



University of Nairobi
Masters in information systems

PROJECT TITLE

*E-learning Acceptance in Kenyan Universities:
An Extension of Rogers Diffusion of Innovation
Theory* (1)

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DECLARATION

This project as represented in this report is my original work and has not been presented for any other University award.

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Kennedy Ochillo Hadullo

Abstract

This study investigates the factors that influence the acceptance and adoption of asynchronous e-learning systems in Kenyan universities and presents a conceptual model based on Rogers's diffusion of innovation theory.

The Model was tested with questionnaire Instruments to a sample size of 639 respondents from 4 public universities. The respondents included e-learning students (N=241), non e-learning students (N=344), e-learning lecturers (N=33) and e-learning technicians (N=21).

The results proved that for all the respondents, e-learning awareness and its benefits were the most important factors to influence adoption.

Content quality, instructor influence, e-learning and computer training plus other technology use formed the other adoption factors for e-learning students while internet access, instructor and fellow student influence were instrumental for adoption by non e-learning students.

The e-learning instructors showed that, training, institutional support, rewards, incentives and recognition influenced their adoption while other factors like training, other technology use, e-learning benefits and triability were also crucial.

The most important factors for the e-learning technicians were training, triability, rewards and recognition and institutional support.

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LIST OF ACRONYMS

1. **Asynchronous:** not at the same time," allows the student to complete the WBT on his own time and schedule, without live interaction with the instructor.
2. **CMS:** Content Management System.
3. **ICT:** information and communication technology.
4. **JKUAT:** Jommo Kenyatta university of agriculture and technology
5. **KCSE:**Kenya Certificate of Secondary Education
6. **KU:**Kenyatta university
7. **LAMP:** Linux, Apache, Mysql, PHP
8. **LMS:** learning management system
9. **LMSs:** learning management systems
10. **MPUC:** Mombasa polytechnic university college
11. **MU:** Moi university
12. **ODEL:**open distance and electronic learning
13. **ODL:**open distance learning
14. **PHP:** hypertext preprocessor
15. **Synchronous:** at the same time," involves interacting with an instructor via the Web in real time
16. **TAM:** technology acceptance model
17. **UON:** university of Nairobi
18. **WAMP:**Windows, Apache, Mysql, PHP

INTRODUCTION

1.1 background information

Garrison and Anderson (2003) defined e-learning as the use of electronic technology to deliver education and training applications, monitor learning performance and report learners' progress.

Keller and Cerenud(2002) extended this further and defined e-learning in the context of the internet as 'the use of a web-based or online courses that feature the use of tools such as electronic mail, videoconferencing, electronic bulletin, board systems and chat channels, in combination with web pages and sites.

There are several advantages that can be achieved such as the creation of an asynchronous learning network, and the possibility to offer the learners a wide range of information sources and examples. The goal of e-learning is to increase the quality of learning activities by re-using and sharing information and knowledge, while the learner can determine his own pace (Downing et al, 2008).

This research investigates the factors that influence the acceptance and adoption of asynchronous e-learning systems in Kenyan universities and presents a conceptual model based on Rogers's diffusion of innovation theory.

Many universities in Kenya and the world over have adopted some form of e-learning which is either web-based or offline for training. This is to overcome the difficulties posed by more traditional and conventional learning methods and to offer their students an effective means of increasing their knowledge and understanding.

Chnik and Marcus (2006) stated that students' e-learning dissatisfaction was based on several reasons among which *the lack of a firm framework* to encourage students being the main factor.

Shal (2005) adds that the lack of a clear relationship between e-learning technologies deployed by universities and desired educational outcomes is a major inhibitor to adoption.

Lee & Bahli (2005) argued that the successful implementation of an e-learning system in an institution depends on its effective adoption by user. This requires a solid understanding of user acceptance issues and ways of persuading students to engage with these technologies by the implementers.

Adoption of e-learning in the university context is influenced by many factors. This research aims to discover all the factors and demonstrate how they influence the adoption of e-learning particularly in Kenyan universities.

The research will consider theories of diffusion of innovations and studies of e-learning adoption and propose the reasons for the lag of e-learning realizing its potential and suggest ways of facilitating a successful implementation through a modified framework.

1.2 Problem Statement

Despite the recognition of the important role that e-learning can provide, there has been a lukewarm adoption of the innovation in teaching and learning, with many institutional and individual barriers to adoption identified. The aim of this study is to gain further insight into the factors preventing adoption of e-learning technology in Kenyan universities.

Bouhnik and Marcus (2006) concluded that the adoption and use of e-learning in institutions of higher learning has not recorded the expected success despite the perceived benefits. Among the reasons they highlighted included the following:

- Lack of a firm framework to encourage students to learn.
- Lack of a high level of self-discipline or self-direct.
- Absence of a learning atmosphere in e-learning systems.
- The distance-learning format minimizes the level of contact, as well as the level of discussion, among students.

