International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Teacher Pedagogical Preparedness in Integrating ICT in Instruction in Public Primary Schools in Bungoma County, Kenya

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Abstract: ***This study reported in this paper sought to ascertain the teacher pedagogical preparedness for the integration of ICTin classroom practices in public primary schools in Bungoma County, Kenya. The study was based on the Roger'sTheory of diffusion of innovations and involvedprimary school teachers, head teachersand Sub-County Quality, Assessment and Standards Officers (SCQASOs) in Bungoma County. Descriptive survey design was adopted and involved use of simple random samplingtechniquesto select asample of 40 head teachers, 300 teachers and 3 SCQASOs. Data was collected using questionnaires, interviews and observation schedules which were validated, and theirreliability established using the Pearson's Product Moment Correlation Coefficient. Data collected was analyzed using descriptive statistics involving computation of frequencies and percentages. The study recommended that teachers are expected to sharpen their technological skills and knowledge as professionals to appropriately integrate ICTs in instruction. Therefore staff development should have a curricular focus for Kenya to realize the incredible benefits of ICTs in classroom instruction.***

Keywords: Pedagogical Preparedness, ICT Integration in Instruction, Classroom Practices.

1. Introduction

The challenge confronting our educational systems is how to transform the curriculum and teaching-learning process to provide students with the skills to function effectively in this dynamic, information-rich, and continuously changing environment. Paradigm shifts in education in recent years envisions a new type of learning culture that demands ICT integration with pedagogy in Education Programmes. The ongoing, unprecedented growth of information and communication technology (ICT), coupled with the globalization of the economy, has created a huge challenge for education. The implementation of ICT is in the forefront of education reforms locally, regionally, nationally and internationally. Implementing the pedagogy-technology integration in mathematics education and managing the changes are highly complex and possibly one of the most challenging tasks (Senapaty, H.K. 2004). ICT has to be infused into pedagogy in such a way that its uses can improve learning. The use of ICT in education has the potential to enhance the quality of teaching and learning, the research productivity of teachers and students, and the management and effectiveness of institutions (Kashorda et al. 2007). The importance of pedagogical integration of ICT in Kenya and globally cannot be overemphasized.

At lower primary class level, Early Childhood Development Education curriculum planning and development is a collective responsibility which involves many participants, teachers being inclusive (Shiundu & Omulando, 1992). According Moon (2007) in Wanjala (2016), it is observed that the traditional instructional styles which entail students being attentive to virtually one and sole spring of knowledge – the teacher, and passively receiving and recording this knowledge in their memory are no longer satisfactory. Kozma (2005) reported that the productivity of education would proliferate greatly if the teachers' skills, knowledge and dexterity in application of such are upgraded. Kozma (2005) is further of the view that professional development of teachers should be alike the approach to human capital in business. Researchers further support learner-centered instructional strategies to enhance on quality learning (McGregor & Mrmane, 2010) and therefore need for a paradigm shift to ICT Integration. With this high-qualitycenter-based intervention and optimal opportunities for learning may have a more lasting benefit in the life of the child (Collins, 2002).

Integration of ICT being one of the main projects in Kenya Vision 2030 is in education sector and through the ICT Policy, 2006 Framework, remarkable progress has been made. The emphasis has been on promoting the growth and implementation of E-learning through various strategies including development of the local content in ICTs and making it available to create ICT skilled human resource that can enhance the learning of the 21st century skills including critical thinking, creativity, communication, collaboration among others (GoK, 2013).

Technology is seen as a vital tool that is flexible and thus assists teachers to easily make use of the information in developing capacities of students to achieve learning goals and meet every learner's educational needs (Centre for Digital Education, 2010; UNESCO ICT Competency Framework for Teachers, 2011). Technology makes learning to be learner centered by providing them with variety of involving activities which provides the platform for pupils to explore hence construct knowledge. The process of Integration of Information Communication Technology is the ability to use technology including computer and Internet technology, multimedia projectors and overhead projectors and mobile phones among others for teaching as a tool to research, organize, evaluate and communicate information and enhance the quality of teaching and learning (Amara, 2006, Kenney,2006,Pernia2008). ICTs consists of hardware, software, networks and media for collection, storage, processing, transmission and presentation of information (Batchelor & Nocrich, 2005). ICT can enhance teaching opportunities and outcomes for students to deepen their knowledge, investigation, and inquiry according to their needs and interest (Anderson, 2009; Apple Computer, 2002; CEO Forum on Education and Technology, 2001).

