



Research Article

CHALLENGES FACING TEACHERS AND STUDENTS IN THE USE OF INSTRUCTIONAL TECHNOLOGIES: A CASE OF SELECTED SECONDARY SCHOOLS IN KISII CENTRAL DISTRICT, KISII COUNTY

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ABSTRACT

In this era of information technology, the role of teachers is changing from providing information to organizing the entire learning process. This is mainly because, learners can easily access any information they need by use of instructional technologies such as Internet, Mobile phones and graphics, unlike in the past where text books were the only source of information. Technology is very essential in the instruction of students in secondary schools today and this is especially so in a developing country like Kenya. Instructional technologies enhance mastery of the content, provide information as comprehensive as possible in different formats and provide teachers with a variety in presentation of content. The rationale was based on the view that properly designed learning materials inspired by instructional technology and delivered by technology add value to a teaching situation where contact hours are limited. The curriculum needs, academic standards and the development of digital age skill for the 21st century learners. The literature review focused on the meaning and use of instructional technologies in teaching and learning in institutions in Kenya and other parts of the world. However, it did not address the use of instructional technologies in secondary schools. This was a descriptive survey design. Despite the importance of instructional technologies, Kenyan secondary schools face challenges. A study was conducted in ten purposively selected secondary schools in Kisii Central District, Kisii County between March 2011 and March 2012. Data was collected using questionnaires, interview schedules and observation schedules. The obtained data were analyzed systematically using descriptive statistics and presented with the help of frequency tables, graphs and percentages. The study findings revealed that teachers were influenced by availability of instructional technologies, knowledge and skills in use. Findings also revealed myriads of challenges faced by teachers and students. Finally, it is paramount that teachers plan teaching, and learning which applies technology to maximize students learning.

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INTRODUCTION

Education in the world over has been recognized as an important means for promoting economic and social development both at individual and national levels. The growth of the global economy and the information-based society has pressurized education systems around the world to use technology to teach students the knowledge and skills they need (UNESCO 2005). In Kenya, Learning institutions are under increasing pressure to use the instructional technologies in teaching the students the knowledge and skills they need in the 21st century. The challenge confronting our educational system is how to transform the curriculum and teaching and learning process to provide students with the skills to function effectively in this dynamic era – rich and continuously changing environment.

Even after the teacher's initial fear of getting involved with technology has been overcome, serious challenges still remain in terms of providing enough technical support that teachers will not be discouraged by equipment failure or software behavior that they do not understand (IJEDICT, 2007). Though the hope is that information technology can add a powerful punch to the modern educational environment, many educators in the United Emirates as Moore *et al.* (2003) notes have found that it is the proper use of available instructional technologies rather than the presence of that technology that advances learning. Even longtime favorites pencil and paper and the Overhead Projector still have a place in the well-rounded modern classroom. Whether old or new, each technology has inequalities (or "affordances") (sic) of which advantages can be taken.

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Brown *et al.* (1973) acknowledge that, researchers in education have shown that with present inadequate infrastructure, large class sizes, and lack of technologically skilled teachers and traditional modes of training of teachers, it is difficult to intensively achieve the goals and objectives of education and training. Further, most of the teachers use expository methods, which do not have the potential of achieving technological know-how in the current technology era. Essentially, in modern classroom teaching, the objectives should be multidimensional in nature, so for their achievements, multiple methods are used in an integration whereby instructional technology will be highly recommended. According to (IJEDICT 2007), modern children are keen to use relevant modern equipment to help them with their learning at school and their confidence enables them to acquire competence quickly and easily. This modern equipment use is instructional technology in the teaching and learning process. Computer studies as one of the instructional technologies is now offered as a subject but Amutabi (2004) in a study on ICT in Kenya Public Universities notes that, the computerization project in secondary schools in Kenya is at its infancy stage. Moore *et al.* (2003) notes that, “properly designed learning materials delivered by modern technology (sic) add value to a teaching environment in which contact hours are limited.”