Res (2005) added that universities have been slow to bring e-learning into the mainstream and maximize potential benefits in the classroom. Barriers identified included lack of infrastructure and funding, and skepticism of the pedagogic value of e-learning.

Neill et al (2004) supported the notion that universities are not fully utilizing technological advances, questioning whether they will continue to meet the needs of shifting knowledge-based societies and increasingly diverse student populations.

Significance of the Study

Implementing e-learning system in Kenya can help in addressing many challenges that arise from the increasing number of students locally and regionally compared to the available human, technical, and other resources. Many students who pass the KCSE examination fail to join local universities because of limited facilities in these institutions. The reason for the limitation can be attributed to the lack of resources and other infrastructure facilities.

E-learning could be an alternative education method which would give equal opportunities to many students to learn.

E-learning implemented for on-campus use can provide flexibility in scheduling courses and improve the use of limited resources such as classrooms and laboratories. Once the e-learning system is implemented in all universities, a greater number of students can be absorbed into education programs but this situation may pose some challenges for university lecturers as they are forced to use the e-learning system.

1.4 Objectives

The objectives of this study are:

- 1) To determine the factors that influence e-learning acceptance in Kenyan universities.
- 2) To determine the type of e-learning instruction used in Kenyan universities.
- 3) To survey the views of non e-learning students.
- 4) To extend Rogers diffusion of innovation theory to fit the Kenyan context.

1.5 Research Questions

In order to achieve the set objectives in this project, we will have to answer the following research questions:

1. How do e-learning systems characteristics such as relative *advantage*, *compatibility*, *complexity*, and *trialability* affect its adoption within a university?
2. Do other variables like *security*, *motivation*, *evaluation*, *self efficacy*, *institutional factors*, *internet skills*, and *quality of teaching materials* affect adoption of e-learning?
3. Is the e-learning system used in Kenyan universities web dependent, web supported, blended or offline?
4. What are the *views* of students who have not done e-learning and how can Rogers's model be modified to fit the Kenyan situation?

LITERATURE REVIEW

2.1 Introduction

The use of e-learning contrasts widely between universities and can range from the simple provision of course content on-line and lecture slides to the use of learning management systems, or virtual learning environments (VLEs) to provide synchronous or asynchronous learning and assessment (Ruiz et al 2006).

Harris (2005) argues that one of the main advantages of e-learning content over traditional face to face content is that her educational materials can be disassembled as individual learning objects, tagged, and stored for reuse in a variety of different learning contexts. These learning objects can be assembled into different configurations depending on the requirements of an individual educational situation and allows for reuse.

Limmerman, Don, Yohon & Teresa (2008) adds that many educational institutions have been slow to adopt Information Technologies for teaching. If higher education institutions can identify the barriers to faculty members' adoption of information technology, they can implement programs to ensure higher adoption rates for their investment of information technology for teaching.

2 E-Learning Status in Kenya.

The Kenyan Government has shown support towards e-learning development by introducing policies aimed towards support to ICT's in institutions and e-learning (ROK, 2005). The policy is articulated in Sessional Paper No. 1 of 2005. Hinged on this policy document, significant strides have been made in providing primary, secondary and universities with needed hardware and software as well as providing training for teachers in computer skills. In all these efforts the focus has been on the integration of ICT's in teaching and learning.

Mwanga (2003) stated that a well tested e-learning platform called wedusoft has been set up to provide training courses within and off campus at the University of Nairobi. Staffs have also been trained on e-learning and content development. Students now use the Interactive CDs to supplement study materials, being able to have independent learning on their own at home and their places of work. This is a simple and convenient way of studying without limitations of pace, time and space.

At the University established in 1984, implementation of an Open and Distance Learning (ODL) programme to support Government efforts in expanding access to university education is ongoing. The

university has set up the necessary ICT infrastructure in its satellite campuses in different parts of the country that will operationalize ODL (ROK, 2007).

In the Lakeside city of Kisumu, Maseno University has assembled requisite ICT infrastructure worth 0.18 million US \$ in readiness for e-learning programmes particularly video conferencing equipment. The university is now in take-off stage of adoption of e-learning programmes. In order to offer access to university education to a larger number of students who qualify but fail to join public universities through Joint Admissions Board (JAB), Maseno University has identified nine Learning Centres countrywide, which can be used as pilot centers' for the Open, Distance and Electronic Learning (ODEL) programmes (ROK, 2007).

At Egerton University near Nakuru, the university plans to launch an e-learning programme in Nursing at its Nakuru Town Campus during the 2007/2008 academic year.

