E-LEARNING READINESS IN PUBLIC SECONDARY SCHOOLS IN KENYA

Gordon O. Ouma [jamikai@yahoo.com], Fredrick M. Awuor [fredrickawuor@gmail.com], Benjamin Kyambo [kimanzi05@gmail.com], Kisii University, Faculty of Information Systems and Technology, P.O. Box 408 - 40200, Kisii, Kenya

Abstract

As e-learning becomes useful to learning institutions worldwide, an assessment of e-learning readiness is essential for the successful implementation of e-learning as a platform for learning. Success in e-learning can be achieved by understanding the level of readiness of e-learning environments. To facilitate schools in Kenya to implement e-learning, the government selected five public secondary schools in each district and provided funds for Information Communication and Technology (ICT) infrastructure development and teachers training on ICT. The selected schools are also intended to serve as reference e-learning centres for other schools. In attempt to implement e-learning, the institutions involved need to be assessed to ascertain their level of preparedness lest the noble initiative be of no benefit to the society. The study investigated the preparedness of ten schools which benefited from ICT development funds within Rachuonyo South and Rachuonyo North districts. The survey examined the level of technical competency and computer literacy among teachers and students, their attitude and perception towards the use of e-learning. Descriptive research was used to obtain information concerning the level of e-learning implementation readiness and to describe the scenarios with respect to conditions in schools. Teachers' and students' computer literacy as well their perceptions and attitude towards technology were significant measures of e-learning implementation readiness. This research findings show that teachers and students are ready to embrace e-learning technology, but there is needed to enhance their technical capacity through training for successful e-learning adoption. Though most students accept e-learning, they lack basic computer skills required of them to effectively use e-learning platform. The study revealed a positive correlation between computer literacy and e-learning acceptance.

Keywords: E-Learning Implementation, ICT infrastructure, e-learning readiness, Perception and attitude

Introduction

Learning institutions are currently integrating technology into their teaching, administration and research work due to its usefulness. After several years of effort to embrace technology, Kenyan government promulgated a National Information & Communications Technology (ICT) Policy in January 2006 to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (Farrell, 2007). The policy's key strategies pertaining to ICT and education is to encourage the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (MoIC, 2006). However, for learning institutions to successfully integrate and realize the benefit of technology as a learning aid and teaching tool, some level of readiness is required.

ISSN 1027-5207

The use of technology in learning can be referred to as electronic learning (e-learning) which comprises a wide range of applications and processes designed to deliver instruction through electronic means. E-learning signals a paradigm shift in education and its profound effect on education cannot be underestimated. Voogt and Knezek (2008) assert that e-learning is of strategic importance and is an effective method that should be blended into schools' learning mix. With technology evolving at such a rapid rate, it is imperative that teachers and students should be equipped with technical skills to manage e-learning environment. These skills are most effectively gained by learning with technology, rather than about technology (Broadley, 2012). Learning with technology not only requires technical skills, but users of technology should also have the desire to use technology as learning and teaching media.

E-learning implementation requires physical infrastructure, technical expertise and psychological readiness. E-learning platform can only be managed and used by people with some level of technical skills. In addition to teachers' ICT capacity, Broadley (2012) affirms that, teachers' perception and attitude towards e-learning play a critical role in e-learning implementation. However, for some students, and teachers, e-learning is too easygoing and foreign, and a number of teachers feel that technology takes a lot of control off their hands (Mansour & Mupinga, 2007). It is therefore necessary to examine the users' technical capacity and their perception towards technology to ascertain levels of e-learning readiness.

The Kenyan government has made effort to initiate e-learning in some public secondary schools. The government through the Ministry of Education (MoE) identified five public secondary schools within each district where e-learning was to be implemented and allocated Sh980 million for their ICT Infrastructure development under the Economic Stimulus Package (ESP) (MoE, 2011b). The selection of ESP beneficiary schools within the district excluded national schools and was based on geographical distribution of schools within a district. The fund was to cater for computers, projector, local area network, internet connectivity and training of teachers. Kenya Institute of Curriculum Development (KICD) has been mandated by the government to provide digital content for e-learning.

A total of 1021 public secondary schools benefitted from ESP-ICT Fund countrywide and Rachuonyo North and Rachuonyo South districts each had 5 schools (MoE, 2011a). Apart from national schools category which was not funded, the schools that benefited from the ESP fund within Rachuonyo North and Rachuonyo South districts represent major categories of public secondary schools in Kenya. The selected schools included county schools, district (sub-county) schools and community (harambee) schools. Among the selected schools were girls boarding, boys boarding, and mixed day. The two districts were therefore considered for this study so as to capture most categories of public secondary schools in Kenya.

All the funded schools are expected to implement e-learning and the success of e-learning initiatives relies on ICT infrastructure and users' readiness. Though there are various reasons for failures in implementing e-learning projects in public secondary schools, users' technical skills and perception are critical to e-learning implementation. To adopt e-learning, schools should attain some level of physical infrastructure development while e-learning users should have necessary technical competency blended with positive attitudes and perceptions towards e-learning. Therefore, in readiness to adopt e-learning in public secondary schools, this study examined schools' readiness to implement e-learning by exploring teachers' and students' technical competency, and their perception and attitudes towards technology.