At present, the use of instructional technologies may be of great help. It is a well-known fact that, not a single teacher is capable of delivering up to date and complete information in his/her own subject. The use of instructional technologies can fill this important gap because it will provide access to different sources of information. It will provide information that is as comprehensive as possible and in different formats with different examples. (ANSTI Nov. 2005). Duffy *et al.* (1993) note that:

Tools are being helpful in developing the learner's mental models of objects, systems or other phenomena that brings about visual spatial capabilities. Visualization tools help learners to construct those mental images and visualize activities.

The use of instructional technologies will provide chat facility (text messages) so that learners will make use of it, exchange their ideas and views and get clarification of any topic with different experts, practitioners so as to broaden their information base. Instructional technologies will assist teachers to provide variety in the presentation of content, which will help learners on concentration, better understanding, and long retention of information. The learners will get opportunities to work on any live project with learners from other countries (Omwenga 2008). The use of instructional technologies will actually provide flexibility to a learner, which is denied by the traditional process and method. On the Internet, many Websites are available freely which will be utilized by students and teachers to develop reasoning, critical thinking, analysis and problem solving hence helping them in sharing resources. Betz (1990) notes that instructional technologies attract attention; which is paramount to learning. Instructional technology also helps teachers to engage students through production work (Dale 1969). To make learning more meaningful to students: teachers often try to involve them in creating their

own technology-based products. Instructional technologies promote learning by linking students to information resources. This lets them access the materials, obtain information and have experiences that they will not have had. They also help students visualize problems, solutions and link students to learning tools especially when using computers (Newby *et al.* 2006). Roblyer (2003) acknowledges that there is substantial empirical evidence indicating that teachers frequently capitalize on the novelty and attraction of the media used to achieve the essential instructional goal of capturing and holding students' attention. Moore *et al.* (2003), have described rich-text materials (material combining multimedia) as potentially enriching experiential, flexible, fun, powerful, self-paced, and time saving. They also believed that properly used technology could further critical thinking and independent learning, expand individual exploration, Shift some of the learning out of the classroom expand time for classroom activities, Liberate (students and teachers alike) from the mundane, create an environment of learning, experimenting, doing and enjoying, and level of playing field between the public and private schools.

Kenya is at an infant state in the use of instructional technology (IJEDICT 2007). Muriithi (2005) further notes that in Kenya like most developing countries, instructional technology usage is still limited. The pertinent question one would ask at this point is whether the schools in Kenya are benefiting from these emerging technologies. If not, then why is it that they are not benefiting from these emerging technologies? Therefore, this study was set to establish challenges facing teachers and students in using instructional technologies.

Objectives of the study

- Examine factors, which influence interactivity and effective use of instructional
- Technologies in the teaching and learning processes.
- Establish the challenges faced in coping with the use of various instructional
- Technologies in teaching and learning processes.
- Offer solutions to the challenges to: a) teachers and b) students.

RESEARCH METHODOLOGY

Research Design

The study was conducted by using a descriptive survey design. This study used both quantitative and qualitative techniques in collecting and analyzing data.

Target Population

The target population for this study comprised 67 public secondary schools in Kisii County. However, ten secondary schools were purposively selected and used for this study.

Research Instrument

According to Wellington (2000), in carrying out a research, a researcher should use methods, which provide high accuracy. Data was collected using three instruments namely; the questionnaire, interview schedule and observation schedule.

Findings of the Study

Interactivity and effective use of instructional technologies

This study was to examine factors that influence interactivity and effective use of instructional technologies in teaching and learning processes. It is obvious that for teaching and learning to be effective and meaningful, the use of instructional technologies was inevitable. The instructional technologies also determine the instructional method the teacher will employ in the teaching and learning process. Since the researchers was to examine the factors that influence effective use; it was necessary for her to first find out the availability of the instructional technologies in the sampled schools. Apart from that, the researcher was to find out whether the instructional technologies used in other parts of the world were available in Kenya. This was with good intentions of finding out whether teachers and students in the entire country benefited from teaching the same way other parts of the country and world do. Table 1.1 analyzes factors that influence teachers' interactivity and use of instructional technologies:

Table 1.1. Factors that influence interactivity and use of instructional technologies

	Frequency	Percentage
Availability of instructional technologies	11	11.1
Skills and knowledge of technology use	11	11.1
Importance of the instructional technology	12	12.1
If readily available in the school	19	19.2
High population/Enrolment of the students	15	15.2
Availability of money to buy some materials	12	12.1
Enough resources	23	23.2

N/B: Percentages are based on the number of responses for each item.