Kenya University has been offering Open Learning and School-Based programmes since 2002. The University currently has eight Open Learning Centers countrywide, namely; Parklands Campus, Embasa, Nakuru, Kakamega, Kisumu, Garissa, Embu and Nyeri. The programmes range from diploma to postgraduate levels hence the University has been receiving overwhelming student's enrolments in the open programmes (ROK, 2007).

3 University Instructors' Acceptance of Electronic Courseware: An Application of the Technology Acceptance Model

Technology Acceptance Model introduced by Davis (1986) was used by Park (2007) to test the instructors' acceptance of e-learning in higher education in the United States of America. Based on the theoretical propositions of the TAM, this study proposes several hypotheses with regard to use of electronic courseware.

Perceived Ease of Use

Considerable amount of research over the past decades supports the significant effect of perceived ease of use on behavioral intention, either directly or indirectly through its effect on perceived usefulness (Venkatesh, 1999). Thus, this study hypothesizes that perceived ease of use of electronic courseware will have a positive effect on both perceived usefulness and behavioral intention to use electronic courseware.

Perceived Usefulness

Behavioral intention to use an information system is fueled, to a large degree, by their perceived usefulness of the system (Davis, Bagozzi, & Warshaw, 1989). There is also extensive empirical evidence

that supports the significant effect of perceived usefulness on behavioral intention (Venkatesh, 1999). In addition, it is very likely that perceived usefulness will increase positive evaluation of the electronic courseware.

c) Evaluation

It is highly likely that users who evaluate electronic courseware more favorably have stronger behavioral intentions to use the technology than those who do not. In the same fashion, such persons are more likely to use the system.

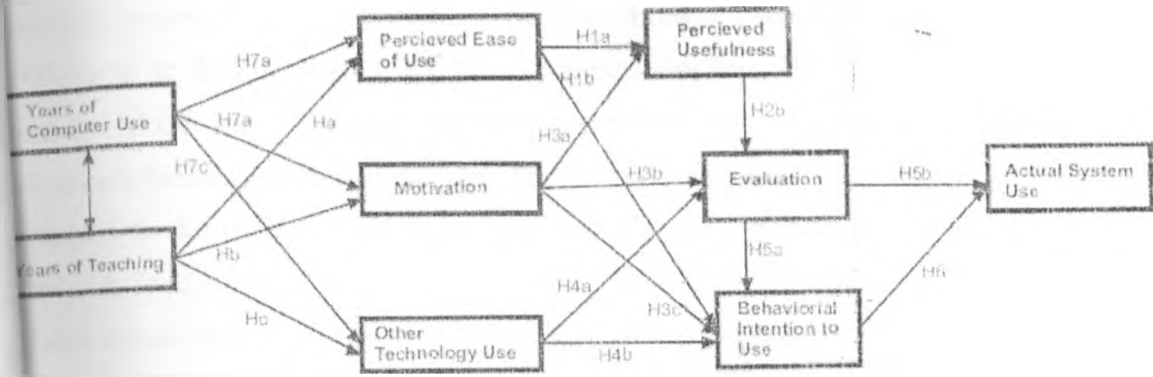


Figure 2.1. Technology Acceptance Model (Source Davis, 1989)

Table 2.1: TAM hypotheses

Hypothesis	Statement
a	Perceived ease of use will have a positive effect on perceived usefulness of electronic courseware.
b	Perceived ease of use will have a positive effect on behavioral intention to use electronic courseware.
a	Perceived usefulness will have a positive effect on behavioral intention to use electronic courseware.
b	Perceived usefulness will have a positive effect on evaluation of electronic courseware.
c	Motivation will have a positive effect on perceived usefulness of electronic courseware
d	Motivation will have a positive effect on evaluation of electronic courseware.
e	Motivation will have a positive effect on perceived usefulness of electronic courseware.
f	Other technology use will have a positive effect on perceived usefulness of electronic courseware
g	Other technology use will have a positive effect on behavioral intention to use electronic courseware.
h	Compliance with School Policy has a direct effect on Behavioral Intention to keep using e-learning systems.
i	Evaluation will have a positive effect on behavioral intention to use electronic courseware.
j	Evaluation will have a positive effect on actual use of electronic courseware.
k	Instructional Technology Clusters has a direct effect on Evaluation of functions of e-learning systems.
l	Behavioral intention to use will have a positive effect on actual use of electronic

	<i>courseware.</i>
H7a	<i>Years of computer use will have a positive effect on perceived ease of use of electronic courseware. using e-learning systems.</i>
H7b	<i>Years of computer use will have a positive effect on motivation.</i>
H7c	<i>Years of computer use will have a positive effect on other technology use.</i>

2.4 Factors influencing e-learning adoption intention: Examining the determinant structure of the decomposed theory of planned behavior constructs

Ndubisi (2004) studied on the factors that determine the intention to adopt e-learning in Malaysian education system. His study focused on the Decomposed Theory of Planned Behaviour (Taylor & Todd, 1995), so as to build a framework for e-learning adoption. He concluded that the Theory of Planned Behavior Model had advantages over other models in that it identified specific salient beliefs that may influence information technology usage. Specifically, He found the model to have better predictive power compared to the traditional theory of planned behavior model and the technology acceptance model (Taylor & Todd, 1995).

