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Project title

A Framework for E-Content Adoption in Secondary Schools

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Declaration

By Candidate

I ***Stanley Kiama Ndegwa*** do hereby declare that this is my original study and to the best of my knowledge it has not been presented for a degree award in any University.

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By Supervisor

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ABSTRACT

The recent development in information communication technology has revolutionized the way modern teaching is being conducted. In education, it has led to the emergence of teaching using computers in class. The hard concepts that long used to be difficult to explain have been simplified by the use of whiteboard in classrooms.

In the recent years there have been initiatives by Kenya Institute of Education (KIE) – (a Government of Kenya education agency which evaluates and recommends instructional materials for secondary school students) to encourage schools to adopt e-content technologies. While adopting e-content technology is very important, several teachers and authors are unwilling to venture into this emerging culture. The failure to adopt e-content technology in teaching causing a lot of concern among the information system researchers.

This study tries to discover why the rate of e-content adoption is very slow in secondary schools. Despite the recent advancement in information technology there has been very minimal use of the e-content in schools.

Research efforts for main determinants of user acceptance and use of new technology have been constrained by lack of appropriate reference theory and key variables. As a result of this gap this study aims to investigate and examine the socio-cultural, individual and institutional factors that explain users' behaviour to adoption and use of e-content technology in secondary schools. Further the study aims to design a framework that can be used by the stakeholders as a blueprint in making e-content technology adopted by teachers in the learning environment.

This study was designed so as to test a proposed model that borrowed most of the constructs from the Technology Acceptance Model (TAM) although some of the other models were reviewed to come up with a more comprehensive model.
The study design was in form of a survey conducted in Limuru District that covered secondary schools offering computer studies in their curriculum.

The findings of this study have significant implications to e-content technology developers, implementers and managers of institutions. The e-content developers and integrators are urged to take into account the importance of social factors, facilitating conditions, technological habits, PU and PEOU that directly or indirectly influence technology usage and hence its adoption.

The research finding of this study were analysed and used to test the validity of the model. The conclusion of the results gave rise to the modified model that is hoped to increase the rate of e-content adoption in secondary schools. The implementers of the e-content technology are advised to use the modified model as they continue to integrate e-content into the secondary school curriculum.

List of Figures

List of Tables

List of Abbreviations

1	ANOVA	One-Way Analysis of Variance
2	ASU	Actual System Usage
3	AT	Activity Theory
4	AT	Activity Theory
5	ATU	Attitude Towards Use
6	BI	Behaviour Intentions
7	CEO	Corporate Executive Officer
8	CIE	Centre For Intercultural Education
9	CM	Contingency Model
10	e-learning	Electronic Learning
11	eLIG2	E-Learning Industry Group Two
12	e-publishing	Electronic Publishing
13	E-teaching	Electronic Teaching
14	EU	European Union
15	ICT	Information Communication Technology
16	IE	Institutional Environment
17	KIE	Kenya Institute of Education
18	LMS	Learning Management Systems
19	MANOVA	Multiple Analyses of Variance
20	MoE	Ministry of Education
21	PB	Planned Behaviour
22	PEOU	Perceived Ease Of Use
23	PU	Perceived Usefulness
24	SCORM	Sharable Content Object Reference Model
25	SCOs	Sharable Content Objects
26	SF	Social Factor
27	TAM	Technology Acceptance Model
28	TFF	Task-Technology Fit Model
29	TPB	Theory Of Planned Behaviour
30	TRA	Theory of Reason Action
31	TTF	Task-Technology Fit Model

Table of Contents

CHAPTER 1

INTRODUCTION

1.1 Background to the problem

According to European e-Learning Industry Group (eLIG2, 2005), "adding an *e* to learning has confirmed or even increased the importance of content as a founding pillar of Education: the more technology spreads itself into classrooms and our lives, the more the need for high quality and media rich content that can be effectively repurposed and reversioned for different devices, platforms and infrastructures." The turn to e-learning content and its quality, is essential in many respects for all stakeholders in education, training and lifelong learning. A major target is to develop a common ground in our understandings about the notion of quality of e-learning contents and it is reasonable to expect that this should eventually lead to the development and widespread adoption of common or comparable quality assurance systems on e-learning content across different sectors and national contexts. The utility of the development of quality assurance systems related to e-learning content is in its wider conception not much different than in other kinds of products or services, i.e. "customer satisfaction". However, examining how "customer satisfaction" can be achieved, starting from the diversity of national learning patrimonies within education system which may also ascribe different meaning to quality and going down to individual learning needs and learning styles, it is not difficult to realise that widespread adoption of common or comparable quality assurance systems on e-learning content may be, for the foreseeable future at least, an elusive goal. As is characteristically pointed out by eLIG (2005) "quality assurance systems cannot be isolated from pedagogy models on which content is based.

Although content development plays a key role in e-learning, it is undoubtedly not an easy process (Jegan, 2004). It requires expert knowledge in the subject area, patience in creating the necessary objects that make up quality, interactive subject ware, and a high sense of creativity in structuring and sequencing the topics to make a complete whole (Omwenga *et al*, 2004).

The rise in knowledge intensity is being dictated by the combined forces of the ICT revolution and the increasing pace of technological change (Beig etal, 2006). Today, the internet is facilitating the quick and efficient movement of information among interacting people in social network at greatly reduced costs.

E-learning content is neither a value free product nor it can be seen independently of a complex web of economic, social, cultural and educational realities. It is therefore an imperative that we should attempt to identify wider trends that directly or indirectly shape the context for understanding the role of e-learning content in education, training and lifelong learning (European e-learning Industry Group, 2010)

1.2 Problem statement

Today there is a growing concern over the e-learning contents and their quality. As a matter of fact, at EU level there is a change in focus, from technology availability and connectivity into schools, houses and workplaces, basic ICT literacy skills and introduction of ICT into curricula towards e-content (Fe-Con framework, 2005).

With the advance of the Information and Communication Technologies, e-Learning is becoming more accessible and pervasive in the world. Although many public and private initiatives are undertaken for improving and widening the computer equipment, networks and Internet connections much work needs to be done and Kenya still needs a better technical infrastructure to stimulate the development of e-Learning.

In the last few years there have been a number of KIE researchers in the field of e-technologies for schools piloting e-learning projects for the future absorption of e-Learning platforms and e-Learning assessment tools. But in most cases the resulting software tools are yet in an experimental or prototype stage (KIE, 2010).

Mwai, (2010) did a research on e-content adoption framework in Kenyan context however he did not research on adoption of e-learning content in secondary schools therefore my study aims to fill the gap of "Why e-learning content is not well received in secondary school curriculum delivery despite the mounted efforts by the government of Kenya to support the digital infrastructure in schools and the society at large.

1.3 Objectives of the study

The purpose of this study was therefore to find out reasons why the adoption of e-content has met resistance from teachers of secondary schools.

The objectives of this study were to;

i. To examine social, economic and technological factors that hinder successful use of e-content in secondary schools

ii. To investigate existing e-content adoption frameworks suitable for implementation of e-content learning in secondary schools.

iii. Develop a framework that will be used as a blueprint for adoption and use of e-content at secondary school level.

iv. Using survey method, test the validity and viability of the proposed model

1.4 Research questions

The research questions were;

- What are the social, economic and technological factors that hinder successful use of e-content in secondary schools?
- Are the existing e-content adoption frameworks working in the implementation of e-content learning in secondary schools?
- What are the constructs that need to be taken into consideration when we are designing an e-content learning framework?
- What is the best method to use to test the validity and viability of the proposed model?

1.5 Justification of the study

The study tries to find out why e-learning content technology is not adopted in secondary schools despite the high advocacy of the use of e-technology in Kenya today. This problem will be addressed using a conceptual e-content adoption framework. Once this framework is implemented, we are anticipating that the e-content adoption would shot up gradually and the same trend maintained through the education system. The ministry of education and KIE in particular are going to be the major beneficiaries of this study.

The framework will provide guidance on the design of e-learning, where the word design includes both the design from scratch of e-learning as well as the use of existing e-learning materials to electronic format. Such broad view on e-learning will also be reflected by the fact that the framework integrates considerations on e-content format and style, on technological aspects, on pedagogical models, on communication styles, on socio-cultural characteristics. In this research, learning is placed at the intersection of all these aspects.

1.6 Limitations and scope

The scope of this study is to cover secondary schools in Limuru constituency where the target population is going to be secondary schools in the selected departments and administration, where each of these areas was to produce one respondent.

1.7 Assumptions

The current education economics aids are adequate to be used in supplying secondary schools with the new technological tools needed towards this goal. The teacher is the centre of the matter. No country can move forward without the full cooperation of the teachers (Bernaars etal, 1994). The teachers' skills and attitude play a leading role in the implementation of e-content technology in secondary schools. It is presumed that all the stakeholders would cooperate and validate the research model.

Further, the teachers and other interested players are going to work together for effective implementation of this e-content technology adoption model.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

E-learning content is part of the whole package of learning economies and societies. Apparently, the turn to "learning" that is so boldly stated in the above terms should sound as excellent news to educators and students at all levels of education and all kinds of training. A "learning society" should, after all, be an educated society with high educational quality and standards of achievement. It's also the kind of society that should provide the means to all individuals, independently of their socioeconomic background and other factors that lead to educational disadvantage (for example ethnic minority status or disability) for better access and higher participation to education.

The aim of this review is to identify and discuss context dependent and independent factors that influence the adoption process and/or development, sustainability, transferability, scalability of e-learning contents. Its role is to provide a tentative framework for opening-up and structuring further in-depth activities in the context of the e-learning content project in secondary schools, particularly in pedagogic, political and technological dimensions directly related to the quality of e-learning contents both at county and national level.

Learning is a culturally bounded activity, defined by various intertwined factors. The design of e-learning should face this complexity and avoid to take a one dimensional view on learning – for instance technology centred, based on a single pedagogical model, constrained by existing habits and traditions.

The term **e-learning content** as widely used however frequently without an idea what it actually means. The popular definitions cited in the review may leave many with the sense that e-learning content can be nearly everything in digital form. This apparently all-encompassing use of the term "e-learning content" is rooted in its rather polysemus constituents, (e) learning and content which afford various interpretations and uses in different contexts and discourses. The problem is not that they are polysemus; it is rather that even within the same context and discourse people tend to use them freely without always making it clear to others and to themselves what they actually mean. Several parallel shifts in our understandings about "learning" and "learning content" have contributed to this.

The study carried out by the Fe-conE project, (2005) shows that positive attitude towards modern technologies is one of the promoting factors for the uptake of e-learning in Germany.

Electronical textbooks together with virtual realities on the web obviously present a better tool for education than paper textbooks (e.g. in biology teaching or physiological experiments at university). However, for teachers in Slovenia educational material in electronic form is still something new and unexplored. However, their students grow up with the use of modern information technology. Therefore, developers try to make learning software attractive enough, so that students demand it from their teachers and teachers could then see the advantages of it.

Another way of promoting e-learning could be to let students create their own simple 3D worlds.

However moving from textbooks and other hard printed papers to digital has had some challenges which include;

- Lack of communication skills using IT infrastructure
- Lack of e-content framework for guaranteeing quality delivery of syllabus materials
- Inadequate IT infrastructure that would connect developers of syllabus materials with KIE
- E-content security policy in implementation of curriculum
- Digitizing the existing curriculum materials
- Negative attitude by some key players in the use of new technology
- Technophobia, where some players in curriculum implementation fear adopting new IT technologies in their day to day work

The study will ensure that there is IT policy for the adoption of e-content support materials in high schools.

2.2 Standardization of e-learning content

Standards of e-learning contents have lately gained much attention in specialist discussions internationally. It is believed that the wide adoption of interoperability standards will lower the costs for the production of learning content, which as a consequence will lead to increases in the size of the potential market, to more emphasis on the quality of the content produced rather than on its format and to more affordable solutions for learning content "teachers".

2.3 The Concept of e-content

Electronic teaching or learning is the process of teaching using digital materials. These materials can be created from the scratch or by converting existing hardcopy materials into digital form using digitizers. The other source of e-content materials is from internet.

KIE has been involved in e-content production for some time now. Ironically, the adoption of the e-content materials as source of teaching/learning materials has met resistance from teachers and school administrators.

The feasibility studies on e-content adoption have shown very little gain in advancing e-content technologies in secondary schools

According to Aluri (1996) electronic learning is the culmination of a number of treads that have been emerging for the last four decades.

First is the rapid development and widespread use of computer technology especially the advent of microcomputers and word processing and typesetting software which brought desktop content to millions of people.

The second trend is the growth of computer and networks which resulted in internet and opening of internet to commercial enterprises and citizens.

The third trend is the merging of computer and telecommunications technologies which with the help of microcomputers, telephone lines, modems, and fibre optic networks have converted educational institutions and homes into information cetres and electronic libraries.

The fourth trend is the development of information industry that demonstrated the feasibility and advantages of electronic information for managing library functions and serving library Users and the greatest benefit of electronic teaching is the richness of information that is available to the Users.

2.4 The risk of appropriation of works

The traditional teacher and authors are very wary about the security of their intellectual property (Mwai, 2010). He also pointed out that the costs of replication are negligible and little or no trail is left by an infringer. They fear that reticulation of illegal copies by third parties will deny them revenue that they, particularly as intellectual property owners in their own right but also as agents for IP-Owners, believe they would otherwise achieve. In this situation of wary about losing control over their property. On the other hand, some authors of learning content have found electronic content on internet to be valuable means of achieving the kind of fame needed to drive sales of conventional books.

Whether the internet offers the prospect to create enough sales of enough books to support conventional learning content as well as authors is an open debate.

Teachers and authors of learning content may find it an increasingly difficult battle to sustain their hold on authors on copyright transfer as a condition for publication and on journal editors and their referees and advisory boards (Mwai, 2010).

2.5 Benefit of e-content learning material

Despite the many problems that may face technology adoption in the future there are still some benefits that will be realized and they include personalized learning, personal assessment, empowering of Users and flexible learning systems.

Teacher's roles will change and the teachers will now act to facilitate and support the learning process. Sharing will be encouraged between schools and also between Users and this will help motivate Users.

The school can gain value creation or value enhancement by adoption of new technology. Electronic content has very specific non-book characteristics that distinguish it from textbook

- Electronic learning content can be produced and disseminated very rapidly than printed book.
- If correction is necessary, an electronic text can be updated or corrected with the same immediacy, whereas a book must either go through a second edition.
- E-content can be made collaborative and interactive, involving both several authors and readers.
- E-content can be disseminated worldwide without the need for separate rights negotiations for different schools and without the cost of distribution or reprinting.
- Through effective, electronic interaction with the buyer or user of an e-content, the producer can collect valuable market research data very cheaply.

2.6 Disadvantage of e-content

- e-content still reaches only a minority of potential Users or customers
- electronic content demands access to relatively advanced technology on the part of both the producer and the consumer of information
- mobile computers, notebooks and other portable computers are either too big or have screens that are too small or otherwise inadequate for use across the full range of environments in which a book can be read
- technology consumes a greater amount of energy in its use than book

- e-content learning requires a well-developed ICT infrastructures

A very substantial industry emerged from the innovations of Gutenberg and Caxton (invented book printing machine). It evidences many of the hallmarks of the industrial age, such as specialization of labour and enterprise and economies of scale. The book industry has naturally resisted and then sought to accommodate, the various forms of information technology.

Electronic teaching is taking centre stage in instilling knowledge into our Users.-learners and teachers.

2.7 The Technology

2.7.1 ICT in general

Supplying the necessary equipment is obligatory when putting e-Learning into practice. Open platforms should be developed for the operation with content, resources and tools, and for management of activities and services for different groups of Users. IT friendly? Many individuals within the teaching staff still maintain a distance from integrating IT into their daily life other than where it is necessary (including e-learning).

2.7.2 E-Learning software

The parameter of usability reveals if the learning environment provides particular problems for Users when working within. Possible evaluation questions:

- Are the learning tools appropriate and adequate?
- Do the students have a sufficient level of media competence to navigate the learning environment? How is the use of technology organised?
- Is the usability and screen design of the environment such that a user can easily navigate the environment and find what they are looking for?
- What kind of media will be used?

Users may need technical support (e.g for the use of proprietary media format, player software, streaming contents)

- How adequate is the technical support offered to the Users?

The approach to e-learning will change if e-learning, the provision of TV broadcasting and audiovisual e-learning broadcasting get closer particularly with the advent of online TV providing on demand programmes. This is not an abrupt change that results from the involvement of new hardware technology in the household but is started also with the emergence of educational TV programmes, edutainment programmes and more and more spectacular and entertaining documentaries and e-learning TV on Satellite and cable TV channels in Italy. Mobile devices should be considered as suitable for educational purposes (for instance many pupils own a mobile phone)

2.8 The Educational System and Society

2.8.1 Educational system

The extent of openness and flexibility of the educational system plays a great role in the development of the e-learning. The majority of households in Italy have internet access. In most of African countries, this level has yet to be achieved. In Kenya for example majority of the adults has bought a mobile and most of the students have in one way or the other been able to use a mobile at home.

2.8.2 Cost of training

Accessibility of the training: payment is still an impediment as a very low percentage of individuals have access to free e-learning module try outs with a view to taking up a subscription for the whole course.

2.8.3 Acknowledgement in Society

E-Learning has to be publicly advertised. Information concerning it has to be spread, so that people recognise it, and it becomes a part of their everyday life. Thus, e-Learning gets more reachable and assimilable. Together with publicity, social recognition concerns the society. E-Learning has to be acknowledged by the society and officially validated with the help of certificates and diplomas.

"In addition to providing students with relevant technological tools (*technical infrastructure*), promoting them to collaborate effectively (*social infrastructure*), and directing them to treat knowledge as something that can be shared and developed (*epistemological infrastructure*), we propose that educational settings should also include an appropriate *cognitive infrastructure*, ensuring that students get a conscious understanding of the working strategies and gradually learn to work independently in an expert-like way (Muukkonen et al., 2009)."

The classification, design and evaluation of technology enhanced collaborative learning settings can be based on this framework as all four aspects covered by the framework facilitate collaborative knowledge creation. With regard to the role of digital content, the epistemological aspect is of importance, as the materials should prompt epistemological affordance (e.g promoting expert-like approaches to knowledge). However, it has to be considered, that the use of authentic information sources can be impeded by e.g. the availability of appropriate materials or the level of prior knowledge with is required from students in order to understand contents of certain materials.

