INFLUENCE OF COMPUTER MEDIATED INSTRUCTIONS ON FACILITATION OF CHEMISTRY TEACHING IN KENYAN SECONDARY SCHOOLS, CASE OF KAPSARET CONSTITUENCY, WARENG DISTRICT

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A Research Project Submitted in Partial Fulfilment of the Requirements for the Award of Degree of Master of Arts in Project Planning and Management of the University Of Nairobi

2013

DECLARATION

This research project is my original work and has not been presented for degree work in any other university.

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This project is dedicated to my Loving parents, Mr. and Mrs. Kiptoo Birgen, who have supported me throughout my education.

ACKNOWLEDGEMENT

This project report is as a result of support from several sources. I would like to thank my supervisors Dr Odundo Paul, first for teaching me introduction to research, which has been of great importance in the development of this document. He further assisted me to formulate the study topic, which has been a success up to this level. I also would like to acknowledge Mr. Ochieng my second supervisor, for his tireless guidance for the success of this project. My profound gratitude also goes to the University of Nairobi, which offered me admission and opening Eldoret extra mural centre, which allowed me to conveniently work as i study, and this made my studies up to this level a reality. My gratitude also goes to all my lectures, more especially Mr. Koringura who taught me statistical methods, which has been of great help in the analysis of this document. Gratitude also goes to my classmates in the Department Of Extra Mural Studies Eldoret Centre, for the support I got from each one of them, especially Peris Tenai and Drusilla Cherogony, who were always there for me whenever I called for their academic assistance. I also owe much gratitude to my employer and colleagues, for all the support they gave me during the entire period of study especially the Principal madam Jane Cheboiywo for her understanding and support specifically during the examination times. I would also like to thank my sister Azaneth for all her financial support and encouragements during the entire period of the study. I also would like to thank my parents for their prayers, support and support they gave me throughout the study. This project would not have been successful without the data I collected from Wareng secondary school, Mother of Apostles Seminary, Racecourse Secondary and Hill School Girls' Secondary School, and I therefore would like to thank the Principals of these schools, all the teachers and students who willingly gave me the support I needed.

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LIST OF ABBREVIATIONS AND ACRONYMS

CMI	Computer Mediated Instructions
PP	PowerPoint
EOC	email and online chats
CT	Chemistry Teaching
IN	Instant Messaging
ICT	Information and Communication Technology
NEPAD	The New Partnership for Africa's Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
SMASSE	Strengthening of Mathematics and Science in Secondary Education

ABSTRACT

Computer mediated instructions play a role in Kenya's education, for instance in teaching of sciences, more specifically in chemistry, whose teachers were trained in the SMASSE INSET of 2012, with the theme of integration of information and communication technology in teaching and learning. The purpose of this study was to establish the impact of using computer mediated instructions on facilitating chemistry teaching. The objectives of the study were to establish the influence of PowerPoint instructions on chemistry teaching, to find out the effect of video instructions on chemistry teaching, to identify the effect of WebPages on chemistry teaching, to determine the impact of email and online chats on chemistry teaching. The study will adopt the theory of multiple intelligences that was proposed by Howard Gardner in 1983, which advocates for the learner being an active participant in their own learning, while the teacher plays the role of construction of knowledge with the learner. Descriptive survey design was adopted in this study; the research design was relevant to this study as it involves collection of data without manipulation. The study was carried out in Kapsaret Constituency, Uasin-Gishu County. The target population for this study was all secondary schools in Kapsaret constituency. The researcher purposely selected schools within Kapsaret constituency that offer computer studies; there were only four schools within the constituency that offer computer studies. The researcher randomly selected 30 teachers, and 120 students, and 4 school principals. Questionnaires and interviews were used to collect data. The data were analyzed using descriptive statistics with the aid of SPSS program. Majority of the respondents agreed that use of computer mediated instructions enhance syllabus coverage due to the facts that; they make the lesson interesting to students, allows students' participation during lesson delivery, lesson preparation is made easier, and that it enhances student understanding of abstract topics, although use of computer mediated instructions in chemistry makes setting of assessment test easier and improves on exam analysis, they were of the opinion that adoption of computer mediated instructions does not automatically lead to increased number of assessment. Majority of the students agreed that the use of computer mediated instructions makes the learning interesting. The results indicate that use of computer mediated instructions promote students engagement during learning, which is good for facilitating chemistry teaching, but it is associated with the challenge of class management. Majority of teachers and students agreed that use of computer mediated instructions has improved academic performance because; computers makes it easier to monitor students' performance, does not distract students from understanding important concepts in the topic, and that it allows the teacher to arrange for remedial for weak students. The researcher recommend that the teachers to enrich the computers information with the contents from recommended books, teachers to update their computer question banks to mitigate the problem of duplicating past exams, the school management to facilitate teachers to administer regular assessment to students, the school management to avail and update students academic progress programs for easy monitoring of academic progress of the students, teachers to balance between students' participation and class control in order to deliver the lessons effectively and the school management to improve teachers' capacity to use ICT teaching and learning process.

CHAPTER ONE

1.0 Introduction

In this chapter, the background to the study is given, a statement of the research problem is made, the objectives of the study are spelt out, research questions are posed, and the significance of the study captured. The basic assumptions of the study are also given, and the limitations and delimitations of the study have also been discussed, and lastly the significant terms in the study have been defined.

1.1 Background to the Study

Computer mediated instructions play a role in education by enhancing teaching and environment of learning and preparing students to acquire skills, competencies, and social skills fundamental for competing in the emerging global "knowledge" economy (MOEST, 2005). Kenya's vision 2030 aims at a globally competitive and prosperous nation with a high quality of life by the year 2030. It is made up economic, political and social pillars which includes education sector whose vision is "globally competitive quality education, training and research for sustainable development". Within this vision, centre for mathematics, science and technology addresses the goal of raising the quality and relevance of education and started training science and mathematics teachers in SMASSE training INSET of 2012 on integration of information and communication technology in teaching and learning (SMASSE training manual 2012), and teachers were urged to use computer mediated instructions such as PowerPoint, Videos, WebPages as well as email and online chats to allow students construct their own knowledge.

In line with these developments, developed and some developing countries are consistently promoting research on computer use and integration in many educational

settings and are depending on their findings for refining of policy decisions. Hardware and software industries continue their fast expansion and development, with new products for the educational system constantly emerging (Davies and Worrall, 1997). Chemistry as a subject requires visual representations and active involvement of the students in teaching and learning not only in distance education mode but also in face-to-face courses (Liu, 1996).

Computer Mediated Communications offers a rich set of tools that can be used to support a variety of learning experiences. One of these tools is PowerPoint instruction. The instructor is not limited to one set of services or tools but can use several to create a learning environment which will best suit his or her students' learning needs.(Tim and Melinda, 2005) PowerPoint as a tool will not, in and of itself, improve student learning. It's the way that instructors use PowerPoint that can encourage student learning by strategically employing it to engage students in the learning process, incorporating classroom assessment techniques and using methods geared toward reaching multiple learning styles.(university of Oregon, 2013) Adobe Connect Professional is a server-based software package with two basic components; Live Meeting, which can be recorded for asynchronous viewing, and Presenter, which allows you to easily put voice over PowerPoint and publish the recording to a URL for student viewing as observed by the university of Carolina in www.sc.com. With Adobe Connect, everyone in attendance can complete simulations and quizzes and interact with content at the same time while remaining inside the virtual classroom experience.

When learners are in the same physical location, they benefit from forming groups, sharing their work, and learning from one another's experiences. Similar collaboration and support can be achieved using Adobe Connect by using breakout

rooms, application sharing, and file sharing as noted by Cardiff metropolitan university. This keeps student engaged in their learning activities.

The use of video devices involves students in assessing themselves, their classroom participation, and other aspects of their learning. Traditionally, teachers have jealously guarded their prerogative to assess student performance. This right can be shared if teachers are willing to trust their students to responsibly assess themselves. This assessment activity takes only a few minutes at the end of an instructional unit, or academic year (Tomlinson, in ICT for education). The digital observations can be viewed by educators, students, and families to note academic, social, and behavioural progress and to identify the skills and behaviours that students have mastered and those in need of further instruction (Spencer, 2006).

Using web pages like a free blog from a site like Blogspot.com or Wordpress.com can allow teachers to easily post assignments for absent students. Parents can also see what their child is supposed to be working on. Students can easily leave comments on a blog, so the teacher can have feedback about his lessons. On a social networking site, such as Face book, a teacher can create a professional profile page that students can "friend." Students can leave comments for the teacher and ask questions after hours. The teacher can add class photos to the site, too. Wiki spaces are available free for teachers. Wiki spaces have many of the same features as a blog or social networking profile, but these pages also have an online discussion forum. In Chicago Illinois, Live text aided by the internet allows teachers to put up content on a webpage and enables them to offer on-line classes. Students have email addresses and hence instantly communicate with their teachers. (www.dist214.k12) use web pages during lessons motivate students to continue using learning outside school hours

(Becker, 2000; Chen and Looi, 1999; Harris and Kington, 2002) as cited by Galea in ICT for education wiki books.

Email and online chats provides current events coverage and the latest information on an enormous number of topics. Slide show tools allow you to incorporate text, video, audio and photos from the Internet easily, allowing you to share the most recent information using media that engage students (Stover in e-how.com). The interactive nature of the email and online chats is the key - pupils can take a quiz online that provides instant, specific feedback. They can get involved in a decision making exercise that allows them to see the results of their actions (ICT in the classroom, 2006). The study adopted the theory of cognitive development that was proposed by Piaget which supports the main activity in a constructivist classroom is solving problems. Students use inquiry methods to ask questions, investigate a topic, and use a variety of resources to find solutions and answers. As students explore the topic, they draw conclusions, and, as exploration continues, they revisit those conclusions.

1.2 Statement of the Problem

For a long time, the Kenya schools have not embraced the use of technology in improving teaching and learning, though there has been some interest in science and mathematics through SMASSE project, more specifically the 2012 April training inset whose theme was integration of ICT in teaching and learning in Kenyan secondary schools. Chemistry has been hard hit and has been poorly performed due to many factors such as wide syllabus, negative attitude by the students, lack of textbooks and enough teachers, and also poorly equipped laboratories. It has also been argued that learners tend to learn better if they are allowed to participate in the

process rather than rote learning in order to allow learners to take part in the process, and construct knowledge as well as get the technological skills required in the job markets. Following this the government has so far supplied computers to 2,000 secondary schools to enable them adopt computer mediated teaching and learning. The then Education PS George Godia said the schools had received 11 computers and a laptop each along with internet connectivity and said that, these are important teaching and learning aids which are part of a plan to modernize education in the country.

During the release of KCSE 2012, the minister of education noted that, the performance in the 2012 was slightly higher than 2011 with at least 298, 560 D+ and above which according to the minister is the minimum pass mark to the entry of the tertiary education. However chemistry, physics and mathematics registered improvement while various subjects' performance dropped. This came after the SMASSE training of science teachers in April 2012, and the study sought to determine the influence of computer mediated instructions on chemistry teaching in Kenyan secondary schools.