Ndubisi argued that the decomposed TPB provided a fuller understanding of usage behavior and intention and may provide more effective guidance to IT managers and researchers interested in the study of system implementation. The D TPB model uses constructs from the innovation literature. It also explores subjective norms and perceived behavioral control more completely by decomposing them into more specific dimensions. It provides a comprehensive way to understand how an individual's attitude, subjective norms and perceived behavioral control can influence his or her intention to use an e-learning system.

Learners Attitude

Attitude is defined as an individual's positive or negative feeling (evaluative effect) about performing the target behavior (Fishbein & Ajzen, 1975). It is related to behavioral intention because people form intentions to perform behaviors toward which they have positive feeling.

System Security

Security is an important issue in e-learning implementation. Sparta (2002) and Olsen (2002) have recognized the importance of security in their list of features to be incorporated in the e-learning structure. Security against intrusion and unauthorized access, editing, alteration, removal or deletion of data or documents is an important issue that all e-learning systems must address.

Perceived behavioral control

Perceived Behavioral Control (PBC) refers to the constraints to technology usage (Taylor & Todd, 1995). The following dimensions are included.

1. Easy access to technological resources and infrastructure (Lau et al, 2001);
2. Self efficacy - defined as an individual's self confidence in his or her ability to perform a behavior (Hill, 1986)
3. Computer anxiety - an individual's apprehension or even fear, when she/he is faced with the possibility of using computers (Simonson, 1987).
4. Computer Training (Igarria, 1997) and Raymond and Bergeron (1992) found that personal computing training has a positive impact on perceived usefulness and technology acceptance
5. Prior experience - this has been found to be an important determinant of behavior (Eagley and Chaiken, 1993) suggested that knowledge gained from past behavior would help to shape intention.

The overall framework used by Ndubisi to determine user acceptance in e-learning system is summarized in Figure 2.2 below.

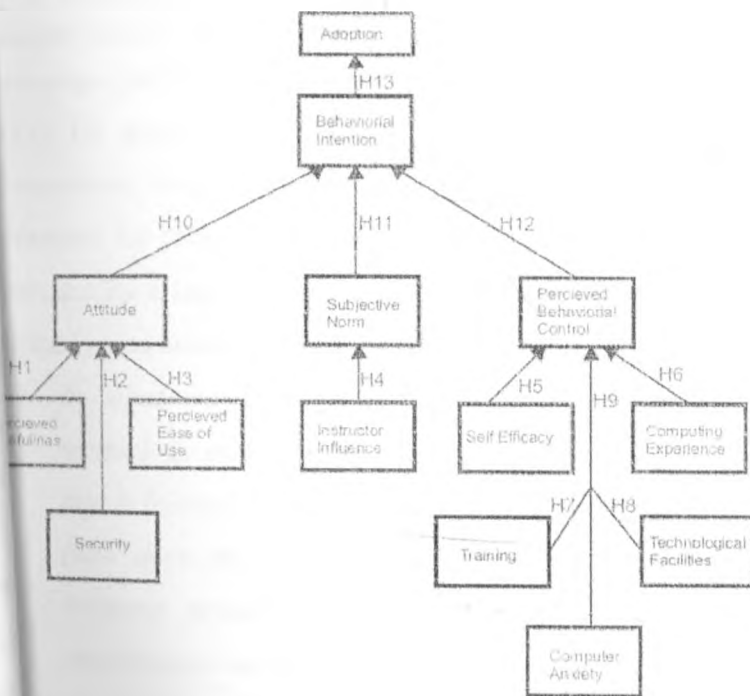


Figure 2.2: The Decomposed theory of planned Behavior (Source –Ajzen 1991)

Table 2.2: PBC hypotheses

Hypothesis	Statement
	Perceived usefulness of using e-learning will positively affect attitude toward the system
	Security of the system will positively affect attitude toward it.
	Perceived ease of using e-learning will positively affect attitude toward the system
	Course leaders influence will positively affect subjective norms
	User's self-efficacy will positively affect perceived behavioral

	Control
	Prior computer experience will positively affect perceived behavioral control
	Training will positively affect perceived behavioral control
	Access to technological facilities will positively affect perceived behavioral control
	Computer anxiety will negatively affect perceived behavioral Control
10	Attitude toward the system will positively affect behavioral Intention
11	Subjective norms will positively affect behavioral intention
12	Perceived behavioral control will positively affect behavioral intention
13	<i>Behavioral intention will lead to adoption</i>

5 A Model for Introducing and Implementing e-learning for delivery of Educational Content within the African context.

Omwenga (2003) developed an e-learning model based on the Diffusion of Innovation by Everett Rogers (1983). He argues that electronic learning models should be sensitive to the level of availability of infrastructure, technical support, and clear policy on implementation, evaluation and curriculum re-orientation. He proposed an e-learning implementation model that can be used by educational institutions introducing e-learning technologies to their staff and students.