Out of 104 respondents, 11 (11.1%) of the teachers revealed that they were influenced by the availability of the instructional technologies, 11 (11.1%) revealed that they were influenced by knowledge and skills on use, 12 (12.1%) of the teachers were influenced by the importance of the instructional technologies, 19 (19.2%) of the teachers were influenced if the instructional technologies were readily available, 15 (15.2%) of the teachers were influenced by enrolment of students in class, 12 (12.1%) of the teachers were influenced by availability of funds to buy the needed materials, 23 (23.2%) of the teachers were influenced by adequacy of the instructional technologies while other teachers in negligible percentages revealed that they influenced by the time available to prepare for the technology, versatility of the instructional technologies, reliable power supply, if involved in the procurement process, attention given by the administration, if instructional technologies are provided by the school, availability of spacious room, versatility of the technologies, the importance of the instructional technologies in teaching the topics, students' level of understanding and, accessibility to the instructional technologies, syllabus requirement, load of the subject and freedom of use and the cost of instructional technologies. An item in the teachers' questionnaire asked how often instructional technologies were used for learning process. Table 1.2 analyzes teachers' responses on how often teachers used instructional technologies as follows: The table shows that out of 104 respondents; 93(91.2%) of the teachers reported that they used printed instructional technologies every time they taught whereas other percentages were negligible, 56(62.2%) of the teachers reported they never used projected instructional technologies whereas 15(16.7%) of the teachers reported that

they used projected instructional technologies once a month; other percentages on use of projected instructional technologies were negligible, 28 (30.8%) of the teachers reported that they used non-projected instructional technologies every time, 26 (28.6%) of the teachers that they used non-projected instructional technologies once a week, 16 (17.6%) of the teachers reported that they used non-projected instructional technologies once a month and 17 (18.7%) of the teachers reported that they never used instructional technologies whereas other percentages were negligible on use of non-projected instructional technologies. Further, teachers were asked whether the instructional technologies they used were adequate. Out of 104 respondents, 30(29.1%) of the teachers reported that instructional technologies were adequate whereas 73 (70.9%) of the teachers reported that instructional technologies were not adequate. Both the head of department and principals of the selected schools confirmed their availability but inadequate. The head of departments confirmed further that teachers used instructional technologies regularly. To confirm what the teachers, heads of departments and the Principals said; an item in the students' questionnaire asked the instructional technologies used for learning process. Table 1.3 analyzes the responses as follows:

Table 1.3 shows that out of 544 respondents; 494(92.7%) of students reported the use of maps and diagrams for learning process whereas 39(7.3%) reported that they never used Maps and diagrams, 310(63.1%) reported the use of the globes whereas 181(36.9%) reported that they never used globes, 455(87%) reported the use of charts whereas 68(13.0%) reported that they never used charts, 301(59.4%) reported the use of Magazines whereas 206 (40.6%) reported that they never used Magazines, 131(27.6%) reported the use of Journals whereas 344(72.4%) reported that they never used Journals, 139(28.7%) reported the use of Radio whereas 345(71.3%) reported that they never used radio, 152(31.5%) reported the use of television whereas 330(68.5%) reported that they never used television, 84(17.7%) reported the use of video recordings for learning whereas 391(82.3%) reported that they never used Video Recordings, 271(52.3%) reported the use of computers for learning whereas 247(47.7%) reported that they never used computers for learning. On the other hand, the heads of departments confirmed that teachers' interactivity and use of instructional technologies was influenced by of their availability even though some of the instructional technologies' use posed a big challenge to some teachers.