The issue of ICT implementation in primary schools is very important especially in the overall academic performance of the pupils, growth of education and to keep pace with the rapidly changing education and job market (Grace, 2012). Many schools in Kenya are yet to benefit from the integration of ICT in classroom practices due to problems ranging from infrastructure challenges, lack of qualified teachers, low administrative support among others (Grace, 2012, Wanjala, 2010)

To enhance ICT integration in primary education, the Kenya Government has put in place many initiatives including supply of computer supply to schools' programme (GoK, 2005), provision of digital content to schools (KIE, 2013),development and dissemination of class 1-3 digital content to public primary schools by longhorn, KICD and Kenya Literature Bureau.Despite all these initiatives, studies show that ICT has not been fully adopted in most public primary schools in Kenya, Njagi, (2010), Begi (2007) Wafula (2014), Wambiri (2014), Begi (2014) Musyoka (2015), Wanyoike (2016), Angwenyi (2016).Teachers play a very vital role in ICT integration yet their preparedness in integrating ICT is largely unknown in Kenya. It is against this backdrop that the study reported in this paper sought to ascertain the teacher preparedness for integration ofICTs in instruction in primary school classroom practices in Bungoma County.

2. Methodology

This study adopted the descriptive survey research design. To answer the research question, the researcher collected both quantitative and qualitative data. The study was undertaken in public primary schools in Bungoma County. The study targeted teachers and head teachers drawn from public primary schools, and Sub-County Quality Assurance and Standards Officers (SCQASOs) in the 9 Sub-Counties of Bungoma County. Purposively, the study focused on 3 Sub-Counties namely: Cheptais, Bungoma West and Bungoma Central. Both purposive and simple random sampling techniques were employed to select the 3 Sub-Counties, 134 schools, and 40 head teachers, 300 teachers and all the 3 education officers (SCQASOs). The designed questionnaires were first subjected to a pre-test through a pilot with teachers from schools that did not take part in the actual study. The pilot study was undertaken,and the results were used in establishing the validity and reliability of the research tools.The instruments were validated, and their reliability sought using the test-retest method. Reliability was determined by correlating the two administrations using Pearson's product-moment correlation coefficient (r). The values of r obtained were 0.867 and 0.829 for teachers and head teachers' questionnaires respectively. These were above the recommended threshold of 0.7 hence the instruments were considered ideal, reliable and suitable for collection of data (Frankel, Wallen and Hyun 2000). Data was analyzed using frequencies and percentages and presented in tables and figures.

3. Results and Discussion

The findings are as presented in the following sections.

3.1 Level of Teacher Pedagogical Preparedness in Integrating ICT in Instruction

To establish the level of teachers' Pedagogical Preparedness in the skills and knowledge of use of ICT in instruction information was sought from the head teachers, teachers and SCQASOs and findings are as presented in the following sections.

3.1.1 Head Teachers' Views

The heads were asked to respond to four particulars: teachers' knowledge of ICT, whether they underwent the training, duration of training, qualifications attained after training, and the skills developed from the training. The findings are as shown in table 1.

Table 1: Head Teachers' Views on Teacher Preparedness in Knowledge of ICT

Statement	Response	Frequency	Percent
Do your teachers have Knowledge of integrating ICT	Yes	23	58
	No	17	42
Did they undergo training	Yes	22	55
	No	18	45
Duration of training	Less than 1 year	1	3
	1-2 years	21	53
	Not Applicable	18	45
Qualification attained	Certificate	17	43
	Diploma	5	12
	Nil/NA	18	45
What Skills did they develop during training	Computer applications	19	48
	Data base	3	7
	ICT pedagogy	0	0
	Programming	0	0
	Not Applicable	18	45

As indicated in table 1, most 23 (58%) head teachers noted that their teachers have knowledge of integrating ICT while some 17 (42%) indicated that their teachers do not have the necessary skills in integrating ICTs in classroom instruction. On whether the teachers had undergone training, a majority 22 (55%) acknowledged while 18 (45%) admitted to having no training. This agrees with the findings of a study done by Pelgrum (2001) on the effect of teachers' skills and knowledge on innovations in teaching and learning. According to Pelgrum, the skills and knowledge of the teachers are key drivers of the success of educational innovations. Consequently, primary school teachers need proper training in the ICT integration pedagogical skills for easy application. The duration of training reported by the head teachers whose teachers had undergone training was less than one year as noted by 1 (3%), of the respondents. A majority 21 (53%) of the head teachers reported that the duration of training was between1-2 years. The respondents felt that the training period should be extended for proper skill development given that majority had no background in ICT. The qualification attained was a certificate while 17 (43%) and 5 (12%) of the head teachers reported that that their teachers had attained certificates and Diplomas in ICT training.