This study was based on two research questions;

1. *In what ways can flexible learning opportunities be enhanced by the internet and other technology-mediated educational arrangements within a well formulated adaptable infrastructure that is learner centered and situated learning oriented?*
2. *How does the learning outcomes and experiences of a flexible learner centered, situational learning oriented, computer mediated learning arrangement compare with the classical instructional method such as face to face classroom approach?*

The study concluded that major adoption stages in institutions include: evaluation, pilot, customization institutionalization and a framework is required to facilitate teachers and students along each stage of adoption.

To address the research questions, the study designed and developed a web based learning management system called *Wedusoft*. Learning outcomes based on this Model (Virtual learning) were compared with outcomes from the face-to face instructional methods (Literal Learning).

Results established that while internet based technology mediated educational instruction enhanced learning; it produced better results when mixed with face to face learning (Omwenga, 2003).

2.6 Predicting College Student' Use of E-Learning Systems: an Attempt to Extend Technology Acceptance Model

This study makes an attempt to extend technology acceptance model (TAM) and presents a conceptual model to examine the factors associated with college students' use of asynchronous e-learning systems. A web-based learning platform was employed to assist the learning of an undergraduate-level course, management information systems (MIS), in a well-known institute of technology in the southern part of Taiwan (Yi-Cheng, Chun-Yu, Yi-Chen, Ron-Chen, 2007).

A cross-sectional survey was conducted. The partial least squares method was applied to validate the reliability and validity of the measurement model and assess the proposed conceptual model in this study. The empirical results indicated that college students showed great readiness and positive intentions towards the use of such e-learning system for the professional courses and suggested potential benefits from its use in the long term. The findings of this study not only can proffer practical implications for on-line professional course learning and teaching in business education, but also may serve as instrumental guidelines for e-learning system to be designed effectively to improve students' interests and motivations in virtual learning environments (Yi-Cheng, Chun-Yu, Yi-Chen, Ron-Chen, 2007).

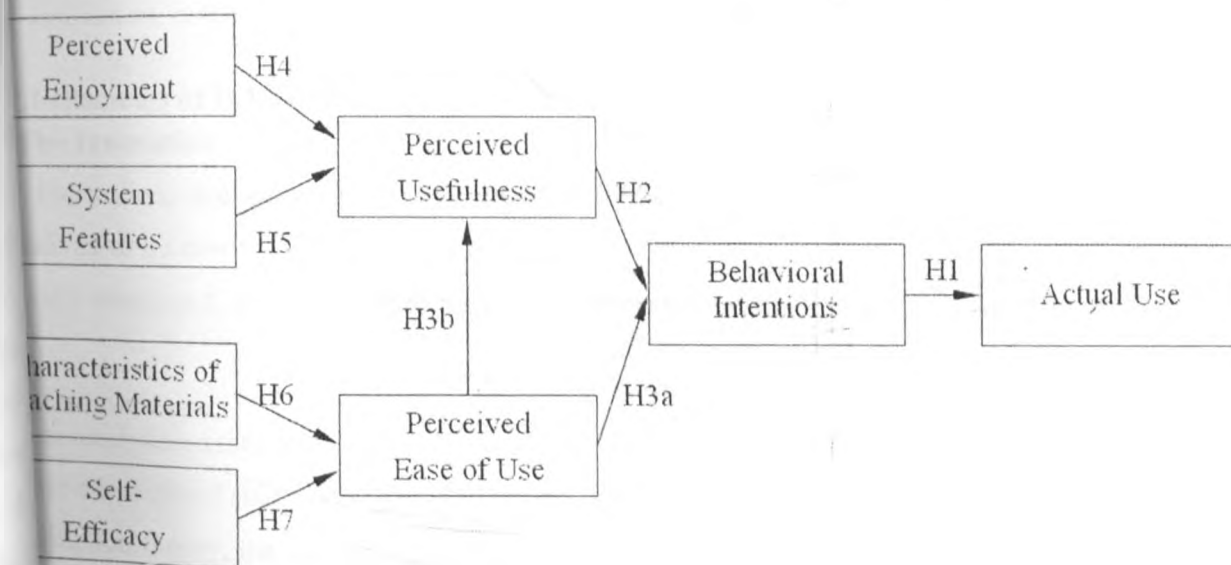


Figure 2.3: Combined TRA model and Technology Acceptance Model (Source Davis, 1989).

