TEACHER PERCEPTION IN COMPUTER ASSISTED INSTRUCTION, ADOPTION FOR EDUCATION SUPPORT IN PUBLIC SECONDARY SCHOOLS IN KENYA

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ABSTRACT

Computers can provide a more flexible and effective ways of professional development for teachers to improve pre- and in-service, teachers training and connect teachers to the global teachers community. The purpose of this study was to investigate the teacher perception in computer assisted instruction, adoption for education support, in Kenyan secondary schools. The study sought to address the following objectives; Find out the teachers' attitude towards the computer use and to assess the perceived barriers towards computer instruction. The study adopted the technology acceptance model (TAM) by Davis (1989) which expresses how technology is integrated into the instruction process. Other theories include, Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB). A descriptive survey research design was used. Stratified sampling was used to select One hundred and fifty schools; Purposive sampling was used to select the Head teachers and Simple random sampling was used to select the teachers. A total representative sample of 414 respondents was used. Questionnaires and interviews schedules were used as instruments for data collection. Internal consistency (Reliability) of the research instrument was ascertained using the test re test technique as well as Cronbach's alpha of 0.75 and above. Data was coded and analyzed using Statistical Package for Social Sciences (SPSS) Version 21.0 as well as STATA version 13.0.Descriptive statistics such as frequencies, percentages and means was used to analyze the data. Data was presented in tables and pie charts appropriately. The study would benefit teachers, school managers, curriculum planners and policy makers, developers and implementers in coming up with the best integration approaches for the use of computers in teaching and learning in Kenyan secondary schools.

Keywords: ***Computer Assisted Instruction, Teacher Perception, Barriers.***

1.0 Introduction

The educational technology era has arrived accompanied by major changes in both education and technology. Technological innovations and applications are becoming apparent in many facets of the education professions and as Gross (1995) suggested then, technology was set to continue to change rapidly in the following 10-15yrs. School technology became a big business in an attempt to provide the necessary technology to link schools and colleges to the information highway (West, 1995; 1996).

CAI started in the 1950s and 1960s, mainly in the USA. Pioneers for example Suppes (Stanford University), Kemeny and Kurtz (BASIC, 1960s (Kemeny & Kurtz, 1968, 1985) and Bitzer (PLATO, University of Illinois) (Hart, 1981, 1995) were between the first to use a computer as part of the learning process. The early CAI programs were rudimentary by today's standards, with mainly text-based interfaces. Bitzer was one of the first to realize the importance of graphics and sound in the teaching process. Initially, CAI programs simply tried to teach a particular topic without a basis on any particular educational philosophy.

The TICCIT (Time-Shared Interactive Computer Controlled Information Television - (Merrill, 1983; 1988) at the Brigham Young University was based on a specific instructional framework that dictated the actual hardware. The Logo project (Papert, 1980; 1993) was probably the first CAL system that was based on a specific learning approach (the experimental, discovery

learning approach). More detail on the history of CALL is given in History (2000) and Levy (1997).

Many studies conducted across the globe on the use of technology in classrooms have reported that computers can be an effective tool in supporting learning and teaching in class, for example, school net programme in South Africa promotes teaching and learning through the use of computers,(Strydon, 2003) However integration of computers in Pedagogy as a project in 3rd world countries has failed to a large extent than other instructional initiatives in schools (Sanchez &Hueros, 2010).The high rate of failed or in complete ICT projects negatively impacts schools teaching , learning and performance with immeasurable consequences to national development.(Schiiiewaert, Ahearne, Frambach , &Moenaert, 2005), Van Raaij & Schepers, (2008).

Kenya is making a remarkable progress in putting in place ICT policy framework and implementation strategy, complete with measurable outcomes and periods. KICD has made great steps in developing Multimedia educational resources in most subject areas .The institute has developed digital content in 12 subjects from form one to form four at secondary level. At Primary school level content for class three to eight has also been developed in Science and Mathematics, The institute is currently developing content for class one and two in all subjects, The institute has further planned to digitalize content in all subjects,(Republic of Kenya, 2005 a).The ministry of Education developed KESSP in 2005 that featured ICT as one of the priority areas, with the aim of mainstreaming ICT into the teaching and learning process, however universal implementation is quite a problem (Farrel, 2007).