The study used the observation schedule to confirm what both teachers and students gave. The researcher decided to investigate further whether the instructional technologies were adequate for both teachers and students in order to make fair judgment about interactivity and use of instructional technologies in the sampled schools. The research confirmed interactivity and use of instructional technologies though use of some instructional technologies were challenging to some teachers. The head of departments also confirmed interactivity and use of instructional technologies though they were inadequate. UNESCO (2002) affirms that learning is an active and not a passive process. To allow students to move towards competence, they must be actively engaged in the learning.

Table 1.2 How often teachers used instructional technologies

	Never		Once a year		Once a month		Once a week		Every time	
	f	%	f	%	f	%	f	%	f	%
Use of Printed instructional technologies	1	1.0	1	1.0	3	2.9	4	3.9	93	91.2
Use of projected instructional technologies	56	62.2	7	7.8	15	16.7	8	8.9	4	4.4
Use of non-projected instructional technologies	17	18.7	4	4.4	16	17.6	26	28.6	28	30.8

N/B: Percentages were based on number of responses per item

Table 1.3 Instructional technologies for learning processes

Items	No		Yes	
	f	%	f	%
Maps and Diagrams	39	7.3	494	92.7
Globes	181	36.9	310	63.1
Charts	68	13.0	455	87.0
Magazines	206	40.6	301	59.4
Journals	344	72.4	131	27.6
Radio	345	71.3	139	28.7
Television	330	68.5	152	31.5
Video Recordings	391	82.3	84	17.7
Computers	247	47.7	271	52.3

N/B: Percentages are based on the number of responses for each item

Table 1.4 Challenges facing teachers on use of instructional technologies

Challenges faced by teachers	f	%
Unskilled/ICT illiteracy/Limited skills	38	37.6
No enough/Unavailability of instructional technology	35	34.7
Unavailability of funds to buy instructional technology	35	34.7
Limited time/Lack of time	27	26.7
Lack of support from administration/Educational authorities	12	11.9
Many students	16	15.8

N/B: Percentages based on the number of responses given

Table 1.5 Challenges faced by students on use of instructional technologies

Challenges faced by students	f	%
Some can't be understood easily (Contradicting)	195	37.4
Some teachers are fast when explaining	140	26.9
Some experiments/Science procedures are hard to follow	79	15.2
Are not enough in school(sharing of computers in the lab)	169	32.4
Background technology wise (some students are illiterate)	71	13.6
Small room/Congested(can't accommodate all students)	61	11.7
No enough explanations	55	10.6

N/B: Percentages are based on the number of responses for each item

Table 1.6 Students' suggestions on overcoming the challenges faced

Suggested ways of overcoming the challenges faced	f	%
Teachers to use simple terms when teaching	55	11.3
Teachers to slow the speed of presenting when using some instructional technologies	81	16.6
Allow students use computers & science labs freely for practical during their free time	276	56.7
Buy enough and quality computers & other instructional technologies	242	49.7
Add more skilled and experienced teachers	53	10.9

N/B: Percentages are based on the number of responses for each item

According to Hung & Khine (2006), meaningful learning occurs when learning is interrelated, interactive and interdependent. That is, learning and instructional activities should engage and support combinations of active, constructive, intentional, authentic and cooperative learning because they are synergetic. Omwenga, (2008) in his study confirmed that other teachers in the world used instructional technologies in teaching and learning, therefore by using them both teachers and students are moving to the digital era.

However, according to Patel (1986), the availability of instructional technologies does not necessarily mean the proper utilization of the same whereas Newby *et al.* (2006) asserts that the use of technology cannot become meaningful support for students' work if they have access to it for only a few minutes a week. But Kemp & Dayton (1985) argue that the use of instructional technologies can help to reduce the length of time for instruction and assist in a lot of content in summary form.