Table 2.3: TRA/TAM Hypotheses.

Hypothesis	Statement
	Behavioral Intentions (BI) has a direct effect on Actual Use (AU) of e-learning systems.
	Perceived Usefulness (PU) has a direct effect on Behavioral Intentions (BI) to use e-learning

H3a	Perceived Ease of Use (PEOU) has a direct effect on Behavioral Intentions (BI) to use e-learning systems
H3b	Perceived Ease of Use (PEOU) has a direct effect on Perceived Usefulness (PU).
H4	Perceived Enjoyment (PE) has a direct effect on Perceived Usefulness (PU).
H5	System features (SF) of e-learning systems have a direct effect on Perceived Usefulness (PU).
H6	Characteristics of teaching materials (CTM) of e-learning systems have a direct effect on Perceived Ease of Use (PEOU).
H7	Self-Efficacy (SE) has a direct effect on Perceived Ease of Use (PEOU).

2.7 Testing Roger's Diffusion of Innovation Concepts: Assessing the Adoption of Information Technologies by University Faculty.

Zimmerman, Don, Yohon and Teresa (2008) study investigated Rogers's diffusion of innovation framework (Rogers, 2003) in an academic setting in Montreal, Canada. They referred to the innovations as technologies, such as software and hardware, which are used by faculty to support instruction and their students' learning.

Rogers identified the four main elements that come together to form the theory of diffusion of innovation: *innovation, communication, time, and the social system*. Each element is briefly described below.

7.1 Elements of Diffusion of Innovation Theory

The Innovation

An innovation, according to Rogers' theory (1995), is an idea, thing, procedure, or system that is perceived to be new by whoever is adopting it. The innovation does not need to be new in terms of being originally developed, it only needs to be new to the person or institution that is adopting and implementing

Communication

The second element of Rogers' diffusion of innovation theory is communication, or the process by which people develop and share information with each other to achieve common understanding.

In diffusion theory, the communication process requires an innovation, a unit of adoption (individual or institution) that knows the innovation and has used it, other units of adoption who have not yet experienced the innovation and a means or channel of communicating between the two units. Most commonly, communication channels are either *mass media*, such as radio, television, or newspapers, or *personal channels*, involving one-on-one communication between people.

In Rogers' diffusion of innovation theory, there is an important relationship between the source of communication about the innovation and the rate of adoption. Research shows far less importance on the specific or technical merits of the innovation itself than on how the potential adopter of the innovation

views the person delivering the communication about the innovation - *the more similar the source of the information to the potential adopter, the faster the adoption of the innovation* (Rogers, 1995).

Diffusion of innovation is thus described as a social process, relying on effective communication between two or more individuals who perceive themselves to be similar in terms of beliefs, status, and education.

c) Time

Time is the third primary element of Rogers' theory. There are three components of the time element: the innovation-decision process, adopter categories, and the rate of adoption.

i) Innovation-decision process.

The innovation-decision process encompasses the timeframe from when the potential adopter first becomes aware of the innovation through the point at which the potential adopter either adopts or rejects the innovation. The Innovation decision process has five stages: knowledge, persuasion, decision, implementation, and confirmation.

When the innovation-decision process occurs within an institution, there is more complexity as well as different stages of the innovation process. The five stages of the innovation process within an institution are: agenda-setting, matching, redefining/restructuring, clarifying, and routinizing. The first two stages (i.e., agenda-setting and matching) comprise the initiation phase, when information is gathering and planning occurs, after which the innovation is either adopted or rejected. If the innovation is adopted, the latter three stages comprise the implementation phase, or the actions and decisions involved in putting the innovation into practice within the institution.

Adopter categories

Adopter categories are the second part of the time element of diffusion theory, and are a measure of how inclined an individual is to adopt new ideas as compared to other members of the social system. The five categories (and relative percentage of the final population) into which potential adopters fall are innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). Innovators are those people who seek out and embrace innovations, are venturesome, and not afraid of risk. Early adopters are open to change, but are more closely connected to and respected within the social system, and are not quite so risky as innovators are in their innovation adoption decisions. The early majority, usually about one third of the members in a system, tends to adopt innovations just prior to the average member of a social system; they are more deliberate about their adoption decisions. The late majority, also comprising about a third of the members of a system, are slower to adopt, and tend to be skeptical about innovation. Finally, the laggards are the traditionalists and the last group in a social system to adopt an innovation; they are suspicious of new ideas, processes, products, and services.

iii) Rate of adoption

The rate of adoption is the speed that an innovation is adopted within in a social system (Rogers, 1995). Innovation adoption tends to follow an S-shaped curve, meaning that only a few individuals initially adopt the innovation; but as time moves on and more and more individuals adopt, the rate increases. Eventually, though, the adoption rate levels off and begins to decline.