1.3 Purpose of the study

The purpose of this study was to assess the impact of using computer mediated instructions on facilitating chemistry teaching in Kenya secondary schools, case of Kapseret Constituency, Uasin Gishu County.

1.4 Research Objectives

The study attempted to answer the following objectives:

1. To establish the influence of PowerPoint instructions on chemistry teaching in Kapsaret Constituency.
2. To find out the effect video instruction on chemistry teaching in Kapsaret Constituency.
3. To identify the effect of web pages instructions on chemistry teaching in Kapsaret Constituency.
4. To determine the impact of email and online chats on chemistry teaching in Kapsaret Constituency.

1.5 Research Questions

The study sought to answer the following questions:

1. What is the influence of PowerPoint instructions on chemistry teaching in Kapsaret constituency?
2. How do video instructions affect chemistry teaching in Kapsaret constituency?
3. How do the web pages instructions affect chemistry teaching in Kapsaret constituency?
4. How does email and online chatting affect chemistry teaching in Kapsaret constituency?

1.6 Significance of the Study

The findings of this study will help the school administration, teachers, students and government through the Ministry of Education to make informed strategic decisions on issues related to computer mediated instructions in chemistry teaching in secondary schools and establish adequate approaches in addressing challenges facing secondary schools implementing them and their influence in chemistry teaching and to help in the realization of the Millennium Development Goals (MDG) more so related to education for all. The study will provide chemistry teachers with information and methodologies, which can be replicated in measuring the influence that computer mediated instructions have in their attempt to improve the performance and creativity of their students which ultimately improve their teaching methodologies and effectiveness in classroom management.

The study will offer a basis for further academic investigations to future researchers and academicians particularly in areas of performance management and evaluation of computer mediated instructions in secondary schools and its contribution to the improvement of the teaching and learning process. Its success thus contributes to important literature and foster pertinent knowledge creation.

1.7 Basic Assumptions of the Study

The study assumed that all the secondary schools that have computers utilize them for teaching. The study also assumed that the sample taken would be able to give response, and that the instruments used will be able to collect the required data and that teachers and students would be in school and willing to answer the questionnaires.

1.8 Limitations of the Study

The study is limited to the few dimensions of computer mediated instructions such as accessibility, availability, affordability and utilization. This study was also limited to non-homogeneity of respondents especially where the findings will not be categorized for sizes of the organization. The cooperation of the various stakeholders also posed a challenge. Teachers and students of these schools were also uncooperative for fear of victimization. However, to counter this, it was ensured that the assurance and cooperation was obtained from the most senior management. Given the topography of the place which is hilly, the means of reaching one school to another was a problem, and the investigator might not have been in position to cover all the targeted schools within the scheduled time, but the presence of motor bikes which can access most places faster were used to help the investigator to cover the targeted areas. Accessing Teachers and students to respond to questionnaire was a challenge due to busy school routines, to overcome this, the researcher booked appointment during games time and weekends for boarding schools.

1.9 Delimitation

The study was delimited to secondary schools in Kapsaret constituency, in Uasin Gishu, and to the critical study of the overt, explicit and written curriculum in Kenyan Secondary Schools in relation to computer mediated instructions and their influence on facilitation of chemistry teaching and learning.

1.10 Definition of Significant Terms

For the purposes of this research study, the following concepts will be taken to mean;

Computer mediated instructions this means use of computers for communication between the teacher and the learner.

Chemistry teaching this means interaction of teacher and students during chemistry lessons either face to face, synchronously or asynchronously.

Computer is a general purpose device that can be programmed to carry out a finite set of arithmetic or logical operations.

Classroom management - Classroom management is a term used by teachers to describe the process of ensuring that classroom lessons run smoothly despite disruptive by students.

Classroom engagement - The term is also increasingly used to describe meaningful student involvement throughout the learning environment, including students participating curriculum design, classroom management and school building climate.

Information Communication Technologies (ICT) ICT refers to technologies that provide access to information through telecommunications.

Secondary school - (also "high school") is a term used to describe an educational institution where the final stage of schooling, known as secondary education and usually compulsory up to a specified age, takes place.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter explores the existing literature review on the impact of computer mediated instruction on facilitating instruction of chemistry in secondary schools in Uasin Gishu County, Kenya. It also reviews available literature review on the PowerPoint, video conferencing, web pages, email and online chat, and audio visuals and the influence they have on instruction of chemistry. Theoretical and conceptual frameworks are also discussed.

2.2 Concept of computer mediated instruction in chemistry teaching

Computer mediated instruction refers to any form of communication between two or more individual people who interact and/or influence each other via a computer. It does not include the methods by which two computers communicate, but rather how people communicate via computers. (Wikipedia: Computer-mediated communication, 2006). The use of media support for sound and video enhancement, and for packaging lots of additional information resources with the basic instruction, means that much of the necessary teaching can be done without any connectivity. This is good news for developing country environments where connectivity is expensive, unreliable, or completely unavailable. While direct interaction with the instructor almost always adds value to instructional materials, it is possible to deliver very effective materials that can be used either in “stand-alone” mode or with only intermittent contact with the instructor. This will be an important distinction in thinking about mediated instruction in the Kenyan context, because the availability of

decent connectivity today is fairly low, and the current costs are held high by the low volume and non-competitive environment. (MOEST, 2005) Computer mediated instruction in teaching chemistry has created a major shift in how teachers and students think about teaching and learning. By allowing students to learn in more convenient locations and often at more convenient times, distance education opens educational opportunities to previously unreached populations. It also enables more people to extend the period of their education into a lifelong learning process (Kassop, 2003). This computer aided teaching in chemistry can be face to face if both the teacher and the learner are both at the same place, or online which can be synchronous if the teacher and the learner are online at the same time, or asynchronous if they are not online at the same time. Computer Mediated instructions offers a rich set of tools that can be used to support a variety of learning experiences. The instructor is not limited to one set of services or tools but can use several to create a learning environment which will best suit his or her students' learning needs (J. Jenkins, 2009).

2.3 PowerPoint in instruction of chemistry

Research shows that PowerPoint was the second most popular tool for creating computer-based training applications, as cited by 48 percent of 3,500 training professionals in a 2003 study conducted by Bersin and Associates (David and James, 2004). PowerPoint presentations can be successfully used as a teaching aid for students of any age (Investintech, 2013). Some of the characteristics it has for teaching and learning include customized instructions, customized presentations and broadcasting.

2.3.1 PowerPoint slide preparation in chemistry teaching

Preparations of PowerPoint presentations in chemistry create captivating lessons and attention-grabbing classroom. Using PowerPoint helps a teacher address different learning styles, making it much easier to engage a variety of learners (Investintech, 2013). A teacher can customize creation of templates, creating slides, inserting text, changing background colours, creating WordArt titles, and adding slide transitions to fit the content and learners at hand. Graphics, sound, video, custom animations, timed transitions, and hyperlinks can also be inserted to make presentations interesting and more meaningful (Investintech, 2013). The brain seeks patterns, connections, and relationships between and among prior and new learning.

The ability to break a concept into its similar and dissimilar characteristics allows students to understand and often solve complex problems by analyzing them in a more simple way (ICT in education, 2006) Guidance in identifying similarities and differences enhances students' understanding of and ability to use knowledge. Independently identifying similarities and differences enhances students' understanding of and the ability to use knowledge. Representing similarities and differences in graphic or symbolic form in PowerPoint slides enhances students' understanding of and ability to use knowledge (ICT in education, 2006). Creating an effective lesson plan is the key to effective teaching and a critical factor in achieving positive student outcomes (McKee, 1999), and this can be achieved with PowerPoint by customizing the content to fit the learners.

2.3. 2 PowerPoint presentations in chemistry teaching

Chemistry teachers can use Microsoft PowerPoint to create interactive presentations containing text, art, animation, and audio and video elements. It is probably the best-known presentation graphics program available (Starr, 2002). Both the teachers and students find projectors to be useful classroom resources, and therefore can be used to present PowerPoint slides in face to face learning. Whitaker an e-how contributor found out that, Projectors enable teachers to create bulleted PowerPoint presentations or other highly organized notes for the class. With the use of projectors in the classroom, students can take better notes with the ability to discern what information the teacher displays is most useful to them. Additionally, students can ask the teacher to repeat a slide if they missed information, or even ask that the teacher to email the presentation for further review. Presentations on a projector, additionally, reduce the need to make copies of materials to pass out to classmates during presentations that can now be displayed for the entire class to view at once, hence faster syllabus coverage. (Csinan word press).Students no longer have to crowd around a computer monitor to view presentations, Web sites or training programs. Multimedia projectors are becoming the centrepiece of classroom technology hubs that directly engage students and add impact to each lesson (Nagel, 2002).

Summarizing and Note Taking like in PowerPoint slides increases student achievement (ICT in education, 2006), as this enhance the note taking skills of the students. These skills promote greater comprehension by asking students to analyze a subject to expose what's essential and then put it into their own words. Research shows that taking more notes is better than fewer notes, though verbatim note taking is ineffective because it does not allow time for processing the information (Nagel, 2002) Teachers can also show students how to process information for their own note

taking with PowerPoint presentations by use of a variety of organizers to assist students who learn visually (Sheingold, 1990). The existence of ICTs can enable teachers to transform their teacher practices, given a set of enabling conditions. Teachers' pedagogical practices and reasoning influence their uses of ICT, and the nature of teacher ICT use impacts student achievement (Trucano, 2005).

2.3.3 PowerPoint Broadcasting and chemistry teaching.

In Kenya, The KIE Broadcasting program provides an excellent opportunity for increasing access for learners in marginalized communities particularly ASALs and urban slums, using relevant and approved curriculum. KIE's intended education channel that would be available for 24 hours provides an opportunity for increasing access to education throughout the country (MOEST, 2005). These presentations are prepared using power point and broadcasted in the television. After creation of presentation, a teacher can send the students a link to the file via e-mail or Instant Message (IM). When class starts, the teacher just clicks Start Broadcasting and with this one click, all of the students with a link to the broadcast (both physically inside and outside the classroom) can see a live, synchronized view of PowerPoint slides in their Internet browser as they click through them (Miller, 2007), and this can enable a teacher to reach several students in different localities at the same time.

PowerPoint and slide presentations hold student attention through the use of video, graphics and music. Because students today are so technologically advanced, tools that involve technology such as slide shows increase student involvement and interaction as found out by Stover, in e-how.com. Adobe Connect Professional is a server-based software package with two basic components; Live Meeting, which can be recorded for asynchronous viewing, and Presenter, which allows you to easily put

voice over PowerPoint and publish the recording to a URL for student viewing (university of Carolina in www.sc.com).With Adobe Connect, everyone in attendance can complete simulations and quizzes and interact with content at the same time while remaining inside the virtual classroom experience. When learners are in the same physical location, they benefit from forming groups, sharing their work, and learning from one another's experiences. Similar collaboration and support can be achieved using Adobe Connect by using breakout rooms, application sharing, and file sharing (Cardiff metropolitan university).This keeps student engaged in their learning activities.