The findings of the study revealed that teachers were influenced by certain factors such as availability of instructional technologies, knowledge and skills on use, time available to prepare, reliable power supply, procurement process, attention given by the administration, if the instructional technologies are provided by the school, availability of room, versatility of the technology, their importance in teaching the topic, students' level of understanding and enrolment, syllabus requirement, accessibility to the resources, teachers' load and the cost of resources. The teachers especially if they wish to reap from the endeavors of their teaching, should pay attention to the use of instructional technologies when teaching their students. The research therefore opted to investigate the preparedness of teachers on how to successfully use instructional technologies in teaching and learning process.

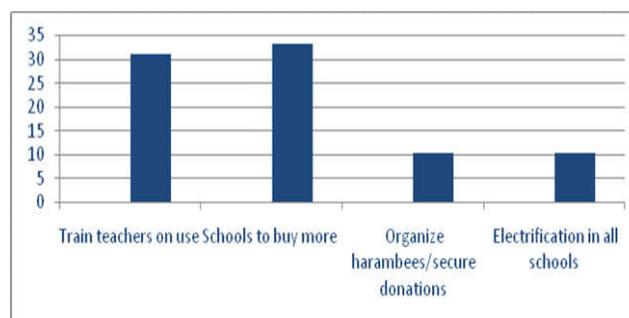
Challenges faced by both: (a) teachers and (b) students on use of instructional technologies:

Table 1.4 analyzes teachers' responses as follows:

Out of 104 respondents, 38(37.6 %)of the teachers reported that they had limited skills/unskilled, 35(34.7%)of the teachers reported that instructional technologies were not enough/unavailable, 35(34.7 %) of the teachers reported unavailability of funds to buy instructional technologies, 27(26.7%) of the teachers reported that they had limited time to use the various instructional technologies as the syllabus was so wide that they may not cover it, 12(11.9 %) of the teachers reported that they lacked support from school administration as some principals locked some instructional technologies in stores and make very strict rules for anybody who wished to use them,16(15.8 %)of the teachers reported that there were many students in classes which made it impossible to use some instructional technologies, other teachers in negligible percentages reported that they were not consulted in the procurement process, no time to improvise instructional technologies to use, some teachers reported that some teachers were lazy and did not bother to use the instructional technologies, some teachers reported of unreliable power supply, lack of infrastructure (storage facilities) and space for installing materials, poor budgeting/administration unwilling to buy enough instructional technologies, lack of opportunities to apply technology, low equipped laboratories, loss of materials from students and school, lack of motivation as teachers are overtaken by events as some heads of departments and principals do things without consultation, some instructional technologies such as radios breakdown hence students miss lessons and low response on material requisition in departments whereas some teachers still believed that if a teacher explained well the information to the students; the students would understand the information even if the teacher did not use the instructional technologies. Further, an item in students' questionnaire required students to state challenges they faced when instructional technologies were used. Table 1.5 analyzes students' responses as follows: Out of 544 respondents, 195(37.4%)of the students reported that some instructional technologies could not be understood easily (were contradicting), 140(26.9%) of the students reported that some teachers were fast when explaining which made them not to comprehend the lesson, 79(15.2%) of the students reported that some experiment procedures were hard to follow when done

once thus they need more practice which was denied due to inaccessibility to the science laboratories during their free time, 169(32.4%)of the students reported that they shared some instructional technologies thus limiting individual accessibility and practice,71(13.6%)of the students reported that they had limited technological knowhow on use of some instructional technologies, 61(11.7%)of the students reported congestion in classrooms,79(15.2%)of the students reported that they had limited time to access some instructional technologies available, 55(10.6%) of the students reported that there was no enough explanations given when some instructional technologies were used. Other students in negligible percentages reported lack of accessibility to some instructional technologies during their free time, lack of skilled personnel to provide assistance especially from some teachers and laboratory assistants, some students steal the resources for others not to use, while others felt that the use of some instructional technologies waste time and others said some subject teachers use instructional technologies while others don't use at all. To verify the information given by teachers and students, the research sort information from the head of departments and principals whereby there was an item asking those challenges teachers and students faced and they both confirmed what both teachers and students gave.

The teachers and students were further asked to give suggestions regarding the challenges they experienced when using instructional technologies. Figure 1.1 shows teachers' suggestions on how to overcome the challenges faced.