ISSN 1027-5207

Related works

E-learning readiness in Kenya

The process of integrating technology in education has been ongoing for the past two decades. In 1993 William D. Graziadei officially recorded the first online lecture through the Virtual Instructional Classroom (Cross, 2005). Bhattacharya and Sharma (2007) described e-learning as the delivery of course content through electronic means which include computer-based learning, online learning and distance education. E-learning is the amalgamation of modern technology into the classrooms which can sometimes include learning that is completely independent of mediation (Voogt & Knezek, 2008). The biggest domains of the users of e-learning are schools, colleges and universities which have paid special attention to e-learning in order to expedite the learning procedures (Olatokun & Opesade, 2008). To successfully implement e-Learning, learning institutions should first assess their e-readiness to integrate the technology (Saekow & Samson, 2011).

In spite of all the effort the Kenyan government has put forth to introduce e-learning in schools, a large number of public secondary schools are yet to implement e-learning. According to NEPAD e-Africa Commission (2003), Ministry of Education, Science and Technology (MOEST), in partnership with three companies; Microsoft Corporation, Oracle Corporation and Digital Satellite Television (DSTV) did a pilot e-learning program implementation in Kenya in selected schools (Ayere, Odera & Agak, 2010). Unfortunately, the report on e-Learning in secondary schools revealed that less than ten percent of secondary schools in Kenya offer computer studies as a study subject. Conversely due to e-Learning's impact on education, the government is determined to integrate the technology in public secondary schools countywide (Kadzo, 2011). Consequently, the government recently embarked on a multimillion ESP-ICT project in selected schools to initiate e-Learning.

E-learning implementation readiness assessment

In order to benefit from e-learning, it is necessary to consider up-front analysis to assess the readiness of prospective e-learning implementation (Aydın & Tasci, 2005). The implementation of the e-learning by any institution can be achieved using one of three approaches: using the technologies to support or supplement the traditional face-to-face course, integrating online activities into a traditional course to enhance the learning experience, and delivering a course that is entirely online (Karim & Hashim, 2004). Any of the implementations approaches an institution chooses depends on the level of readiness in terms of the budget, infrastructure and human resources such as experience, skills, knowledge and attitude (Karim & Hashim, 2004).

Readiness is defined as being "prepared mentally or physically for some experience or action" (Webster's New Collegiate Dictionary). Borotis and Poulymenakou (2008) defined e-learning readiness as "the mental or physical preparedness of an organization for some e-learning experience or action". E-learning readiness assessment helps an organization to design e-learning strategies comprehensively and to implement its ICT goals effectively (Kaur & Abas, 2004). Learners must also be "e-ready" so that a coherent achievable strategy, tailored to meet their needs, may be implemented. E-learning readiness assessment provides key information to organizations willing to supply e-learning solutions which can cater for the specific needs of each learning group (McConnell, 2008). Olatokun and Opesade (2008) suggested that the parameters to be looked into when accessing the e-readiness for an institutions include; infrastructural availability, access to infrastructure, manpower availability, policy and regulatory framework. Tubaishat and Lansari (2011) identified key components of e-learning readiness as technology, Internet usage, and general understanding of e-learning and culture at the institution. After

ISSN 1027-5207

analysis the existing literature, it was important to assess the level of schools readiness to implement e-learning in Kenya by examining the following key components of e-learning implementation; existing ICT Infrastructure in schools, teachers and students computers literacy level and competence, schools management support, current content format, and students and teachers attitudes and perceptions towards e-learning.

E-learning implementation components

Teachers technical competency

Teachers' success in handling e-learning programs depends on their prior technical experience in information technology (Boakye & Banini, 2008). Because the ways in which the online curriculum is delivered are new – and very different from the traditional approach – a major factor influencing the success of e-learning is teacher's technical competency. Instructors must themselves be educated in how to take advantage of these updated teaching methods. The way teachers teach is a product of their own schooling, training, and experiences. It is unreasonable to expect teachers to change their existing pedagogical approaches if they have not themselves been provided with sufficient and appropriate training in how to integrate ICT and new teaching technologies into their instruction programs (Eslaminejad, Masood, & Ngah, 2009). According to Webster and Hackley (1997) there are three characteristics of instructors that influence student performance: attitude towards technology; teaching style; and control of the technology. Each of these factors should be taken into account in the identification of suitable teachers (Volery & Lord, 2000).

E-learning technology is too demanding to let teachers learn to use this technology only by experimenting. It is generally accepted that the e-learning competencies for teachers require a longer course about the technical use of the virtual learning environment (Awouters & Jans, 2009). Most categories of ICT-competencies for teachers are currently too tightened. However, the ICT competences teachers need to integrate ICT in their teaching practice include the basic knowledge and skills for handling the required hardware and software, and the skills to select critically the right media in a learning process. Finally, teachers should be aware of the new technologies that are developed and can be integrated in the daily teaching and learning practice (Awouters, Jans & Jans, 2008).

Teachers attitude and perception

One of the most relevant barriers to the effective diffusion of e-learning concerns the cultural and personal attitudes of teachers towards e-learning (Afshari et al., 2009). It is important to understand the degree to which a teacher believes that e-learning would be free of effort and enhance his or her teaching. As there is a high rate of failure of ICT initiatives for the creation of development opportunities, a solid understanding of the determinants of user acceptance of particular ICT is crucial not only for theory building but also for effective practice (Park, et al., 2009). Research has shown that teachers' perceptions and attitudes towards technologies influenced the effective use of these technologies in teaching and learning (Paraskeva, Bouta & Papagianna, 2008).