2.4 Video instructions in teaching chemistry

The arrival of broadband access in more and more schools and homes, and the invention of new technologies for compressing and streaming video over the Internet, have combined to make it easier than ever to use video for teaching and learning (Lengel, 2013). Videoconferencing has been available since the 1960's, but has always been too expensive and too unwieldy to be used in classrooms. In the beginning, you needed two television studios, two transmitters, and two receivers to conduct a videoconference.

2.4.1 Video assessment and chemistry teaching

National Teachers Training Institute in Thirteen ed online recognizes that, teachers who use instructional video report that their students retain more information, understand concepts more rapidly and are more enthusiastic about what they are learning. With videos in a classroom, students often make new connections between curriculum topics and the world outside classroom. The use of video devices involves

students in assessing themselves, their classroom participation, and other aspects of their learning. Traditionally, teachers have jealously guarded their prerogative to assess student performance. This right can be shared if teachers are willing to trust their students to responsibly assess themselves. This assessment activity takes only a few minutes at the end of an instructional unit, or academic year (Tomilson, in ICT for education).

Digital observations sometimes referred to as digital diaries, can document students' academic performance and classroom-related behaviours (blue toad.com). Teachers and students can use digital camcorders and audio recorders to create visual and audio digital observations that contain recordings over time of students performing various learning activities and classroom routines, engaging in learning strategies, and interacting with others in a range of classroom situations. The digital observations can be viewed by educators, students, and families to note academic, social, and behavioural progress and to identify the skills and behaviours that students have mastered and those in need of further instruction (Spencer, 2006). In developed countries, there is an ICT tool called an iClicker. It allows teachers to be able to quickly poll students and get results in real time. An iClicker is a radio frequency device that allows a student to anonymously respond to questions the educator poses in class (media services, 2012), enhancing student participation and engagement.

2.4.2 Video Presentations and chemistry teaching

Digital or video cameras are among the Computer Mediated Instructions tools that are used by teachers to prepare and deliver their lessons to students. Its use has positive effects to both the teacher and the student, since lesson content can be recorded before lesson time, and teachers can use teleconferencing technologies that

enable instruction to be received simultaneously by multiple, geographically dispersed learners or to create a synchronous learning (ICT in education, 2006).This allows both the teachers and the students to develop good presentation skills. Radio and television have been used widely as educational tools since the 1920s and the 1950s, respectively. There are three general approaches to the use of radio and TV broadcasting in education (Perraton and Creed, 2002) they include direct class teaching, where broadcast programming substitutes for teachers on a temporary basis, school broadcasting, where broadcast programming provides complementary teaching and learning resources not otherwise available, and general educational programming over community, national and international stations which provide general and informal educational opportunities.

Adobe Connect allows users even non technical subject matter experts, to create and deliver programmes that mix and reuse a variety of learning resources, materials and activities. It enables educators to deliver synchronous, interactive tutorials and simulations using media rich e-learning content. The tool supports video, animations, audio, high resolution graphics, Microsoft PowerPoint, Adobe Presenter presentations, and Adobe Captivate® demonstrations. (Cardiff Metropolitan University)

2.4.3 Listening skills in video instruction and chemistry teaching.

Video conferencing combines text, sound, and colourful, moving images that can be used to provide challenging and authentic content that will engage the student in the learning process (Engauge, 2002). Regular use of Computer Mediated Instructions in teaching chemistry has a beneficial motivational influence on students' learning (Cox 1997). If chemistry teacher uses video conferencing and learners are

entering a lesson with a positive attitude the learning potential is already increased. The interactive nature of computers allows pupils to become more involved, permitting effective and active listening, hence enhancing learner engagement in learning, since it's a form of discussion and the learners are actively involved (ICT in the classroom, 2006).

2.5 Web pages in chemistry teaching

Web pages discussion is an educational online tool by which chemistry teachers and students can interact via discussions without the constraints of time and classrooms. An effort is made in asynchronous discussions to mimic the traditional discussions of face-to-face classroom. The asynchronous discussions typically require that students provide their own reflection or critical analysis of the chemistry topic being discussed. They also can use web pages like blogs to post homework assignments, upcoming events, articles of interest, and links to resources, upload documents, enhance graphics and upload photos and videos to your Schools-in-Sites classroom webpage. These pages are designed for teachers from all subject areas including chemistry and all education levels to deliver personalized instruction to students of all ability levels (Coastal Carolina Community College, 2013).

2.5.1 Collaborative writing on the web pages on chemistry teaching

A key area of rapid growth has been that of on-line learning, both in webhosted environments and in packaged form on CD. The use of web-based courses is proliferating in Australia and the USA. Schools are providing wider curriculum choices and more individualized programmes through the use of web courses; home-

based students of all ages are now able to choose courses and gain qualifications from a widening range of organizations (Eadie, 2001).

National Teachers Training Institute in Thirteen ed online has also found out that, communication and collaboration are particularly exciting for students using the Internet A web page like blog is a powerful internet program that helps chemistry teachers create lessons, tests and letters. Students can use it for creative writing, basic reports or research papers. Chemistry teachers can also design spreadsheet assignments for their students that require them to enter data, apply formulas, and graph and chart their data (the connected classroom blog).

Web pages may be employed to promote experiential learning, or learning "on site," so that the process of learning is integrated with the real world. Several expeditions by scientists and professionals have elicited student participation from schools. Students vicariously experience the excursion/expedition via photographs, activity logs, interaction with participants, and classroom activities based on the topic.

Instead of focusing solely on increasing the acquisition of facts related to specific subject areas, teams of students are engaged in solving complex, authentic problems that cross disciplinary boundaries. Instead of dispensing knowledge, teachers set up chemistry projects, arrange for access to appropriate resources, and create organizational structures and support that can help students succeed. These approaches move the concept of learning beyond the rote memorization of facts and procedures toward learning as a process of knowledge creation (Bransford & Cocking, 2000). Constructivism envisions a learning process in which students set their own goals, plan their learning activities, and monitor their current levels of mastery and understanding in preparation for lifelong learning. It moves concepts of school beyond the notion of a place where knowledge is imparted, to one of

classrooms, organizations, and societies as knowledge-building communities (Brown and Campione, 1994; Scardamalia and Bereiter, 1994).

As a result, it is proposed (OECD, 2001) that students will learn the skills needed for the 21st century, such as the ability to handle information, solve problems, communicate, and collaborate The Internet provides current events coverage and the latest information on an enormous number of topics. Slide show tools allows a chemistry teacher to incorporate text, video, audio and photos from the Internet easily, allowing you to share the most recent information using media that engage students (Stover in e-how.com)

2.5.2 Assessment of chemistry on the web pages

The impact of web pages on the learning process in chemistry seems to be more important and requires more than looking only to curricula. Improved student outcomes are observed, with regard to: motivation, enjoying learning; self-esteem; computer skills; collaborative skills; subject knowledge; information handling skills; meta-cognitive skills, etc. Driscoll (2001) believes in the power of technology to facilitate and even transform teaching and learning. She argues that, it is by using technology in a transformative way that students are able to realize the potential of technology and hence begin to develop more powerful uses and applications. Besides this, web pages can also help chemistry teachers restructure their classrooms, according to Knapp and Glenn (1996).Kook (1997) and OAT (1995) add that because the computers is a highly versatile tool, the teacher may use it for his/her own personal productivity and as away to expand classroom instructional activities. Despite the power of web pages to transform the teaching and learning process, research on the effective uses of technologies for enhancing chemistry teaching and

learning is still in its infancy (Driscoll, 2001). However, the most important issue concerns the decisions secondary school chemistry teachers make about how and why they incorporate web pages in their instruction (Driscoll, 2001; OAT, 1995).

The interactive nature of the internet is the key - pupils can take a quiz online that provides instant, specific feedback. They can get involved in a decision making exercise that allows them to see the results of their actions (ICT in the classroom, 2006). Web technologies provide huge potential for promoting more imaginative applications of computer aided assessment. They enable the use of different assessment methods within a range of approaches, including peer-assessment, self-assessment, group-based assessment and objective testing. Assessment methods involving web pages include case studies, mock exams, group projects and the creation of authentic learning tasks (Brown et al., 1999; Peat and Franklin, 2002; Herrington et al., 2002). The internet also enables chemistry teachers to access to up-to-date student and school data, anytime and anywhere (Perry, 2003) as cited by Galea in ICT across the curriculum.

2.5.3 Interaction on chemistry web pages

Effective use of web pages in the learning makes learner management easy by chemistry teachers since it makes pupils feel they are in control in terms of independent learning. Web pages use during learning motivates students to continue learning outside school hours (Becker 2000; Chen and Looi 1999; Harris and Kington 2002) as cited by Galea in ICT for education wiki books. Hargreaves (1997) and Meighan (1997) argue that merging computer mediated instruction and education requires organizational changes at the level of the whole system: in the direction of

allowing more distance-learning or even virtual schooling, thus changing the attitude towards time, place, curriculum and other connected attributes of the system.

Tonarely an e-how contributor found out that, with students' increased time spent online and social networking, using a blog or social networking page can help students easily connect with teachers. Using a free blog from a site like Blogspot.com or Wordpress.com can allow chemistry teachers to easily post assignments for absent students. Parents can also see what their child is supposed to be working on. Students can easily leave comments on a blog, so the teacher can have feedback about his lessons. On a social networking site, such as Face book, a chemistry teacher can create a professional profile page that students can "friend." Students can leave comments for the teacher and ask questions after hours. The teacher can add class photos to the site, too to attract more students. Wiki spaces are available free for teachers of all subjects. Wiki spaces have many of the same features as a blog or social networking profile, but these pages also have an online discussion forum.

2.6 Email and online chat in chemistry teaching

Online chatting and email are other tools with which to communicate online. Developing and conducting a well-designed collaborative learning via email discussion is not a simple endeavour. To be successful, it requires the integration of proper and adequate elements. These are proposed practical strategies for the implementation of email in Computer Mediated Instructions writing classroom: the teachers' role and course framework, the learner's role, the provision of the learning environment, inclusion of assessment and assessment method, task structure and task content (Noraien Mansor, 2007)

2.6.1 Assessment on EOC

Emailing assignments to students has a number of benefits. There is always a record of the assignment and absent students get the homework right away. Through email, students always have a quick and easy way to communicate questions or concerns to their teacher. In general, a chemistry teacher becomes more easily and privately accessible to the students. (The Gaggle, 2007) Specifically, research shows that email is a very useful vehicle for teaching chemistry (Lee, 1998; Warschauer, 1995).

Email can be used in teacher-student, student-student communication including formal and informal consultations, exchange of dialogue journals and writing conferencing (Belisle, 1996). It is not easy for students to consult a teacher because of shyness or lack of time. However, studies have found that students using email wrote more, asked more questions, used more language functions and adopted a more conversational tone in their language. It enables a chemistry teacher to monitor the process of the students' writing in order to save class time (Belisle, 1996). The interactivity of technologies is cited as a key feature that enables students to receive feedback on their performance, test and reflect on their ideas, and revise their understanding. Networked technology can enable teachers and students to build local and global communities that connect them with interested people and expand opportunities for learning.