Results. Figure 1.1 Teachers' suggestions on overcoming the challenges faced

Out of 104 respondents; 30 (31.2 %) of the teachers suggested that teachers should be trained on how to handle /use instructional technologies such as computers /ICT, 32(33.3 %) of teachers suggested that the schools buy more instructional technologies to cater for swollen classes, 10(10.4%)of teachers suggested that the schools to organize harambees /ask donors to assist in buying instructional technologies, 10(10.4%)of teachers suggested that the government should ensure there is reliable power supply in all schools, 10(10.4%) of teachers suggested that students should be exposed to technology early. Other teachers in negligible percentages suggested that the schools should put up infrastructure for computer installation in classes, buy modern computers/renovate and repair facilities, acquire enough instructional materials, have other power alternatives, provide security and stores for keeping facilities, management to collaborate with teachers on material requisition, admit manageable number of students, develop INSETS for teachers to replenish their skills on use of instructional technologies, provide internet to enable them share what other teachers are doing in the world, employ more

teachers especially those with technical skills to reduce teachers' work load, equip the laboratories as a long term project, motivate teachers for improvisations and the government to help schools to purchase more materials by providing more funds. Out of 544 respondents, 55 (11.3 %) of students suggested that teachers to use the simple terms when teaching, 81(16.6%) of students suggested teachers should slow down the speed of presenting, 276(56.7%) of students suggested that students should be allowed to use computers and science laboratories freely for practice during their free time, 242(49.7%) of students suggested that schools should buy enough instructional technologies such as quality computers and other instructional materials, 53(10.9 %) of students suggested that the schools should add more skilled teachers on use of instructional technologies. Other students suggested in negligible percentages that the schools should build bigger rooms/laboratories to accommodate the enrolled population, connect computers to the internet, be exposed to technology early, have generators in case of power failure, update/hire laboratory technicians with modern technological skills, allow students to access available materials freely and expose them fully to the resources, government to implement policies that it can meet especially on provision of instructional technologies and modify classes to be compatible with instructional technology facilities. Figure 1.1 emphasizes the results shown on the table 1.6, and the percentages show students' suggestions on how the challenges can be overcome. The findings revealed a myriad of challenges facing both teachers and students in the use of instructional technologies. This conquers with Mogeni (2005) in a study on factors influencing the utilization of resources in the teaching of Kiswahili in Transmara district whereas Msei (1985) in a survey of teaching resources for teaching and learning of Kiswahili in primary schools in Central Division, Machakos District found out that most teachers in schools did not use teaching resources partly due to ignorance of their importance and called for the organization of seminars, symposia and workshops to help equip the teachers with the skills and awareness to effectively use instructional resources. Andafu (1996) also in a study of factors affecting the teaching of Kiswahili in secondary schools in Lamu District indicated that most teachers did not make any effort to use even simple teaching aids.

Conclusion

The main question that this study endeavored to answer was what challenges faced teachers and how students used instructional technologies. Based on the findings of the study, the following conclusions were made:

- Although many teachers in the selected secondary schools in Kisii County were academically and professionally qualified, they had very limited post-training on the use of instructional technologies.
- The teachers appreciated the role played by the use of instructional technologies in teaching and learning process. However, they hardly use most of these instructional technologies available in their schools. They mainly use textbooks, chalkboards and laboratory equipments for Chemistry, Biology and physics.
- Print resources were the most commonly available instructional technologies in the selected secondary

schools in Kisii County. However, many of the available instructional technologies were inadequate in both quality and quantity; despite their being accessible to teachers and students.