Students technical competency

As schools incorporate elements of e-Learning, they must look at factors that affect the performance of students. Studies reveal that students who have prior experience of using information technology will generally be more successful in e-learning environment than those who do not (Volery & Lord, 2000). For new e-learning providers it is important then to

ISSN 1027-5207

accommodate students with little prior experience by offering help. Haverila (2011) asserted that students' prior experience in using information technology is important in e-learning though not mandatory. However it was necessary to ascertain the existing level of students' prior experience of using Information Technology (IT) to help schools plan, design and execute basic IT courses, and to help students interact seamlessly with e-learning learning environment.

Students' attitude and perception

Students find it difficult to migrate from the traditional learning mode to the new e-learning mode when they are not confident of handling the new learning mode (Datuk & Ali, 2008). Institutions implementing e-learning must be aware that students will react differently to the changing paradigm of learning and rather than implement changes across the board, should aim to offer courses tailored specifically towards the different learning styles. In failing to take such action, schools run the risk of low success rates or failures during e-learning implementation as e-learning requires a very high degree of self-motivation which is found to be lacking among most learners.

Framework of measuring levels of readiness

Measuring the level of e-learning implementation readiness in public secondary schools require clear understanding of how key e-learning environmental components interact. The main components of e-learning implementation to be examined are people and technology. Students and learners (students) are the people whose readiness to accept and use e-learning should be measured. School management must always be ready to support learning initiatives. A framework showing all the E-learning environmental components and their interactions in respects to e-learning implementation readiness used in this study is shown in Figure 1 below.

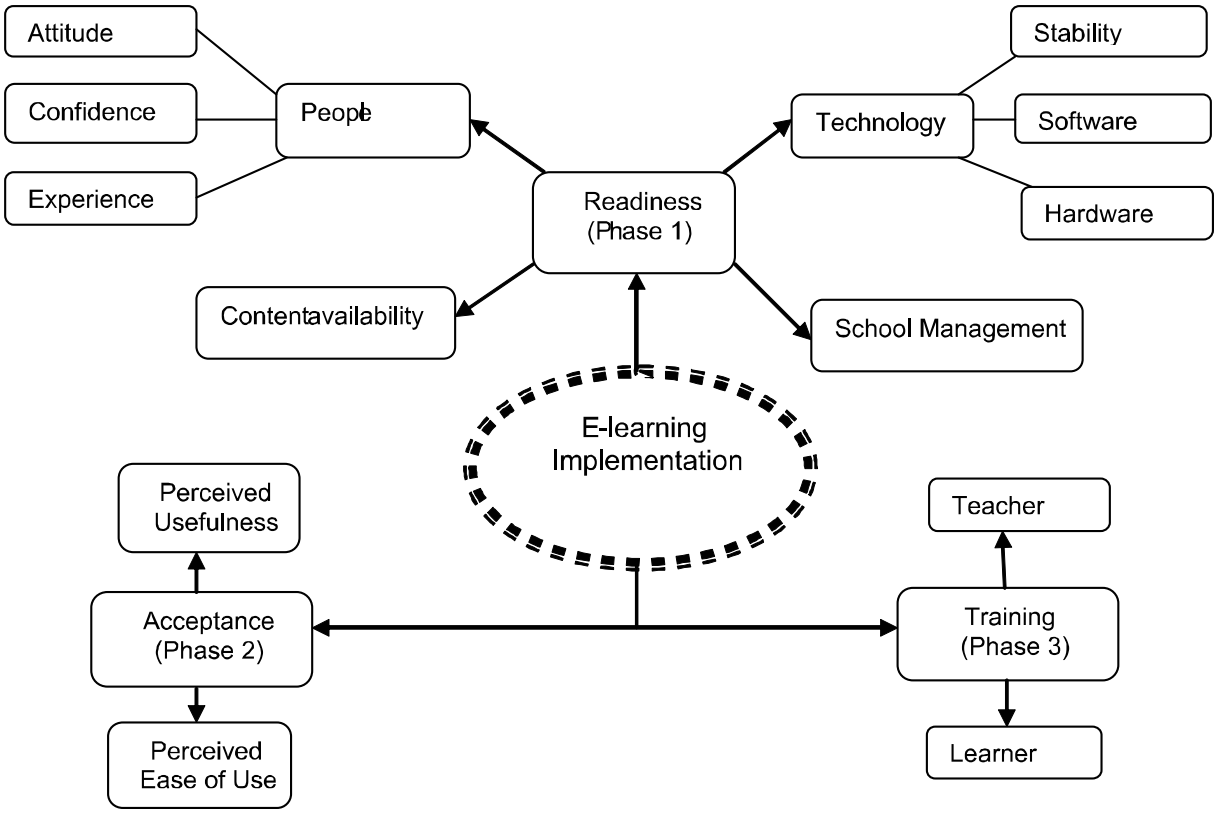

Figure 1. Framework for assessing the level of readiness to implement e-learning (Akaslan & Law, 2010).