Increasingly, an email is coming to be incorporated into various science subjects in the curriculum and across subjects. Although many teachers see email and online chatting as a resource that is often assessed by standardized tests to help them teach the standard curriculum (Law et al., 2000; Schofield & Davidson, 2002), other teachers are coming to see email and online chats as a way of changing what is taught

and how it is assessed. These teachers are using computer within the context of complex tasks, conducted within a multidisciplinary context and extended blocks of time, and with performance-based assessment (Means and Olsen, 1995).) However, Bransford, Brown, and Cocking (2000) caution that the positive impact of technology does not come automatically; much depends on how chemistry teachers use computers in their classes. A national study in the U.S. (Wenglinski, 1998) actually found a negative relationship between the frequency of use of school computers and school achievement. Similar findings came from international data (Pelgrum and Plomp, 2002).

2.6.2 Collaborative study on EOC

Collaborative learning via email discussion requires conscientious preparation and arrangements on the part of the chemistry teacher in order to develop activities and devise an appropriate course framework which will help guide students through the email writing class. Learners, too, need training which involves technical training and careful training related to the process approach involving new behaviours and new ways of thinking about learning in order to value and adopt the approach. (Noraien Mansor, 2007) Developing activities and devising a course framework involve the selection of topics, group discussion, the writing approach, guidance and regulations, duration and facilities for the whole task to be conducted via email discussions. The process will be jeopardized without a proper course framework. The chemistry teachers need to equip themselves with advanced knowledge in the area of information communication technology (ICT) especially in using an appropriate email software program.

Further Warschauer (1995) asserts that email provides the students with an excellent opportunity for real and natural communication, and supplies opportunities for independent learning which is essential for collaborative writing, and also allows the students to communicate easily with hundreds of other students. It can provide information, contact and stimulation, supplying the teacher with more effective and enjoyable teaching situations. In brief, email enables students to have various opportunities for communication, collaboration and information. It leads students to a new world of experience (ICT in education, 2006). Chemistry teachers could use Internet communication tools, such as e-mail and Instant Messaging, to enable students to communicate with other students about various educational topics, or to contact experts in various fields to obtain information about particular subjects of interest.

For example, a chemistry teacher might arrange for students in their class to converse, via e-mail or Instant Messaging, with students in another country. E-mails could be sent with a procedure of an experiment by the writer, and the recipient student would be responsible for performing that described experiment in their own locality. If the timing could be appropriately arranged, the same sort of exchanges could be possible through the use of Instant Messages. In either situation, students would benefit not only from having "hands-on" experience in learning a foreign language, but would also have the opportunity to speak with a peer in another part of the world, a. rare and exciting educational opportunity.

Similarly, teachers could design lessons that require students to correspond with an expert about a particular subject. A chemistry teacher might ask students to e-mail professionals who use chemistry knowledge and expertise everyday in their careers. Students could find out how meteorologists, astronauts, forensic scientists,

and doctors use information they are currently learning about in their classes each day in their respective fields. This kind of communication, facilitated through the medium of Internet communication tools, could make information being learned seem relevant and important to students, rather than unexciting and abstract.

2.6.3 Communication on Email and online chats

The internet is an extremely useful source of information for use by chemistry teachers. Many sites offer freely downloadable resources that can be adapted for chemistry teachers' own use. Interactive electronic communication among people located at two or more different places can also be used (Rao and Rama, 2002). There are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology: audio conferencing; audio-graphic conferencing, videoconferencing; and Web-based conferencing (ICT for education). Teachers can also use the email to collaborate on projects with other chemistry teachers in the school or in other schools in the country or elsewhere, or even with scientists in the field (MOEST, 2005). Each school in Western Australia has a Network operating system whether it is local area network or increasingly wide area network and traditionally this has included the servers, desktops, applications, and other Information and Technology infrastructure, such as printers (Australian parliamentary report no 16).

This allows communication of many computers to a main one, hence enhancing lesson delivery. Online chatting or instant messaging, or IM, is more instantaneous than email. With IM, a teacher or a learner maintains a list of people with whom to communicate. Like email, with IM the users communicate by typing their messages to one another. The messages show up on a small window on the

computer screen. In this case, both the teacher and her learner can see the messages on their screens. As soon as one types and sends a message, both users can see the message and the messages stay up for the duration of the conversation. On IM, a user can also send videos, images, files, links to websites, and sounds. Instant messaging can also be set up to work like a phone. Most cell phones are capable of sending instant messages. Learners can set up e-pals (email pen pals) to connect with peers around the country and the globe. Students can correspond with experts in various fields via e-mail. E-mail activities are a good way to get started on the Internet, as they require minimal planning. These activities capture student's attention hence easier management.

2.7 Theoretical Framework

The study adopted the theory of multiple intelligences that was proposed by Howard Gardner in his 1983 book Frames of Mind: The Theory of Multiple Intelligences as a model of intelligence that differentiates intelligence into specific "modalities", rather than seeing it as dominated by a single general ability. Within the theory of Multiple Intelligences (MI) learning is explained as involving an interdependent functioning of multiple intelligences that accounts for all aspects of human cognition. Developed by Howard Gardner, the theory postulates that there are seven or more intelligences that each individual is born with and is needed to live life well (Smith, 2002, 2008). As people develop new knowledge, often these intelligences complement each other (Hatch and Gardner, 1989).

In MI theory, the learner is seen as an active participant in their own learning. When new knowledge is presented to the child, the child will utilize different intelligences in order to synthesize and analyze the new information. With an

understanding of Gardner's theory of multiple intelligences, teachers, school administrators, and parents can better understand the learners in their midst. They can allow students to safely explore and learn in many ways, and they can help students direct their own learning (Guignon, 2010). These learning ways are as logical-mathematical, linguistic using words effectively using tools like computers and multimedia. Others learn intra-personally by understanding one's own interests while others learn interpersonally through interaction with others like when video conferencing and emailing. Students who show sensitivity to rhythm and sound using tools like CD-ROM and DVD learn musically. There are students who learn by bodily kinaesthetic use body effectively with practical. Visual-spatial is a learning way that students think in terms of physical space by drawing, solving puzzles, reading maps with tools like multimedia (Lane in tecweb). This method of learning stands in contrast to the traditional view of intelligence testing using only two kinds of intelligences, linguistic and logical-mathematical and therefore accommodates use of various ICT tools in classroom teaching so as to meet the various learning ways used by different students.

In social constructivism, the teacher is a co-constructor of knowledge with the child. Instead of lecturing or direct instructions, the teacher allows and guides the child to come to his or her own understanding of the material. A teacher in the classroom will aid and support the student in their own discovery and initiative through a concept called, the zone of proximal development. The Zone of Proximal Development allows a child to tackle a problem that is sufficiently novel to attract and maintain a child's attention, yet not so difficult that the solution cannot be perceived (Edwards, 2005). To expand this concept to the classroom, the teacher will 'set up' activities for students that are just beyond the students' abilities and then guide and

support the student to come to a solution themselves with minimal help from the teacher. By allowing students to use content-free software (for example word processors, spreadsheets, draw and paint programs, e-mail, Hyper Studio, Micro Worlds, Inspiration, PowerPoint) teachers can develop activities to enrich many of the multiple intelligences.

In MI theory, the role of the teacher is to take a broader view of learning to include all intelligences and consequently plan and deliver activities that will allow children to learn through intelligence that they are strongest in. Taking this approach to learning, teachers are able to give their students extended opportunities to construct new knowledge that makes most sense to them and can therefore be readily applied to novel situations. Therefore, if educators are to adopt a constructivist approach, they will easily adapt and change instructional design strategies to actively engage learners in meaningful projects and activities that promote exploration, experimentation, construction, collaboration, and reflection of what these learners are studying. The Internet, World Wide Web, and hypermedia application programs, all hypertext based environments, are very quickly transforming how information is stored and retrieved and how learners collectively communicate, access, contribute, and create information and resources.

2.8 Conceptual Framework

The conceptual framework illustrates how the CMI impact chemistry teaching

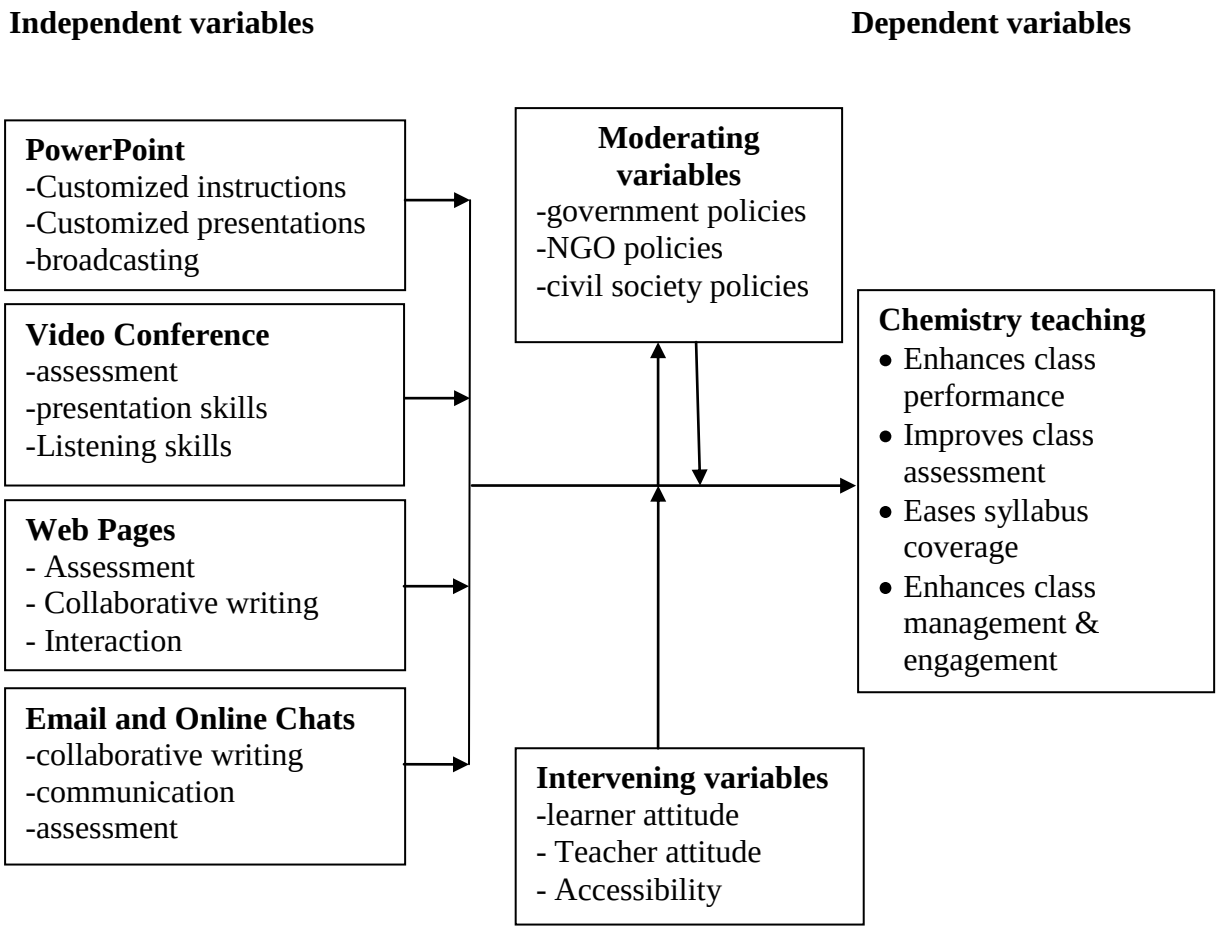

Figure 2.7 –Conceptual Framework

Source: Author (2013).