Being a global issue, the programmed process involves a paradigm shift where new insights and information facilitates new forms of understanding. Various studies indicate that success in ICT rests on proactive school teachers who would give support to the integration of ICT in school operations, (Davis, 2002:8, Persand, 2006; 23-24, Bowes, 2003).

Over the past years, IT has broadened to become ICT and has become of interest in schools, Hennessey *et al.* (2005), Toarle (2004) reported having embraced computer assisted learning while others were handicapped. Ruthven *et al.* (2004), on factors influencing dissemination and sustainability of ICT integration in schools cited the teachers role in orchestrating mediating computer based activities requiring a lot of background training and time.

Honey *et al.* (2000) on successful integration of learning technologies into classroom showed that success requires understanding the complex interactions in class between teachers and students and technology. Cope *et al.* (2000) on teacher's perception of learning technologies and teachers influence of student's perception ,indicated that the student's perception being influenced by teacher's perception and use in their approaches.

Hennesseys and Deaney. R.(2004) on sustainability and evolution of ICT supported classroom practices indicated that ICT can provide more flexible and effective ways for professional development of teachers ,connecting them to the global teacher community .Teaching is becoming one of the most challenging profession in the society where knowledge is expanding rapidly and modern technology demands teachers to learn how to use them in their teaching .For teachers to use this tools effectively and efficiently, they need visions of technologies potential opportunities to apply them, training just in time, support and time to experiment .Only then can teachers be informed and be confident in their new technology.(Perraton, Robbinson& Creed, 2001).

The study aims at establishing the teachers' perception of computer assisted instruction, adoption for education support in secondary schools, especially with the expected compulsory laptop program to be rolled out. The study will assist curriculum developers, teacher training

institutions and policy makers in establishing teacher competence in the use of computers in education. The main purpose of the study was to investigate the teacher perception in computer assisted instruction, adoption for education support in secondary schools in Kenya.

1.2 Objectives of the study

The study was guided by the following objectives

i. To find out the teachers' attitude towards the computer use

ii. To Assess the perceived barriers towards computer instruction

2.0 Teachers attitude towards computer use

Research shows that if teachers perceive computer programs as either satisfying their own needs or their student's needs, it is likely they would implement it in school. Teacher's adequacy, skills, and attitudes influence successful implementation of ICT in schools (Keengwe & Onchwari, 2011). If teacher's attitudes are positive towards use of computers, then they can easily provide useful insight about implementation.

Teachers' attitudes have been found to be major predictors of the use of new technologies in instructional settings (Almusalam, 2001). Mumtaz (2000) states those teachers' beliefs about teaching and learning with ICT are central to integration. To be successful in computer use and integration, teachers need ''to engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher'' (Niederhauser et al. 1999,). Hence the successful use of ICT into classroom largely depends on teachers' attitudes and belief relating to these. In fact, it has been suggested that attitudes towards computers affect teachers' use of computers in the classroom and the likelihood of their benefiting from training (Kluever, et al, 1994). It is found that less technologically capable teachers who possess positive attitudes towards ICT, require less effort and encouragement to learn the skills necessary for the implementation of ICT in their design activities into the classroom. Therefore, teachers who have positive attitudes towards ICT itself will be positively disposed towards using it in the classroom (Moseley & Higgins, 1999). Moreover, Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals' negative attitudes is essential for increasing their computer skills. Therefore, if teachers want to successfully use technology in their classes, they need to possess positive attitudes to the use of technology. Such attitudes are developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use (Afshari et al, 2009).

A study by Simonson (2008) revealed that, teacher's skills and attitude were related to their use of computers in teaching and learning. The more skilled teachers were in computer use the more likely they were to use it in teaching and learning in the classroom. Further study by Drent & Meelissen (2008) revealed that positive attitude, personal entrepreneurship and computer experience had a direct positive influence on adoption and use of ICT by teachers. A similar study by Huang & Liaw, (2008) showed that teacher's skills and attitudes influenced their acceptance of the usefulness of ICT and its implementations in schools.