ISSN 1027-5207

E-learning Implementation readiness level

The level of schools readiness to implement e-learning can be established from existing ICT infrastructure, users ICT literacy and competency, users' attitude and perception towards technology. The aspects of e-learning readiness were measured on a scale of 1 to 5 and each component level of readiness assessed on a five-point liker-type scale (Watkins, Leigh, & Triner, 2004). On the liker –type scale, the readiness level was bench marked as: 'not ready lot of work to be done' for items between 1 and 2.6, 'not ready some work to be done' for items between 2.6 and 3.4, 'expected level of readiness' for items on 3.4, 'ready but need some improvements' for items between 3.4 and 4.2 and 'ready to go' for items between 4.2 and 5 (Aydın & Tasci, 2005). The study adopted 3.41 mean score (weighted mean) on tested factors as the expected level of readiness (elr), while other responses showed higher or lower levels of e-learning readiness. The 3.41 mean average was determined after identifying the critical level: 4 intervals / 5 categories = 0.8. As a result of this analysis, the levels of readiness were determined and mapped on a liker-type scale as depicted in Figure 2.

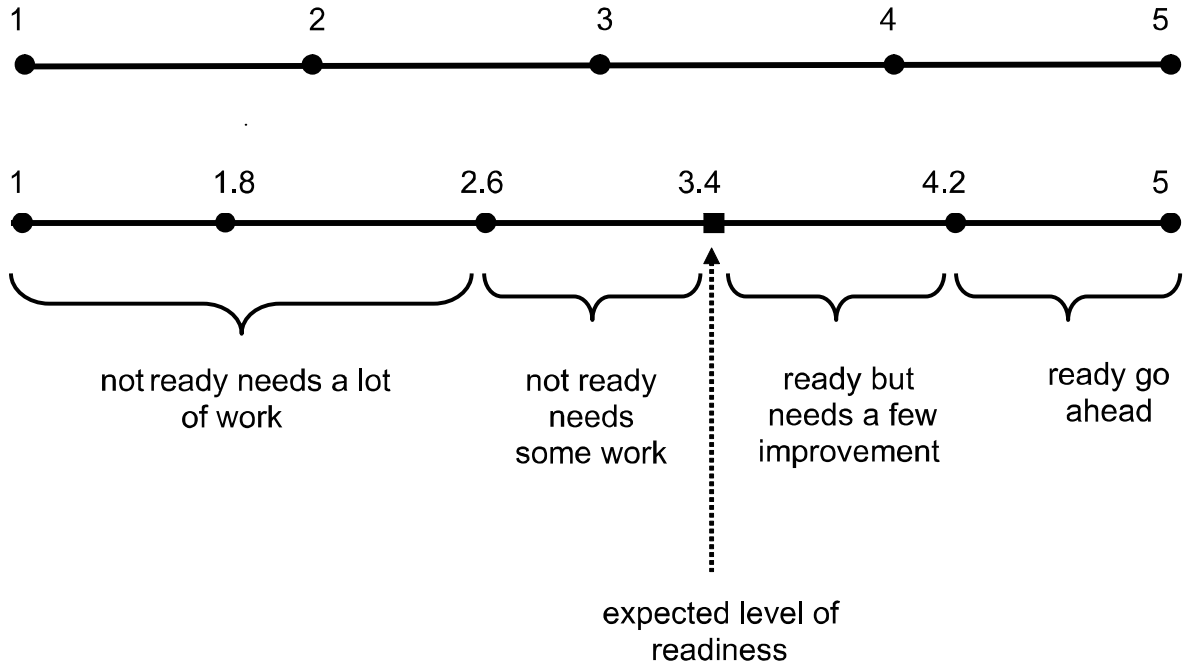

Figure 2. Levels of measuring e-readiness (Aydın & Tasci, 2005)

Methodology

The study adopted a descriptive survey design to establish and determine the level of readiness to implement e-learning in secondary schools. The study involved principals, teachers and students as the key e-learning adopters. The target population consisted of ten public secondary schools in Rachuonyo districts which received ICT infrastructure funding from the government. A census was done on principals strata while a multi-staged random sampling using PPS (proportionate to population size) was applied to students and teachers. Questionnaires were printed and issued to 196 students, 107 teachers and 10 principals from which 170 students, 72 teachers and 10 principals completed and returned the questionnaires which were used in the study. Those questionnaires formed the basis from which analysis and discussions were made on the existing level of e-learning implementation readiness.

Survey analysis and results

Demographic profile

Three female principals and seven male principals participated in the study. Seven principals were between 40-49 years old while three were between 50 -59 years. Four principals hold post graduate diploma qualification and six principals hold bachelor degree. The teachers' respondents comprised of 15.3 percent female and 84.7 percent male. Thirty two percent of the teachers were aged between 20-29 years, 31.9 percent were between 30-39 years, 15.3 percent were between 40-49 years and 8.3 percent were aged between 50 – 59 years. Out of the one hundred and seventy students who participated in the study, 76 (44.7 %) were female and 94 (55.3 %) were male. Of the students who participated in the study, 34 (20 %) were in 10th Grade (form two), 94 (55.3 %) were in 11th grade (form three) and 42 (24.7 %) were in their 12th Grade (forth form). The study left out student in 9th Grade (form one) as they had not reported by the time data was collected.