Additional to the epistemological dimension, digital content should build to the social and cognitive infrastructure by providing tools and strategies, e.g. meta-knowledge about the required learning and working processes.

Although the Ministry of Education supports e-learning projects and although primary and secondary schools in Kenya have enough platforms and software to be able to run smoothly web or offline education, there is only slow implementation of e-learning in the educational system. One reason is that teachers are not familiar with the use of such materials for teaching ICT and e-Learning software. The electronic way of education is in Kenyan schools is still so undeveloped that it does not make any sense to produce materials in electronic format.

2.8.4 Learning preferences

Whereas an increasing emphasis on self-regulated learning promotes e-learning, there are also variations in learning styles and preferences among different cultures which could impede the successful uptake of e-learning.

The population of the digital divine is becoming more and more aware of the need for lifelong learning although the actual participation is still quite low.

2.8.5 Economic-social perspectives and the role of e-learning content in learning

E-learning content is part of the whole package of learning economies and societies. Apparently, the turn to "learning" that is so boldly stated in the above terms should sound as excellent news to educators and students at all levels of education and all kinds of training. A "learning society" should, after all, be an educated society with high educational quality and standards of achievement. It's also the kind of society that should provide the means to all individuals, independently of their socioeconomic background and other factors that lead to educational disadvantage (for example ethnic minority status or disability) for better access and higher participation to education. The above visions are reflected mainly in the first two (out of three) strategic objectives of the "Education and Training 2010" work programme, namely "improving the quality and effectiveness of education and training systems in the EU" and "facilitating the access of all to education and training systems." Overall, the EU has set ambitious targets related to these strategic objectives.

This suggests that in EU we have a long way to go to achieve both equity and improved performance in education. It should also be noted that it is in Finland that early school leaving is not related to parents' level of education.

The analysis further identified groups of students which, depending on the country, may be at a disadvantage, more specifically students from single parent families, students with a foreign background, girls in mathematics and science and boys in reading.

Regarding gender differences in performance in reading as compared to mathematics and science this is a clear indication that the cultural constrains of gender stereotyping is establishing itself in students' beliefs at an early age and is affecting negatively the performance of not only girls but also boys. Perhaps through a socio-psychological phenomenon called 'stereotype threat', a performance-hindering anxiety about conforming to stereotypes. This, from the point of view of the individuals, can have huge implications regarding their future academic choices and professional careers. From a wider social perspective the latter can help reproduce and strengthen such socio-cultural beliefs about genders and of course from an economy point of view of the learning societies this can lead to sub-optimal exploitation of the potentials of the human capital.

The findings presented above reveal some further issues regarding e-learning content development issues that need to be addressed. The high variation in learner characteristics that is observed within schools calls for differentiated approaches to learning that are better adapted to the learner needs and styles. Serving the needs of different Users in a classroom is a challenging task for the teacher and e-learning content that is flexible enough so as to be adaptable to different learning styles is likely to be much more effective than content that embodies a narrowly defined pedagogic approach or technique. The latter may effectively introduce a kind of bias that is benefiting some but not all students and in turn may widen already existing gaps in performance.

Today's schools and classrooms are not only facing diversity in terms of students' learning preferences and styles but also diversity in terms of their socio-economic and cultural background that, as we have seen, have a huge impact on their performance. The findings presented above indicate that within the same classroom where all students are exposed to the same kind and quality of teaching and learning content, it is likely that

some students will not perform well not quite because they do not try hard enough but just because they are coming from families that are poor and poorly educated, from single parent families, from families that do not speak fluently the native language. Most EU countries face such issues and it is an imperative that they need to devise targeted policies to address them. Further research from national level to local level is needed to identify disadvantaged student groups, their proportion and distribution at different levels of education and to develop a deeper understanding of their learning needs. In terms of e-learning contents there is a need to formulate policies that will help such groups of students get access to extra, supportive, e-learning materials for study at home or school that will come for free or at very low cost, as well as funding schemes that will help their families get a home pc and internet access. One of the policy recommendations of the Haahr et al (2005) report was to consider providing nonnative students with relevant bilingual tuition because it affects positively their academic performance. Perhaps self-study bilingual e-learning materials for students as well as their parents could offer a helping hand towards this direction.

Substantial private investments in content development for such target groups are quite unlikely to take place because the national target "markets" are quite small and the purchase power of the potential customers is often low. Non-commercial approaches are probably the only viable solution and therefore targeted public investments in e-learning content development and the establishment of public-private not-for-profit partnerships aiming to foster the development and distribution of relevant e-content should be considered.

As with the observed discrepancies between the performance of boys and girls there is a very crucial job to be done to review e-learning contents in terms of their explicit and implicit stereotyping functions that may alienate students from specific academic routes or alienate them from education altogether. It is also recommended that e-learning content approval regulations should extent to issues of social and cultural relevance to the target audiences. Further research is also required towards this direction. Important inputs can be offered by existing research in intercultural education, gender in education studies, foreign language teaching and comparative education. For example, the Centre for Intercultural Education (CIE) in Belgium is offering valuable guidelines for the development of learning content that is responsive to the cultural diversity observed in European schools. Furthermore, more attention should be paid to the ways the use of the Internet as a source

for learning is relevant to the needs of culturally diverse Users. Many things have already been said about the dominance of the English language on the Internet. But one should not underestimate emergent biases against ethno-linguistic minorities that can be introduced by well indented massive government-led efforts to increase the representation of their national languages on the Internet or to create a critical mass of on-line e-learning contents and a national market for them. As John Paolillo (1998) argues, "if national language groups hope to secure their own niche in the global telecommunications ethno- sphere, then they must acknowledge and address linguistic diversity within their national borders."

The aim of this study is to structure a framework that can serve as guidance for other e-learning designers, where the word design includes both the design from scratch of e-learning as well as the adaptation of existing e-learning materials. The target group of this work includes all the people directly involved in the delivery of e-learning courses, i.e. all the educational professionals that use e-learning tools in secondary school teaching.

Applying digital technology as a tool for delivery of e-learning content enables all stakeholders to have the opportunity to become competent, discriminating, creative and productive Users of ICT. They develop the knowledge, skills and capacity to select and use e-learning content tools to inquire, develop new understandings, create, and communicate with others in order to participate effectively in society. Curriculum stakeholders should have the opportunity to understand the impact of digital technology on society, including potential risks to health and safety. ICTs provide a means for overcoming historically intractable problems of isolation and lack of access to information and knowledge, crucial impediments to educational and socioeconomic development. Digital tools have reshaped the educational landscape by transforming the content and modes of delivery/acquisition of learning as well as how the educational institutions operate. No wonder, the implementation of digital tools is inseparable from the process of curriculum reform and development. This is because digital content is a means to help achieving future curriculum goals by providing a learner-centered environment, as studies have shown.

However, digital tool is not really well integrated into the curriculum activities on regular monitory and evaluation process particularly in Africa (Gajendran, 2007). Teachers who are the main agents of curriculum implementation should be trained on how to use digital

curriculum in their teaching activities. The e-content framework that support digital curriculum is a thing that requires first priority in our strategic planning.

While the feature is digital technology, the focus is on creating the ultimate enriching environment for learning. The results are autonomous Users, able to critically think and solve problems, who are creative and innovative, adaptable and agile, who are effective at communication and collaboration, and who have curiosity, imagination, and initiative (Wagner, 2002), and who do so in synchronous connection with their community and the larger world.

Technological change has become a most stable factor and digital technology has intertwined with knowledge, making it dependent upon the technology. Through this alliance abstract knowledge has become the centre of the world's political economy replacing traditional concrete products. Digital contents provide a means for overcoming historically intractable problems of isolation and lack of access to information and knowledge, crucial impediments to educational and socioeconomic development. Despite these awesome impact of digital technology on education particularly, many teachers still adopt a 'teacher-centred' approach and do not know how to apply IT into their subjects. If this is the case; the question is how can these teachers impart knowledge of contemporary issues that can assist in the attainment of education for sustainable development? It is noted that in the process of building and developing curriculum through the use digital technology there are bound to be challenges.

2.8.6 Financial factors

The financial factor has a negative influence on e-learning. A main obstacle in realising any national, regional or institutional e-learning project is the limited financial resources. At the present stage, the main source of financing of Bulgarian e-Learning projects is the national budget. The financial support from the business society is quite limited. The insufficient investments affect the quality of e-learning negatively.

In Italy the financial factor seems to be highly important as the uptake of e-learning is influenced positively or negatively by these factors. From the students point of view the cost of tuition in relation to its benefits and the means and socio-economic situation of the prospective students are relevant. For providers – which are generally private institutions – the economic viability of selling e-Learning courses is of importance.

In Slovenia, it has been noticed, that the promotion of e-learning products on CD-ROM is rather difficult due to the fact that e-learning resources on the internet are often free of charge. One aspect could be considered as mediating factor for the successful implementation of e-Learning approaches: the socio-cultural factors, which promote or impede e-learning in different European countries to a different extend. Evaluation of e-learning therefore should take into account the socio-cultural background of specific e-learning approaches, teaching.

The term Digital Media Asset refers to a group of resources including still photographs and images, sound files, digital video clips and digitized film, that are available for use in the classroom to enrich teaching and learning making it clear to others and to themselves what they actually mean. Several parallel shifts in our understandings about "learning" and "learning content" have contributed to this.

2.8.7 Textbooks as "carriers" of learning content

In contrast to such, both generic and utterly subjective, conceptions of learning and Users, the long tradition of educational and training systems in Europe made sure that the meaning of content in learning was shared among students, teachers, parents, policy makers, administrators and content developers. Content was what Users had to know and be able to perform in order to progress into a well-defined system subject and skill areas, timetables, grades and exams.

Textbooks apart from teachers of course, were the "carriers" and "transmitters" of the content in most of the education and training areas.
Today textbooks from primary to tertiary education and training of any kind still play a critical role, very often as "intermediaries" between what is described in formal curricula or what is explicitly indented by education/training providers and what is actually learned in teaching/learning practice.

In many cases, textbooks and other supplementary materials (such as worksheets, teacher guides etc in digital or printed form) practically organise and materialise the curriculum contents into specific topics, specify the organization and pacing of ordinary lessons and offer descriptions of learning activities that teachers/trainers and students can engage in throughout a course. Everyday teachers all around the world do their job on the basis of a

textbook. As Mark Montgomery9 comments, "of course, for those star teachers who have a strong background in content and who have years of experience and a natural knack for teaching, a textbook may not be so important.

But the research on how curriculum is enacted strongly suggests that even in the United States, the vast majority of teachers at all levels and all grades use textbooks nearly every day." There is no reason to believe that this is not the case for European teachers. The textbook availability for every student and teacher in almost any kind of curriculum area may sound as a commonplace in our ears. However, it still holds a conclusion made by Pernille Askerud in a UNESCO report 10 years ago that it is the availability of textbooks and other traditional supplementary materials that "determine the kind of education a country is able to provide." (ibid)

Textbooks may come from the past, unconnected, world of whole classroom teaching but is one thing to challenge the "authority" of textbooks in "conveying" a curriculum content and being used as a straight jacket to everyday school life and quite another to believe that because we connected schools to the internet we "opened a huge window to the world of knowledge." Actually, they still can teach us a lot about "learning content". Textbooks explicitly respond to curriculum content; as a matter of fact they are "textbooks" and not just "books" because they are written with the intention to do so. Of course there are bad textbooks but still few would claim that they are *not* textbooks. As it happens with books of bad poetry or fiction, it is the intention of the author(s) and the functioning

Textbooks were and still are very frequently subject to open criticism not just about the pedagogy they embody or the accuracy of the information they contain but also and sometimes more importantly about the various kinds of social/ideological/cultural biases they possibly impose on their Users. Such kind of criticism has still a long way to go to reach the fragmented and vaguely defined world of "e-learning contents".

As perhaps it has already been made clear, defining what "e-learning contents" are is far more complex than defining other kinds of "digital contents". If we turn our focus on cultural and memory institutions, such as museums and galleries few would disagree that the digitization of their collections is actually about development, management, preservation and dissemination of digital content.

2.9 From conventional Teaching to electronic Teaching

A very substantial industry emerged from the innovations of Gutenberg and Caxton (invented book printing machine). It evidences many of the hallmarks of the industrial age, such as specialization of labour and enterprise, and economies of scale. The book industry has naturally resisted, and then sought to accommodate, the various forms of information technology.

2.10 E-teaching adoption

The institutional adoption of an innovation has been defined as the adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization (Daft, 1982).

E-teaching commonly involves integration of the internet and related ICTs into the teaching/learning process. The integration of the ICTs into learning environment increase efficiency in content deliverance (Windrum and De Berranger, 2002). It is possible to trace a number of stages through which firms are passing as they progress towards e-content. Each stage is associated with a higher degree of interworking and sophistication in communication modes, progression from traditional content to e-content teaching frameworks which require more radical restructuring of the internal structures. (Windrum and De Berranger, 2002).

In order to acquire a holistic view of the electronic teaching/learning adoption phenomenon the academic and research community has focused its research attention on the analysis of the electronic teaching adoption process. Within this framework, a great amount of effort has been placed on the examination of electronic teaching adoption process as well as on the investigation of the significant factors that affect the specific process. The results of the specific research attempts and development have led to the formulation of certain electronic teaching adoption frameworks.

The stages theory has been widely used as a way of examining the adoption and progression of various aspects of electronic teaching in institutions. The main assumption of the stages theory is that institutions progress towards electronic teaching through a number of clearly defined and successive stags of phases. Each adoption stage or phase is characterized by the existence of distinctive applications benefits and problems while it reflects a particular level of maturity in terms of the use and management of Information Systems and Information Technologies (Taylor and Murphy, 2004). It is also assumed

that the electronic teaching adoption process is linear, while the outcomes and the developments of the progressive process are cumulative.

Within the staged adoption frameworks, early stages of electronics teaching adoption are typically characterized by gaining access to the Internet followed by the use of relatively simple applications, such as electronic mail (e-mail), in order to dispense and gather information. Later, the teaching starts to publish a wider range of information in order to market its products or services and perhaps provide after-sales support. The deployment of electronic commerce practices comes next, allowing the Users of the corporate site to order and/or pay for goods and services. In the most mature stages, the corporate website is fully integrated with the various back office systems such as enterprise resource panning (ERP), customer relationship management (CRM), and integrated supply chain management (SCM) applications (Mend and Fitzgerald, 2005). The school environment is taken to be like a teaching enterprise where services offered are evaluated by the customers.

2.11 Factors contributing to success or failure of technology adoption in institutions

There are many reason why efforts to bring technology to organization have failed. Understanding this reason is of critical importance because they provide insights into what problems organization is to overcome if a technology adoption project is to be successful.

- New technology adoption is high-risk. As presented by Rainer, Jr.R & Watson, H. 1995, surveys in the US approximately 60% of institutions invested in adopting new technologies have experienced failure. Also, a study by (Poon, P. & Wagner, C.2001), estimated the failure rate of newly adopted technological system as high as 70%. These failures have been attributed to managerial, psychological, social and cultural factors rather than technical factors alone.
- The absence of executives; top manager's and key user's involvement in technology adoption process can cause a significant problem in their use. Executives and top managers are the potential Users of adopted technology therefore understanding their information requirement, decision-making style and information search behaviour is critical to success. Their constructive guidelines in the design process will contribute immensely to the system's success.
- Top managers and executives may feel uncomfortable interacting with new technology. These problems can be resolved through education and increasing technological awareness and interaction of executives' and top level managers

even if they have ready access to staff personnel to fulfill their request for information.

- Technology providers' integrators assume that they know exactly what organization management style and requirements. Such technology is rejected at the very inception if the initial version does not fit and facilitate the ways organization management work (Fitzgerald, 1998).
- The change in the teaching/learning has significant influence on technology adoption projects. The need for consistent information for better reporting of learning activities often results in the development of new systems in some institutions (Salmeron , 2002). However, the demise of new systems in institutions can be influenced by the changing priorities of the executives who might be responding to the revolution in the teaching environment.
- Further, technological projects are influenced by power, politics and use resistance to change required in the projects. (McBride , 1997) shows that most new system projects only gain momentum and support by the general management because their initiators such as the CEO and ICT Manager who have political and financial resources and are within the top management level. Their departures from the institutions may bring about the end of these projects especially if these projects are not financially viable. A new executive's interest in a project may decline resulting in the project failure.

The failure factors of adoption of new technology are grouped into technology-related, support-related and user-related factors:

- *Technology-Related-Factors* -This means that the developers/designers are developing systems with complicated and unfriendly interface.
- *Support-Related Factors* - This means that during technology adoption process system integrators and analyst often fail to address the critical success factors such as, teaching problem, and changing pace of Users' information requirements and ability of the system to access external data critical for strategic tasks.
- *User-Related-Factors* - This means that an institutional project can fail if the technology is so complicated that Users resist its implementation, there is a political resistance by potential Users' against its development and the developers restricting their focus of the stem to only a few managers rather than to all managers. Also, Users make no commitment through such means as education and training to understanding the system.

2.12 The SCORM framework

One of the most concrete effort today to address the problems of interoperability and reusability of e-learning contents, which as we have seen are by no means a European phenomenon, has been done by the ADL29 initiative which developed and refined the Sharable Content Object Reference Model (SCORM), a technical framework that references interrelated technical standards, specifications and guidelines aimed to meet technical quality requirements for learning content and systems. Since its first testable release SCORM improved significantly to the point that the US government made SCORM conformance a requirement in federal government contracts with colleges and universities.

