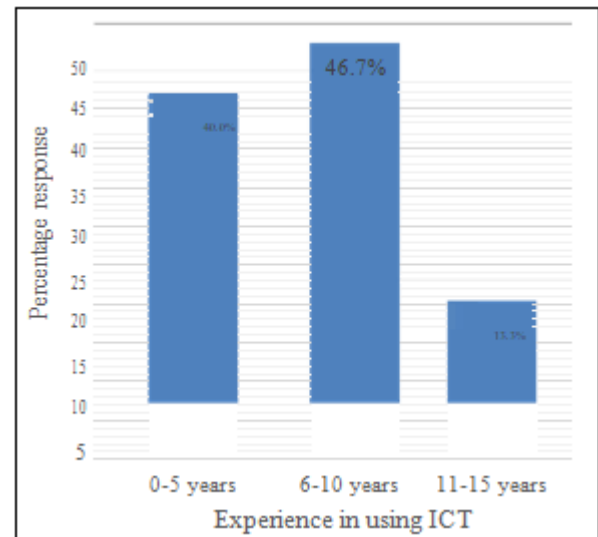

Figure 2: Experience in the Use of ICT

It was established that most teachers, 46.7%, had used the ICT for 6-10 years, 40.0% for 5 years, and 13.3% for 11- 15 years. The findings indicated that, most teachers had experience in the use of ICT which could be employed in the integration of ICT in teaching and learning of Agriculture. Teachers were asked to indicate whether they acquired the ICT skills formally or informally. Figure 3 below presents the findings.
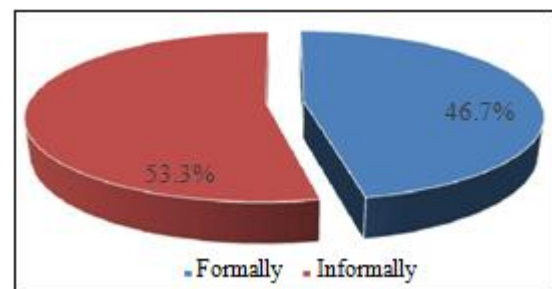

Figure 3: Mode of Acquisition of ICT Skills by Teachers

As illustrated in figure 3 above, a majority (53.3%) of respondents acquired their ICT skills informally, but a considerable number (46.7%) acquired the same formally. This indicates that that most teachers have a diverse knowledge background, with some having attended a computer class while some learnt by doing. Integrating these diverse experiences on board as regards the learning and teaching agriculture digitally will prove efficient as teachers will be borrowing skills and knowledge from their diverse backgrounds and hence diverse perspectives. To further determine the influence of teachers ICT training and skills on the integration of ICT in teaching and learning of

agriculture in public secondary school in the study area, respondents were asked a range of questions on how they perceive their ICT skills and its efficacy in teaching and learning agriculture. Table 1 below presents the findings.

Table 1: Teacher Perception on use ICT in Teaching and Learning

Statement	Yes		No	
	F	(%)	F	(%)
I have attended an in service training on use ICT in teaching and learning of agriculture	6	40	9	60
I feel adequately prepared to use ICT for teaching agriculture	9	60	6	40
ICT will lead to reduction of jobs for teachers	2	13.3	13	66.7

From the table, most of teachers (60.0%) had not attended an in service training on use of computers in curriculum delivery; while a majority affirms that they feel adequately prepared to use ICT for curriculum delivery 60.0%. A majority (66.7%) felt that computers would lead to reduction of jobs for teachers. From the finding, it can be deduced that while a majority of teacher respondents have not vigorously engaged in professional development with respect to ICT. Nonetheless, a majority are adequately prepared to use computers for curriculum delivery including teaching agriculture based on their ICT skills. From the foregoing, teachers had positive attitudes towards ICT and its integration in teaching and learning of Agriculture.

Respondents were further asked to indicate which methods they mostly preferred in teaching Agriculture, whether traditional or by use of ICT. This would serve to show the level of acceptance of ICT use by agriculture teachers in the study area. Figure 4 presents the findings.
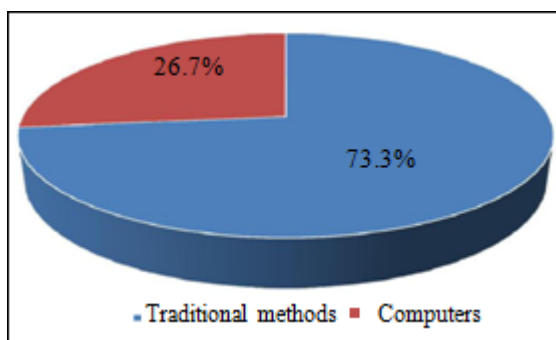