Level of e-learning readiness

Teachers' level of interaction with computers (e-learning systems) is dependent on their technical competency and computer literacy. Teachers were asked to respond to 11 questions that measure their technical competency towards e-learning on a 5–point Likert Scale ranging from 'strongly disagree (1)' to 'strongly agree (5)'. Mean and standard deviation were computed to determine the trends in the responses and compared to the generic scale below:

Table 1: The Scale and Indication of Means

Means	Scale
0 - 2.6	not ready, needs a lot of work
2.6 - 3.4	not ready needs some work
3.4 - 4.2	Ready but needs a few improvements
4.2 - 5	Ready to go a head

The study tested respondents on the following fundamental computer operations in an e-learning environment: printing documents, surfing the internet, saving documents, sending and receiving email, restarting a computer, beginning a new document and switching off a computer. The general level of experience in handling these basic computer operations was analyzed and it was evident that teachers have expected level of readiness to perform most of the basic computer operations required to start e-learning implementation in secondary schools.

ISSN 1027-5207

Table 2: Means and Standard Deviations in the Technical competency (N= 72)

No.	Statements	Mean	SD
T31	I can print a document.	4.07	1.34
T32	I can open a Web address directly	3.79	1.34
T33	I have the basic skills for finding my way around the Internet (e.g. using search engines to research materials).	3.99	1.32
T34	I can use "save as" when appropriate.	4.17	1.26
T35	I can save text contents off Web pages to a disk.	3.49	1.50
T36	I can open a previously saved file from any drive/directory.	3.99	1.45
T37	I know how to send and receive e-mails messages; and I can send an e-mail with a file attached.	3.54	1.58
T38	I can restart a computer.	4.33	1.11
T39	I can begin a new document.	4.19	1.25
T40	I can use a browser such as Mozilla or Explorer to navigate the World Wide Web.	3.71	1.54
T41	I can switch a computer on.	4.51	0.98

From table 2 above, teachers had adequate skills to use the internet resources (M_{T32}=3.79; M_{T40}=3.99; M_{T33}=4.17; M_{T35}=3.99 > M_{elr} =3.41), manage documents within a computer system (M_{T31}=4.07; M_{T36}=3.54; M_{T34}=3.49 > M_{elr} =3.41), communicate by e-mail (M_{T37}=4.33 > M_{elr} =3.41) and manage computer system (M_{T38}=4.19; M_{T39}=3.71; M_{T41}=4.51 > M_{elr} =3.41). The existence of above level of literacy among several teachers makes it practical to start e-learning implementation process in schools. However, it was observed that opening a file attached to an email (T37) and switching a computer on (T41) are the only operations which most teachers were able to perform as reflected by the weighted mean (M_{T37}=4.33; M_{T41}=4.51 > 4.2) above 4.2 which is an indication of 'ready to go'. Therefore, teachers have necessary technical skills required for e-learning adoption but a few improvements are essential in equipping them with ICT skills for successfully e-learning implementation.

Time wastage and frustrations while using computers are indicators of incompetency and illiteracy which were observed as barriers to e-learning implementation in schools. Majority (48.8 %) of the surveyed teachers do not consider themselves to be very competent with computers and 47.2 % think otherwise. General observation from the study demonstrate that the teachers are uncertain of their competency as indicated by the likert mean score (M_{T46}=2.88). Similarly teachers are uncertain (M_{T44}=2.65) whether they find working with computers very confusing or not. However, it was clear that the teachers feel that they (M_{T45}=1.92) do not waste a lot of time struggling with computers and are not frustrated while working with computers (M_{T47}=1.57). Though the study revealed some level of competency among the teachers, they require further training to boost self-confidence and minimize time wastage, frustration, and confusion while using computers.

Teacher training

Training all teachers in using ICT for themselves and in the classroom requires training in two major programs: ICT Skills and Application of ICT in Curricula. Successful implementation of the two programs depends on teachers' willingness to learn about e-learning and computers, training availability to learn ICT, and belief in the importance to learn how to use computers. Out of the 72 teachers who participated in the study, 55 (76.4 %) had attended some kind of computer training course while 17 (23.6 %) have never attended a computer training course. It is

ISSN 1027-5207

important that e-learning is embraced by all teachers and the study established the factors that directly affect learn about e-learning and computers. It was established that most (73.6 %) teachers strongly agree and 25 % of teachers agree that it is important for them to learn how to use computers (M_{T22} = 4.71). The teachers strongly agree that they are willing to learn about e-learning and computer.

However, the challenge appears to be lack of training availability to learn technology as indicated by weighted mean of 3.82. The study found out that majority (M_{T18} = 4.13) of the teachers would like their school to send them on a course on using e-Learning before they can start using it. Despite teachers willingness to attend training on e-learning, the study showed (M_{T11}=3.82) that there is lack of training availability to learn technology. Most of the principals (M_{Q25}=4.80) have a strong will to send their staffs to a course on using eLearning before teachers start using it. However, the principals also confirmed (M_{Q20}=3.50) confirmed the lack of training availability to learn technology. Thus, as secondary schools embrace e-learning, relevant e-learning training facilities and opportunities must be availed to teachers for successful e-learning adoption.