At conceptual level, SCORM supports the notion of learning content composed from "sharable content objects" (SCOs), i.e. relatively small, reusable content objects aggregated together to form meaningful units of instruction (activities in SCORM's terms), such as subjects, modules, chapters and assignments. Content objects are composed of one or more "assets" (digital files of any kind), which in this model are considered the most basic form of a learning resource. These content objects may not actually serve any particular learning purpose or adopt a clear-cut pedagogy, in other words they are conceived as "context-free" units of information and in principle they do not constitute learning content proper. The concept of content objects as "context-free" units of information is believed to be necessary because this enhances the *reusability* of such information in different learning contexts. According to the SCORM documentation, by keeping the rules and navigation separate from and outside of content objects, the content may be reused in new and different ways to support many different instructional strategies. *Learning content and context* is specified when different content objects are aggregated and organised into one package to form a unit of instruction and define a learning experience. This approach therefore adopts the assumption that the application of different sequencing/navigation paths on the same set of content objects can lead to the development of units of instruction that serve different instructional methodologies and hence different learning experiences (which ideally would be tailored to the needs of individuals and whole institutions -the *adaptability* requirement). More specifically, the sequencing/navigation paths are conceptualised in terms of an Activity Tree with branches and nodes which represent the institution of the learning contents in various levels of instructional units (courses, units, modules, lessons, learning activities).

SCORM packages finally follow a run-time environment model which has been negotiated between mainly US content authoring tool vendors, learning management systems (LMS) vendors, the US government and people from the academic world to ensure *interoperability* of SCORM-compliant content objects across multiple LMSs regardless of the tools used to create the content.

SCORM has a long way to go to become a de facto technical framework beyond the US. However it has already attracted the interest of many different stakeholders in education World-wide. For example, most if not all leading LMS solutions, commercial or open-source, are already offering tools to integrate scorm-compliant content. Compliance to scorm is becoming part of the technical specifications endorsed by governments and education bodies for learning platform software and systems to be used in educational establishments. Content providers are developing scorm-compliant learning content. There are already affordable or even free, easy to use content authoring programs to create SCORM-compliant content that can be deployed to learning management systems (LMS) and so is the case for stand-alone scorm package players.

A pedagogically competent teacher/trainer can use such tools to implement different pedagogic approaches and in effect overcome the limitations of the SCORM framework. Overall, what constitutes learning content in the digital era is a quite complex to define and probably will remain so in the foreseeable future (Omwenga, 2005). Within the wider converging forces of harmonisation and homogenisation that brings the globalisation of markets including the "learning content" market and connectivity and the diverging forces of autonomisation and decentralization of education administration and cultural diversification, notions about learning content, such as "learning objects" are fated to be like a foot in two boats, the "object" one that is referring to something that can be handled, shaped and transferred in many different ways and the boat of "learning" that is always bound to specific contexts and situations.

Perhaps the real measure against to which we can judge our concepts about learning content is to turn our focus on its relevance to the wider socio-economic and cultural context of its use.

2.13 E-content Security

E-content security means protecting electronic materials and digital systems from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction. E-content plays a major role in teaching and learning activities in e-learning environment.

Information is an asset that, like other important business assets, is essential to an institutions business and consequently needs to be suitably protected. This is important especially in the increasingly interconnected business environment. As a result of this increasing interconnectivity, information is now exposed to a growing number and a wider variety of threats and vulnerabilities (ISO/IEC 17799:2005). For this reason, many institutions nowadays implement various security policies in order to protect the information they are generating. In addition institutions implement an information security framework in order to have a secure flow of information which helps the institution to identify the risks associated with the institution's information.

The MoE is increasingly relying on information Technology systems for essential operations including human resource administration, financial operations and research. Nevertheless, the process of effectively implementing information security management is challenging. The MoE consists of mix of many factors ranging from administrative to social influence to adherence with the mandate of specific agencies in MoE.

As information security become increasingly important to the continue success for business, many are seeking an appropriate security framework (Yhan, 2005). Information security procedures are critical to the success of e-content implementation in our secondary schools running. The intellectual e-materials KIE will get from the teachers must be well guarded to prevent pirating and taking to the account of copyright. There is great need for the MoE to establish good IT policy framework to oversee smooth delivery of E-content materials to support teaching and learning activities in our secondary schools today. Full implementation of e-content support materials in secondary schools will thereafter make the secondary education offered in Kenya globally competitive therefore giving our graduands an opportunity to compete with their counterparts in the world.

Although technology itself is a major control applied to mitigate security risks, it is the management of security as a business function that determine the overall success. The

application of technology is most effective when aligned with the business goals – E-content goals in learning institutions. Security awareness is an important function, yet it is under-funded, under-represented and generally applied in ad hoc process and in a reactive manner.

Research by Gardner and AMR (Haldar and Forsy, 2004) conclude that many enterprises remain inadequately protected from security threats because of the perceived high cost of an effective security strategy that suits the organization's culture. The lack of focus on security strategy has led to an emphasis on products and technologies instead of a security strategy that incorporates security awareness, training and policy and standards in an effort to develop a "culture of compliance" towards information security.

Security awareness is therefore highly unstructured in most institutions and can be seen as operating on a spectrum ranging from either ignoring it, or developing according to a study conducted by Adams and Sasse (1999) on the compromises of security in relation to password management. One important factor which contributes to compromise in security is insufficient communication from security sections in institutions to Users, which caused users to construct their own models of reality on possible security threats and the importance of security. All these are factors that the KIE is facing as it is applying e-content supplementary materials to secondary schools in Kenya today.

To be able to ensure maximum security of our e-content materials, it is important that we train all the Users of e-content and make them aware of the security risks associated with this digital technology. Teachers, Users and KIE staff must be fully trained to handle the e-content materials. This study explores on how schools can be involved to protect the e-content they are using.

2.14 Theory underpinning the study

In the past few decades, technology acceptance issues have been extensively studied. Recent studies by Dista (2002) focus on theory-based models to investigate the factors that could explain individual's reactions to computers. Candidates among these theories include Activity Theory (AT) (Verenikina I. & Gould E. 1997), the Task Technology Fit Model (TTF) (Dishaw M. & Strong D. 1997), the Theory of Planned Behaviour (TPB)) (Mathieson, K. (1991), (Taylor, s. & Todd, P.A. 1995), and the Contingency Model (CM) (Handzic M., 1997). The current study employs a theory-based model to investigate and

examine the cultural, social, individual and institutional critical success factors that might explain behaviour in accepting and adopting Technology.

2.15 Activity theory (AT)

Activity theory (AT) aims to explain the connection between human psychology and computer interface design in a social work environment. As a result, it establishes the relationship between human computer interactions and computer interface design by taking into consideration the context of the work environment (Virenikina I. & Gould E. 1997). AT is normally used in qualitative case-based research where units of analysis are investigated over a very long period of time. Because this study employs a cross sectional time dimension where the unit of analysis is observed at a point in time, therefore, AT is not a feasible theory for this study.

2.16 Task-Technology Fit Model (TFF)

TTF aims to match the capability of the technology to the demand placed on the technology in a work environment. TTF states that technology will be used if, and only if, the functions available to the user support fit the activities of the user (Dishaw M. & Strong D. 1997). Task Technology Fit Model suggests that rational and experienced Users will choose these tools which allow them to complete the task with the greatest net benefit. However, a model focusing on fit alone does not give sufficient attention to the fact that a system must be utilized before it can deliver performance impacts. Because utilization is a complex outcome, based on other factors (e.g. habits, social factors and facilitating conditions), TTF can only benefit from the addition of this richer understanding of utilization. Further, TTF does not establish user specific beliefs about technology such as perceived usefulness and perceived ease of the technology that can influence system use by means of Users' attitude and behaviour intention. Based on the above discussion, the TTF model alone is not feasible for the present study.

2.17 The theory of planned behaviour (TPB)

Mwai,(2010) in quoting Theory of Planned Behaviour (PB) incorporates the notion of perceived behaviour control (PBC) as an independent influence on behaviour, recognizing that there are circumstances in which behaviour might be expected to result in positive consequences (or net benefits), yet not undertaken due to a perceived lack of ability to control the execution of behaviour. PBC encompasses perceptions of ability or self-efficacy (Taylor S & Todd P A, 1995), (Mathieson K 1991). Interestingly, despite TPB's intuitive plausibility, the interactive hypothesis has received limited empirical support due to its conditional requirements in predicting behaviour (Fishbein M & Ajzen I 1975).

Further, TPB leaves aside other beliefs such as the perceived usefulness (PU) and perceived ease of use (PEOU), which could also have an influence on behavioural intentions and on behaviour itself. Hence, TPB is not a feasible model for this study.

2.18 The Contingency Model (CM)

CM of human information processing suggests that the utilization and effectiveness of information systems may be dependent upon the characteristics of the sure and the demand of the systems. CM suggests that higher reliability of information results in superior task performance rather than low reliability information. However, performance is due to the adaptive nature of human information processing in terms of the ability to take advantage of the task context to perform at satisfying levels while saving on cognitive cost (Handzi M, 1997). Nevertheless, a contingency model does not explicitly examine institutional contextual factors, such as cultural, social, and institutional variables, that might explain administrator's behaviour towards adoption and use of new technology. Further, it does not take into account the importance of beliefs such the perceived usefulness (PU), perceived ease of utilization (PEOU) and individual's attitude in predicting the behaviour towards technology adoption and usage. Therefore, it is not a feasible theory for this study.

2.19 The Technology Acceptance Model (TAM)

TAM explains how Users come to accept and use a technology. In particular, TAM suggests that when a person is using a new technology, a number of factors such as the perceived use (PU), perceive ease of use PEOU, attitude towards use (ATU) and behaviour intentions (BI) influence a person's decision about how to and when he will use it. The Technology Acceptance Model (TAM) (Davis, F.D. 1998) is an intention-based model derived from the Theory of Reasoned Action (Fishbein, M. & Ajzen I. 1975) of a social psychology. Davis (Davis F D 1989) developed TAM to explain the effect of user perception of system characteristics on the user acceptance of computers. The objective of TAM is "to provide an explanation of the determinants of computer acceptance that are capable of explaining the behaviour of Users across a broad range of end-user computing and user populations while concurrently being economical and theoretically justified" Two particular belief constructs, perceived use (PU) and perceived ease of use (PEOU) are central in TAM for predicting information about technology Users' acceptance behaviours. According to TRA external stimuli indirectly influence a person's attitude towards the behaviour, through BI by influencing his/her salient beliefs about the consequences of performing the behaviour (Fishbein, M. & Ajzen I. 1975). TAM uses

TRA as a theoretical basis to specify causal chain linkage between four key sets of constructs:

- Perceived Use and Perceived Ease Of Use
- ATU
- Behaviour Intension
- Actual System Usage (ASU).

PU is defined as "the degree to which an individual believes that using a particular system will enhance his or her job performance".
PEOU is defined as "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis, F.D 1989).

The aim of TAM, therefore, is to provide a basis for tracing the impact of external factors on internal beliefs and attitudes. The aim of TAM, therefore, is to provide basis for tracing the impact of external factors on internal beliefs and attitudes. TAM was developed in attempt to achieve these aims by identifying a number of fundamental variables that deal with cognitive and affective determinants of computer acceptance. In addition, TAM assumes that the decision to use a particular computer technology is based upon one's cognitive response (PU and PEOU) to using the technology, which in turn affects one's affective response (attitude) toward the technology. As a result, the affective response drives the behavioural response about whether to use the technology.

2.20 Conceptual E-Content Assessment Framework

The framework represents our practical approach to this issue, detailed into applied theoretical categories, pedagogical approaches, learning activities, design guidelines.
The framework will:

- integrate disparate considerations on socio-cultural aspects, technology, learning styles and habits
- articulate the ways that different instances of these considerations come into the design process, by mapping these considerations on the various phases of a design process

The conceptual framework is based on five main constructs;

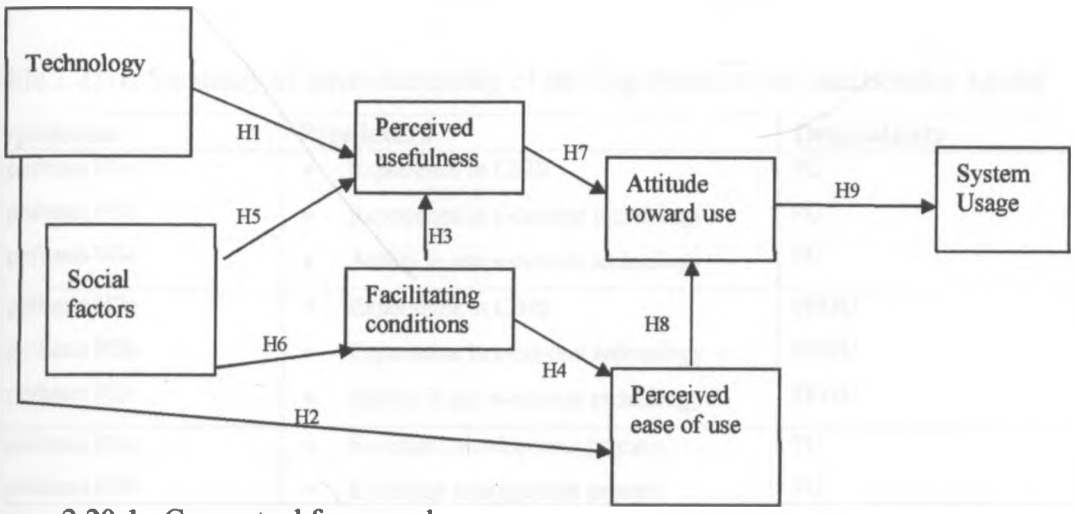


Figure 2.20-1 : Conceptual framework

Construct	Borrowed from	Variables	Hypotheses
Technology	TAM	PU, experience, ability in e-content technology	H1a, Hb1, Hc1
Perceived usefulness	TAM	PEOU, experience, ability in e-content technology	H2a, H2b, H2c
Facilitating conditions	TAM	PU,Development process,Management process, institution environment	H3a, H3b, H3c
Perceived ease of use	TAM	PEOU, Development process,Management process, institution environment	H4a, H4b, H4c
Social factors	Triandis	PU,Norms, Roles.Values	H5a, H5b, H5c
Social factors	Triandis	PEOU	H6a, H6b, H6c, H6d
Perceived Usefulness	TAM	ATU , PU	H7
Attitude towards use	TAM	ATU, PEOU	H8
System use	TAM , TTF	ATU,Perceived benefits	H9

Table 2.20-1: Summary of Conceptual framework variables, constructs and Hypotheses

2.21 Research Hypothesis

The section presents the hypotheses to be test, which were rooted in research model, as demonstrated in table 2.21-1

Table 2.21-1: Summary of interrelationship of the Hypothesis in the Relationship Model

Hypotheses	Predictors	Dependents
Hypothesis H1a	• Experience in CBIS	PU
Hypothesis H1b	• Experience in e-content technology	PU
Hypothesis H1c	• Ability to use e-content technology	PU
Hypothesis H2a	• Experience in CBIS	PEOU
Hypothesis H2b	• Experience in e-content technology	PEOU
Hypothesis H2c	• Ability to use e-content technology	PEOU
Hypothesis H3a	• E-content development process	PU
Hypothesis H3b	• E-content management process	PU
Hypothesis H3c	• school environment	PU
Hypothesis H4a	• E-content development process	PEOU
Hypothesis H4b	• E-content management process	PEOU
Hypothesis H4c	• school environment	PEOU
Hypothesis H5a	• Subjective role	PU
Hypothesis H5b	• Subjective norms	PU
Hypothesis H5c	• Subjective values	PU
	• Subjective social situation	PU
Hypothesis H6a	• Subjective role	PEOU
Hypothesis H6b	• Subjective norms	PEOU
Hypothesis H6c	• Subjective values	PEOU
Hypothesis H6d	• Subjective social situation	PEOU
Hypothesis H7	PU	ATU
Hypothesis H8	PEOU	ATU
Hypothesis H9	ATU	A

2.21.1 Habits on perceived usefulness and perceived ease of use

Triandis explains that technological habits can be measured based on individual experience and the ability in performing a given task. In technology adoption domain, habits have been operationalized on the basis of experience and the ability to use that technology. Therefore, it is hypothesized that:

H1a: Users who have more years of experience in computer based information systems (CBIS) will have a higher perceived usefulness (PU) of e-content technology than those who have limited years of experience.

H1b: Users who have more years of experience in using e-content technology will have a higher perceived usefulness (PU) of teaching technology than those who have limited years of experience.

H1c: Users who have higher ability in using e-content will have a higher perceived usefulness (PU) of e-content technology than those who have limited ability in using e-content technology.

H2a: Users who have more years of experience in computer based information systems will have a higher perceived ease of use (PEOU) of e-content technology than those who have limited years of experience.

H2b: Users who have more years of experience in using e-content technology will have a higher perceived ease of use (PEOU) of e-content technology than those who have limited years of experience.

H2c: Users who have higher ability in using e-content technology will have a higher perceived ease of use (PEOU) of e-content technology than those who have limited ability of using e-content technology.

2.21.2 Facilitating Conditions on PU and PEOU

Triandis argues that behaviour will not occur if objective factors (facilitating conditions) of the geographical environment prevent it are not favourable. In the IS research domain, facilitating conditions had been defined as support provided to Users to enhance information systems use (Thompson et al. 1991; Bergeron et al. 1995). This support could be hotline help, user training and other assistance given to Users to counter difficulties experienced by them. E-content development process have been linked to factors such as general top management support, committed executive sponsorship, management of user resistance and expectations and Users' involvement in the development. Institutional environment have linked it to such factors as the dynamic change of the management environment, influence of the institutional culture on project, interaction of the e-content technology (ECT) with other systems between management units and, institutional commitment to wide use of ECT.

In this study, facilitating conditions technology management and adoption processes and institutional environment will positively be related to behaviour. In view of that, it is hypothesized that:

H3a: E-content technology development process is positively related to the perceived usefulness of teaching technology to be adopted.

H3b: Adoption management process is positively related to the perceived usefulness (PU) of technology to be adopted.

H3c: Institution environment is positively related to the perceived usefulness (PU) of technology to be adopted.

H4a: E-content technology development process is positively related to the perceived ease of use (PEOU) of teaching technology to be adopted.

H4b: Adoption management process is positively related to the perceived ease of use (PEOU) of technology to be adopted.

H4c: Institution environment is positively related to the perceived use (PEOU) of technology to be adopted.

2.21.3 Social factor on perceived usefulness and perceived ease of use.

The internalisation of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others in specific social situations, constitute the social factors that determine behavioural intention. In the information systems research domain, superior, peer and subordinate influences have been strong determinants of subjective norms. In several past studies, social factors have shown strong influence on behaviour and utilisation of technology including acceptance of teaching technology. Thus, it is hypothesised that:

H5a: Subjective norms positively relate to perceived usefulness (PU).