The identification of the effects and implications of CMI on class performance is important from the onset. The implementation of the computers is expected to affect how chemistry teachers teach and deliver content in the classrooms. Research indicates that there is no positive correlation between the use of CMI and student performance but the computers may improve the student's creativity and innovativeness. CMI have an impact on the way teachers carryout their assessment both in terms of the speed and ability to develop the assessment, which could be done

online through networked systems and also by having computer based instructions and assessments.

The success of any project depends on the communication of critical information to those involved it various ways in the efforts to realize the goals and objectives. Lack of requisite training may hamper the implementation of the same, and therefore there is need for chemistry teachers to be trained on how to incorporate CMI in helping them deliver their syllabi to the students. There is need to understand how CMI influence how a teacher manages the classroom and also incorporate CMI to assist and improve the same. And also to make sure that teachers understand the technology and utilize it to their advantage to improve the environment of learning and teaching.

2.9 Gaps in Literature Review

From the literature review done, there exists knowledge and skills gap on how well the teachers and other stakeholders understand the issue of computer mediated instructions in secondary schools. The introduction of Computer mediated instructions has been greeted with a lot of apprehension by others while most teachers strive to embrace their use in their class teaching. If there is need for Computer Mediated Instructions, what are benefits and the shortcomings? There is a lot that is yet to be done on areas like training and inclusion the curricular. Are there additional effects other than the ones that this research is addressing that the Computer Mediated Instructions in secondary schools have? This research seeks to fill this gap.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The chapter outlines the research design adopted for the study. It also describes the target population and how the sample and the sample size were determined. The chapter also describes the data collection instruments, pilot testing of the instruments, validity and reliability of the instruments, and also describes the data collection procedure. Data analysis technique and ethical consideration has also been explained.

3.2 Research Design

This study adopted a descriptive survey design approach. This research design best describes the characteristics of a large population, and can be administered from remote locations using mail, email or telephone. It also allows collection of data in the field without manipulating conditions. Consequently very large samples are feasible, making the results statistically significant even when analyzing multiple variables. There is flexibility at the creation phase in deciding how questions will be administered: as face to face interviews, use of telephones, individual or group administration, written or oral, or by electronic means. Standardization ensures that a similar data can be collected from groups then interpreted comparatively between group studies.

3.3 Target Population

The study targeted all secondary schools in Kapsaret Constituency, Uasin Gishu County, with a special focus in schools that offer computer studies. The target population were principals; science teachers and students in secondary schools within the constituency were used as the population for the study.

Table 3.1 Target population

Strata	**Target population**
Head Teachers / Principals	11
Teachers	180
Students	3082
Totals	**3273**

Source: DEOs Office, Wareng District (2013)

3.4 Sample Selection and Sample Size

The study used both purposive sampling and simple random sampling techniques. According to Kothari (1999), an optimum sample is one that fulfils the requirements of efficiency, representativeness, reliability and flexibility. The sample size selected was considered large enough to use powerful statistic and to generalize results to the population (Creswell, 2002). The key informants were; school principals, the teachers, and students. Purposive sampling was used to select schools that offer computer studies in all forms, and whose computers are connected to the internet. The head teachers of the selected schools where purposively selected, while simple random sampling was used to select teachers and students that participated in the study. The population in the schools selected for study is as shown in table 3.3.

Table 3.3 sample selection

school	Principals	Teachers	Form 1	Form 2	Form 3	Form 4
Hill school	1	20	70	60	70	61
Wareng secondary	1	26	100	90	80	111
Race course secondary	1	21	51	70	60	30
Mother of apostles seminary	1	24	81	80	90	100
total	**4**	**91**	**302**	**300**	**300**	**292**

The sample was selected in such a way that ensured that students in all forms were represented in the study. This method enabled the study to capture all the intended informants. 30% of 91 science teachers in the schools that offer computer studies and 10% of 1204 the students were selected randomly, while principals of the selected schools were purposely selected, these gave a sample size of 154 respondents. This was done in order to obtain sufficient and reliable data. According to Mugenda and Mugenda (1999), when dealing with heterogeneous, that is the population with different characteristics, the sample size should be at least10- 30% of the total population so as to capture variability in the population. Based on this, 4 head teachers, 30 teachers and 120 students were selected as shown in table 3.2.

Table 3.3 Sample Size and Sample Design

School	Target population					
	Principal	teachers	Form 1	Form 2	Form 3	Form 4
Hill school girls high school	1	7	7	6	7	6
Wareng secondary	1	8	10	9	8	11
Racecourse secondary	1	7	5	7	6	3
Mother of apostles seminary	1	8	8	8	9	10
Total	**4**	**30**	**30**	**30**	**30**	**30**

3.5 Data Collection Instruments

The study used methods that provided accuracy, generalization, and with administrative convenience (Warwick and Lininger, 1975). Data was collected with questionnaires in the case of students, and semi structured interviews for all the teachers.

3.5.1 Pilot Testing of the Instrument

As suggested by Oppenheim (1992) and Zikmund (1994) who argued the significance of pre-test in a questionnaire survey, a pilot survey was conducted using a group of convenient samples, in a neighbouring school which also offers computers studies. This aimed at detecting problems in the questionnaire design and see if the questionnaire has an easy-to-follow layout, clear instruction, understandable statements, easy to answering, comfortable time to complete the questionnaire and generally to give the respondents a chance to propose several constructive suggestions for further improvement. The proposed questionnaire items was submitted to research colleagues, supervisors, state and community policy makers and a limited number of teachers and students for reviews and comments. The initial assessment was done where the researcher reviewed and summarized the existing data, information and knowledge about computer projects. These revealed gaps in existing knowledge suggest what extra information will be needed and stimulate new ideas. It also produced useful background information to complement the researcher's later findings. Following the suggested modifications and improvements, a specific number of items were selected and included in the questionnaire survey for the students.

3.5.2 Validity of the Instrument

Validity refers to the degree to which a test actually measures the variable it claims to measure. Validity is the accuracy and meaningfulness of inferences, which are based on the research results. Validity is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study (Mugenda and Mugenda, 1999)A test is valid if it measures what it claims to measure (Koul, 1986). Consistent with the existing research the reliability coefficient was measured when all the items are included in a single questionnaire and necessary comparison made, another important aspect of questionnaire development is validity assessment (Churchill 1979, Gerbing and Anderson 1988), the question is whether this questionnaire measured what it purported to measure. Carmines and Zellor (1979) discuss two types of validity; Content validity and criterion-related validity (predictive and concurrent validity). Similarly, Gerbing and Anderson (1988) emphasize the constructs relationships with other constructs and indicators in validity assessment.

Content validity of the questionnaire was established during the item identification phase. Review of the literature and colleague assessment was used to identify a comprehensive pool of items related to the construct of the effect of employee turnover on organizational performance. Construct validity was examined by assessing the scales relationship with other constructs or indicators by carrying out correlations, and correlated and checked if consistent with homological expectations or relevant theories, and the scales validity was high. Additionally it was important to provide information about the population means and standard deviations so that readers could establish the meaning of a score (Spector, 1992). The overall mean of the scale and its standard deviation were calculated.

3.5.3 Reliability of the Instruments

A data collection instrument must be reliable. That means it must have the ability of constituently yield the same result when repeated measurements are taken on individuals under the same condition (Freeman 1965:66). Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda and Mugenda, 1999). Reliability of a test is the accuracy of the scores that are free of errors. The researcher undertook to ensure that the research instruments are reliable.

3.6 Data Collection Procedure

The researcher obtained a letter of introduction from the University of Nairobi, a list of Secondary schools from the Ministry of Education from the District Education Office (Wareng District). This made easy the identification and facilitated simple random sampling procedures. Questionnaires was then administered (to informants) during the official working hours. Informants were interviewed so as to obtain their feelings about the computer mediated instructions in secondary schools and their influence on classroom management and engagement. Interviews were scheduled with the Principals to get an in depth understanding of the issue of CMI in chemistry learning. Confidentiality of information was assured to all the respondents.

3.7 Data Analysis Technique

Data analysis refers to examining what has been collected in a survey and making deductions and inferences (Kombo and Tromp, 2006). It was feasible to carry out a quantitative analysis of all the responses in the study because in-depth interview method was used where specific framing of the question varied from interview to

interview. Both quantitative and qualitative (descriptive) methods of data analysis were used. Quantitative analysis was used in the interpretation and analysis of data represented in tables. Coding was used to assign the collected data with numerical values where the response rate of each respondent's category was determined. Coding ensured efficient analysis since it reduced the gathered data into small number of classes which contained the most important information. SPSS Version 19 (SPSS Inc. 2001) was used as the major software package for statistical analysis. The use of percentages also made it easier for the researcher to interpret and analyze data for better understanding.

3.8 Ethical Considerations

Necessary ethical concerns were done to ensure that the relevant authorities were informed and permission to carry out the research was obtained.

The researcher will asked for permission from the ministry of education to carry out the study in the targeted schools. The researcher also sought permission from the District Education Officer (DEO) of Wareng District to carry out the study. The head teachers will also be informed of the study so as to schedule their programs on their respective schools.

Questionnaires were also handled with confidentiality and subjects were advised not to indicate their names on the questionnaire. The research findings were also made confidential and will be used in the study in answering the research questions and no publications were done without a notification from parties involved. The participants were informed before collecting data from them. Assurance was given on the fact that the information given was not to be used for other purposes other than for academic research.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATIONS AND INTERPRETATIONS

4.0 Introduction

This chapter describes the impact of computer Mediated Instructions in facilitating chemistry teaching in Kenyan secondary schools in Kapsaret Constituency. The data was collected through questionnaires and interviews. The qualitative data was organized into broad themes that answered the research objectives. Quantitative data was organized in frequency counts and converted to percentages for clear presentations.

4.1 Response rate

The response rate of the students was 100%, since the targeted sample was obtained, since they were given enough time to fill the questionnaires but on teachers, out of the 32 targeted only 30 (88%) responded, and therefore the total response rate was 98.54%.

4.2 Demographic characteristics

The preliminary of this study was done through administration of questionnaires. The respondents used in the study were categorized into two strata, of teachers and students, who were further disaggregated by gender, age, form and Computer knowledge for the students.

4.2.1 Members Participating In CMI in Chemistry Teaching By Gender

The study sought to know the gender distribution of respondents participating in Computer Mediated Instructions in chemistry teaching by gender as illustrated in table 4.1

Table 4.1 Members participating in CMI in Chemistry teaching by gender

Members	Male	Female
F1	18	12
F2	20	10
F3	17	13
F4	15	15
TEACHERS	16	14
TOTAL	**86**	**64**

Out of 150 respondents who participated in this study, there were 86(57.3%) male and 64(42.7%) were female. The number of male was higher than that of the female because the schools selected composed of one boy's school with a large population, one girl's school and two mixed school.