Teachers' confidence in handling computers

Fear of using technology can be a barrier to adoption of the technology. Teachers' self-confidence in doing ICT tasks and activities was tested during the study. Teachers confidence in handling computers was determined by rating their confidence in computer usage ability, computing skills and extend to which they enjoy working with computers. The findings show that teachers exhibit high level of confidence in working with computers. Most teachers (M_{T42}=4.514) strongly agreed that they enjoy working with computers and also agreed (M_{T43}=3.861) that they are very confident in their abilities to use computers as well as self-approval (M_{T48}=3.542) of computing skills. The tested factors reveal that the confidence level in handling computers is adequate ($M_{average}$=4.11). However it is evident from the mean scores of T43 and T48 that teachers computing skills meet expected e-learning readiness levels but below the 'ready to go' level of 4.2.

Technical competency and computer literacy among students

Students need experience and some level of competency in ICT systems for effective use of ICT in learning. It was observed that out of the 170 students surveyed, 130 (76.5 %) had no prior experience with computers, 25 (14.7 %) had used computer for a period of 1-2 years, and 15 (8.8 %) had used computers for 3 years and above. It was established that 110 (64.7 %) of the students surveyed have never taken any subjects in computers in school against 60 (35.3 %) who have at onetime taken a computer subject. It was noted that computer studies is not compulsory for all students but importance of e-learning emphasized should be made for every student to be introduced to computers. Internet experience among students is very limited as 123 (72.4 %) students have no access to Internet while at school against 47 (27.6 %) who said they use computers connected to the Internet. The study revealed that 112 (66.3 %) respondents had no experience in using digital content stored in CDs to supplement their study against 57 (33.7 %) students who use CD-ROMs to supplement their learning. Most of the students who participated in this study strongly agreed (M_{S12}=4.858) that they believe it is important for them to learn how to use computers. This was a clear indication of high level of readiness within the student community to embrace ICT. Most teachers agreed (M_{T10}=4.069) that low computer literacy level among students is barrier to implementation of e-learning. Similarly, the principals agreed (M_{Q18}=3.60) that lack of computing skills among students is another obstacle to e-learning adoption.

ISSN 1027-5207

Students' and teachers' attitude and perception towards the use of e-learning

As one of the research objectives, the study investigated the students' attitude and perception towards technology. Attitudes and perceptions towards a technology in generally derived from perceived ease of use and perceived usefulness of that technology.

Students' attitude and perception towards technology

Would be users of technology feel uneasy and threatened when others talk about the adoption of such technology. Perceived difficulty in using a technology can result into anticipated frustration during technology adoption. Most students disagree (M_{S11}=1.871) that they are threatened when other talk about computers. Similarly majority of the students disagree (M_{S18}=1.600) that computers are difficult to use and further disagree (M_{S15}=1.582) that using computers will be a frustrating experience them. It was generally observed that computers are perceived by the student as easy to use since form (M = 1.684**)**. However, measures should be taken to change the perception of those students who feel computers are difficult to use, frustrating and threatening.

Perceived Usefulness of technology can makes people adopt systems hence the study also tested items related to perceive usefulness of use of computers among students and the results indicate that most student agree (M_{S13}=4.294) that they would like to use computers in the classroom and strongly agree (M_{S14}=4.841) that computers can make learning interesting. They further strongly agree (M_{S16}=4.568) that their learning can be improved by using computers. While a smaller number of student were neither willing to use computers in classroom, nor think that computers can make learning interesting nor believe that their learning can be improved by using computers, they perception cannot be ignored during e-learning implementation and necessary sensitization is necessary.

Teachers' attitude and perception towards technology

Perceived Usefulness: As key stakeholders in the e-learning implementation, teacher's perceived usefulness of e-learning and computers are somehow related to the adoption of the e-learning technology. To establish their perceived usefulness of the technology, the three factors were given to them for consideration and their responses showed that most teacher disagree (M_{T17}=2.46) that they would use e-Learning only if am required to. The teachers strongly agree (M_{T27}=4.57) that their teaching can be improved by using computers and most of them strongly agree (M_{T27}=4.75) that computers can make learning interesting. From the responses above, it can be deduced that teachers perceive the usefulness of computers in learning.

Perceived Ease of Use: A technology perceived by users to be easy to use is likely to be adopted by the users. The study investigated the teachers' perception on the ease of use of computers by asking the teachers to give their opinions on the set of factors. It was observed from the table above that most teachers disagree (M_{T27}=1.89) that computers are difficult to use (91.7 % of teachers disagree that computers are difficult to use and 93.1 % of teachers feel comfortable using computers. Similarly, 77.8 % of the teachers disagreed (M_{T26}=1.49) that it will not be easy for them to use computers for teaching. It was also found that teacher majority of the teacher strongly agree that they feel comfortable using computers. However it is important that the plight of the small number of teachers who get difficulty in using computers is addressed by trainings and seminars.

ISSN 1027-5207

Principals and teachers approach to the integration technology in learning.

The study sought to compare the old approach of teaching to the new technology enabled learning, teachers' readiness to integrate the technology in their teaching, the appropriateness of introducing technology at secondary school level, and teachers' feelings regarding students' readiness for the technology. The findings are as revealed that most teacher agree (M_{T15}=4.40) that the technology enabled way of teaching and learning is the best. The findings confirms that most teachers (M_{T20}=4.67) strongly agree that they ready to integrate computers in their teaching. Majority (M_{T25}=4.67) of the teacher think that e-learning is appropriate at secondary schools and they agree (M_{T28} = 3.93) that students are ready for e-learning. This is an indication that they teachers are willing to use technology enabled learning. Though fewer teachers not enthusiastic about e-learning, most teachers' attitude towards e-learning is that they are ready ($M_{average}$=4.42 > M_{elr} =3.41) for e-learning implementation in their schools.