H5b: Subjective roles positively relate to perceived usefulness (PU).

H5c: Subjective value positively relate to perceived usefulness (PU).

H5d: Subjective social situations positively related to perceived usefulness (PU).

H6a: Subjective norms positively relate to perceived ease of use (PEOU).

H6b: Subjective roles positively relate to perceived ease of use (PEOU).

H6c: Subjective value positively relate to perceived ease of use (PEOU).

H6d: Subjective social situations positively relate to perceived ease of use (PEOU).

2.21.4 Perceived usefulness and perceived ease of use behaviour

David identified two specific beliefs: PU and PEOU as important user acceptance criteria of technology. PU and PEOU are strong determinants of user acceptance and adoption of teaching technology. Thus, it is hypothesised that:

H7: Perceived usefulness positively relates to the attitudes towards using e-content technology.

H8: Perceived ease of use positively relates to attitudes towards using e-content technology.

2.21.5 Attitude towards using

Fishbein (1979) defined attitude as, "a function of beliefs". Fishbein and Ajzen (1975) distinguished between beliefs and attitudes and specified how external stimuli like the objective feature of attitude object such as individuals, situation and social groups can be casually linked to beliefs, attitudes and behaviour. It is therefore hypothesised that:

H9: There will be a significant difference in mean attitude towards using for actual Users of e-content technology and non-Users of e-content technology.

CHAPTER 3

METHODOLOGY

3.1 Research Design

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them (Bernard Ostle and Richard W. Mensing, 2005). The function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money.

This study employed survey approach. A survey research design is methodology designed to collect primary or secondary data from a sample with a view to generalize the results to a population (Kothari, 2005). This design was appropriate for the design where the objective is to know the truth on the ground about e-content adoption in secondary schools

3.2 Research Purpose

The purpose of this study was to conduct an exploratory and descriptive research in order to collect as much information as possible in relation to the adoption of e-content learning materials in teaching and learning activities.

3.3 Population and target population

The population of secondary schools in Limuru constituency was considered. The schools that offered computer studies were taken to be the target population.

3.4 Sample selection technique

The researcher purposively sampled all the national schools (two national school) offering computer studies that are in Limuru Constituency. The respondents were computer teacher and one administrator. Out of the remaining schools with computer facilities, the researcher randomly sampled every school in the population to give equal chance of being included in the sample (Gall el at, 1996). The sample of 9 schools was taken, according to Mulusa (1990). He suggests that 30% of the target population would be representative enough to generalize the characteristic being investigated. Therefore study sampled 9 schools (30% of 25) and the respondents were one administrator and one computer teacher. The total sample size was 18 (9 secondary schools multiplied by 2)

3.5 Types of Data and Data collection Instruments

Data for this study would be collected using questionnaires that would be given by the administrator and ICT department of secondary schools with E-content potential. These schools are the ones which offer computer studies in their schools.

Both primary and secondary data would be used for the study. Primary data would be obtained through observation, interviews and self-administered questionnaires with both closed and open ended questions. Questionnaire would contain structured and unstructured questions. The researcher and his assistants would be required to deliver the questionnaire physically to the targeted respondents and collecting the said data collection instruments using same methods. Observational data would be collected and analyzed as well and where necessary digital photographs would be taken. The closed ended questions would enable the researcher and his team to collect quantitative data while open-ended questions enable the researcher to collect qualitative data.

Secondary data on the other hand would be collected using published reports and KIE manuals. Other sources include journal, new papers and education task forces constituted by the GoK.

3.6 Pilot study

A pilot study was carried out with schools that were outside the population to validate both the study reliability and instrument tool of data collection.

3.7 Data analysis and presentation

The data collected from the source was quickly analyzed using the computer based software Statistical Package for Social Science (SPSS) version 11.5 and result tested and compared to that of other reports on the same area for validation. The reliability coefficients were then discussed and reported to the researcher for further action.

CHAPTER 4

FINDING, ANALYSIS AND INTERPRETATION

This chapter presents the results of data analysis for the study. The data collected has been used to validate the proposed model for the adoption of e-content in secondary schools.

4.1 Coding of measurement scale for e-content technology adoption

Table 4.1-1: coding of measurement scale for e-content technology adoption

Construct or Variable	Code	Statement
Technology Experience in e-content (ECT)	EXPCON	How many years have you personally been using e-content technology?
Ability to use e-content technology	ABCON	E-teaching teachers can be categorized as follows. Individual , Departmental or School
Experience in Computer based information system (CBIS)	EXPCBIS	How many years have you personally been using CBIS?
Perceived Usefulness- PU	PU1	➢ I believe my use of e-content technology would Improve my performance in teaching
	PU2	➢ Provide my school with a competitive edge
	PU3	➢ I believe my use of e-content technology would Provide me with greater level of control over our activities
	PU4	➢ I believe my use of e-content technology would Increase the quality of my decision-making
	PU5	➢ I believe my use of e-content technology would Provide me with information to detect problems
	PU6	➢ I believe my use of e-content technology would Increase the speed of my decision making
Perceived Ease Of use	PEOU1	➢ Learning to operate available e-content in a computer based system is easy for me
	PEOU2	➢ My interaction with e-content resources is clear and understanding
	PEOU3	➢ Based on my knowledge of e-content technology I find it easy to use it
	PEOU4	➢ I find available e-content technology flexible to interact
	PEOU5	➢ It is easy for me to become skillful by using e-content
Attitude Towards Using – ATU	ATU1	➢ My using electronic content in my teaching activities is;
	ATU2	➢ My using electronic content in my teaching activities is;
	ATU3	➢ My using electronic content in my teaching activities is;
	ATU4	➢ My using electronic content in my teaching activities is;
	ATU5	➢ My using electronic content in my teaching activities is;

Actual System	NTUCON1	➢ On average how many times do you use e-content technology in a term
	NTUCON2	➢ E- content technology can be used by school for enhancing academic and management operations. In your school choose the most applicable **Academic [ ] Management [ ]**
Social Factors SF **Subjective norms – N**	N1	➢ My colleagues think that I should use e-content technology
	N2	➢ My superior thinks that I should use e-content technology
	N3	➢ My subordinates think that I should use e-content technology
Subjective Roles – Rs	R1	➢ By the virtue of my role in my school, my colleagues expect that I would use e-content technology
	R2	➢ By the virtue of my role in my school, my superior expect that I would use e-content technology
	R3	➢ By the virtue of my role in my school, my subordinates expect that I would use e-content technology
Subjective Social Situation – S	S1	➢ The social working relationship between me and my colleagues encourages me to use e-content technology
	S2	➢ The social working relationship between me and my superior encourages me to use e-content technology
	S3	➢ The social working relationship between me and my subordinates encourages me to use e-content technology
Subjective Values – V	V1	➢ Generally I want to do what my colleagues want me to do
	V2	➢ Generally I want to do what my superiors want me to do
	V3	➢ Generally I want to do what my subordinates want me to do
Facilitating Conditions – FC **Development process – D**	D1	➢ Acquisition of e-content technology with executive or sponsor
	D2	➢ My involvement in e-content technology acquisition
	D3	➢ Availability of relevant resources other than technical in my school encourages me to use e-content technology
	D4	➢ Follow-ups carried out immediately after acquisition and implementation of e-content technology
	D5	➢ The spread of use of e-content technology in my school following acquisition
	D6	➢ Other schools have used the technology and are comfortable with it
Management Process – M	M1	➢ Our school has clearly defined e-content policy
	M2	➢ Available Users' support group on e-content technology
	M3	➢ The availability and accessibility of information on the systems
School Environment	SE1	➢ The dynamics changes of the teaching environment encourages me to use e-content technology
	SE3	➢ The influence of power and politics in the school encourage me to use e-content technology
	SE3	➢ The culture of my school on e-content encourages me to use it
	SE4	➢ My school in committed to wide use of e-content technology

Barriers – BA	BA1	➢ There is insufficient trained teacher with necessary computer skills
	BA2	➢ Recruiting computer skilled teachers is a challenge and costly
	BA3	➢ The political environment in school is not supportive towards e-content
	BA4	➢ Obtaining E-content supporting materials is difficult from KIE
	BA5	➢ The initial cost of preparing e-content is very high
	BA6	➢ Copyright infringement is a key concern
	BA7	➢ I believe e-content can be modified very easily
Opportunities – OP	OP1	➢ I believe there is enough e-content teaching materials in the present social network
	OP2	➢ e-content would improve academic results
	OP3	➢ E-content teaching would improve the school image
Participants Details	PD1	Designation
	PD2	Your Age (in years)
	PD3	Your highest education level attained

4.2 Respondent demographic factors

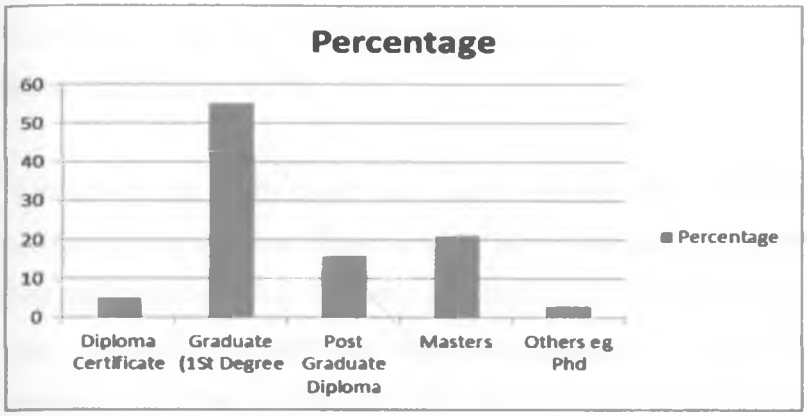
Demographic factors are those variables such as education level and job position of the participants. According to age groups, the modal group was 36-45 with 55% , followed by the 26-35 group with 21%, then 46-55 group with 12% and > 55 group with 10% participation rate. As expected, the group of 18-25 was among the lowest with 2% participation rate. This suggests that while people over 55 years of age in management positions may be retiring from the workforce, there are very few of those within the 18-25 group who have just entered management positions.

Age Bracket	Percentage
18 - 25	2%
26 - 35	21%
36 - 45	55%
46 - 55	21%
>55	10%

Table 4.2-1 : Respondent Demographic Factors

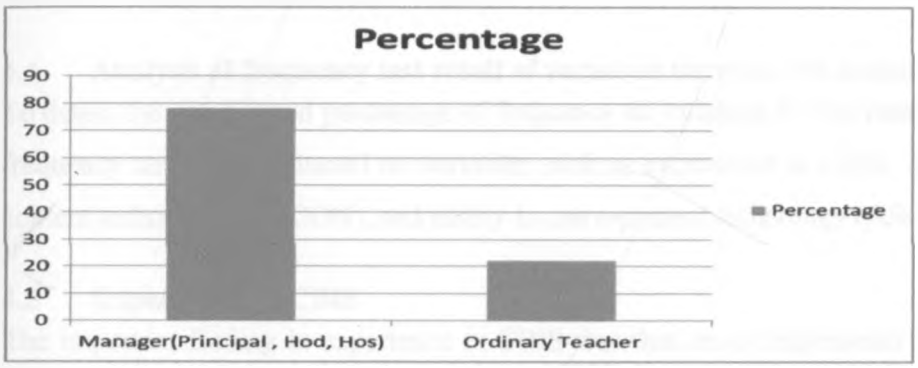
The majority of the respondents were highly educated. For instance, 55% of the respondents held an undergraduate degree, 16% held a postgraduate degree, 5% held diploma certificates and 21% masters. Of the respondents only 3% held other qualification.

Figure 4.2-1 : Demographic analysis Level of Education



In terms of designation, the results show that while 78% of the respondents held top level management positions such as Principal, HoD, HoS, 22% of the respondents held mere class teacher positions. This means that major of them are in the position of making decisions on matters pertaining e-content adoption in schools.

Figure: 4.2-2 Designation Analysis



4.3 Electronic content Barriers and opportunities

More than half (61%) of responded said that reaching the appropriate accessibility is more difficult with e-contents. Of the total respondents, 52% felt that there is a general awareness and receptivity to e-contents among teachers and Users. Electronic distribution has unknown legal liabilities and this confirmed that teachers were concerned that established terms, common practices and teaching pedagogical methods are still evolving for e-contents. Another major concern was copyright infringement. Since copyright infringement has a detrimental effect on legal action against teachers, being concerned is not surprising but the extent of concern and consensus was perhaps more than expected. Respondents" were fairly receptive on whether the offering of e-contents would improve their performance with more than half (58%) either agreeing or strongly agreeing to that. Respondents who were neutral to or disagree with the importance of e-contents were generally not engaged in e-content activities.

Most of the respondents (80%) think the cost of preparing e-content is very high. Given that most of the respondents did not have e-contents, this showed that e-contents are not as cheap as many of us think.

Teachers in the study were also asked whether they had encountered any technical problem in the creation of e-contents. More than half of the respondents indicated that they had faced technical problems including lack of technical knowledge and high capital cost. This could be partly due to the lack of supply of suitably skilled graduates into the teaching arena but another possible reason could be the difficulties in attracting high caliber potential teachers into teaching and in retaining skilled or experienced staff in the e-content technology. Over half of the respondents (58%) thought there is a lack of understanding of e-content among school managers. The study affirmed the general view that school management is more comfortable with the familiar tried and time tested hard print and undecided, apprehensive or even not supportive of e-content technologies.

4.4 Analysis of frequency test result of variables for research module

To detect the number and percentage of frequency of variables for the research model, the frequency test was conducted on variables such as experience in CBIS, EXPCBIS in e-content technology (EXCON), and ability to use e-content technology (ABCON).

4.5 Experiences in CBIS

The important finding in experience in CBIS was that most respondents had been using CBIS for between 0-4 years. Therefore, the modal group in experience in CBIS was 0-4 years' experience with 59% followed by 5-9 years group with 20%. The next was the 10-14 years group with 13% followed closely by the 15-19 years group with 5%. The group of more than 20 years' experience in CBIS was the smallest with just 1%.

4.5.1 Experience in e-content technology

The important finding in experience in e-content technology was that most respondents had been using e-content technology for between 0 to 4 years. Thus, the modal group in e-content technology experience was 0-4 years with 70% followed by the 5-9 years group with 23% the 10-14 years group with 1. The groups with more than 15 years' experience were the smallest with just 1%.

4.5.2 Ability to use e-content technology

In this category, expert (knowledgeable) casual user was the modal group with 31% followed by novice frequent user group with 29%. The expert (knowledgeable) frequent

user group was next with 23% followed by the novice casual (intermittent) user group as the smallest with 10%.

4.6 Analysis of descriptive statistics of variable for the research model

This section, presents the analyses of descriptive statistics of variable in the study that explain the behavior of respondents towards e-content adoption. A summary of descriptive statistics of variable for the research model is presented in Table 4.6-1 as shown; the means of each variable is relatively high, indicating generally positive response of the variables.

Variables	Mean	Std. Deviation
Perceived usefulness	4.04	0.81
Perceived ease of use	3.68	0.79
Attitude toward use	4.45	0.63
Subjective Norms	4.03	0.77
Subjective Values	3.98	0.93
Subjective Roles	4.05	0.78
Subjective Social Situations	3,81	0.97
Development process	3.77	0.83
Management Process	3.94	0.86
School environment	3.80	0.92

Table 4.6-1 Descriptive Statistics of Variables for the Research Model

4.7 Factor Analysis

Factorial validity was conducted to analyse the scale items: habits, facilitating conditions, social factors and perceived ease of use and perceived usefulness the variables for the research model. The aim of the analysis was to reduce the large number of interrelated variables to a small number of underlying factors and to explain the interrelation between variables and the variables measuring them. The Principal Components Extraction and Varimax with Kaiser Normalization rotation methods were employed for these analyses. First, the Barlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy were employed to assess whether the data was suitable for analysis. Second, the Scree Plot was utilized to determine the numbers of factors to be retained in the factor loading. Factors with Eigen values greater than one were retained in the factor loading (Kaiser"s criterion). In addition, it is required that each variable clearly differentiate itself in the factor loadings otherwise it should be removed. Factor loadings below 0.4, which is the cut-off limit for loading items (Francis, 2004), should be considered low and any low items should be eliminated from the analysis for the underlying factors that explain joint variation in the items measured.

4.7.1 Factor analysis for habit variables: EXPCBIS, EXCON AND ABCON

The Principal components analysis with extraction method was performed on the three items of habits: experience in computer based information systems (CBIS), experience in e-content technology (EXCON) and the ability to use e-content technology (ABCON). The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy results are shown in Table 4.7-1, the KMO statistic showed 0.607 at a significance level of 0.000.

Table 4.7-1: KMO and Bartlett's Test for Habit Variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.607
Barlett's Test of Sphericity	Approx. Chi-Square	92.083
	Df	3
	Sig.	0.000

The results of these tests indicated that the data was suitable for analysis as KMO values were greater than 0.6 and Berlett's Test of sphericity 92.083 with 3 degree of freedom was highly significant at 0.000 level.

4.7.2 Factor Analysis of TAM Variables (PU, PEOU,ATU)

The principal components Extraction using Varimax with Kaiser Normalization rotation was performed on the perceived usefulness (PU) and perceived ease of use (PEOU) 12 items, six for each and the five items of attitudes toward using (ATU). The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy result were utilized to examine whether the data was suitable for analysis (see Table 4.7-2). The KMO statistic showed 0.856 at a significance level of 0.000. The results of these two tests indicated that the data was suitable for a factor analysis being that KMO values was greater than 0.6 and Barlett's Test of Sphericity (896.583) with 187 degree of freedom) at a significant level of 0.000. The results indicated that the data was suitable for factor analysis.

Table 4.7-2 KMO and Barlett's Test for TAM Variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.786
Barlett's Test of Sphericity	Approx. Chi-Square	896.583
	Df	187
	Sig.	0.000

Overall, the three factors explained 56.95% of the original variance. All the three factors have initial Eigenvalues, which are greater than 1.