Innovations are communicated through channels over time among members of a social system. Rogers (2003) theorizes that adoption of innovations eventually happen but at varying rates by individuals based on the availability of resources and acceptance of innovation. The perceived attributions of innovation relevant to its adoption are the perceived *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability*. As each of these increases, it is hypothesized that the rate of adoption will increase (with the exception of complexity, for which a decrease is hypothesized to increase the rate of adoption). These attributes are summarized in the table below.

Table 2.5: Rogers Innovation characteristics

Innovation characteristics	Description
Relative advantage	Relative advantage is the perceived improvement over whatever currently exists that the innovation will replace or enhance; the greater the perceived relative advantage is, the faster it will be adopted.
Compatibility	Compatibility is the measure of how well the innovation aligns with the experiences, values, and needs of whoever is adopting the innovation; as a result, the greater the compatibility, the faster the adoption
Complexity	Complexity relates to ease of understanding and use of an innovation; more simple ideas are adopted faster than more complex ideas,
Triability	Trialability is the level at which an innovation adopter can test and asses the innovation before fully adopting and implementing; the more trialability, the less uncertainty, and the faster the adoption.
Observability	Observability is how visible the innovation is to others; and when an innovation is readily observable by those considering adoption, it is adopted faster.

Social System

At last of the four primary elements of Rogers' diffusion of innovation theory is the social system. All diffusion occurs within a social system, whose members may be individuals, groups, institutions, or systems, but who share a common goal or objective that links them together as a social system. The social system, for example, may be all of the families in a particular neighborhood, all of the lecturers in a university, or all consumers in the country.

Opinion leaders, change agents, and champions are the people within a social system who have the ability to influence the diffusion of innovation within a social system (Rogers, 1995). Opinion leaders are the

influential members of a social system, whose influence stems from expertise and competence, accessibility, or leadership in conforming to the system's norms. Opinion leaders are at the center of interpersonal communication networks, and thus can serve as the model to be imitated when it comes to adopting an innovation (or to opposing an innovation).

Change agents, on the other hand, are external to the system but represent change and innovation to the system. They are often not seen as similar to the rest of the members of the system, but instead possessing some special knowledge or expertise. Change agents often use opinion leaders to gain acceptance within a social system to diffuse (or oppose) an innovation. Within institutions, the individual who has the key role in influencing the institution's adoption and implementation of an innovation is the champion. The innovation champion has the ability to overcome barriers within the institution, and studies have shown that the involvement of an innovation champion contributes to the success of an innovation within an institution (Rogers, 1995).

7.2 The adoption Process.

Diffusion of an innovation occurs through a five-step process. This process is a type of decision-making that occurs through a series of communication channels over a period of time among the members of a similar social system. Rogers categorizes the five stages (steps) as: *awareness*, *interest*, *evaluation*, *trial*, and *adoption*. It should be noted that an individual might reject an innovation at anytime during or after the adoption process. In later editions of the Diffusion of Innovations Rogers changes the terminology of the five stages to: *knowledge*, *persuasion*, *decision*, *implementation*, and *confirmation*. However the descriptions of the categories have remained similar throughout the editions.

Knowledge (awareness)

In this stage the individual is first exposed to an innovation but lacks information about the innovation. It could be noted that during this stage of the process the individual has not been inspired to find more information about the innovation.

Persuasion (interest, Intention)

In this stage the individual is interested in the innovation and actively seeks information/detail about the innovation.

Decision (evaluation)

In this stage the individual takes the concept of the innovation and weighs the advantages/disadvantages of the innovation and decides whether to adopt or reject the innovation. Due to the individualistic nature of this stage Rogers notes that it is the most difficult stage to acquire empirical evidence.

4) Implementation (trial).

In this stage the individual employs the innovation to a varying degree depending on the situation. During this stage the individual determines the usefulness of the innovation and may search for further information about it.

5) Confirmation (Adoption).

Although the name of this stage may be misleading, the individual finalizes their decision to continue using the innovation and may use the innovation to its fullest potential.

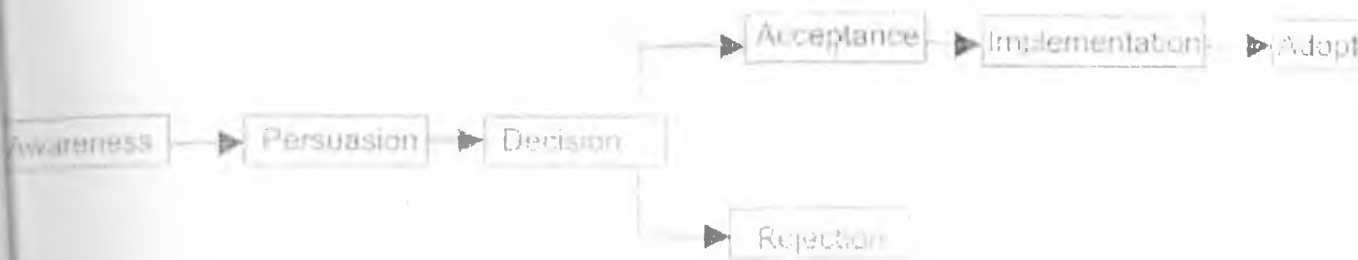


Figure 2.4: Stages in Decision Innovation Process (Source: Rogers, 1995)