The study further established the attitude of principals concerning e-learning implementation with respects to whether it is the right time to promote e-Learning in their school interest, teachers willingness to use new technology in the classroom, principals readiness for integrating e-learning in their schools and helpfulness of e-learning in improving teaching and learning was reflected. The principals strongly agreed that it is the right time to promote e-Learning in schools, they are ready for integrating e-Learning in their schools and also think e-learning is helpful to improve teaching and learning. The principals concur that both students and teachers are willing to embrace e-learning in classroom.

Discussion

The findings from the study demonstrated that most teachers could confidently operate computers with minimal time wastage, limited frustration and less confusion. From readiness measuring model, this was adequate level of readiness to implement e-learning but needs a few improvements are needed. Teachers had the necessary technical skills required for e-learning adoption but improvements are essential in equipping them with ICT skills for successful e-learning implementation. The study indicated that teachers are willing and ready to acquire computing skills as illustrated by readiness level of 3.82. This calls for the government and relevant education stakeholders to organize ICT training opportunities to enable practicing teachers develop their technical skills for e-learning adoption in schools.

The technical experience and computer literacy among student was found to be very low. About 77 % (130) of the students had no prior experience with computers and only 35 % of the surveyed students have taken computer studies as a subject. Computer study was not compulsory for all students but every student needs basic computing skills for the adoption of e-learning. Most of the students who participated in this study strongly agreed and believe it is important for them to learn how to use computers which is a clear sign of high level ($Mean_{S12}$=4.858) of readiness to embrace e-learning. The study revealed that students are not threatened by technology as most of them felt that computers are not difficult to use and would not frustrate them. With students' perceived usefulness of technology in class confirms that students are ready to go on with e-learning. Students believed that computer will improve their learning and make learning interesting.

ISSN 1027-5207

Conclusion

This study has raised a number of issues that are significant to the success of e-learning initiatives in public secondary schools. It may be concluded that teachers, principals and students are moderately ready for e-learning, and that there are individuals who may need to be acculturated into the e-learning system before they can be said to be at the expected state of readiness for e-learning. Further, the study had shown that policy makers and other education stakeholders have a crucial role to play in enhancing greater engagement in a technology-driven teaching-learning environment. There is need for change of mindset that presence of computers in schools is an indicator for e-learning adoption, but how ready the learners are able to use them in an enabling environment. Otherwise, regardless of positive effects of technology on student learning, technology may remain limited in use and it is unlikely to be an effective instructional tool unless e-learning implementation readiness is given priority.

Finally, to successful implement e-learning in public secondary schools, this study recommends the establishment of a policy framework on strategic e-learning implementation pillars. The government should develop comprehensive framework of e-learning adoption in schools. Though Teachers Service Commission is collaborating with teacher training institutions to develop specialized human resource capable of implementing e-learning in Kenyan schools, robust e-learning policy will be instrumental in addressing its implementation challenges. Teachers' and students' ICT capacity need to be enhancement through in-service training for teachers and compulsory computer studies for all students.

Recommendation and further work

Since the study covered only public secondary schools in Rachuonyo North and Rachuonyo South District, but e-learning implementation is taking root from standard one (1st Grade) as proposed by the Government, further study of the level of e-readiness should be extended to primary schools in the whole country. Education is a fundamental right to all children in Kenya and a study should be done on private secondary and primary schools to ascertain their level of E-learning Implementation readiness. Teacher training institutions and bodies mandated with curriculum development should also be studied to fasten the loose link in the e-learning readiness chain in Kenya.

Reference

1. Afshari, M.; Bakar, K.A.; Luan, W.S.; Samah, B.A. and Fooi, F.S. (2009). Factors affecting teachers' use of information and communication technology. In *International Journal of Instruction, 2(1)*, (pp. 77-104).
2. Akaslan, D. and Law, E.L.-C. (2010). *Measuring Teachers' Readiness for E-learning In Higher Education Institutions associated with the Subject of Electricity in Turkey*. Paper presented at the 2011 IEEE Global Engineering Education Conference (EDUCON) – "Learning Environments and Ecosystems in Engineering Education", Amman, Jordan.
3. Awouters, V., Jans, R. and Jans, S. (2008). *E-learning competencies for teachers in secondary and higher education.* Paper presented at the Conference International e-Learning-Zaragoza.
4. Awouters, V. and Jans, S. (2009). E-learning Competencies for Teachers in Secondary and Higher Education. In *International Journal of Engineering and Technology (iJET), 4(2)*, (pp. 58–60).
5. Aydın, C.H. and Tasci, D. (2005). Measuring Readiness for e-Learning: Reflections from an Emerging Country. In *Educational Technology & Society, 8(4)*, (pp. 244-257).