The Principal Components Extraction and Varimax with Kaiser Normalization rotation methods were used for the analysis and the initial communities were 1. That is, all the factors explain all of the variance in each item. With the three factors solution, about 52% to 73% of the original variance is explained for each of the variables.

In a rotation that converged in five iterations, all items of TAM loaded well, from moderate to strong, among three factor loadings.

4.7.3 Factors Analysis for Facilitating Condition Variables: (D,M and OE)

The Principle components extraction using Varimax with Kaiser Normalization rotation was performed on the 15 items of development processes (D), management processes (M) and institutional environment (IE). First, the Barlett's Test of Sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy were utilized to examine whether the data set was suitable for analysis.

Table 4.7-3: KMO and Barlett's Test for Facilitating Conditions Variable

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.617
Barlett's Test of Sphericity	Approx. Chi-Square	92.083
	Df	3
	Sig.	0.000

The KMO statistics showed 0.607 at a significant level of 0.000. The results of these two tests indicated that the data was suitable for a factor analysis because the KMO values was greater than 0.6 and Barlett's Test of Sphericity (92.083 with 3 degree of freedom) was highly significant at 0.000 level.

Overall, the four factors explained 54.36% of the original variance. In addition, all three factors have initial Eigenvalues which are greater than 1. Because the study chose to use the principle components extraction and Varimax with Kaiser Normalization rotation explain all of the variance in each item. With the three factors solution, about 55% to 70% of the original variance is explained for each of the variables.

In a rotation that converged in five iterations. D group items D2, D3, D5 and D6 loaded between moderate to strong on factor two on a distinct scale. D1 (a project with management sponsorship) and D4 (the follow-up carried out immediately after implementation effort) were eliminated. This was because their loaded values were less than the acceptable limit of 0.40. M group items M1-M4 loaded between moderate to strong on factor 3 on distinct scale. IE items, IE1 – IE5 loaded between moderate to strong on factor 1 on a distinct scale.

Because the study chose to retain three factors, the Scree Plot suggests that it was appropriate to retain the three factors. The line of the Scree Plot begins to flatten out at about the fourth factor – this is the beginning of the Scree.

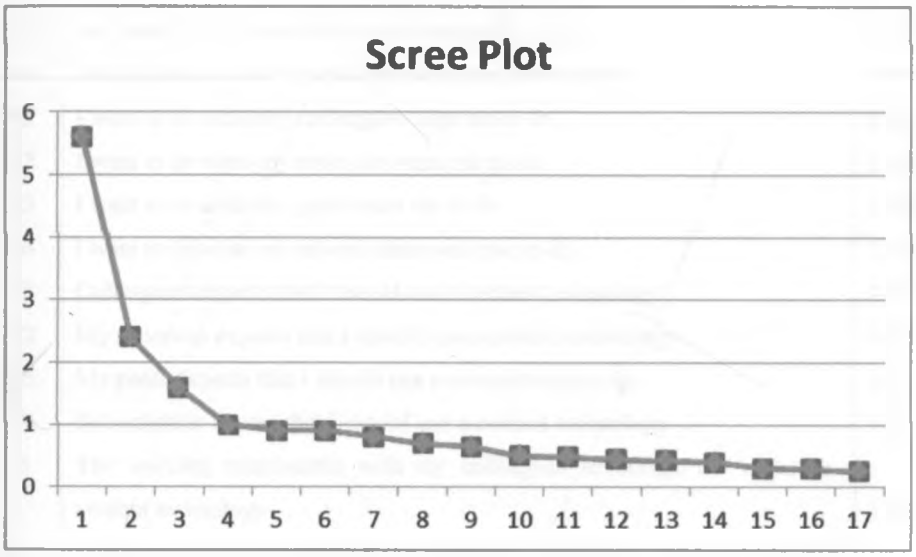


Figure 4.7.3-1 : Facilitating Variables Scree Graph

4.7.4 Factors Analysis for the Social Factor Variables

The social factor analysis construct consists of four variables, namely; subject norm (N), subjective roles(R) , subjective values (V) and subjective social situations (S). each of these variables has more than three items. Factor analysis was conducted to detect the validity of V, R, V, and S items of the social factor construct. The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin measure of Sampling Adequacy were utilized.

The KMO statistic showed 0.797 at a significance level of 0.000. the results of these two tests indicated that the data was suitable for a factor analysis for a factor analysis for a factor analysis being that KMO value was greater than 0.6 and Bertlett's Test of Sphericity was significant (chi-square = 1028.195) with 136 degree of free at $p < 0.000$)

In setting up the factors analysis 1 chose to retain four factors, therefore the variance explained by these factors is shown in the second section of Table 4.6-3. Overall, the four factors explained 64% of the original variance. All of the four variables have initial Eigen values which are greater than 1.

4.7.4.1 Extraction Method: Principal Component Analysis

The principal components extraction and Varimax with Kaiser Normalization rotation methods were used for the analysis and initial communalities was as in Table 4.6-4.1-1

Table 4.7.4.1-1: Communalities for the social factors

		Initial	Extraction
N1	Colleagues thinks I should use e-content technology	1.000	.423
N2	Superiors thinks I should use e-content technology	1.000	.681
N3	My peers thinks I should use e-content technology	1.000	.656
N4	Subordinates thinks I should use e-content technology	1.000	.373
R1	I want to do what my colleagues want me to do	1.000	.736
R2	I want to do what my superiors want me to do	1.000	.693
R3	I want to do what my peers want me to do	1.000	.665
R4	I want to do what my subordinates want me to do.	1.000	.394
V1	Colleagues expects that I should use e-content technology	1.000	.662
V2	My superiors expects that I should use e-content technology	1.000	.589
V3	My peers expects that I should use e-content technology	1.000	.709
V4	Subordinates expect that I should use e-content technology	1.000	.444
S1	The working relationship with my colleagues encourage me to use e-content technology	1.000	.638
S2	The working relationship with my superiors encourage me to use e-content technology	1.000	.739
S3	The working relationship with my peers encourage me to use e-content technology	1.000	.604
S4	The working relationship with my subordinates encourage me to use e-content technology	1.000	.592

The communality is the proportion of the variance in each item, which is explained by the factors. That is, all the factors explain all of the variance in each item. With the factors solution, about 65% to 70% of the original variance is explained for each of the variables. After performing rotated component matrix of the factors those with loading more than 0.4 were retained for the factor loading. Table : 4.7.4.2-1 presents the results of results of the rotated component matrix for the social factor variables. N4, and R4 items were eliminated since their factor loading was less than 0.4. The Scree suggests that it was appropriate to retain only four factors. (subjective norms, roles, social situation and values)

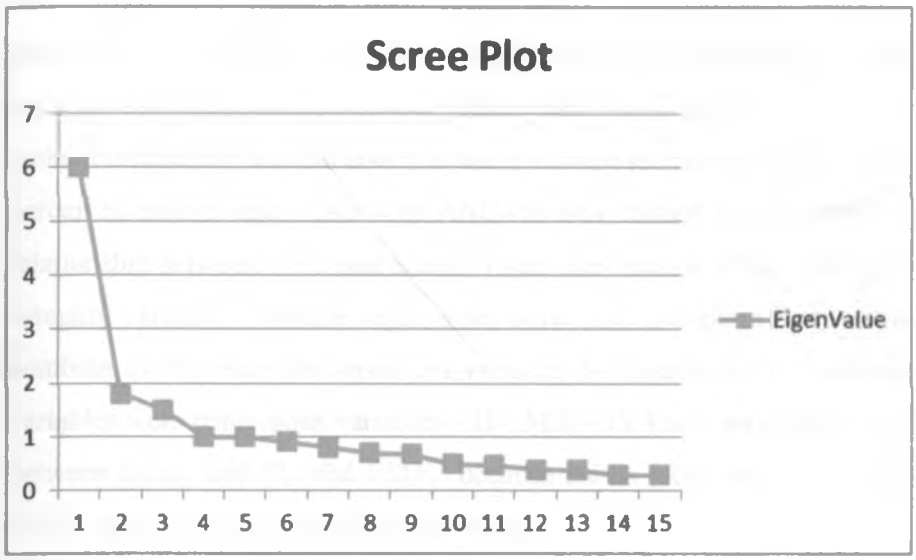


Figure 4.7.4-1 : **Social Factors (N, R, V, S)**

Table: 4.7.4.2-1 Rotated Component Matrix for Social Factors (N, R, V, S)

	Items	Factors Loading			
		1	2	3	4
N1	Colleagues think I should use e-content technology	0.680	0.042	0.126	0.070
N2	Superiors think I should use e-content technology	0.822	0.235	0.021	0.035
N3	My peers think I should use e-content technology	0.081	0.120	0.817	0.150
R1	I want to do what my colleagues want me to do	0.362	0.110	0.732	-0.002
R2	I want to do what my superiors want me to do	-0.003	0.184	0.792	0.071
R3	I want to do what my peers want me to do	0.663	0.072	0.149	0.544
V1	Colleagues expect that I should use e-content technology	0.647	0.109	0.002	0.581
V2	Superiors expect that I should use e-content technology	0.095	0.199	0.237	0.731
V3	My peers expect that I should use e-content technology	0.043	0.373	-0.007	0.657
V4	Subordinates expect that I should use e-content technology	0.474	0.488	0.288	-0.005
S1	The working relationship with my colleagues encourage me to use e-content technology	0.523	0.701	0.161	0.049
S2	The working relationship with my superiors encourage me to use e-content technology	0.155	0.671	0.436	0.192
S3	The working relationship with my peers encourage me to use e-content technology	0.076	0.791	0.027	0.266
S4	The working relationship with my subordinates encourage me to use e-content technology	0.050	0.677	0.179	0.308

4.8 Multiple Linear Regression, MANOVA and One-Way ANOVA for Hypotheses

Multiple Linear Regression, MANOVA and One-Way ANOVA for Hypotheses were used to test the associated hypotheses for the research model. Whereas a One-Way ANOVA

examines the variance between the independent variable attitudes towards using (ATU) and dependent variable actual System Use (A), multiple regressions explore the relationships between several independent variables and dependent variable. MANOVA explores the relationships between habits such as experience in CBIS, experience in e-content technology and the ability to use e-content technology on perceived usefulness and perceived ease of use. One-Way ANOVA was utilised to examine the variance for the relationship between ATU and actual system use because actual system use variable was a category variable. Multiple regressions were used to explain how the predictor variables combine to influence the dependent variables because both the predictors and dependent variables were continuous variables. The MANOVA test was used to test the relationship between habits and PU and PEOU because habits were category variables and PU and PEOU were continuous or metric variables.

Multiple regressions were used to test the relationship between the facilitating condition variables (predictors) such as development processes, management processes, school environment and PU (dependent) as well as their relationships with the PEOU (dependent). In addition, multiple regressions were used to test the relationships between social factors variables (predictors) such as subjective norms, subjective roles, subjective values, subjective social situations and PU as well as their relationships with PEOU. Multiple regressions were further used to explore the relationship between PU, PEOU (predictors) and ATU (dependent). A summary of the interrelationships of variables and types of tests is presented in table 4.8-1

Table 4.8-1: A Summary of Interrelationships of Variables and Tests Used

Predictors	Dependent variables	Types of tests conducted
Habits (H) • Experience in CBIS • Experience in e-content technology (EXCON) • Ability to use e-content technology (ABCON)	PU & PEOU	MANOVA
Facilitating Conditions (FC) • Development processes (D) • Management processes (M) • Institutional environment (OE)	PU & PEOU	Multiple regression
Social Factors (SF) • Subjective norms (N) • Subjective roles (R) • Subjective values (V) • Subjective social situations (S)	PU & PEOU	Multiple regression
• Perceived usefulness (PU) • Perceive ease of use (PEOU)	ATU	Multiple regression
• Attitude towards using (ATU)	Actual system use (A)	ANOVA

To rest the hypotheses associated with the predictors and dependent variables, the SPSS 11.5 package was utilised to compute: predictor variables entered/removed, model summary, analysis of variance (ANOVA), and residual statistics. The ANOVA tests whether multiple regressions R is significantly different from zero (F statistics). R is the correlations between the observed value of dependent variable and predicted values based on regression equation. R square is the coefficient of multiple determinations. An adjusted R square reflects the goodness of fit of the model to the population taking into account the sample size and the number of predictors used. Also, while the partial regression coefficients (r) in the coefficients table give the regression equation of the model, the standardized regression coefficients (beta) assess the relative importance of the predictors. The t value and sig t values in the coefficient table show how the partial regression coefficient (slopes) differs significantly from zero. The residual shows the difference between the actual value and predicted value of dependent value. The general form of the multiple regressions equation for the variables in this present study as follows:

Equation 1 $y=\beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + \ldots\ldots + \beta_n \chi_n + \epsilon$

Where y is the response variable; $\chi_1, \chi_2, \ldots\ldots \chi_n$ are the predictor values; $\beta_0, \beta_1, \beta_2 \ldots \beta_n$ are the partial regression coefficients, net regression coefficients or just regression coefficients. In addition, ϵ is the error or residual assumed to be random and normally distributed with equal variances at every χ point. In the present study, Y represents the PU of e-content technology (ECT), PEOU of ECT or ATU in their equations, also $\chi_1, \chi_2, \ldots\ldots \chi_n$ are the predictors

4.9 Hypotheses Testing

The results of the hypotheses proposed in this study are reported below:-

4.9.1 Hypotheses: Habits versus PU and PEOU

Since habit variables such as experience in CBIS, experience in e-content technology and ability to use e-content technology are category variables and PU and PEOU are continuous variables, the MANOVA test was conducted for the relationships between habit variables on perceived usefulness (H1a, H1b and H1c) and perceived ease of use (H2a, H2b and H2c).

H1a: Users who have more years of experience in computer based information systems would have a higher perceived usefulness (PU) of e-content technology than those who have limited years of experience.

H1b: Users who have more years of experience in using teaching technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited years of experience.

H1c: Users who have higher ability in using teaching technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited ability in using teaching technology.

H2a: Users who have more years of experience in computer based information systems would have a higher perceived ease of use (PEOU) of teaching technology than those who have limited years of experience.

H2b: Users who have more years of experience in using teaching technology would have a higher perceived ease of use (PEOU) of teaching technology than those who have limited years of experience.

H2c: Users who have higher ability in using teaching technology would have a higher perceived ease of use (PEOU) of teaching technology than those who have limited ability in using teaching technology.

The results of MANOVA tests (Table 4.9.1-1) for the hypotheses H1a, H1b and H1c are as follows:

1. There was no significant main effect across EXPCBIS on PU.

   $F(2, 42) = 2.137$, $p>.05=.084$, $\eta 2= .095$. F ratio is reported with the degree of freedom and residual degree of freedom.

2. There was no significant main effect across EXCON on PU.

   $F(2, 42) = .983$, $p>.05 = .006$, $\eta 2= 0.046$.

3. There was a significant main effect across ABCON on PU.

   $F(1, 42), =4.426$, $P<.05=.006$, $\eta 2=.141$

4. The interaction effect across EXPCBIS and EXCON on PU was statistically significant $F(3, 42) = 3.123$, $p<.05 = .006$, $\eta 2=.213$.

5. The interaction effect across EXPCBIS and ABCON on PU was statistically insignificant. $F(4, 42) = 1.473$, $p>.05 = .172$, $\eta 2=.141$

6. The interaction effect across EXCON and ABCON on PU was statistically insignificant. $F(3,42) = .660$, $p>.05 = .705$, $\eta 2 = .054$

Table 4.9.1-1: Results of MANOVA tests for Habits Vs PU

Source	Dependent variable	Df	F	Sig	Partial Eta Squared (η^2)
EXPCBIS	Perceived usefulness (PU)	2	2.137.	.084	.095
EXCON	Perceived usefulness (PU)	2	0.983	.421	.046
ABCON	Perceived usefulness (PU)	1	4.426	.006	.041
EXPCBIZ * ABCON	Perceived usefulness (PU)	3	3.123	.006	.213
EXPCBIS * EXCON	Perceived usefulness (PU)	4	1.473	.172	.141
EXCON * ABCON	Perceived usefulness (PU)	3	.660	.705	.054
EXPCBIS*EXCON*ABCON	Perceived usefulness (PU)	1	3.423	.021	.113
Residual		42			

P<0.05

Overall the results showed that there were no significant interaction effects across (1) EXPCBIS*EXCON on PU, (2) EXPCBIS * ABCON on PU and (3) EXPCBIS * EXCON*ABCON on PU.

$F(1, 42) = 3.423$, $p>.05=.021$, $\eta^2=.113$

The significance interactions effect among these last three variables suggests that the main effect must be treated with caution. However, further investigations of the means and standard deviations scores of the means and standard deviation scores of EXPCBIS, EXCON and ABCON for PU revealed (see Tables 4.9.1-2 to 5.9.1-4) that means range for the PU were substantially higher.

Table 4.9.1-2: The Mean Scores of EXPCBIS on PU and PEOU EXPCBIS * PU*PEOU

EXPCBIS	PEOU Mean	PEOU Std Dev	PU Mean	PU Std Dev
0-4	22.74	4.12	25.50	3.86
5-9	23.65	2.91	23.82	2.91
10-14	23.34	3.72	26.57	2.48
15-19	24.08	3.20	25.56	2.97
>20	24.13	3.61	24.06	2.69

Table 4.9.1-3: The Mean Scores on PU and PEOEXCON*PU*PEOU

EXCON	PEOU Mean	PEOU Std Dev	PU Mean	PU Std. Dev
0-4	22.43	3.66	23.50	3.46
5-9	23.64	3.21	24.86	2.31
10-14	23.44	3.18	24.66	2 81
15-19	23.93	3.81	25.83	3.62
>20	22.98	3.56	24.66	3.01

Table 4.9.1-4: The Mean Scores of ABCON on PU and PEOU ADCON*PU*PEOU

EXCON	PEOU Mean	PEOU Std Dev	PU Mean	PU Std Dev
Novice (intermittent) user	21.21	4.37	21.50	2.67
Novice frequent user	24.01	3.19	23.81	2.48
Expert (knowledgeable) casual user	24.58	3.35	25.96	3.68
Expert (knowledgeable) frequent user	22.30	3.74	23.86	2.72

The Null hypotheses (H0a, H0b and H0c), therefore have been rejected. The results suggest that:

1) Users who have more years of experience in CBIS and e-content have a higher perceived usefulness of e-content technology than those who have limited years of experience.