4.2.2 Members participating in CMI in chemistry teaching by age bracket

The study sought to know the age bracket distribution of members participating in Computer Mediated Instructions in chemistry teaching, and the results summarized in Table 4.2.

Table 4.2 Members participating in CMI in chemistry teaching by age bracket

Members	14-15	16-17	18-19	19-24	25-30	31-40	41-50	Above 50
F1	18	12	0	0				
F2	2	28	0	0				
F3	0	20	10	0				
F4	0	0	26	4				
teachers					14	10	4	2
Total	**20**	**60**	**36**	**4**	**14**	**10**	**4**	**2**

Majority of the students are aged between 16 and 17 years, which formed 50%. Thirty students were selected in each class. All the students selected for this study were CMI conversant, and all took chemistry. This is because in all the schools sampled, computer lessons were compulsory in form one and two Majority of the teachers aged between 25-40 years and most of the teachers have been in their current schools in less than 3 years. Majority of the teachers interviewed were classroom teachers. All the respondents were computer literate since the teachers were all trained in the SMASSE INSET of 2012, while all the students have gone through computer classes.

4.3 Influence of PowerPoint instructions on chemistry teaching

Establishing information on PowerPoint instructions in teaching chemistry was my first objective of the study. There are many factors considered for one to confirm that there is influence of PowerPoint in chemistry teaching, key among them is customized instructions, customized presentations and broadcasting. This will allow students time to revise and inform the teacher on areas that they have difficulty.

To measure this parameter, teachers and students were asked closed ended questions relating to the influence of PowerPoint on chemistry teaching.

4.3.1 PowerPoint customized instructions in teaching chemistry

The study sought to know from the respondents how customized instruction is useful in teaching chemistry, and both the students and the teachers were asked questions on use of PowerPoint customized instructions on chemistry teaching. The students were asked to rate the following statement: PowerPoint preparation of slides can make a chemistry lesson captivating and students' attention is not captured. Out of 120 respondents, 104 (86.7%) agreed that PowerPoint preparation of slides can make a chemistry lesson captivating, while 16 (6.7%) said that PowerPoint slides preparation can lead to a lesson that students attention is not captured. The findings summarized in table 4.3.

Table 4.3 Response on influence of PowerPoint instructions on Chemistry teaching

Form	Lessons are captivating	Students attention not captured	Total
1	20	10	30
2	30	0	30
3	26	4	30
4	28	2	30
TOTAL	**104**	**16**	**120**

These results show that a large percentage of the respondents feel that lessons aided with PowerPoint are captivating, due to the fact that it can be customized to show graphics, diagrams and short notes depending on the lesson, hence enhancing student learning, since the student attention is captured. This leads to improved student performance as noted by one of the interviewed respondents.

The teachers were also interviewed in relation to the preparation of power point instruction. Most respondents agreed that customized PP instructions in preparation of slides ensure time available for class is sustained for learning without interruptions. Some of the respondents also said that use of PowerPoint preparation of slides makes lesson preparation easier, though they strongly felt that it mainly depends on the teacher's competence on how to customize the slides to meet the lesson's objectives, indicating that, without competence, preparation of lessons with PowerPoint can be equally difficult.

4.3.2 PowerPoint presentations on chemistry teaching

In order to determine the influence of PowerPoint presentations in chemistry learning, the students were asked questions on PowerPoint presentations. The students were asked to rate the statements; with PowerPoint instructions, learning is effectively organized with sequence being logical and the second question was if illustration using PowerPoint allows students to understand abstract topics easily. Out of 120 respondents, 102(85.0%) agreed that PowerPoint presentations enhances student note taking, that is effectively organized with sequence being logical, while 18(15.0%) agreed that presentations does not enhance syllabus coverage. For the statement that PowerPoint presentations allows students understanding of abstract concepts, 102(85.0%) of the 120 respondents agreed. PowerPoint presentations make students to make poorly organised notes statement was agreed by 18(15.0%). This information has been summarised in Table 4.4.

Table 4.4 Response in PowerPoint presentations

Form	PowerPoint enhanced student note taking	Pp presentations does not enhance syllabus coverage	Repeat of slide presentations allows understanding of abstract topics	PowerPoint presentations make students to make poorly organised notes
1	26	4	23	7
2	23	7	25	5
3	25	5	28	2
4	28	2	26	4
Total	**102**	**18**	**102**	**18**

From these results, it can be seen that PowerPoint presentations enhance organized note taking that is sequential in chemistry in majority of the students. Since the teachers summarise the notes on the slides Students across the forms agreed to this question. Interviewed teachers confirmed this, with the reason that all the presentations are prepared in advance including all the notes such that students can make short notes during the presentations, and a teacher can also post the lesson contents through mail to absent students, or retrieve the presentations when needed without having to prepare again. However, one of the head teachers noted that though PowerPoint presentations really fosters student note taking skills, not all the students will be captured if the teacher does not control the class effectively. He added that teachers need to be in a position of balancing between class control and engagement, otherwise use of PowerPoint can have counteractive effects to teaching and learning, since the objectives of the lesson might not be achieved if the learners minds concentrate elsewhere especially if the notes are note well organized, or if they are too long for the students to copy as they listen to the teacher.

Results also show that repeat of slide presentations allows understanding of abstract topics since in cases were visual aid is required for the students to understand. This is because students can always ask the teacher to repeat presentation of a given slide if there is need, and the learners can all see clearly the presentations if projectors have been used. An interviewed teacher added that PowerPoint presentations make students to find lessons interesting and absorbing rather than monotonous and boring, and this improves their performance because students like lessons aided by visual aids and tend to recall more than when just said, which leads to enhanced syllabus coverage as noted by a number of the respondents, since the teacher does not need to repeat several times a given topic.

4.3.3 PowerPoint broadcasting in chemistry teaching

In order to determine the influence of PowerPoint on learning, the students were asked questions through questionnaires in relation to PowerPoint broadcasts and chemistry teaching. The students were asked to respond to the question; PowerPoint broadcasts enhance syllabus coverage and that learners do not recall more from broadcast lessons in chemistry. Out of 120 respondents, 71(59.2%) agreed that PP broadcasts enhances syllabus coverage, while 49(40.8%) felt that learners do not recall more from broadcast lessons, as illustrated in Table 4.5.

Table 4.5 Response on PowerPoint broadcasts in teaching Chemistry

Form	enhances syllabus coverage	Learners do not recall more from broadcast lessons	Total
1	15	15	**30**
2	13	17	**30**
3	20	10	**30**
4	23	7	**30**
Total	**71**	**49**	**120**

This results show that use of PowerPoint broadcasts in teaching enhances syllabus coverage. This is due to the fact that, many students can be reached by one teacher at the same time, especially in schools with less chemistry teachers. Many interviewed respondents noted that this is an important teaching style especially is schools with unequipped laboratories, where a practical set can be performed as the students watch, rather than being taught theoretically. Another respondent also commented that this can be useful where field trips to manufacturing companies are involved, such that a teacher can record the whole process and present it through PowerPoint broadcasts instead of taking a whole day out, and this saves time for more syllabuses to be covered. The respondent further added that in schools where there is a shortage of teachers; students without a teacher can benefit from the broadcasts and finish the syllabus on time. However a respondent felt that the use of PowerPoint broadcasts makes class management difficult, as students can decide to divert their attention to the beauty of presentation instead of learning from them. This affects the achievement of the intended objectives of the broadcast. The second question asked was; learners do recall more from lessons aided by PP Broadcasts, and results shows indeed they do recall, and this can be explained by the fact that learners like varied

teaching styles, especially when the lesson is interactive and with visual aids, and they tend to remember more, unlike when they are spoon fed by the teachers without being given an opportunity to contribute.

4.4 Effect of video instructions on chemistry teaching

Objective two of the study was to find out the effect of video instructions on facilitating chemistry teaching. The current approaches to effective classroom teaching making the lesson to be student centered; one way of achieving this is encouraging students' participation during the lesson. Care must be taken to ensure that student participation does not interfere with lesson delivery.

4.4.1 Video assessment in chemistry learning

The aim of assessment of learners is to enable the teacher to rate the performance of every individual learner. To find out the effect of video instructions on chemistry teaching the students were given questionnaires with questions on assessment with video instructions on chemistry. The students were asked the question; video instructions enhance assessment, or if it lowers assessment Out of the 120 respondents, 79(65.8%) agreed that use of video instructions in chemistry enhances assessment, while 41(34.2%) felt that it lowers assessment and the findings were summarized on Table 4.6.

Table 4.6 Responses on video assessment in Chemistry learning

Form	Video instructions enhance assessment	Video instructions lowers assessment	Total
1	20	10	30
2	23	17	30
3	21	9	30
4	15	15	30
Total	**79**	**41**	**120**

This results show that videos can be used as assessment tools by making digital diaries of each students, that can document students' academic performance and classroom related behaviours, unlike when assessment of behaviours mainly depend on the memory of teachers. On this connection, interviewed respondents commented that Students can self assess them by recording how they perform a given activity, and later counter check it with how it should be performed. One respondent noted that if a teacher is well trained on how to record a video, then not only academic performance can be assessed, but other skills like hands on activities of students can also be assessed, which can later be used to show students were they need to make adjustments. Majority of the interviewed respondents also agreed that use of Video instructions can enhance monitoring of student progress, and this is because the recording of videos can be done repeatedly and compared to check if the students performance is improving, giving a basis of guiding students on the areas to improve.

4.4.2 Video presentation in teaching chemistry

To determine the effect of video presentations on chemistry teaching, the students and the teachers were given questionnaires to fill. In order to determine the effect of video presentation skills on facilitating learning, students were asked to rate the following question: students don't understand difficult concepts in lessons aided by video instructions, VI does not enhance syllabus coverage, and the last question was if VI instructions enhance student participation in chemistry lessons. Out of 120 respondents, 24(7.5%) agreed that students don't understand difficult concepts easily in chemistry lessons aided by videos, while 88(73.3%) agreed that VI enhances syllabus coverage, and 99(82.5%) agreed that Video Instructions enhance

participation of learners in chemistry lessons, and the findings summarized in Table 4.7.

Table 4.7 Response on the effect video presentations on Chemistry teaching

FORM	Students don't understand difficult concepts easily in lessons aided with VI	Video presentations enhance syllabus coverage	VI presentations enhance participation of learners
1	2	20	20
2	3	19	25
3	4	22	26
4	15	27	28
TOTAL	**24**	**88**	**99**

These results show that most of the students understand difficult concepts in chemistry lessons aided by videos, since it mixes and uses a variety of learning resources, materials and activities otherwise not available in school. It also indicates that VI presentations enhance syllabus coverage since teachers can deliver synchronous and interactive lessons, hence enhancing syllabus coverage. Results also show that Video presentations enhance participation of learners.

These results also indicate that VI presentation skills indeed enhances participation, more especially when answering questions with the support of video tools, and adobe presentations. However, an interviewed respondent had the opinion that students don't pay attention to lessons aided by video presentations, showing that Video presentations can have a negative effect in chemistry learning, if the teacher does not a good class control and ensure that students' attention is captured, by ensuring that the lesson is well prepared, to meet the needs of all the students.