ISSN 1027-5207

6. Ayere, M.A.; Odera, F.Y. and Agak, J. (2010). E-Learning in Secondary Schools in Kenya: A Case of the NEPAD E-Schools. In *Educational Research and Reviews, 5(5)*, (pp. 218-223).
7. Bhattacharya, I. and Sharma, K. (2007). India in the knowledge economy – an electronic paradigm. In *International Journal of Educational Management, 21(6)*, (pp. 543-568).
8. Boakye, K.B., & Banini, D.A. (2008). Teacher ICT Readiness in Ghana. In K. Toure, T.M.S. Tchombe & T. Karsenti (eds.), *ICT and Changing Mindsets in Education*. Bamenda, Cameroon: Langaa; Bamako, Mali: ERNWACA/ROCARE.
9. Borotis, S. and Poulymenakou, A. (2008). *Critical Success Factors for E-Learning Adoption: Handbook of Research on Instructional Systems and Technology*. Greece: IGI Global.
10. Broadley, T. (2012). Enhancing Professional Learning for Rural Educators by Rethinking Connectedness. In *Australian and International Journal of Rural Education, 22(1)*, (pp.85-105).
11. Cross, J. (2005). An informal history of eLearing. In *On the Horizon, 12(3)*, (pp. 103-110).
12. Datuk, T. and Ali, A. (2008). *Issues and challenges in implementing e-learning in Malaysia*. Retrieved 10 March, 2013, from http://asiapacific-odl.oum.edu.my/C33/F80.pdf
13. Eslaminejad, T.; Masood, M. and Ngah, N.A. (2009). *Identifying Instructors' Readiness Factors on e-learning for the Continuing Medical Education Programs in Iran*. Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (ELEARN) 2009, Vancouver, Canada.
14. Farrell, G. (2007). *Survey of ICT and Education in Africa: Kenya Country Report*. Paper presented at the ICT in Education in Kenya, Nairobi, Kenya.
15. Haverila, M. (2011). Prior E-learning experience and perceived learning outcomes in an undergraduate E-learning course. In *MERLOT Journal of Online Learning and Teaching, 7(2)*, (pp. 607-619).
16. Kadzo, L. (2011). *Kenya launches National ICT Innovation and Integration Centre*. Retrieved 13 Sept, 2012, from http://www.cio.co.ke/news/main-stories/Kenya-launches-National-ICT-Innovation-and-Integration-Centre
17. Karim, M.R.A. and Hashim, Y. (2004). The Experience of the E-Learning Implementation at the University Pendidikan Sultan Idris, Malaysia. In *Malaysian Online Journal of Instructional Technology (MOJIT), 1(1)*, (pp. 50-59).
18. Kaur, K. and Abas, Z.W. (2004). *An assessment of e-learning readiness at the Open University Malaysia*. Paper presented at the International Conference on Computers in Education (ICCE2004), Melbourne, Australia.
19. Mansour, B.E. and Mupinga, D.M. (2007). Students' positive and negative experiences in hybrid and online classes. In *College Student Journal, 41(1)*, (pp. 242-248).
20. McConnell, D. (2008). *Examining Conceptions of E-learning in an Intercultural Sino-UK Context*. Paper presented at the Proceedings of the 6th International Conference on Networked Learning, Halkidiki-Greece.
21. MoE. (2011a). *ESP-ICT Funded Schools 2010-2011*. http://www.education.go.ke
22. MoE. (2011b). *ICT Fund*. http://www.education.go.ke
23. MoIC. (2006). *National Information & Communications Technology (ICT) Policy*. Nairobi: Government Printers. Retrieved from http://www.ist-africa.org/home/files/Kenya_ICTPolicy_2006.pdf

ISSN 1027-5207

24. NEPAD e-Africa Commission (2003). *The NEPAD e-Initiative: Ensuring that Young Participate Actively in the Global Information Society and Knowledge Economy*. Retrieved 22 September, 2012, from http://www.eafricacommission.org

25. Olatokun, W.M. and Opesade, O.A. (2008). An e-readiness assessment of Nigeria's Premier University (Part 1*). In *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 4(2)*, (pp. 16-46).

26. Paraskeva, F.; Bouta, H. and Papagianna, A. (2008). Individual characteristics and computer self-efficacy in secondary education teachers to integrate technology in educational practice. In *Computer and Education, 50(3)*, (pp. 1084-1091).

27. Park, N.; Roman, R.; Lee, S. and Chung, J.E. (2009). User acceptance of a digital library system in developing countries: An application of the Technology Acceptance Model. In *International Journal of Information Management, 29(3)*, (pp. 196-209).

28. Saekow, A. and Samson, D. (2011). E-learning Readiness of Thailand's Universities Comparing to the USA's Cases. In *International Journal of e-Education, e-Business, e-Management and e-Learning, 1(2)*, (pp. 126-131).

29. Tubaishat, A. and Lansari, A. (2011). Are Students Ready to Adopt E-Learning? A Preliminary E-readiness Study of a University in the Gulf Region. In *International Journal of Information and Communication Technology Research, 1(5)*, (p. 210).

30. Volery, T. and Lord, D. (2000). Critical success factors in online education. In *The International Journal of Education Management, 14(5)*, (pp. 216-223).

31. Voogt, J. and Knezek, G. (2008). *International Handbook of Information Technology in Primary and Secondary Education*. NewYork: Springer.

32. Watkins, R.; Leigh, D. and Triner, D. (2004). Assessing Readiness for E-Learning. In *Performance Improvement Quarterly, 17(4)*, (pp. 66-79).

33. Webster, J. and Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning. In *Academy of Management Journal, 40(6)*, (pp. 1282-1309).

ISSN 1027-5207