2) Users who have higher ability in using e-content technology have a higher perceived usefulness of e-content technology than those who have limited ability in using e-content technology.

Hence, the results are considered statistically significant and about 11.3% of the variance in PU could be explained by the interactions among EXPCBIS *EXCON * ABCON.
The results of the MANOVA tests for the hypotheses H2, H2b and H2c are presented in table 4.9.1-5. The results showed as follows:

i. There was no significant main effect across EXPCBIS on PEOU.

$F(2,42) = 2.459$, $P>0.05 = 0.521$, $\eta 2 = 0.108$

F ratio is reported with the degree of freedom and residual degree of freedom.

ii. There was no significant main effect across EXCON on PEOU.

$F(2,42) = 0.610$, $P>0.05 = 0.657$, $\eta 2 = 0.029$

iii. There was no significant main effect across ABCON on PEOU.

$F(1, 42) = 2.438$, $p>0.05 = 0.07$, $\eta 2 = 0.083$

iv. The interaction effect across EXPCBIS and EXCON on PEOU was statistically insignificant. $F(3,42) = .433$, $p>0.05=.879$, $\eta 2=0.036$.

v. The interaction effect across EXPCBIS and ABCON on PEOU was statistically insignificant. $F(4,42) = 1.497$, $p>0.05 = 0.163$, $\eta 2=0.143$

vi. There was no significant interaction effect across EXCON and ABCON on PEOU.

$F(3, 42) = 1.212$, $p>.05=.306$, $\eta 2=.095$.

Table 4.9.1-5: Results of MANOVA test for Habits Vs PEOU

Source	Dependent variable	Df	F	Sig	Partial Eta Squared (η^2)
EXPCBIS	Perceived ease of use (PEOU)	2	2.459	0.052	0.108
EXCON	Perceived ease of use (PEOU)	2	0.610	0.657	0.029
ABCON	Perceived ease of use (PEOU)	1	2.438	0.070	0.083
EXPCBIS *ABCON	Perceived ease of use (PEOU)	3	0.433	0.879	0.036
EXPCBIS *EXCON	Perceived ease of use (PEOU)	4	1.497	0.163	0.143
EXPEIS* ABCON	Perceived ease of use (PEOU)	3	1.212	0.306	0.095
EXPCBIS*EXCON*ABCON		1	0.937	0.427	0.34
Residual		42			

$P<0.05$

Overall, the results showed that there were no significant interaction effects across EXPCBIS, EXCON AND ADCON on PEOU.

$F(1,42) = 0.937$, $P>.05=.427$, $\eta 2 = .034$.

Therefore, the Null hypotheses (H20a, H20b and H20c) have been accepted. The result is considered statistically insignificant. The results suggest that:

- Users who have more years of experience in CBSIS and e-content technology have same level of perceived ease of use of e-content technology with those who have limited years of experience.

- Users who have higher ability in using e-content technology have same level of perceived ease of use of e-content technology with those who have limited ability in using e-content technology. About 3.4% of the variance in PEOU could be explained by the interactions among EXPCBIS, EXCON and ABCON.

4.9.2 Hypotheses: H3a, H3b and H3 vs PU

Hypotheses H3a, H3b and H3c collectively tested the relationship between facilitating conditions and perceived usefulness of ECT. Hypotheses H3a, H3b and H3c hypothesized the development process (D), management process (M) and institutional environment (OE) would be positively related to PU. A multiple regression analysis was used in testing the associated hypotheses (H3a, H3b and H3c). The results (Table 4.9.2-6) show that in general, all the dimensions significantly affect PU (<.05 = .000). The entire dimensions explain 20.6% of the total variance of PU. D has a positive influence (beta=0.219) on PU but the result is significant (p<.05 = 0.024). Therefore, H3a is supported. M has a negative influence (beta = -0.00) on PU but the result is not significant (p> .05 = 0.984). Therefore, H3b is not supported. OE has a positive influence (beta = 0.310) on PU but the result is significant (p< .05 = 0.005). Therefore, H3c is supported.

Table 4.9.2-6: Results of Multiple Regression Analysis for Facilitating Conditions Vs PU

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
PU	Development Processes (D)	0.250	0.110	0.219	2.281	0.024
PU	Management Processes (M)	-0.003	0.126	-0.002	-0.020	0.984
PU	Institutional Environment (OE)	0.262	0.092	0.310	2.842	0.005
F R R^2	10.10 454 0.206					

P<0.05

4.9.3 Hypothesis H4a, H4b and H4c vs PEOU

Hypotheses H4a, H4b and H4c collectively tested the relationship between facilitating conditions and perceived ease of use of e-content technology. Hypotheses H4a, H4b and H4c hypothesized that development processes (D), management processes (M) and institutional environment (IE) would be positively elated to PEOU. A multiple regression analysis was employed to test the associated hypotheses (H4a, H4b and H4c). The results show that in general, all the dimensions significantly affect PEOU (p<0.0 = 0.000). The entire dimensions explain 19.4% of the total variance of PEOU. D has a positive influence (beta=0.213) on PEOU but the result in insignificant (p<.05=0.030). Therefore, H4a is supported. M has a positive influence (beta=0.100) on PEOU but the result is not significant (p> .05 =.369). Therefore, H4b is not supported. OE has a positive influence (beta=0.215) on PEOU but the result is not significant (p<0.05 = 0.056). Therefore, H4c is not supported.

However, when variable M was dropped from the analysis base and the hypothesis are tested D become significant (P<.05 = 0.005) H4a is thus supported.

Table 4.9.3-7: Results of Multiple Regression Analysis for facilitating condition Vs PEOU

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
PEOU	Development Processes (D)	0.291	0.132	0.213	2.202	0.030
PEOU	Management Processes (M)	0.137	0.152	0.100	0.902	0.369
PEOU	Institutional Environment (OE)	0.215	0.111	0.215	1.944	0.054
F R R^2	9.156 436 0.19					

P<0.05

TABLE 4.9.3-8: Results of Multiple Regression Analysis for facilitating condition

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
PEOU	Development Processes (D)	0.319	0.138	0.241	2.542	0.013
PEOU	Institutional Environment (IE)	0.288	0.104	0.267	2.848	0.005
F R R^2	13.35 430 .185					

P<0.05

4.9.4 Hypotheses: H5a, H5b, H5c and H5d vs PU

Hypotheses H5a, H5b, H5c and H5d collectively tested the relationship between social factors and perceived usefulness of e-content technology. Hypotheses H5a, H5b, H5c and H5d hypothesized that subjective norms (N), subjective roles (R), subjective values (V) and subjective social situations (S) would be positively related to PU. A multiple regression analysis was used in testing the associated hypotheses (H5a, H5b, H5c and H5d). The results show that in general all the dimensions significantly affect PI (p<.05 = .000). The entire dimensions explain 36% of the total variance of PU. N has a positive influence (beta=.205) on PU but the result is significant (p<.05 = .019). Therefore H5b is supported. V has a positive influence (beta=.048) on PU but the result is not significant (beta= .048) on PU but the result is not significant (p>.05=.613). Therefore, H5c is not supported. Finally, S has a negative influence (beta=0.250) on PU but the result is significant (p<.05 = .01333. Therefore, H5d is supported.

Table 4.9.4-9: Results of Multiple Regression Analysis for Social Factors vs. PU

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	beta		
PU	Subjective norms (N)	0.496	0.208	0.205	2.385	0.019
PU	Subjective roles (R)	0.381	0.11	0.287	3.442	0.001
PU	Subjective values (V)	5.867 – 0.002	0.116	0.048	0.0508	0.613
PU	Subjective social situation (S)	0.201	0.080	0,250	0.013	0.013
F R R^2	16.24 599 0.360					

P<0.05

4.9.5 Hypotheses: H6a, H6b, H6c and H6d vs PEOU

Hypotheses H6a, H6b, H6c and H6d collectively tested the relationship between social factors and PEOU. Hypotheses H6a, H6b, H6c and H6d hypothesized that subjective norms (N), subjective roles (R), subjective values (V) and subjective social situations (S) would be positively related to PEOU. A multiple regression analysis was utilized to test the associated hypotheses (H6a, H6b, H6c and H6d). The results (Table 4.8-10) show that in general, all the dimensions significantly affect PEOU ($p<.05 = .000$). The entire dimensions explain 24.7% of the total variance of PEOU. N has a negative influence (beta = -0.111) on PEOU but the result is not significant ($p>.05 = 0.238$). Therefore, the H6a is not supported. However, R has a positive influence (beta=0.064) on PEOU but the result is insignificant ($p>.05=.479$). Therefore H6b is not supported. Also V has a positive influence (beta=0.004) on PEOU but the result is not significant ($p>.05 = .966$). Therefore, H6c is not supported. Finally, S has a positive influence (beta=.500) on PEOU but the result is significant ($p<.05 = .000$). Therefore, H6d is not supported.

Table 4.9.5-10: Results of Multiple Regression on social factors vs PEOU

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
PU	Subjective norms (N)	-0.318	0.268	-0.111	-1.185	0.238
PU	Subjective roles (R)	0.101	0.143	0.064	0.710	0.479
PU	Subjective values (V)	6.395E - 03	0.149	0.004	0.043	0.966
PU	Subjective social situation (S)	0.477	0.103	0.500	4.635	0.000
F R R^2	9.487 496 0.247					

P<0.05

4.9.6 Hypotheses: H7 and H8 vs ATU

Hypotheses H7 and H8 collectively tested the relationship between PU and PEOU and attitudes towards using (ATU). Hypotheses H7 and H8 hypothesized that PU and PEOU would be positively related to ATU. A multiple regression analysis was employed to test the associated hypotheses (H7 and H8). The results (Table 4.9.6-11) show that in general, all the dimensions significantly affect TU ($p < .05 = .000$). All the dimensions explained 28.4% of the total variance of ATU. PEOU has a positive influence (beta=0.219) on ATU but the result is significant ($p<.05=.011$). Therefore, H7 is supported. PU has a positive influence (beta = .405) on ATU but the result is significant ($p<.05==.000$). Therefore, H8 is supported.

Table 4.9.6-11: Results of multiple regression analysis for PU and PEOU vs ATU

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
ATU	Perceived usefulness	0.164	0.064	0.219	2.575	0.011
ATU	Perceived usefulness	0.361	0.076	0.405	4.758	0.000
F R R^2	23.417 533 0.284					

P<0.05

4.9.7 Hypothesis: H9 vs Actual System Use

Hypothesis H9 tested the relationship between ATU and actual System use (A). Hypothesis H9 hypothesized that ATU would be positively related to actual system use (A). One-Way ANOVA was used to test the associated hypothesis (H9) because A was a category variable. The results (Table 4.9.7-12) show that there was a significant difference between ATU and A. An analysis of variance revealed a significant difference in mean between people who actually use teaching technology and people who never use. ($F=3.369$, $p<.012$).

A Newman Keuls post ad hoc test ($\alpha = 0.05$) indicated that people who never use e-content technology have significantly lower mean ($M=18.75$, $SD=2.5$, $n=1$) than those who actually use (i.e. less than once a term, 2 or 3 times a term, several times a term and several times each day).

The Eta Squared (η^2) derived by dividing "Between group" of the ANOVA by total of the ANOVA (84.261/809.603) Table 4.9-13) = 0.104. This shows that 10.4% of the variance. ATU could be explained by differences between no-use at all and the actual use of e-

content technology. On average, actual Users of e-content technology have slightly higher ATU than the Non-Users. However, the patterns for the Users are different. While those who use less than once a term had an ATU of 21.90. Those who use it 2 or 3 times a term had an ATU mean of 22.07. Those who use it several times a term had ATU mean of 22.68 and those who use it several times each day had a mean value of 20.86. The difference in mean among Users of e-content technology indicates the levels of perceptions of e-content technology among user groups. The non-user was only 1 in the distributions. Hence, the null is rejected. The result suggests that there is a significant difference in mean attitude towards use for difference actual use groups.

However, when the non-users of e-content technology were dropped from the analysis and the rest rerun the result suggests that the mean of the actual Users of e-content technology differs significantly for people with different levels of ATU ($F(5,51) = 3.2.04$, $p<.001$. It should be noted that over 99% of responded indicated that they use e-content technology for management and academic purposes.

Table 4.9.7-12: Report ATU

NTUCON	MEAN	N	Std Deviation
Not at all	18.80	1	2.50
Less than once a term	21.90	5	3.60
2 or 3 times a term	22.07	22	2.52
Several times a term	22.68	16	1.85
Several times each day	20.85	14	2.17

Table 4.9.7-13: ANOVA: ATU

	Sum of Squares	DF	Mean Square	F	Sig
Between groups	84.26	2	21.065	3.369	0.012
Within groups	725.34	56	6.253		
Total	809.60	58			

Table 4.9.7-14: Student-Newman-Keuls ATU test

NTUCON	N	Subset for Alpha=0.05	
		1	2
Not at all	1	18.7500	
Several times each day	14		21.90
Less than once a term	5		20.86
2 or 3 times a term	22		22.07
Several times a term	16		22.68
Sig.		1.00	.273

Table 4.9.7-15: ANOVA: ATU

	Sum of squares	Df	Mean square	F	Sig
Between groups	25.244	5	2.524	3.204	0.001
Within groups	83.525	51	.788		
Total	108.769	42			

4.10 Stepwise Regression Analysis

In making accurate and efficient predictions of the dependent variables and determine the relative importance of the best model in explaining e-content technology adoption and usage in institutions a stepwise regression analysis was performed. This was done by entering the predictors most strongly correlated with the dependent variable. This allowed the predictors with significant impact to the R square to be added. This continued until none of the variables could make an important change to R square. The completion of the process allowed only the predictors contributing significantly to remain in the model. The results of stepwise regression analyses for the PU and PEOU as dependent variables and habits, facilitating conditions and social factors as independent variables are summarised as follows:

4.10.1 Stepwise Regression for habits, facilitating conditions, social factors and PEOU.

It is evident that 27.1% of the variance in PEOU was explained by the social situations (S3), relating to an individual relationship with their peers (Social factors), institution environment (IE2), relating to the influence of institutional culture (facilitating conditions) and e-content technology development process (facilitating conditions.

Table 4.10.1-1: Stepwise regression analysis – the perceived ease of use (PEOU)

Dependent variable	Independent variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
S3	Social factor-social situations	1.115	.314	.305	3.552	0.001
OE2	Facilitating conditions –IE	.824	.301	.236	2.738	0.007
D2	Facilitating conditions –D	.765	.368	.171	2.078	0.040
F R R^2	23.417 533 0.284					

This result suggests that social factors were very important in explaining the PEOU of e-content technology with individual influenced by those at the management, culture and the characteristics of the environment. The result was contributed to by including variables such as S3, IE2 and D2 of the social factors and facilitating conditions of the environment into the equation.

4.10.2 :Stepwise regression of habits, facilitating condition, social factors and PU

As shown in Table 4.10.2-1, 43.1% of the variance in PU was explained by subjective social situations (S3), which relates to the influence of peers in the industry on e-content

technology adoption (social factors), subjective norms (N1), which relates to the influence of colleagues on individual's towards e-content technology adoption, subjective roles (R3), which relates to the influence of peers in the industry direction on an individual towards e-content technology adoption as well as the ability to use e-content technology (ABCON), relating to the individual's ability in the use of e-content technology (habits).

The results suggest that the relevant constructs in explaining the PU of e-content technology were social factors and habits with individual influence technology. This was established due to the contribution by: S3, N1, R3, V1 and ABCON variables of the social factors and the habits constructs into the equation.

Table 4.10.2-1: Stepwise regression analysis – the perceived usefulness (PU)

Dependent variable	Source construct	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
S3	Social Factor- social situations	.802	.250	3.210	3.210	.002
N1	Social factor-subjective norms	.823	.325	2.527	2.527	.013
ABCON	Habit	.671	.226	2.969	2.969	.004
R3	Social factors –Social roles	.905	.237	2.813	2.813	.000
V1	Social factors-Subjective values	.781	.353	2.212	2.212	.029
R3 R R^2	17.247 656 431					

4.10.3: Stepwise regression for PEOU and PU and attitude toward using

Table 4.10.3-1 shows that 31.4% of the variance in attitudes towards using was explained by perceived usefulness (PU1) which relates to an increase in institutional performance due to e-content technology adoption and another perceived usefulness variable (PU6), relating to an increase in speed in an individual's decision-making (PU) and (PEOU6), relating to the individual's clear understanding of the system due to frequent interactions with it (PEOU). These results suggest that the relevant constructs in explaining ATU were both the PU and PEOU with an increase in organization performance, speed in decision making and an individual's clear understanding of the system following frequent interactions with it. This was established by the influence of the PU1, PU6 and PEOU6 variables of both the PU and PEOU into the equation.