A survey by EU school net in 2010 cited by Andoh (2012) involving teachers use of Acer net books in six European union countries, revealed that, a large number of participants perceived use of net book had positive impact on their learning, elicited interest, promoted individualized learning and helped to lengthen study beyond school day. However a study by Korte & Husing (2007) suggested that a small number of teachers perceived benefits of computer use in schools

were not clearly identified. Some teachers viewed computer use as a waste of time and expensive.

A report by Becta, 2008 on a survey of UK teachers (cited in Andoh, 2012) revealed that teachers positivity about possible contributions of computers in schools was moderated as they became rather unsure and sometimes doubtful about specific and current advantages of it. Woodrow, (2002) points out that for successful transformation of school practice, teachers need to develop appositive attitude towards innovations. Van Braak, Tondeur, &Valcke, (2008) argued that positive computer attitudes by teachers are expected to foster implementation of computer use in schools.

Further study by Teo, (2012) on teacher's attitudes towards computers use in Singapore, found out that teachers had appositive attitude towards computers and intention to use them, than the helpfulness of computer towards teaching and learning. These studies reveal that teacher's perceptions and attitudes influence adoption and use of computers in schools.

As established in this study, internal variables greatly influence how teachers integrate technology in the classroom. But which variable has the strongest impact on ICT use and how internal variables are influenced by ICT preparation programs are discussed below. Palak and Walls (2009) conducted a mixed study to investigate whether teachers who frequently integrate technology and work at technology-rich schools shift their beliefs and practices toward a student-centered paradigm. The results showed that their practices did not change; neither student-centered nor teacher-centered beliefs are powerful predictors of practices. However, teachers' attitudes toward technology significantly predict teacher and student technology use, as well as the use of a variety of instructional strategies (p <0.05). Sang et al. (2010) focused on the impact of Chinese student teachers' gender, constructivist teaching beliefs, teaching self-efficacy, computer self-efficacy, and computer attitudes on their prospective ICT use. The findings confirmed the results of the study by Palak and Walls (2009) that the strongest predictor of future ICT use were teachers' attitudes toward it.

In addition to the influence of teacher attitudes, Sang et al. (2010) further indicated that pre-service teachers with highly constructivist teaching beliefs have stronger intentions to integrate technology into their future teaching practices. Furthermore, more confident pre-service teachers were more capable of and interested in using computers in real classrooms. Thus, although teachers' attitudes towards ICT use were found to be the strongest predictor of technology integration, the impact of their beliefs and confidence in using ICT should not be disregarded either.

Internal variables can partially explain the success of technology integration in the classroom. However, the influence of these variables may change after participation in technology preparation courses or programs. Abbott and Faris (2000) examined pre-service teachers' attitudes toward the use of computers before and after a semester-long technology literacy course.

Another similar study was conducted by Doering, Hughes and Huffman (2003), who analyzed pre-service teachers' perspectives regarding ICT in their future classrooms before and after participation in a teacher preparation program. Prior to taking the preparation courses, teachers were doubtful about the utility of ICT in the classroom, implying that they would closely examine and consider technology integration, rather than blindly incorporate it into their teaching practices.

After completing the courses, their doubt had transformed into more positive sentiments. The teachers had a better understanding about ICT use in the classroom. Although the teachers

confronted other issues such as technology availability, accessibility, professional support, and classroom management, their perceptions about technology's role had changed. They were more likely to believe that technology can assist in learning and to recognize its importance. Serhan (2009) and Chai, Koh and Tsai (2010) also investigated pre-service teachers' beliefs about the use of computer technology and the effectiveness of ICT courses. The results of both studies indicate that after participating in courses, pre-service teachers recognized the importance of technology integration into their curricula and believed that ICT use would enhance student learning. They felt that such courses prepared them to apply ICT in the future, and their abilities to select, evaluate, and use a variety of technological resources improved. More specifically, Chai, Koh and Tsai (2010) found that ICT courses with direct instruction on the use of technological tools through the technology enhanced lesson (TEL) approach helped teachers learn how to use technologies as supporting tools in order to enhance their teaching and student learning. Consequently, the pre-service teachers viewed the preparation course favorably.