There was need to determine the type of skills teachers developed during training and as indicated by the head teachers who participated in the study, a majority 19 (48%) indicated that their teachers had acquired computer applications knowledge and skills while only 3 (7%) of the head teachers noted that their teachers had acquired Data base knowledge and skills. The head teachers did not report teachers training in the other computer application knowledge and skills in Programming and ICT pedagogy. The results show that in most of the public primary schools, most of the teachers are aware of the need for ICT knowledge but have not had ICT training, since those who have trained only have basic computer application skills at the certificate level that could not help them competently use these technologies in instruction.

3.1.2 Teachers' Views

The perception of teachers on the level of preparedness for ICT use in instructionwas ascertained and the findings are as presented in table 2.

Table 2: Teachers' Views on their Preparedness for ICT Use in Instruction

Teachers Data		Frequency	Percentage
Have Knowledge of integrating ICT	Yes	90	30
	No	210	70
Did you have any training on use of ICT during initial training	Yes	90	30
	No	210	70
When acquired	College/training	63	21
	After college	27	9
	Not at all	210	70
Duration of training	Less than 1 year	36	12
	1-2 years	54	18
	Not at all	210	70
Qualification attained in ICT	Certificate	72	24
	Diploma	9	3
	Nil/NA	219	73
What Skills did they develop during training	Computer applications	90	30
	Data base	0	0
	ICT pedagogy	0	0
	Programming	0	0
	Not at all	210	70
Have you individually attended any in-service teacher training on computer use	Yes	72	24
	No	228	76
How often does your school sponsor teachers in-service training attendance	Quite Often	9	3
	Often	27	9
	Less often	108	36
	Not at all	156	52
Rating of computer skills acquired during in-service training	Highly Sufficient	27	9
	Sufficient	45	15
	Undecided	9	3
	Insufficient	9	3
	Highly Insufficient	36	12
	Not at all	174	58
Do you think the skills you acquired have assisted you in integrating ICTs in instruction	Yes	90	30
	No	192	64
	Not at all	18	6

The results show that very few 90 (30%) reported to have knowledge of ICT integration in instruction as a majority 210 (70%) of the teachers who took part in the study indicated having no such training. On whether they had undergone training, 90 (30%) of all the teachers who indicated to have ICT knowledge indicated to have undergone training for between 1 and 2 years. Some agreed to have trained for less than one year and that most 72 (24%) of them had attained certificate qualification.

There was need to ascertain the type of skills developed during training. Teachers who participated in the study 90 (30%) indicated to have acquired computer applications knowledge and skills, as none indicated to have acquired ICT pedagogy, Programming and Data base knowledge and skills. The results show that the teachers lacked knowledge and skills satisfactory in enhancement of the use of ICT in instruction. This revelations corroborate the research findings of Wanjala, Khaemba and Mukwa (2011) whose study showed that only a few teachers used ICTs in classroom instruction for lack of the necessary expertise. Asked whether they have individually attended any in-service teacher training on computer use, only 72 (24%) agreed as a majority 228 (76%) disagreed. These findings are consistent with those of Pelgrum (2001) who observed that the lack of knowledge and skills requisite in ICT integration is a drawback that has lingered in developing countries including Kenya.

Integrating technology in classroom practices requires knowledge and skills of the subject matter, software, and understanding of how children learn and the level of technical expertise.

On how often their school sponsor teachers in-service training attendance, quite often was noted by 9 (3%), often 27 (9%), less often by 108 (36%) as a majority 174 (58%) noted that it has never happened. The results show that teachers in most of the schools that participated in the study indicated they had not gotten their schools' sponsorship to attend in-service course in ICT integration in classroom practices. This points to the need for a policy to make it mandatory for schools to have their teachers to take up training in ICT knowledge and skills.

The study sought to ascertain the teachers' rating of the computer skills acquired during in-service training. From the results, 27 (9%) of the teachers agreed to be highly sufficient, sufficient 45 (15%), insufficient 9 (3%), highly insufficient 36 (12%) as a majority 174 (58%) noted not sufficient at all. The results show that the teachers who had noted to acquire ICT knowledge and skills rated them low and this could be attributed to the lack of competent personnel in the training institutions and the short time taken in training. This further contributes to the lack of the necessary ICT knowledge and the low level of integration of ICT in instruction. Asked on their thinking of whether the skills they acquired have assisted them in integrating ICTs in instruction, 90 (30%) agreed while a majority 192 (64%) and 18 (6%) disputed as they had earlier indicated not to have acquired any knowledge and skills for ICT integration in instruction. From the above findings, most teachers who indicated that the training was insufficient could have had

negative attitude towards the training and time taken was inadequate to enable them to be competent enough in ICT skills and knowledge. This was reported to be due to poor training conditions and the environment in institutions where the training took place. As noted in the findings, the teachers who had stayed in the field longer felt that the training was a bother.