Table 4.10.3-1: Stepwise regression analysis – the perceived ease of use (PEOU)

Dependent variable	Source construct	Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
PU1	Perceived usefulness	1.331	0.303	0.346	4.387	.000
PEOU6	Perceived ease of use	0.897	0.322	0.240	2.784	.006
ABCON	Perceived ease of use	0.596	0.266	0.198	2.240	.027
R3 R R^2	17.839 560 .314					

4.11 Summary and Conclusions

The results of multiple regressions, MANOVA and ANOVA showed that fourteen out of twenty three hypotheses were supported, while nine were not supported. Three out of the fourteen supported hypotheses are from the relationship between habits and PU variables, four were from the relationships between facilitating conditions and PU and PEOU variables, four were from the relationships between social factors and PU and PEOU variables, two were the relationships between PU, PEOU and ATU. Finally, one was from the relationship between ATU and A. with reference to the nine unsupported hypotheses, three were those from the relationships between habits and PEOU variables, two were from the relationships between facilitating conditions and PU and PEOU variables and four were from the relationships between social factors and PU and PEOU variables. In conclusion, the results of data analyses showed that the majority of the hypotheses proposed were significant.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Summary and Conclusions on Hypotheses

5.1.1 Table 5.1-1 : Summary of test results for the Study Hypotheses

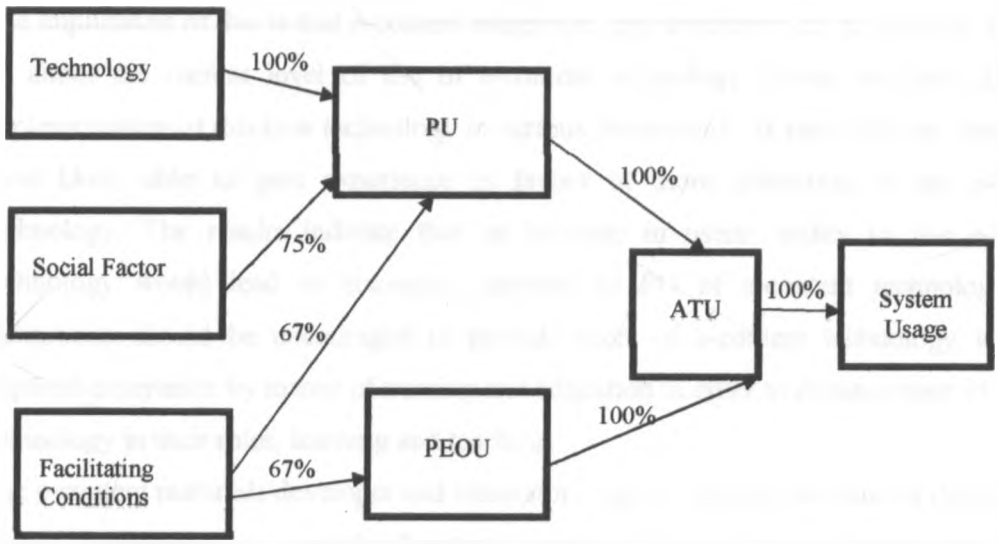
Code	Hypothesis	Outcome of the study	Percentage support
H1a	Hypothesized that Experience in computer based information systems would have a higher perceived usefulness (PU) of e-content technology than those who have limited years of experience.	Supported	100%
H1b	Hypothesized that experience in using e-content technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited years of experience.	Supported	
H1c	Hypothesized that Users who have higher ability in using e-content technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited ability in using teaching technology.	Supported	
H2a	Hypothesized that Users who have more years of experience in computer based information systems would have a higher perceived ease of use (PEOU) of e-teaching technology than those who have limited years of experience.	Not supported	0%
H2b	Hypothesized that Users who have more years of experience in using teaching technology would have a higher perceived ease of use (PEOU) of e-teaching technology than those who have limited years of experience.	Not supported	
H2c	Hypothesized that Users who have higher ability in using e-teaching technology would have a		

	higher perceived ease of use (PEOU) of e-teaching technology than those who have limited ability in using teaching technology.	Not supported	
H3a	Hypothesized that e-content technology development process (D) would be positively related to PU	Supported	
H3b	Hypothesized that e-content technology management process (M) would be positively related to PU	Not Supported	67%
H3c	Hypothesized that Institutional environment (IE) would be positively related to PU	Supported	
H4a	Hypotheses H4a, H4b and H4c hypothesized that development processes (D)	Supported	
H4b	Hypothesized that management processes (M) would be positively elated to PEOU	Not supported	67%
H4c	Hypothesized that institutional environment (IE) would be positively elated to PEOU	Supported	
H5a	Hypothesized that subjective norms (N), would be positively related to PU	Supported	
H5b	Hypothesized that subjective roles (R), would be positively related to PU	Supported	
H5c	Hypothesized that subjective values (V) would be positively related to PU	Not supported	75%
H5d	Hypothesized that subjective social situations (S) would be positively related to PU	Supported	
H6a	Hypothesized that subjective norms (N), would be positively related to PEOU	Not supported	
H6b	Hypothesized that subjective roles (R) would be positively related to PEOU	Not supported	25%
H6c	Hypothesized that subjective values (V) would be positively related to PEOU	Not supported	
H6d	Hypothesized that subjective social situations (S) would be positively related to PEOU	Supported	

H7	Hypothesized that PU would be positively related to ATU	Supported	100%
H8	Hypothesized that PEOU would be positively related to ATU	Supported	100%
H9	Hypothesized that ATU would be positively related to actual system use (A)	Supported	100%

Most of the hypotheses on relationships were supported except for the relationship between technological habits versus perceived ease of use and social factors versus perceived ease of use.

Figure 5.1-1: Modified conceptual framework



5.1.2 Interpretation on technological habits and PU

The first set of hypothesis, H1a, H1b and H1c tested hypotheses about habits and their relationships with PU

H1a: Users who have more years of experience in computer based information systems would have a higher perceived usefulness (PU) of e-content technology than those who have limited years of experience.

H1b: Users who have more years of experience in using teaching technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited years of experience.

H1c: Users who have higher ability in using teaching technology would have a higher perceived usefulness (PU) of teaching technology than those who have limited ability in using teaching technology.

The outcome of the first set of hypotheses was supported in the study. The results of H1a, H1b and H1c agreed very well with other earlier studies that were done on the acceptance and adoption of e-content technology (Davis, 1989, Thompson et al, 1991, Ditsa, 2002).

The outcome suggest that the more experience that user had in e-content technology as a result of their experience in computer based information system, the more PU of e-content technology.

The higher the levels of user's experience with e-content technology the high the higher the percentage of their PU of e-content technology.

The implication of this is that e-content integrators and developers do not need to worry at all about the current level of use of e-content technology during the first phase of implementation of this new technology in various institutions. As time goes on, the user is most likely able to gain experience in favour of more utilization of the e-content technology. The results indicate that an increase in users' ability to use e-content technology would lead to automatic increase in PU of e-content technology. The institutions should be encouraged to provide users of e-content technology with the required experience by means of training and education in order to enhance their PU of the technology in their roles, learning and teaching.

The e-content materials developer and integrators need to address the issue of designing e-content technologies to meet the functional needs of the teachers and users who are the main consumers of these technologies. The management encourages their teachers to move towards the adoption of e-content technologies.

5.1.3 Technological Habits and PEOU Interpretation

The following hypotheses were used;

H2a: Users who have more years of experience in computer based information systems would have a higher perceived ease of use (PEOU) of e-teaching technology than those who have limited years of experience.

H2b: Users who have more years of experience in using e-teaching technology would have a higher perceived ease of use (PEOU) of e-teaching technology than those who have limited years of experience.

H2c: Users who have higher ability in using e-teaching technology would have a higher perceived ease of use (PEOU) of e-teaching technology than those who have limited ability in using e-teaching technology.

The outcomes showed opposite of what was predicted, that there was no significant relationship between experience in CBIS, e-content technology and the ability to use e-content technology. However, these findings agree significantly with previous studies of Mwai (2010), Davis (1989) and Bergeron et al (1995). In Hubona and Jones (2002) study, they reported that there were no significant relationship between user's level of education and perceived ease of use of technology. A likely explanation given by Mwai (2010) in these findings is the fact that e-content technology users with more computer literacy have higher expectations in terms of ease of use of the system than those with low computer literacy. Thus they may react negatively to the adoption of e-content technology if it does not meet these expectations. Further findings of the relationship between users' experience in CBIS, e-content technology and the ability to use e-content technology on PEOU may be more or less dependent upon the stage of e-content technology integration and adoption. Users need some basic skills to handle the e-content technology hence there would be an initial positive relationship between experience to the use of e-content technology, the ability to use e-content technology and PEOU. However in the mature stage, users would have much less difficulty in using the system since the system should be relatively easy to use.

Davis (1989) argued that the PEOU may not be an important variable for explaining user acceptance of new technology but there are other factors that influence technology acceptance. These factors may include technology characteristics such as functionalities, development process and access to other applications and ease retrieval of data amongst others. User acceptance of e-content technology more or less depends upon e-content technology, teacher characteristics such as teacher qualifications, skills and ease of acquiring it from the source.

5.1.4 Facilitating Conditions and PU

Hypotheses H3a, H3b and H3c collectively tested the relationship between facilitating conditions and perceived usefulness of Electronic Teaching Technology (ETT). Hypotheses H3a, H3b and H3c hypothesized the development process (D), management process (M) and institutional environment (OE) would be positively related to PU.

The outcome supported the hypotheses H3a and H3c but failed to agree with hypothesis H3b. In summary the PU clearly mediates the effect of facilitating conditions and users' behavior. PU mediates the effect of e-content technology on behavior but no effect on behavior through e-content technology management processes. This indicated that although e-content technology management process may be an independent department in the early e-content technology project phase, it is embedded within the e-content technology development processes and institutional environment in the long run of the e-content technology project.

The implications of these outcomes are that e-content technology developers, implementers, and administrators of institutions should involve executive users (teachers) in all phases of the e-content projects. The involvement of users of e-content technology would have the following advantages;

- Users' inclusion in the e-content design and development process would improve the design process by identifying their requirements, validating design choices and creating better understanding and hence a sense of ownership.
- Users' involvement in e-content technology integration would enhance speedy rate of adoption
- Users' involvement and participation in e-content technology projects can have a positive effect on their satisfaction with e-content technology.

It is evident that identification of all users of the e-content technology would be a first step towards the successful integration of e-content technology. Close relationship between user, developers and integrators of e-content technology project assist the integrators and developers to identify critical success factors and stakeholders preference; determine reporting formats and frequency outline information flows and its usage and document performance measures that monitor the critical success factors and stakeholders.

The Kenya Institute of Education should take into consideration the importance of e-content materials that support teachers' core business other than technical ones to enhance system use. This includes provision of qualified teachers who can use e-content or providing technical staff to support and train teachers on e-content use. The school managements must also take into account the importance of school economic and cultural background and the dynamics of the environment over the life of an e-content technology project in their institutions. Teachers should be more involved in the integration of the e-content technology; they should be given the necessary training to handle e-content

materials and thereafter used to train their fellow colleagues. Training institutions like universities and teachers colleges should work closely with KIE in enhance the new technology to schools. They need to provide enough teachers who have e-content teaching technology.

5.1.5 Hypotheses H4a, H4b, and H4c: Facilitating Conditions and PEOU

Hypotheses H4a, H4b, and H4c tested the relationship between facilitating conditions of e-content technology and PEOU of e-content technology. Hypotheses H4a, H4b and H4c assumed that there would be a positive relationship between: e-content technology development processes, e-content technology management processes, institutional environment on the one hand, and perceived ease of use of e-content technology on the other.

The outcome of the study supported two of the hypothesized relationships between facilitating conditions and PEOU. The results of H4a and H4c were significant but H4b was insignificant. The results suggest that the PEOU of e-content technology has no relating effect on e-content technology management processes and utilization of e-content technology by the users (H3c). May be e-content technology management processes are embedded within the e-content technology development processes and institutional environment of e-content technology in the long run since both of these variables encompass management.

E-content technology has the potential to drastically alter the prevailing patterns of communication within the institution and thus its implementation would be met with resistance due to lack of knowledge, feelings of fear, insecurity and sarcasm experienced by individuals throughout the institutions. This can be a potential problem that can inhibit the success of the e-content technology project.

This implies e-content technology integrators/developers must enhance the facilitating conditions (e-content technology development processes and institutional environment of e-content technology) of their products by improving the technical capabilities and functionalities of e- content technology. Examples include improving access to an internet, KIE teaching database, providing sophisticated features such as online help screen, data support tools, dial-in access to e-content technology, and graphic, tabular and textual data on screen. To enhance use, these features must be made flexible and user-friendly.

E-content technology integrators/designers, developers, implementers and managers of institutions should have face-to-face meetings with e-content technology user groups (teachers) so that problems proposed by users including issues of business culture and decision-making style can be resolved early. Also, e-content technology implementers need to see an e-content technology project as an ongoing project. As a result, they should make available adequate user support staff, data management processes and resources for a sustainable e-content technology project. The implementers must also ensure that these systems are available and can be accessed anytime anywhere. Managers of organization must consider the importance of enlisting heads of their business units into an e-content technology for their roles and through education and training in the development and implementation phases on how to use statistic, performance measures and so on. In addition, managers of institutions must consider the importance of institutional culture, the interactions among and between users and the dynamics of the environment for the success of the e-content technology project.

5.1.6 Hypotheses H5a, H5b, H5c and H5d: Social factors and PU

Hypotheses H5a, H5b, H5c and H5d collectively tested the relationship between social factors and PU. Hypotheses H5a, H5b, H5c and H5d hypothesized that subjective norms, roles, values and social situations would be positively related to PU of e-content technology.

The results of the study supported hypotheses H5a, H5b, and H5d but did not support H5c. In general, hypothesis H5 suggests social factors in the workplace would have a significant impact on the PU of e-content technology by the users. The above results have a significant implication to e-content technology designers, integrators, developers and managers. These findings, call for the institutions to adequately prepare e-content technology designers, implementers and integrators should note that e-content technology are social systems therefore the social working relationships within institution must be considered in the e-content technology projects (McBride, 1997, Ditsa, 2002). Furthermore, e-content technology integrators, designers, implementers and top managers need to involve users in all phases of an e-content technology project because interactions among participants would have positive effect on its success and minimize resistance to use. Through this way, users' resistance can be managed through identifying their requirements such as information, decision-making style and training and assistance

required to encourage e-content technology use. Therefore appropriate user involvement in e-content technology project and measure of its objectives is a precondition for reducing institutional resistance to an e-content technology.

5.1.7 Hypotheses H6a, H6b, H6c and H6d: Social Factors and PEOU

Hypotheses H6a, H6b, H6c and H6d collectively postulated that social factors of the work environment would be positively related to PEOU of e-content technology. Hypotheses H6a, H6b, H6c and H6d hypothesized that subjective norm, roles, values and social situations would be positively related to PEOU. H6a, H6b and H6c were not supported. Only H6d was supported. This suggests that social factors such as subjective norms, roles, and values social situations have little effect on the PEOU of e-content technology. This might be explained by the fact that e-content technology may be sufficiently user-friendly and easy enough to use that social factors such as norms (H6a), values (6b) and rules (H6c) are not specifically required as ease of use variables, once initial training has been provided to the users. Although, subjective norms, roles and values may have a substantial influence on the perceived usefulness of e-content technology in the initial training period and implementation phases of the e-content technology in the initial training period and implementation phases of the e-content technology project, this influence does not extend to later periods. Therefore, their relationships to ease of user in the later period would become insignificant.

The implications of the results are that the PEOU of a e-content technology to users may be more or less achieved through their effectiveness to users; business requirements such as accessibility to relevant information, flexibility and user friendliness, timeliness and accuracy and so on rather than by the group subjective factor variables such as norms (H6a), roles (H6b) and values (H6c). E-content technology designers, implementers and managers of institutions must therefore ensure that e-content technology projects are more or less institution-led and expert-driven such that:

- Users can have direct hands-on-usage,
- The system can provide immediate access to internal and external data;
- The system can provide accurate data;
- The systems are used directly by executives without intermediaries;
- The systems are user-friendly and require minimal or no training to use.

The significant relationship between social situations (workplace influence) and PEOU of e-content technology (H6d) calls for the organization to adequately prepare e-content

technology implementation by focusing not only on individual users but also on their work units, peer groups and executive users' group. This would enable every group that is involved and participates in the implementation process to perceive the intrinsic characteristics of e-content technology such as ease of use, ease of learning, flexibility and clarity of the interface.

5.1.8 Hypotheses H7 and H8

H7 hypothesized that there would be a positive relationship between the PU of e-content technology and attitude towards use. That is, the greater the PU of e-content technology by the users, the more positive attitude they have would have towards suing the systems. H8, hypothesized that there would a positive relationship between the PEOU of e-content technology and ATU. That is, the greater the PEOU of e-content technology by the users, the greater their perceived ease of use in Electronic Teaching Technology (ETT) of the systems in terms of attitudes towards using it.

The results of the test supported hypotheses H7 and H8 in the study. The results suggests that users tend to have more positive attitudes towards using e-content technology when e-content technology is seen as having more PU. Further, the results suggest that users tend to have a more positive attitude towards using e-content technology when the systems are perceived to be say to use. In other words, computer usage behaviour is seen to be extrinsically and intrinsically motivated. That is, computer users are more or less driven by concern over performance gain and associated rewards as well as, enjoyment, flexibility and clarity of e-content technology interface.

These results have significant implications to e-content technology designers, developers, implementers and institutional managers. E-content technology designers and developers should ensure that there is a significant PU of e-content technology to users in terms of users' productivity, efficiency, effectiveness communication, time saving and enhancement of their mental model of their institutions. Designers and developers should ensure that the attributes of e-content technology are such that users can easily access and assimilate information from the systems. Executives need not be sophisticated computer users in order to use e-content technology. Instead minimal training and education of executives should be enough to enable them to navigate through the system. The systems interface such as keyboard, mice, touch screen, infrared devices or combination should be flexible to uses to enhance use, because executives would be unwilling to tolerate using a difficult interface (Davis, 1989) the users information needs can change. Therefore,

integrators, designers, developers, implementers and institutional managers should plan for the future right from the start. The actual development of e-content technology should take place in close contact with the users an interactive process. In addition, their introduction in the institutions hold takes place in stages in order to test what users prefer.

5.1.9 Hypothesis H9: Attitudes towards using and Actual use

H9 hypothesized that there would be a positive relationship between attitudes towards suing e-content technology and actual use of e-content technology. In other words, the more positive attitudes that users have towards e-content technology, the more he/she would use the systems.

The test results supported the hypothesis. E-content technology integrators, designers are urged, to create favorable user attitudes, usually through such practices as involving uses in the system development work. This allows user concerns over performance and rewards to be addressed before irretrievable investments are made in design efforts. Also, system designers and implementers would be well advised to find some means of addressing these concerns during e-content technology development.

5.2 Findings and conclusions related to the research questions

5.2.1 Findings related to the research questions

In order to provide answers to the research questions stepwise regression analyses was performed on the data collected for the study. The results of the stepwise regressions showed that PU was a more appropriate measure of user behaviour than PEOU and ATU. About 43.1% (see table 5. 10-2) of the variance in PU was explained by variables such as subjective social situations, norms, roles and values of social factors and the ability to use e-content technology of Habits. On the whole, the results suggest that the relevant constructs in explaining the PU of e-content technology were social factors and technological habits with individuals being influenced by the peer in the industry, colleagues and their ability to use the systems. Technological habits followed social factors in a decreasing order of importance in explaining the PU of e-content technology.