Figure 4: Methods Preferred by Teachers

As illustrated in figure 4.8 above, a majority of respondents (73.3%) preferred traditional methods as opposed to computers (26.7%) in teaching Agriculture. As such, it was noted that although most teachers had a positive attitude towards ICT and its integration in teaching and learning of Agriculture; 73.3% preferred using traditional methods in teaching teach Agriculture.
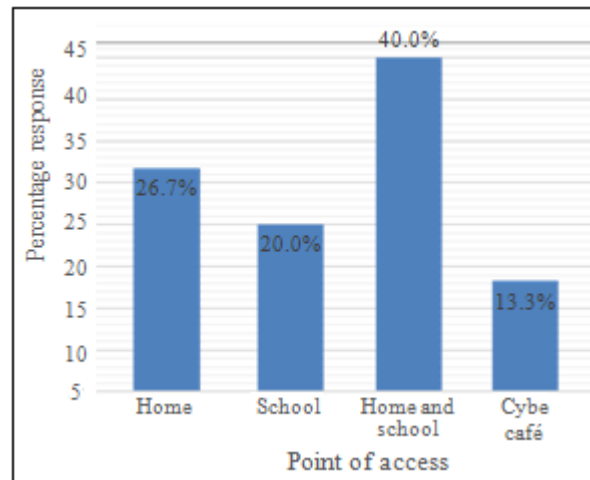

Figure 7: Where teachers access computers

It was established from the finding that a most of teachers (40.0%) accessed computers at home and schools, followed by 26.7% who accessed computers at home, 20.0% at school and 13.3% accessed the computers at the cyber cafes. Respondents were asked to indicate whether or not they use computers to teach and learn Agriculture. This would show the level of ICT integration across the schools in teaching and learning of the subject (Agriculture) a Figure 8 presents the findings.
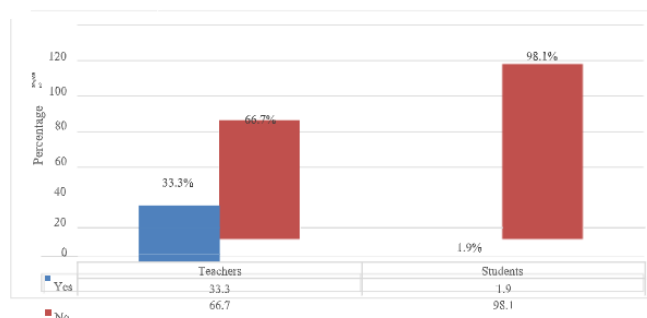

Figure 8: Use of Computers for Teaching and Learning of Agriculture

As illustrated in figure 8, a majority of teachers (66.7%) do not use computer to teach Agriculture. The finding was in line with Munyoro (2013) who indicated that there was minimal use of computers in teaching and learning due to lack of Agricultural Software software, fewer computers per school, lack of computer skills by teachers and students, power blackouts and inadequate computer laboratory space to accommodate all students at once.

Respondents were also asked to explain how they use the computers in teaching Agriculture. Findings revealed that a majority of teachers access online resources including revision papers and assignments as well as further research. Others use the same to access and present visual recordings from agricultural shows. Agriculture teachers were asked to indicate how often they used ICT in teaching of agriculture. Figure 9 presents the findings.
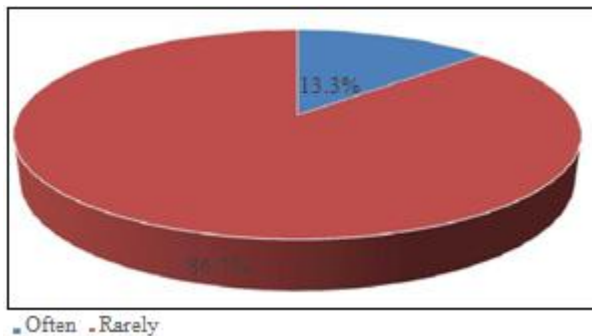
Figure 9: Frequency of ICT Use in Teaching Agriculture

Most teachers (86.7%) confirmed that they only used ICT rarely to teach agriculture while only 13.3% used ICT often. The findings points to low levels of ICT integration in teaching and learning of agriculture in public secondary schools in Masaba South sub-County. This should inform policy makers on the need to put in place measures to encourage the integration of ICT in teaching and learning of agriculture. Those teachers who used ICT rarely attributed failure to use ICT to inadequate ICT facilities. However, even in schools with a high number of computers the teachers rarely used computers for teaching.

4. Discussion

The study aimed at determining the influence of teachers' ICT training and skills on its integration of ICT in teaching and learning of Agriculture in public secondary school in Masaba South Sub-county. It was established that 40.0% of teachers had used ICT for up to 5 years, 46.7% had an experience of 6-10 years, while 13.3% of teachers had used ICT for 11 - 15 years. More than 60.0% of teachers had not gone through in service training on use of ICT in teaching and learning of Agriculture, though they felt adequately prepared to use computers for curriculum delivery. Most teachers (66.7%) confirmed that they did not think that computers would lead to reduction of jobs for teachers agreeing with Kiilu & Muema(2012) who noted that the numbers of teachers was not affected by simply using computers in Murang'a County.