- Though schools provided a few, parents were the main providers of instructional technologies for teaching and learning process. However, teachers were sparingly consulted or involved in the procurement process.
- Very minimal instructional technologies were being prepared locally by teachers for use during the learning process thus, students were hardly involved in the preparation some of the instructional technologies. This was mainly because schools lacked enough funds to buy the raw materials and provide storage facilities while on the other hand; administration didn't allow students to assist for the same.
- The instructional technologies that were preferred by teachers in teaching and learning process were charts, Globe, maps models, audio cassettes, handouts, class readers (books), pamphlets, radio, news papers and diagrams. Some schools had computers but they were mainly used for computer studies subject and SMASE teachers (Mathematics and Science) rarely used the Liquid Cristal Display (LCD).
- The main driving force that influenced the teachers' choice of instructional technology for teaching learning process were the availability of the instructional technologies, the class or form and the students' level of understanding.
- The major challenge teachers expressed as impeding their effective use of instructional technologies were that some instructional technologies made them spend a lot of time in teaching topics, rigid administration in provision and providing storage facilities and the suitability of the instructional technologies to suit topics being taught.
- Scarcity of some instructional technologies and especially lack of modern efficient instructional technologies in the schools, lack of technological assistants and lack of sufficient knowledge of use of these technologies made the teaching and learning process very difficult.

“Learning is facilitated when new knowledge is integrated into learners' world...” Education as central to a knowledge society must produce people who are able to create and gain from the new knowledge (Bereiter 2002). Further, Hung & Khine (2006) adds that; learners need access and manipulate available resources and appreciate the skills and knowledge each instructional technology provides. This is because the choice of instructional technologies can greatly affect the way information may be structured and manipulated. The research will give educators a better understanding of the importance of functional, usable, communicative, and aesthetically appropriate use of instructional technologies.

Recommendations of the study

The following recommendations were made based on the findings of the study:

The study findings revealed that the instructional technologies available in schools were barely enough and some were

outdated. The Ministry of Education, Science and Technology (MoEST). Further, the Ministry of Education, Science and Technology should: Organize seminars, workshops and any other in-service courses frequently to familiarize and sensitize with a wide range of instructional technologies and their potentials. This could trigger teachers' creativity and innovation in the use of instructional technologies in teaching and learning process. Moreover, the planners/organizers of such seminars and workshops should ensure that the teachers personally get information about the seminars/workshops to avoid communication breakdown and encourage them to attend. Ensure that the authors and publishers avail the necessary new, instructional technologies especially textbooks in the market and schools promptly whenever the syllabus is revised. This will ensure that schools acquire and use the current instructional technologies and adequately prepare students for the national examinations. Regularly seek information from teachers and students on the challenges they face in teaching learning process using instructional technologies. This will enable the Ministry of Education to organize necessary in-service courses for the teachers to mentor direct and monitor improved production and provision of instructional technologies; design instructional technologies with the teachers and students in mind, or otherwise seek alternatives of solving or easing the teachers' problems thus enabling them to teach more effectively. Establish instructional technologies centers as close as possible to teachers including instructional technologies mobile services.

Planning and designing learning environments and experiences. To achieve these teachers should: Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. Apply current research on teaching and learning with technology when planning learning environments and experiences. Identify and locate instructional technologies and evaluate them for accuracy and suitability. Plan for the management of instructional technologies within the context of learning activities. Plan strategies to manage student learning in a technology-enhanced environments. Planning helps teachers to determine instructional technologies they will use. Instructional plan plays a critical role in directing the selection and use of all other tools within the learning environment (Newby *et al.* 2006).

Plan teaching, learning, and the curriculum, which apply technology to maximize student learning. To realize this teachers should: Apply technology to develop students' higher-order of skills and creativity. Facilitate technology-enhanced experiences that address content standard standards and student technology standards. Manage student-learning activities in a technology-enhanced environment. Use technology to support learner-centered strategies that address the diverse needs of students. Teachers use technology to enhance their productivity and professional practice by: Using instructional technology to engage in ongoing professional development and lifelong learning. Continually evaluate and make reflection on professional practice to make informed decisions regarding the use of instructional technology in support of student learning. Apply technology to increase productivity.

Teachers understand the social, ethical, legal, and human issues surrounding schools and apply those principles in

practice. Teachers should: Promote safe and healthy use of instructional technology. Apply instructional technology to enable and empower learners with diverse backgrounds, characteristics, and abilities. Facilitate equitable access to instructional technology for all students.

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