It is worth exploring how the ICT preparation courses or programs change teachers' intentions and actions. Choy, Wong and Gao (2009) conducted a mixed study to examine the intentions of pre-service teachers before and after a technology preparation course. Their intentions were then compared with their actions related to technology integration during their teaching. Confirming previous results from Doering, Hughes and Huffman (2003), the findings showed that their intentions became significantly more positive (p <.05) as a result of increased pedagogical knowledge. Nevertheless, these teachers were not able to translate the positive intentions into actual teaching, largely due to unfamiliar school environments. Based on these results, Choy, Wong and Gao (2009) concluded that teacher education programs need to increase awareness of the benefits of integrating technology into student-centered learning approaches, and provide pedagogical knowledge related to student-centered learning as well as technology integration strategies.

Beyond the impact of preparation courses on teacher perceptions and attitudes, Vannatta and Beyerbach (2000) reported increased proficiency in technology applications and instructional methods. They found a significant increase (p < 0.01) in technology integration for both pre-service and in-service teachers after participation in a preparation course. After the course, teachers were able to incorporate a constructivist view of technology integration into their instruction in order to engage students in meaningful learning. Qualitatively, the pre-service teachers reported great benefits from the use of technology in the classroom after the course.
The study concluded that simply teaching basic ICT skills is inadequate if teachers are to constructively integrate technology constructively into their instruction. More emphasis should be placed on advanced skills in teacher education programs in order to provide teachers with authentic opportunities to experience and develop lessons that integrate technology in a meaningful context. The findings also encourage collaborative learning in technology-related assignments.

A study done in Syria (Abdulkafi, 2006) surveyed attitudes of high school English teachers who were using ICT in classrooms. The study was based on the teachers‟ computer attributes, competencies, access to ICT resources, cultural perceptions and personal characteristics. The findings suggest that these teachers had a positive attitude towards use of ICT in instruction. This is as a result of their vision of technology itself, their experiences with it, the cultural conditions surrounding its introduction in schools and its subsequent diffusion into their educational practice. The existence of ICTs does not transform teachers‟ practices. However, ICTs can enable teachers to transform their practices given a set of enabling conditions. There is anxiety from teachers over being replaced by technology or losing their authority in the classroom with ICT use. The roles are getting reversed where learning is now more students centered, but the

teacher remains a guider and a facilitator of the entire process (Kafu, 2011). Watson (1999) argues that integrating new technologies into educational settings requires change in attitude which is handled differently by different teachers. Considering different teachers attitudes to change is important because teachers‟ beliefs influence what they do in classrooms. BECTA (2004) claims when teachers understand how these technologies will benefit their teaching then they develop a positive attitude hence willingness to use. The teachers also need relevant training, support, guidance or reward for integration of ICT in instruction. According to Empirica (2006) teachers who were not using new technology in the classroom were of the opinion that its use had none or unclear benefits. A study done in Nigeria shows that the government values ICT and has funded it to the tune of 5.4 billion Nigerian naira so that it can be used in education and governance. In Tanzania the MOE is working on a pilot design aimed at using ICT to offset the teacher shortage. At the 6th International e- learning conference held in Dar es-salaam, it was reported that ICT implementation in Tanzania was hampered by unclear policies, finance, technical support, high cost and unmatched ICT facilities (Kizito, 2012).