4.4.3 Video listening skills in chemistry learning

In order to find out the effect of video instruction on facilitating chemistry teaching, respondents were asked questions on listening skills. The students were asked of their opinion on whether listening to videos can improve student performance in chemistry. Out of 120 respondents, 102 (85%) agreed that it improves performance, and 18 (15%) said it does not increase student curiosity to learn and the findings illustrated in the Table 4.8.

Table 4.8 Response on video listening skills in Chemistry learning

Form	Video instructions increases student performance	Video instructions does not increase student curiosity to learn	Total
1	28	2	**30**
2	23	7	**30**
3	24	6	**30**
4	27	3	**30**
Total	**102**	**18**	**120**

From the results, it can be observed that, video instructions increases student performance. This is because as students listen keenly, they are able to identify areas they have not understood and ask questions, and due to the high student and teacher interaction, student attention is enhanced, which in turn leads to improved learner performance.

This result also show that video presentations do increase student curiosity in learning chemistry, and this is because during video interaction students questions can be instantly answered, giving them the motivation to know more of the topic being discussed, as said by one of the respondents. One of the interviewed respondents also added that during video presentations, students can ask and answer questions and this

enhances their engagement, which in turn leads to understanding of abstract topics, hence increased performance.

4.5 Effect of web pages instruction on chemistry teaching

Identifying the effect of web pages on chemistry teaching was my third objective of the study. Web pages are an important component for CMI in chemistry teaching. It is important for both students and teachers in order determine if the set objectives has been made, the more frequent the students are accessed the better, in order to collect information on this factor, and the investigator asked the respondents to rate some questions relating to web pages as a CMI tool.

4.5.1 Effect of web pages collaborative writing on chemistry teaching

In order to identify the effect of web collaborative writing on chemistry teaching, teachers and students were given questions relating to web pages collaborative writing and chemistry teaching. Students were asked to respond to the question; web pages enhance revision, and if it also improves students' writing skills. Out of the 120 respondents, 72 (60%) agreed to the question that web pages allows variety of revision material. On the question of whether web pages improve writing skills, 91(75.8%) said yes. The findings were summarized in the Table 4.9.

Table 4.9 Response on effect of web pages collaborative writing on Chemistry teaching

Form	Web pages allows variety of revision material	Improves writing skills of students
1	8	16
2	16	21
3	22	28
4	26	26
Total	**72**	**91**

These results show that the collaborative writing on the walls of web pages equips students with a variety of revision material. Teachers also agreed that students can indeed access various revisions material and even one responded added that the content on the web pages should regularly be updated by the teachers to ensure that the content is always adding value to the students' knowledge when accessed. Most of the interviewed respondents confirmed that this improves the learners' performance, and this is attributed to the fact that it involves learning on site and since teachers engage students in solving complex problems, hence enhancing better performance of the students. This results also show that web pages improves writing skills, since this activity of writing on the walls of web pages engages the students to continuously learn, hence facilitating self assessment of the student, and makes the learner to feel control of own self, which boosters' responsibility in students since they can be in charge of managing their own time.

4.5.2 Web pages and assessment

In order to determine the effect of web pages in assessment of learners, the students were asked to respond to the questions on the use of web pages for assessment of learners. In order to determine the effect of web pages in assessment of

learners, the students were asked to respond to the question; use of web pages increases the number of assessments. Out of the 120 respondents, 75(62.5%) said that it enhances assessment, while 45(37.5%) felt that it does not enhance assessment. The information was summarized in Table 4.10.

Table 4.10 Response on web pages and assessment

Form	Web pages enhances assessment	Web pages does not enhance assessment	Total
1	15	15	**30**
2	20	10	**30**
3	19	11	**30**
4	21	9	**30**
Total	**75**	**45**	**120**

These results indicate that web pages can enhance assessment in chemistry. This is attributed to the fact that teachers post questions on the walls of web pages almost on daily basis, hence increasing the accessibility of tests to students rather than waiting up to end of term for students to be assessed. However, one respondent noted that if the walls of those pages are not updated, then it might not serve the purpose of effective assessment. Majority of the interviewed respondents agreed that WebPages makes setting of tests easier, and one respondent interviewed added that it improves exam analysis, but these does not automatically increase the frequency of administering continuous assessment to students. This indicates one danger associated with the use of web pages, as two other respondents felt that, web pages encourage duplication of past exams. This is because if the questions bank in the computer is not updated; limited questions will lead to duplication of past exams, which negate the objectives of students' assessments.

4.5.3 Web pages interaction and chemistry teaching

In order to identify the effect of web pages interaction on facilitating chemistry learning, the students were asked questions on the effect of web pages interaction. The students were asked if the interaction on the web pages allows students to learn outside school, or does not allow. Out of 120 respondents, 84(70%) agreed that web pages interaction allows students to learn outside school, while 36(30%) said it does not allow learning outside school, and results summarized in Table 4.11.

Table 4.11 Response on web pages interaction and Chemistry teaching

Form	Web pages allows learning outside school	Web pages does not allow learning outside school	Total
1	15	15	**30**
2	23	7	**30**
3	21	9	**30**
4	25	5	**30**
Total	**84**	**36**	**120**

This results show that the interaction on the web pages which can be done anywhere as long as one is connected allows students to learn even in absence of the teachers and this enhances student engagement, assessment as well as fast coverage of the syllabus. This was confirmed by the interviewed respondents who felt that since learners can easily access revision materials, and also questions that are discussed by the students and teachers which boosts student understanding, leading to increased performance. Majority of the interviewed teachers are of the opinion that webpages does increases student engagement in chemistry lessons. This is achieved by the equal chance given to the students to make contributions, unlike when in a class of 40

minutes where the teacher does more of the talking as students listen leaving them with less time to make contributions.

4.6 Impact of email and online chats on chemistry teaching

The last objective of this study was to establish the impact of email and online chats on chemistry teaching, which was dealt with in three sub themes which are assessment, collaborative study, and communication.

4.6.1 Assessment on Email and Online Chats and chemistry teaching

In order to determine the impact of Email and Online Chats assessment on chemistry teaching, students were asked to rate statements on Email and Online Chats in relation to chemistry teaching. In order to determine the impact of Email and Online Chats assessment on chemistry teaching, students were asked to rate the statement; email and online chats enhances student self assessment. Out of 120 respondents, 62(51.7%) said email and online chats enhance student self assessment, while almost a similar number of 58(48.3%) said that it does not. The results summarized in Table 4.12.

Table 4.12 Response on the effect of Assessment on EOC and Chemistry teaching

Form	Enhances student self assessment	Does not enhance student self assessment	Total
1	12	18	30
2	16	14	30
3	19	11	30
4	15	15	30
Total	**62**	**58**	**120**

These results indicate that email and online chats can enhance student assessment or not enhance depending on how it is used by both the teachers and the students. If teachers can post individual assignments and monitor the progress of each student, and this improves assessment since students can be tested even when the teacher is not in the same place, and if both the teacher and the students happens to be online at the same time, then assessment will be instant. One respondent said that if there can be a frequent communication between the teacher and the student, then instant assessment will be enhanced, where the students can assess themselves. However, in cases of shy students who cannot communicate with the teacher, or if the teacher does not respond to the students' questions, then Email and online chats might not offer effective assessment of chemistry. One of the interviewed respondents felt that unlike having students' progress record that can only be accessed in office; with email and online chats the records can be kept in spreadsheets which can be accessed by both the teacher and the students away from school. However one respondent noted that for this to be effective, then teachers should get support from the administration, while another respondent felt that teachers' technological skills should be regularly refreshed to enhance their competence.

4.6.2 EOC collaborative study and chemistry teaching

In order to determine the effect of email and online chats collaborative study, students were given questionnaires to fill. They were asked if the use of email and chats has improved the academic performance and if does not. Of the 120 respondents, 87 (72.5%) said that it does improves performance, and 33 (27.5%) said it does not improve performance, as summarized in Table 4.13.

Table 4.13 Response on impact EOC collaborative Study on Chemistry teaching

Form	Improves student performance	Does not improve student performance	Total
1	17	13	**30**
2	19	11	**30**
3	24	6	**30**
4	27	3	**30**
Total	**87**	**33**	**120**

This results show that Email and Online Chats collaborative study improves students' performance. This is attributed to the fact that a chemistry teacher selects topics with a proper course framework which ensures that the intended content is covered for set objectives to be achieved, which in turn enhances syllabus coverage and student engagement in chemistry. Most of the interviewed agreed that emails and online chats enable students to communicate with other students about various educational topics which might not have been taught by their teachers but can correspond with experts and this enhances student engagement, syllabus coverage and their performance as well. One of the interviewed respondents added that it also enhances monitoring of individual student's progress by the teachers and this allows attention of every student hence an improvement of students' performance.

4.6.3 Impact of EOC communication on chemistry teaching

In order to determine the impact of EOC communication on chemistry learning, students were asked to give their opinion on questions relating EOC to chemistry teaching. In order to determine the impact of EOC communication on chemistry learning, students were asked to give their opinion on the statements; communication on the EOC does not improve performance and communication on email and online chats improves student performance. Out of the 120 respondents,

48(40%) said that online and email chats does not improve student performance, while 72(60.0%) agreed that it improves performance, and results illustrated in Table 4.14.

Table 4.14 Response on EOC communication in Chemistry teaching

Form	Does not improve performance	Improves performance	Total
1	16	14	30
2	13	17	30
3	10	20	30
4	9	21	30
Total	**48**	**72**	**120**

This results show that use of Email and Online Chats communication in teaching chemistry, improves performance due to the interaction on the internet. In connection to this, one respondent noted that, the fact that teachers can communicate to individual students means that a chemistry teacher can organize for remedial work for the weak students, leading to improved performance. Most of the interviewed respondents agreed that Email and Online Chats communication eases student monitoring and improves assessment. This can be explained by the fact that both the student and the teacher can type their questions and answers to each other, and as messages are replied, they show up on a small window on the computer screen, which facilitates instant messaging, and this enhances assessment and monitoring of students. The above results indicate that email and online chats improve students' performance, which is an indicator of teaching. Generally it can be observed that email and online chats positively impact chemistry teaching.

CHAPTER FIVE

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses summary of the findings, conclusions, recommendations from the study, contributions to the body of knowledge and areas for further study.

5.2 Summary of Findings

The gender of the students who participated in this study were 86(58.3%) boys and 64(41.7%), the number of boys was higher than that of the girls because the schools selected composed of one boys school, one girls school and one mixed school. Majority of the students aged between 16 and 19 years. Sixty students were selected in each class. All the students selected for this study were computer literate; this is because in all the schools, computer lessons are compulsory in form one and two. The gender of teachers who participated in this study composed of 16(53.3%) males and 14(46.7%) females. Majority of the teachers aged between 25-40 years. Most of the teachers have been in their current schools in less than 3 years. Majority of the teachers interviewed were classroom teachers.