The findings indicated that those teachers who indicated having undergone ICT training concurred that the knowledge and skills acquired assisted them in the integration of ICTs in instruction. Most of the teachers indicated to be aware of the need for ICT knowledge and skills though had not gone through ICT training. Those who had trained indicated to only have basic computer application skills at the certificate level that could not help them to competently and effectively use these technologies in instruction. In most of the schools, it was only the use of the internet that was noted high by most of the teachers. This could be attributed to the personal use of the internet for communication and search of new material and information and not classroom instruction. The results showed that in most of the schools, it was only the use of the internet and ICT content material preparation applications that were noted high but with very few teachers. This could be attributed to the personal use of the internet for communication and search for the new material and information and not instruction.

The results showed that largely some of the head teachers noted the use of ICTs in preparation of schemes of work, instructional materials, pupil's progress records, and instruction in class and in preparation of learner's records. However, in all the applications most of the heads taking part in the study indicated none. Findings of the study show that largely the teachers did not note use of ICTs in library management, collaboration with peers and class attendance management. ICT use in timetable preparation and pupils' progress use was noted to some extent by some teachers but in the other applications rarely. None was noted among majority of the teachers of the schools participating in this study. Results of this study generally show unsatisfactory use of ICT materials in the instructional practices in the public primary schools. This findings agrees with Smith (2001) who proposed that there is close relationship between teacher pedagogical knowledge and skills in using ICTs and children's learning.

On the Knowledge and Skills Required for ICT Integration in Classroom Practices,the results show that in most of the schools that took part in the study, the heads agreed that the use of ICTs is worthwhile, can enhance learner's development skills, ICTs motivate children to want to learn, ICTs can be used to teach a new topic even in absence of a teacher. They admitted that they would like to work with computers and that working with ICTs would be enjoyable and stimulating for teachers. However as indicated, some of the head teachers think that what a computer can do teachers can do as well. Therefore, ICTs are not necessary and that integrating ICTs in instruction is a very expensive venture. They will just be a waste of time that could be used for syllabus coverage; ICTs encourage laziness among teachers and rote learning among pupils.

The head teachers further acknowledged that ICTs assist learners to access digital information better and usefully. They promote collaborative learning, aid teaching by easing access to course content, and that ICTs improve teaching and learning quality. However, most of the head teachers had negative perceptions on the role of ICTs on supporting learner-centered and self-directed learning, producing a creative learning environment and offering more opportunities to develop critical thinking skills.Most teachers agreed that ICTs encourage individualized instruction and therefore working with ICTs will be important and efficient. However, most of the teachers could not acknowledge that ICTs enhance development of problem solving skills, ICTs make teaching easy and efficient, and learning how to use the ICTs materials is worthwhile. Some agreed that any purpose ICTs can be used for, they could do just as well some other way.

4. Conclusion

From the findings of the study, it can be concluded that the teacher, not the technology, is of central importance to the implementation of ICTs in curriculum practices in primary schools. Staff development should have a curricular focus and help teachers to integrate (ICTs) technology into the curriculum. This implies changes to the current professional development strategies especially at the Universities. From this study if authentic integration of ICTs is to occur, professional development strategies must focus on giving teachers an understanding on how educational curriculum objectives can be supported by technology and how ICTs will influence their pedagogy. This study has been directed towards emphasizing the importance of professional development to any program concerned with the integration of the information communication technology into teaching and learning aspects. The findings, discussions and implications of this study are an important ingredient to the adoption of ICTs technology in an educational context.

5. Recommendations

Based on the findings and conclusion of this study, the following recommendations are made:

1) There is need for providing teachers with professional learning opportunities to enhance their capacity to fully utilize the opportunities presented using ICTs and to enable the use of ICTs in teaching and learning environments, including the modes in which ICTs could aid instruction and assessment practices among primary schools. Teacher training courses should equip an extra set of teachers with the required ICT knowledge and skills.
2) Adequate adaptation time must be allowed for teachers to develop new skills, explore their integration into their existing teaching practices and curriculum, and undertake necessary additional lesson planning, if ICTs are to feature well and effectively in instruction. The study recommends that teachers should make every effort to produce or obtain appropriate and well-articulated computer programmed instructional materials and use them effectively in their lessons.
3) Teacher training institutions including universities should enhance and improve on the training of teachers on ICT

pedagogical skill. This should be made as a key course to be taken by all their students throughout their course

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