Use of ICTs in instruction in Kenya is not a new concept. From a study done by Makau (1990) teachers expressed a negative attitude to integration of computers in teaching and learning. They found them noisy, disruptive to learning and cumbersome moving from the normal classrooms to the computer rooms for lessons. The study showed that teachers were not willing to accept change, instead they wanted to maintain their authoritarian and know it all role. Wabuyela (2003) agrees that ICT use in education is still minimal with teachers avoiding to use these technologies. This is because of scarcity of resources and also teachers lack of ICT competencies. He recommends pre-service and in-services trainings in order to successfully integrate ICT in classrooms. He also proposes a review of teacher preparation, staff development and a national plan to in-co-operate ICT into the curriculum. A study by Manduku, Kosgey and Sang (2010) on ICT implementation in Kenya shows that the government has formulated a national ICT policy to ensure efficient, accessible, reliable and affordable ICT services. Kwake and Adegun (2008) observed that the government planned to spend Kshs. 497.25 billion to make ICT accessible to a large population by 2015. Despite these efforts ICT adoption in schools has remained elusive. Many schools are still not connected to the national electricity grid and there are frequent power failures. Schools lack finances to purchase enough ICT resources and teachers lack the necessary skills to adopt ICTs for instruction. Hence many learners are deprived the benefits of using ICTs in the learning process. To effectively implement ICT teachers need to be well trained on how to use ICT in the process of teaching and learning. A study done in Bungoma (Wanjala, Khaemba and Mukwa, 2011) on barriers to ICT implementation found out the following:

i. Teachers did not understand how ICT could make them productive.
ii. They were not confident to use ICT in the classroom.

iii. There was lack of software and hardware resources.
iv. Lack of technical support.
v. Lack of time to experiment with new technologies.
vi. Negative attitude and resistance to change.

The study concluded that all these barriers could be as a result of inadequate pre-service teacher training, lack of in-service and perhaps training that is not tailored to teachers‟ ICT needs.

2.1 Perceived barriers to computer use

Use of computer assisted learning in teaching and learning may encounter many difficulties and these difficulties are known as “barriers” Several studies have divided these barriers into two categories, Extrinsic and intrinsic. In one study Ertner (1999) referred to extrinsic as first order and cited access, time, Support resources and training. Intrinsic barriers as ,second order and

cited attitudes, beliefs, practices and resistance. Herdren (2000) saw extrinsic barriers as pertaining to organization, rather than individuals and intrinsic barriers as pertaining to teacher's administrators and learners. The barriers can also be classified into resource, teacher level, and school level and management barriers.

Resource barriers include ,lack of adequate computer assisted learning resources like computers, internet connectivity and content in digital form, devices that support teaching and learning like the projectors, speakers and optical disk readers and players. Teacher level barriers include, lack of teacher confidence, some studies have investigated the reason for lack of teacher confidence of using computer assisted learning in teaching and learning, for example Eggs (2000) asserted that teachers "fear to failure" caused lack of confidence, and limitation in ICT knowledge makes them feel anxious about using computers in teaching, Balanskat*et al.* (2006) where some of the learners could be having more skills than them.

There are school level barriers like lack of time; some researchers have indicated that though some teachers have some basic knowledge of using computers in the classrooms, they still make little use of technologies because they do not have enough time. This is attributed by the fact the schools do not have enough time scheduled for computer classes, the research time to explore sites to gather information, connecting devices and preparing the lesson in PowerPoint presentation form or in other digital form, like photos, images.

Ford,(2007) indicated that many teachers lack training in the proficiency of using computer assisted learning in that they cannot be able to use basic devices like a computer and a projector to display or deliver a lesson. Tedre,(2009) showed that lack of accessibility to technological devices and other resources in school and at home attributed to a high cost of facilities like internet connection and computers. School administration as a barrier, if the school Head is ICT compliant or has interest in learning the skills, then support to purchase and implement ICT related resources will be done and vice versa. All these literature point to the fact that in order to implement an efficient working ICT infrastructure some of these barriers must be removed, these studies thought did not focus on specifically on public secondary schools in Bungoma County.

3.0 FINDINGS AND DISCUSSIONS

3.1 Teachers' attitude towards the computer use

As shown in Table 3.1 below was addressing question items; computer use boosts students' creative abilities, Computer use enables teachers to simplify difficult topics while teaching, computer use facilitates teachers' better management of classroom while teaching, Computer use helps teachers to convey specific contents the learners in a better way, I think computer use develops students' skill of problem-solving, I think Computer use facilitates teachers' better management of classroom teaching and I think students learn more when using computer.