The purpose of this study was to establish the impact of Computer Mediated Instruction on facilitating chemistry teaching in Kenyan secondary schools. Specifically the study sought to find out impact of school CMI; PowerPoint instructions, video instructions, web pages, and the email and online chatting, on chemistry teaching. There are many factors considered for one to confirm that computer mediated instructions facilitate teaching, key among them is use of

PowerPoint. This allows students time to revise and inform the teacher on areas that they have difficulty, and even request the teacher to replay a slide. To measure this parameter, teachers and students were asked questions relating to use of PP in teaching. Majority of the students and teachers believe that the use of PowerPoint presentations facilitate syllabus coverage. This is because adoption of PowerPoint allows; students' participation during lesson delivery, using PowerPoint presentations allows students to internalize concepts easily, and that generally the use of PowerPoint enhance syllabus coverage. The use of illustrations in the designed computer programs allows students to understand faster hence the teacher can cover the syllabus at higher speed compared to conventional teaching materials.

The Study also sought the opinion of the teachers and students on the role of videos in enhancing chemistry syllabus coverage. The results of the teachers also were in agreement with that of students, majority of the teachers agreed that use of videos enhance chemistry syllabus coverage due to the facts that; the use of videos makes the lesson interesting to students, videos allows students participation during lesson delivery, lesson preparation is made easier with the use of videos, and that videos use enhance understanding of abstract topics. Notes preparation with the aid of computers easier, portable and can be easily updated unlike old methods of pen and paper, where you were required to carry books around. With the use of videos, teachers can carry their notes in their phones, flash disks, and Compact Disks (CDs) and update them wherever need arise.

The current approaches to effective classroom teaching making the lesson to be student centered; one way of achieving this is encouraging students' participation during the lesson. Care must be taken to ensure that student participation does not interfere with lesson delivery. In this study, the investigator tried to establish the role

video instructions on students' engagement and management. The aim of adopting student participation during lesson delivery is to make the lesson interesting and captivate the attention of the students. Majority of the students agreed that the use of video makes the lesson interesting. When the lesson is interesting to the student, it captures their attention, hence easing the task of class control on the part of the teacher.

Teachers were interviewed to respond to some questions relating to the role of video on students engagement and management. They agreed that video allows students participation during the lesson, video increase students curiosity to learn, the use of video makes the class difficult to manage, students can access irrelevant sites during the lessons, and that Students fail to pay attention to teachers explanations when computers are used in class. The results indicate that use of video promote students engagement during the lesson, which is good for effective classroom teaching, but it is associated with the challenge of class management such as, making it difficult for the teacher to control students, students' failure to pay attention to teachers explanations, and students accessing irrelevant information during lesson.

Web pages are an important component of CMI for chemistry teaching. It is important for both students and teachers in order determine if the set objectives have been made, the more frequent the students are assed the better, in order to collect information on this factor, and the investigator asked the respondents to rate some questions relating to assessment on the web pages. The students agreed that introduction of web pages would increase the number of assessment in chemistry. Teachers were also requested to respond to questions relating to how web pages influenced students assessment. Although teachers agreed that use of web pages makes setting of assessment test easier, improves on exam analysis, they were of the

opinion that adoption of web pages in a school does not automatically lead increase number of assessment. Administering continuous assessment to students' depends on other factors such as teachers' work load, school calendar, and availability of computers and other tools to be used. One limitation that was highlighted with the use of web pages was that it might lead to duplication of past exams, if there are limited questions in soft copy, teachers might recycle the same questions, hence compromising the quality of assessment.

The last objective of this study was to establish the impact of email and online chatting on chemistry teaching. Students and teachers were asked five point Likert questions. Majority of students agreed that use email and online chatting improves their academic performance. Teachers were also asked to rate statements relating to the influence email and online chats on improving students' performance. Most teachers agreed that email and online chats improves students performance because; they make it easier to monitor students' performance, they do not distract students from understanding important concepts in the topic, and that they allow the teacher to arrange for remedial for weak students. Adoption of CMI in schools allows teachers to keep academic records of the student in a form that is easier to retrieve, draw comparison and initiate early remedial measure if a student records a worrying academic trend.

5.3 Conclusion

The purpose of this study was to establish the impact of computer mediated instruction on facilitating chemistry teaching. Specifically the study sought to find out influence of CMI on; syllabus coverage, students assessment, students engagement and management. Majority of the teachers agreed that use of PowerPoint enhance

syllabus coverage due to the facts that; the use of PowerPoint make the lesson interesting to students, PowerPoint allows students participation during lesson delivery, lesson preparation is made easier with the use of PowerPoint, and that it also enhances understanding of abstract topics.

Majority of the students agreed that the use of video instructions makes the lesson interesting. When the lesson is interesting to the student, it will capture their attention, hence easing the task of class control on the part of the teacher. Teachers agreed that videos allows students participation during the lesson, increases students curiosity to learn, the use of videos makes the class difficult to manage, students can access irrelevant sites during the lessons, and that Students fail to pay attention to teachers explanations when videos are used in class. The results indicate that use of videos promote students engagement during the lesson, which is good for effective classroom teaching, but it is associated with the challenge of class management

Although teachers agreed that use of web pages makes setting of assessment test easier, improves on exam analysis, they were of the opinion that adoption of web pages in a school does not automatically lead increase number of assessment. Administering continuous assessment to students' depends on other factors such as teachers' work load, school calendar, and accessibility of CMI tools. One limitation that was highlighted with the use of web pages is that it might lead to duplication of past exams. Majority of students agreed that use of EOC has improved their academic performance. Most teachers agreed that EOC improves students performance because; It makes it easier to monitor students' performance, it does not distract students from understanding important concepts in the topic, and that EOC allows the teacher to arrange for remedial for weak students. The findings indicate that CMI positively

impacts classroom teaching, and therefore schools should adopt and enjoy enormous benefits associated with adoption of this technology.

5.4 Recommendations

In view of above findings and opinions from the respondents the study recommends the following measure in order for chemistry teachers to reap maximum benefits of computer mediated instructions.

1. The teachers to enrich the ICT tools with the contents from recommended books or the schools to purchase the programs from authorized sources such as Kenya Literature Bureau (KLB) in order to ensure that the information accessed by students are relevant to their syllabus
2. Teachers to update their computer question banks to mitigate the problem of duplicating past exams
3. The school management to facilitate teachers to administer regular assessment to students
4. The school management to avail and update students academic progress programs for easy monitoring of academic progress of the students
5. Teachers to balance between students' participation and class control in order to deliver the lessons effectively
6. The school management to improve teachers' capacity to use CMI teaching and learning process.

5.5 Contributions to the body of knowledge

Objective	**Contribution**
1. Broadcast presentations	This is a new technology that is available in PowerPoint, and schools with few teachers and many students can benefit by having one teacher deliver a lesson to more than one class at the same time, and interactively
2. Video conferencing	This is a computer mediated instruction that can be used where distance learning is involved, since a teacher can deliver a lesson to students in different geographical regions at the same time. In Kenya, this can be used to curb the wide chemistry syllabus.
3. Collaborative research	This is where both students and teachers can post a question in e.g. Google groups, Amazon and wiki and have it responded by people from different regions to have better findings.
4. Global team work	Online chatting can help both the students and the teachers to have instant answers to their questions

5.6 Suggestions for Further Research

1. The findings of this study did not establish the nature and level of support from the administration on integration of computer mediated instructions in teaching and also the time both the students and their teachers use the computer mediated instructions. There is therefore need for research to establish the support given to it by the administration and the time of access.
2. The study did not also establish the attitude of the teachers and students on the use of computer mediated instructions.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR STUDENTS

I am a master's student in the University of Nairobi, and currently undertaking a research on the impact of computer mediated instructions on facilitating chemistry teaching in Kenyan secondary school. Your assistance will be highly appreciated, and all your honest responses will be kept confidential.

Section A: Demographic information

1. Gender Male [ ] Female [ ]
2. Age 14-15 [ ] 16-17 [ ] 18-19 [ ] above 19 years [ ]
3. Form I [ ] II [ ] III [ ] IV [ ]
4. Do you have any knowledge on computer use? Yes [ ] No [ ]

Section B: Influence Computer Mediated Instruction on chemistry

Respond to this section by ticking the box that has a statement you agree with in relation to use of computer mediated instructions on chemistry

No.	TASK	Response		Comments
				Select by either using (√) (x)
1.	PowerPoint Slide preparation can make chemistry lessons captivating	Yes No	[ ] [ ]	
2.	Preparation of PowerPoint slides can lead to lessons that don't capture student attention	Yes No	[ ] [ ]	
3.	PowerPoint presentation enhances student note taking	Yes No	[ ] [ ]	
4.	PowerPoint presentation enhance syllabus coverage	Yes No	[ ] [ ]	
5.	Repeat of slide presentations allows understanding of abstract topics	Yes No	[ ] [ ]	
6.	PowerPoint presentations makes students to make poorly organised notes	Yes No	[ ] [ ]	
7.	PowerPoint broadcasting enhances syllabus coverage	Yes No	[ ] [ ]	

8.	Learners do not recall more from PowerPoint broadcasted lessons	Yes No	[ ] [ ]	
9.	Use of videos in chemistry teaching enhances assessment	Yes No	[ ] [ ]	
10.	use of videos in chemistry teaching does not enhance assessment	Yes No	[ ] [ ]	
11.	In chemistry lessons aided by video students don't understand difficult concept	Yes No	[ ] [ ]	
12.	Video presentations enhance syllabus coverage	Yes No	[ ] [ ]	
13.	Video presentations enhance participation of learners in chemistry lessons	Yes No	[ ] [ ]	
14.	student performance is increased when video instructions are used in chemistry teaching	Yes No	[ ] [ ]	
15.	Using video in teaching chemistry increases student curiosity to learn	Yes No	[ ] [ ]	
16.	Use of web pages collaborative writing allows variety of revision material	Yes No	[ ] [ ]	
17.	Collaborative writing in web pages improves writing skills of students in chemistry	Yes No	[ ] [ ]	
18.	Use of web pages enhances assessment	Yes No	[ ] [ ]	
19.	Interaction in web pages allows learning outside school	Yes No	[ ] [ ]	
20.	Use of email and online chats enhances student self assessment in chemistry	Yes No	[ ] [ ]	
21.	Collaborative study in the web pages improves student performance	Yes No	[ ] [ ]	
22.	Communication in the email and online and online chats improves student performance	Yes No	[ ] [ ]	

Thank you for finding time to respond to this questionnaire

APPENDIX 3: INTERVIEW SCHEDULE

1. How is Chemistry lesson being facilitated in your school? (Please explain) _____

_____

_____

2. On your own assessment how do PowerPoint instructions helped in improving Chemistry teaching in classrooms _____

_____

3. What is the contribution of video instructions chats in improving the delivery of Chemistry lesson in classrooms _____

_____

4. What is the influence of in web pages instructions improving the delivery of Chemistry lesson in classrooms _____

_____

5. What is the contribution of email and online chats in improving the delivery of Chemistry lesson in classrooms? _____

_____

6. Are computer mediated instructions helpful to learners in understanding Chemistry in your school? _____

_____

7. Do you think any adjustments should be done on integration of computer mediated instructions on chemistry to teaching?

_____

_____

Thank you for finding time to respond to this interview