About 31.4% (see table 5.10-3) of the variance in ATU was explained by PU and PEOU variables such as (PU1), relating to an increase in institutional performance due to systems use, (PU6), relating to individual's speed in decision-making due to system use and (PEOU6), relating to individual's clear understanding of the system due to frequent interaction. On the whole, the results suggest that the relevant constructs in explaining

ATU were both the PU and PEOU with an increase in institutional performance, speed in decision-making and an individual's clear understanding of the system following frequent interactions with them. The PU followed PEOU in a decreasing order of importance in explaining attitudes towards suing. About 27.1% (see Table 5.9.3-1) of the variance in PEOU was explained by the social situations of social factors, institutional environment and e-content technology development processes of the facilitating conditions. Overall results suggest that social factors ere of vital importance in explaining the PEOU of e-content technology with individuals influenced by those at the top management. Also, institutional culture and user involvement in the systems development processes of the Facilitating conditions were to be important the social factors followed facilitating conditions in a decreasing order of importance in explaining the PEOU of e-content technology.

5.2.2 Conclusions related to the research questions

The results suggest that PU was a more important measure of user behaviour towards e-content technology adoption by means of attitudes. This was followed by the ATU measure and then, the PEOU measure via attitudes. The contributions from the PU, ATU and PEOU in explaining user behaviour towards e-content technology adoption and usage were significant.

When deciding to develop and implement e-content adoption in institutions, integrators, developers, implementers and institutional managers are therefore recommended to consider the PU, PEOU and ATU as important aspects of behaviour in using the systems. The PU and PEOPU of e-content adoption can be linked to user involvement in the development phases of the e-content projects. This is because user involvement in e-content technology design improves the design process by identifying the requirements, validating design options, creating better understanding and ownership options and facilitate implementation by ensuring acceptance, follow-up and continuous resource and technical support.

The developers are recommended to ensure that designs are intuitive and easy to use and that minimal training is required in order to use the systems. The features of the systems such as keyboards and mice, touch screens should be flexible enough to enhance use. Based on the analysis of the results, institutional, social factors, facilitating conditions and e-content technology represent the most important factors in explaining users' behaviour

towards e-content technology adoption and usage by means of the PU, PEOU and ATU the systems.

5.2.3 Implications related to the research questions

The implications of these findings and conclusions are as follows:

- Institutions need to play the leading roles in influencing the e-content technology development and implementation to suit users' information requirements as opposed to integrating e-content technology without taking this requirement into consideration.
- E-content technology users should be actively involved and participate in the design, integration, development and implementation of the e-content systems.
- E-content systems design, development and implantation in institutions should be business led and expert driven for positive user behavior towards using e-content systems. Executive sponsors of e-content systems projects need to reinforce the importance of e-content technology for strategic management activities.
- Initial training needs of users and support from the IS team are of vital importance to enhance use of the system.

5.2.4 Conclusions related to the research problem

The research problem was to develop framework for e-content adoption in secondary schools. On the basis of the findings and results of research hypotheses and questions the general conclusion that can be drawn from this is that: social, cultural, technological habits, individual (beliefs) and institutional variables represent the important factors that explain users' behaviour towards the adoption and usage of e-content technology in the institutional setting. Therefore these factors can influence the underutilization of e-content technology by users and the failures to adopt. The importance of these factors from most influential to least influential is: social, cultural, technological habit, individual and institutional variables. Table 5.2-1 presents the classification of social, cultural, institutional and individual variables along with their sub-variables-as derived from hypotheses H5a, H5b, H5d and H6d of social factors; H3a, H3c, H4a, and H4c of facilitating conditions and H1a, H1b and H1c, H7, H8 and H9 of technological habits, PU and PEOU.

Social and cultural factors	Institutional Factors	Individual / technological habits
- Norms - Roles - Social set-up	- E-content development process - Institutional environment	- Experience in computer based information system - Experience in e-content technology in teaching - Ability to use e-content technology - Perceived use - Perceived ease of use

Table: 5.2-1: Success factors for e-content adoption in institution

Social and cultural factors - The institutional social and cultural factors such as norms, values, roles and social situations are of great importance in influencing user' behaviour towards the adoption and usage of e-content in an institutional setting. This suggests that social factors defined as users' work group such as peers, superiors, subordinates have strong influence on behavour and utilization of e-content technology. Also, the social working relationships among users are important in influencing use of technology.

Institutional factors - The conclusions and findings of this study suggest that institutional factors such as system development processes and institutional environment represent the critical success factors that could influence users' behaviour towards the adoption and usage of e-content technology. This suggests that project with: executive support , that users directly or indirectly involved in development processes, with the spread of use following implementation, follow-ups processes immediately after implementation and, well established communication patterns between the technology integrators and users would have an impact on behaviour. In addition, institution's environment such as the impact of institutional culture on the e-content project, the interaction of the e-content systems with other systems, the influence of power and politics within institutions on e-content technology and institutional commitment via executive sponsorships to wide use of e-content technology should significantly influence user's behaviour towards e-content adoption.

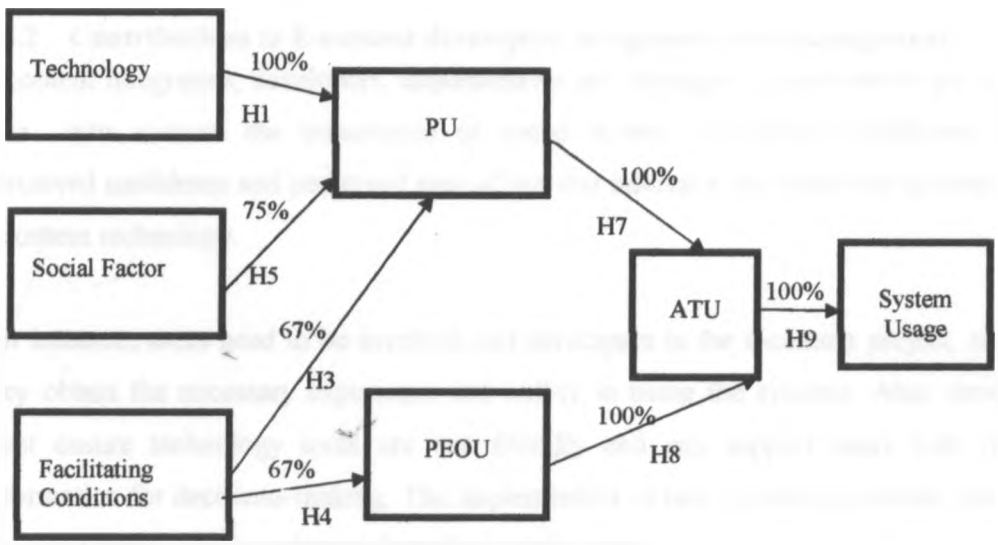
Individual factors- The conclusions drawn from this study further suggest that PU and PEOU of e-content technology as well as users' ability and experience in the systems are

critical for e-content technology adoption. This means that users would use e-content technology provided the systems can increase their institutional performance following use. Also, users would use e-content technology provided the systems can increase their decision making speed following use. Next, users would use e-content technology provided they can understand the systems following frequency of use. Finally, users would use this technology provided e-content technology integrators, designers along with other IT staff provide relevant training and education to enhance use. Therefore, these factors must be considered by integrators, designers and institutional managers in any e-content system projects to enhance use.

5.3 A Validated E-Content Technology Adoption and Usage Model (E-CTAUM)

Based on the results obtained, the research model has been modified to the e-content technology adoption and usage model (E-CTAUM). The hypothesized relationship between technological habits and perceived ease of use has been excluded from the modified version of the model as well as that of facilitating conditions and perceived ease of use. The CBIS Experience, a sub-set variable of the technological habits, has been added. The technology management processes, a sub-set variable of the facilitating conditions, has been excluded as well. In both cases the test results indicated there was no significant relationship.

Figure 5.3-1: A Validated E-CTAUM



5.4 Contributions of the Study

This study has a significant contribution to academic literature and adoption of e-content technologies by the Key stakeholders. The study is a wake-up call to the education stakeholders to use the existing e-technologies adoption model in their efforts to implement the new technologies.

5.4.1 Contributions To Academic Literature

This study has established TAM and TTF in combination with Triandis' frameworks are appropriate reference theories suitable in investigating the adoption and usage of e-content technology in an institution.

The Triandis' framework variables-habits facilitating conditions and social factors have clearly addressed the social, cultural, individual and organizational factors that explain and influence users' behavior towards the adoption and usage of e-content technology in their organizations.

The e-content technology adoption and usage model (E-CTAUM) has been derived from the research model and presented in the modified. The model (E-CTAUM) emphasizes the importance of social, cultural, individual and an institutional variable in the development and implementations of IS including e-content technology for a successful user's adoption and usage.

5.4.2 Contributions to E-content developers, integrators and management

E-content integrators, developers, implementers and managers of institutions are urged to take into account the importance of social factors, facilitating conditions, habits, perceived usefulness and perceived ease of use that influence the behaviour of users to use e-content technology.

For instance, users need to be involved and participate in the e-content project, such that they obtain the necessary experience and ability in using the systems. Also, developers must ensure technology tools are user-friendly and can support users with relevant information for decisions-making. The implementers of new technology should make sure the new products give maximum benefits to their users.

5.5 Future Research

The present study results reveal that TAM, TTF and Triandis' framework represent an appropriate reference theoretical foundation in understanding the user behavior towards e-

content technology adoption and usage. The E-CTAUM framework provides some scenario for IS researchers studying user-behaviour to test the model with different populations of IS users and software choices. E-CTAUM can also be applied in other social science disciplines: marketing, E-commerce and E-tourism by adding new constructs or deleting constructs or simply using it in its current form. For instance, a new construct can be added between social factors and behaviour.

5.6 Recommendation

The KIE should model its implementation frameworks based on the various current research models carried out by several scholars and not to let them lay idle in the library. This can be done through the consultation between KIE and the university scholars who are more informed with the content compiled by their research students.

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APPENDIX B : QUESTIONNAIRE

SURVEY TO VALIDATE A FRAMEWORK FOR E-CONTENT ADOPTION IN SECONDARY SCHOOLS

QUESTIONNAIRE

Preamble

A survey to validate a conceptual framework for e-content adoption in secondary schools is being conducted. The data collected will be analyzed and findings of this study will be recommended to KIE.

It is hoped that KIE which is mandated to develop content for schools will use this report to develop e-content adoption framework for all secondary schools in Kenya.

This questionnaire is therefore directed to you in an effort to collect data that is to be used to validate the e-content framework. This research is purely academic and any information given will solely be used for that purpose. The details and data provided will be strictly confidential and that will not be passed on to any third party without your consent. Please fill in the spaces provided or tick appropriate box representing your response.

INSTRUCTIONS

1) Please answer all the questions in the questionnaire provided
2) Do not indicate your name on the questionnaire
3) Make sure that you **tick , cross (X) or shade** within the box to choose your answer
4) Where only one answer is required choose only one, selecting more than one answer makes the answer invalid and will not be considered.
5) In the sections based on 5-point scale, give your opinion where 5 means strongly Agree and 1 means you strongly Disagree
6) For questions where there is no options to choose, please write your answer in the space provided.

PARTICIPANT'S PERSONAL INFORMATION

Status of your SCHOOL (according to the Ministry of Education)

[ ] National [ ] Provincial [ ] District

Your designation in the school .....

Teaching experience (in years): .....

1. ICT adoption use in school

a) Have you ever used electronic teaching in your school?

Yes [ ] No [ ]

b) Do you think adopting e-content in your teaching would help you to deliver syllabus content more efficiently? Please tick one of the choices below

Yes [ ] No [ ]

2 **Computer based information systems (CBIS) and e-content technology experience and ability**

a) Your experience with Computer based information systems

How many years have you personally been using CBIS for your work. Please Tick your response.

0 – 4 [ ] 5 – 9 [ ] 10 – 14 [ ] 15 – 19 [ ] Over 20 [ ]

b) Number of times you often interact with available e-content technology in a term.

That is, on average how many times do you use e-content technology in a term?

[ ] Not at all [ ] Less than one a term [ ] 5 – 10 [ ] Several times a term
[ ] Daily

c) E- content technology can be used by school for enhancing academic and management operations. In your school choose the most applicable

Academic [ ] management [ ]

d) Your ability in using e-content technology

Electronic teaching technology: Users can be categorized as follows;
Please tick the box which best suits your school

Individual [ ] Departmental [ ] School [ ]

3 **Perceived Usefulness and Perceived Ease of Use**

Below are statement of your personal opinion of the usefulness and ease of use of e-content technology to your school and your inclination to use the CBIS. Please tick your response to ease of the statements

a) Perceived usefulness ie usage outcome

I believe my use of e-content technology will have the following results;	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
Improve my performance in teaching	5	4	3	2	1
Provide my school with a competitive edge	5	4	3	2	1
Provide me with greater level of control over our activities	5	4	3	2	1
Increase the quality of my decision-making	5	4	3	2	1
Provide me with information to detect problems	5	4	3	2	1
Increase the speed of my decision making	5	4	3	2	1

b) Perceived ease of use i.e user-friendliness , clarity, strain-less

Regarding my use of e-content technology in teaching I believe the following	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
Learning to operate available e-content in a computer based system is easy for me	5	4	3	2	1
My interaction with e-content resources is clear and understanding	5	4	3	2	1
Based on my knowledge of e-content technology I find it easy to use it	5	4	3	2	1
I find available e-content technology flexible to interact	5	4	3	2	1
It is easy for me to become skillful by using e-content	5	4	3	2	1

5 **Attitude towards using e-content technology**

Individual attitude towards any technology adopted in learning institution can influence their use of the systems in their jobs. Please tick your response to each of the following statements. My using electronic content in my teaching activities is;

Good	5	4	3	2	1	Bad
Wise	5	4	3	2	1	Foolish
Favourable	5	4	3	2	1	Unfavourable
Beneficial	5	4	3	2	1	Harmful
Positive	5	4	3	2	1	Negative

6 **Electronic Content technology barriers and opportunities**

Statement (Please using the given likert scale tick your response which represent your opinion)	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. There is insufficient trained teacher with necessary computer skills	5	4	3	2	1
b. Recruiting computer skilled teachers is a challenge and costly	5	4	3	2	1
c. The political environment in school is not supportive towards e-content	5	4	3	2	1
d. Obtaining E-content supporting materials is difficult from KIE	5	4	3	2	1
e. The initial cost of preparing e-content is very high	5	4	3	2	1

f. Copyright infringement is a key concern	5	4	3	2	1
g. I believe e-content can be modified very easily	5	4	3	2	1
h. I believe there is enough e-content teaching materials in the present social network	5	4	3	2	1
i. e-content will improve academic results	5	4	3	2	1
j. E-content teaching will improve the school image	5	4	3	2	1

7 E-content technology development, management and institutional environment

Some aspect of organization environment, acquisition management process can encourage people in organization to use technology, please tick your response to each of the following statement.

The following aspects of the e-content technology acquisition processes (e.g documentations, training etc) in my school encourage me to use e-content technology.	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. Acquisition of e-content facilities by my school management	5	4	3	2	1
b. My involvement in e-content technology acquisition (buying CDs, DVDs and Downloading e-content from internet)	5	4	3	2	1
c. Availability of relevant					

e-content resources other than technical in my school encourages me to use e-content technology	5	4	3	2	1
d. Follow-ups carried out immediately after acquisition and implementation of e-content technology	5	4	3	2	1
e. The spread of use of e-content technology in my school following acquisition	5	4	3	2	1
f. Other schools have used the technology and are comfortable with it	5	4	3	2	1

E-content technology management process

The following aspects of the e-content technology management process in my school encourages me to use it	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. Our school has clearly defined e-content policy	5	4	3	2	1
b. Available users' support group on e-content technology	5	4	3	2	1
c. The availability and accessibility of information on the systems	5	4	3	2	1

School environment

The following aspects of my school encourages me to use e-content technology	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. The dynamics changes of the teaching environment encourages me to use e-content technology	5	4	3	2	1
b. The influence of power and politics in the school encourage me to use e-content technology	5	4	3	2	1
c. The culture of my school on e-content encourages me to use it	5	4	3	2	1
d. My school in committed to wide use of e-content technology	5	4	3	2	1
e. The status of my school encourages me to adopt new technology in teaching	5	4	3	2	1

8 Norms , Roles, Values and social situation in relation to electronic content technology usage

People adopt technology because of self-instructions being that , it is perceived to be appropriate by their institutional members (organizational norms) or peers in the school . Moreover by virtue of their roles in the schools, other people may be expected to use particular systems. Further, the broad tendency to prefer certain states of affairs to others (values) can dictate the usable technology in schools. Additionally, the social working among teachers within schools can make it easy to use particular systems. Please tick your response to each of the following statements.

The following people think that I should use e-content technology;	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. My colleagues	5	4	3	2	1
b. My superior	5	4	3	2	1
c. My subordinates	5	4	3	2	1

By the virtue of my role in my school the following people expect that I will use e-content technology	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. My colleagues	5	4	3	2	1
b. My superior	5	4	3	2	1
c. My subordinates	5	4	3	2	1

The social working relationship between me and the following encourages me to use e-content technology;	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. My colleagues	5	4	3	2	1
b. My superior	5	4	3	2	1
c. My subordinates	5	4	3	2	1

Generally I want to do what the following people want me to do;;	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a. My colleagues	5	4	3	2	1
b. My superior	5	4	3	2	1
c. My subordinates	5	4	3	2	1

9 **Participant personal information**

Designation

[ ] Computer Teacher [ ] Management (Principal,D/Principal BoG members, Administrator, HoD)

Your Age (in years)

[ ] 18 – 25 [ ] 26 – 35 [ ] 36 – 45 [ ] 46 – 55 [ ] Over 55

Your highest education level attained

[ ] Diploma [ ] Undergraduate [ ] Postgraduate [ ] Masters Others (specify) ……

Once again let me take this opportunity to assure you that this information you have given here will be for this academic research and will not be used as evidence in any other areas.

THANK YOU FOR YOUR VALUABLE PARTICIPATION IN THIS SURVEY