All these with respect to Teachers' attitude towards the computer use in the Table 3.1 the number of the respondents who agreed to various questions and clearly were in agreement that computer use facilitates teachers' better management of classroom teaching with 383 respondents followed closely by a tie at 376 respondents for question item (I think Students learn more when using computer & computer use helps teachers to convey specific contents the learners in a better way).

Table 3.1: Teachers attitude towards the computer use

Response	Frequency	Percentage
Computer use boosts students' creative abilities	351	91.41 %
Computer use enables teachers to simplify difficult topics while teaching	355	92.45 %

Computer use facilitates teachers' better management of classroom while teaching	360	93.75 %
Computer use helps teachers to convey specific contents the learners in a better way	376	97.92 %
I think Computer use develops students' skill of problem-solving	374	97.40 %
I think Computer use facilitates teachers' better management of classroom teaching	383	99.74 %
I think Students learn more when using computer	376	97.92 %

3.2 Teachers' attitudes on perceived barriers

With respect to the following five question items on teachers' attitudes on perceived barriers i.e. Computer use is good only for students who are mathematically inclined, Lack of motivation to adopt to new way of instruction using computer use, Many teachers are not computer literate & see computer as waste of time, School does not receive sufficient support from government as far as adoption of CAI is concerned and Students feel bored when teachers use computer), with their respective values as (Frequency=19, Percentage=4.95%), (Frequency=94, Percentage=24.48%), (Frequency=140, Percentage=36.46%), (Frequency=372, Percentage=96.88%), (Frequency=21, Percentage=5.47%) and (Frequency=49, Percentage=12.76%), it was clear that (School does not receive sufficient support from government as far as adoption of CAI is concerned) had the highest number of respondents in agreement about the opinion regarding perceived barriers and this means one of the biggest barriers was lack of support from the government with 372(96.88%) of the respondents in agreement followed closely by the fact that many teachers are not computer literate and see computer as waste of time with the number of respondents as 140(36.46%). The notion that computer use is good only for students who are mathematically inclined as a barrier received very few responses in agreement i.e. 19(4.95%) followed closely by the idea that students feel bored when teachers use computer use making a total of 21(5.47%) as shown in Table 3.2 below:

Table 3.2: Attitudes on perceived barriers

Response	Frequency	Percentage
Computer use is good only for students who are mathematically inclined	19	4.95 %
Lack of motivation to adopt to new way of instruction using computer use	94	24.48 %
Many teachers are not computer literate and see computer as waste of time	140	36.46 %
School does not receive sufficient support from government as far as adoption of CAI is concerned	372	96.88 %
Students feel bored when teachers use computer use	21	5.47 %

4.0 Conclusions

The need for embracing technology and more so computing as applied in day to day instruction at school cannot be overemphasized and so this study will make some conclusion on the basis of study objectives

Teachers need to constantly find out how they can improve on daily use of computer skills in order to boost implementation of CAI in schools. They also need to be equipped with knowledge

of basic computer applications like word processing, spreadsheets, emailing, database management and so forth in order to enhance them when it comes to use of CAI.

Teachers and head teachers as well as government need to come up with ways to address various barriers as identified in the current study finding in order to foster smooth learning environment as far as use of computers in teaching is concerned. Issues like insufficient funds, power outages as well as teacher negative attitude toward computers need to be addressed accordingly.

5.1 Recommendations

Teachers' attitude towards the computer use is crucial in implementation of CAI. Such preparedness may be in form of having very good knowledge of some basic computer programs like word processing, internet browsing, emailing, data processing etc. the attitude of the teacher for instance the understanding that "computer use will improve student learning" is crucial and will be a morale booster for the teachers to embrace CAI in their daily instruction.

Some barriers need to be removed in order to ensure proper implementation of CAI and this should be a joint responsibility of both teachers and head teachers alike. Some of the notable barriers from the study findings included lack of proper funding for CAI gadgets and instruments, also the question of the attitude of the teachers need to be changing in order to fast track implementation of the CAI programmers. Other areas that need to be addressed include proper infrastructure, consistent power supply as well as the vexing question of insecurity.

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