Respondents were further asked to cite some of the challenges they face when using ICT to teach agriculture and to recommend measures and actions to address the challenges and more efficiently use ICT for teaching and learning Agriculture. A majority cited inadequacy in the number of computers in their respective schools; a lack of internet connection; inadequate source of power; and poor ICT proficiency among a majority of students. This findings were also in line with those of Newhouse (2002) and The National ICT in Education Strategy which noted that the lack of knowledge and skills in computer use by teachers and the limited and uncoordinated approach to imparting appropriate ICT skills and competencies to teachers remained to be the major barriers in the integration of ICT in education in Kenya.

From the findings, 53.3% of teacher respondents had not vigorously engaged in professional development with respect to ICT. These findings agree with Ayere et al, (2010)

on E-learning in secondary schools in Kenya which reported that a number of teachers in secondary schools had not received any training in ICT use during their formative years at teacher training institutions before joining the profession. It therefore follows that a bulk of the sampled teachers has taken self-initiative to undertake ICT training during the years they have been in service. Nonetheless, 60 % are adequately prepared to use computers for teaching Agriculture based on their ICT skills.

5. Conclusions

With 60% of teachers having used ICT for at least 6 years, a rich diversity of experience in ICT use was established in the study area. Findings also implied that most teachers (60%) were adequately equipped with necessary computer skills requisite for integration of ICT in teaching and learning of Agriculture. It is also deduced that a majority of teachers have a diverse knowledge background, with some having attended a computer class while some learnt on the job.

A majority of teachers access online resources including revision papers and assignments as well as further research. Others use the same to access and present visual recordings from agricultural shows. There were considerably low adoption levels of digital technology in teaching and learning of Agriculture among a majority of public secondary schools in Masaba Sub-County as depicted by 86.7% of teachers who confirmed that they rarely used ICT to teach Agriculture. This is important in informing decision makers on the need to put in place measures to facilitate the adoption of technology in teaching and learning of Agriculture.

6. Recommendations

The study recommends that training institutions and universities train teachers on how to integrate ICT in their teaching and learning of Agriculture in public secondary schools. The training should include the use of ICT facilities such as Smart Boards, PowerPoint, and other related software as part of microteaching training.There is need to increase thenumber of ICT teachers who could be involved in the integration of ICT in the teaching andlearning of Agriculture.The use of ICT by students in doing assignments should be emphasized in Masaba South Sub-county. Finally, ICT in-service courses should be plannedfor teachers in Masaba South Sub-county.

References

[1] Afshari, M., Bakar, K.A., Luan, W.S., Samah, B.A., &Fooi, F. S. (2009). Factors affecting teachers' use of Information and Communication Technology. *International Journal of Instruction*, vol. 2, no. 1, pp.78-98

[2] Ayere, A.M; Odera, F.Y. and Ayak, J.O. (2010).E-learning in Secondary Schools in Kenya: A Case of the NEPAD e-schools*. Educational Research and Reviews*Vol.5(5), pp 218-223, May, 2010

[3] Farrel, G. (2007) Survey of ICT in Education in Kenya. Washington DC. *; InfoDev/WorldBank.* Farrell, G.

(2007) ICT in Education in Kenya. Retrieved *from http:/www.infodev.org.*

[4] Garrison, D. and Anderson, T. (2003).*E-learning in the 21stCentury.* London: Rutledge Falmer.

[5] Gok, A. (2012).Factors affecting the use of ICT in Teaching and Learning in Secondary Schools in teaching and learning in secondary schools in Kangema, Muranga county. *Unpublished master's thesis.*

[6] Hennessy, S, Harrison, D. and Wamakote, I. (2010). Teacher Factors Influencing Classroom *Use* of ICT in Sub-Sahara Africa*: Itupele Online Journal of African Studies.* 2 (2010)pp 39- 54.

[7] Kamau G. K. (2012).Constrains in the use of ICT in Teaching –Learning process in Secondary Schools in Nyandarua South District, Nyandarua county *Unpublishedthesis.*

[8] Kenya Government (2005) Sessional Paper No .1 of 2005.A policy Framework for Education, Training and Research. Nairobi. *Government Printer.*

[9] Kenya School Net (2003).Preparing a workforce for the Evolving Information Economy. A survey on ICT Access and use in Kenya Secondary Schools. Nairobi Summit Strategies Limited. Kenya.

[10] Kiilu, R. and Muema, E. (2012). An e-learning approach to Secondary School Education: E-Readiness Implications in Kenya .*Journal of Education Practice*. Vol.3, No. 16, 2012.

[11] Monyoro, W.M,(2013).Factors Affecting use of Computers in teaching and Learning Mathematics in Secondary Schools in Kisii Central District, Kisii County.Unpublished Master's Thesis.

[12] Republic of Kenya,(2009*).* ICT Capacities and Capabilities in Secondary Schools in Kenya*,* 2009/2010 NSCT No: 046*Retrieved from http://www.ijcir.org/volume2 number2/article 3.pdf.*

[13] Waema, W. (2005).*A Brief History of the Development of an ICT Policy in Kenya.*

[14] FAtta and L. Elder (Eds.).*At the crossroads ICT Policy Making in East Africa.(*PP25-43).Nairobi; East Africa Educational Publishers ltd.