8 Choice of a framework.

- TAM deals mainly with perceived ease of use and perceived usefulness
- The Decomposed theory of planned Behavior included subjective norm, perceived behavioral control and attitude
- Researchers have extended TAM to include institutional factors, LMS system factors, quality of teaching materials. Incentives and motivation.
- Roger's Diffusion of Innovation theory had compatibility, triability, complexity, observability and relative advantage.
- This research preferred Rogers's model to others as it has been successfully tested in Kenya as well as other developed countries.
- Rogers Model was used with modifications

Figure 5 shows the proposed Research Model to be empirically tested in this study. This is an extension of Rogers innovation Diffusion of Innovation Model (Rogers, 1995) and was constructed to answer the research questions raised earlier.

2.9 Proposed framework.

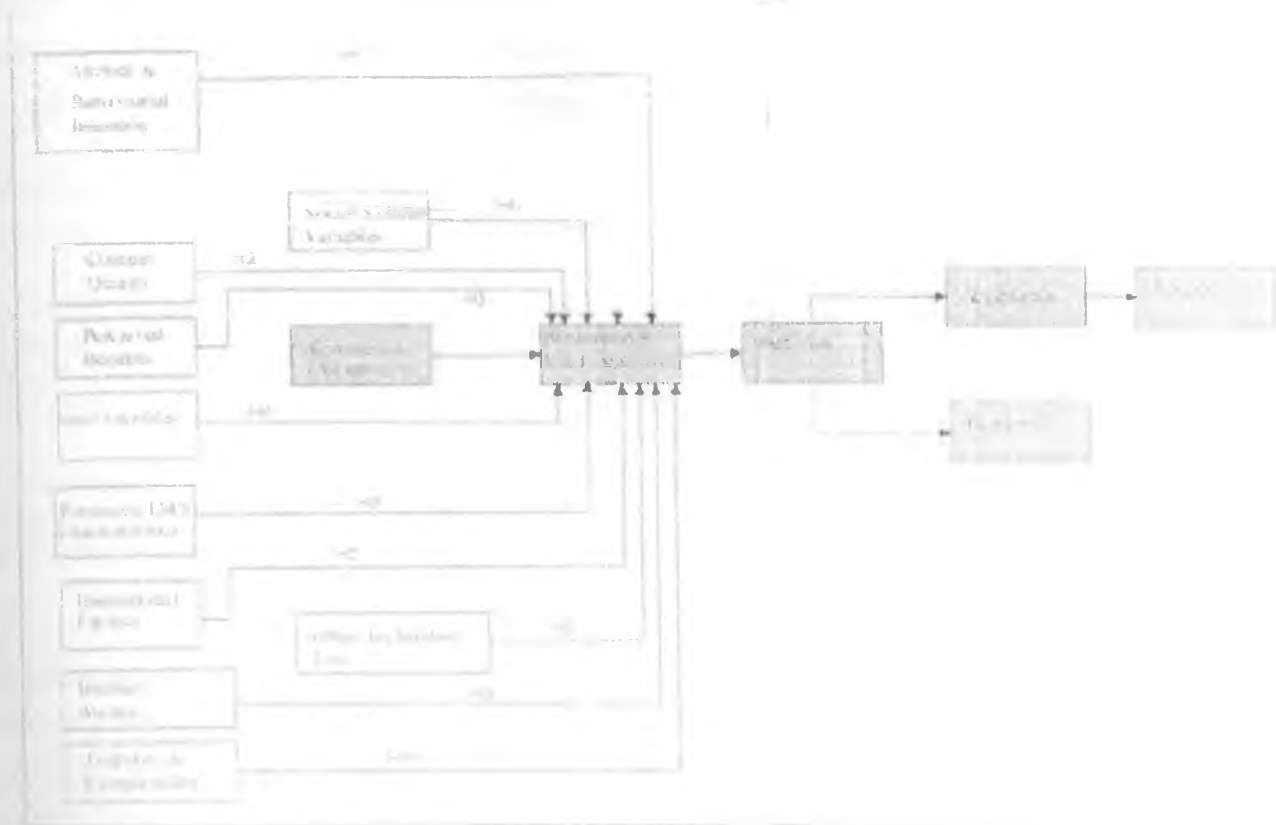


Figure 2.5: The Proposed Research Model.

2.1 Hypotheses

A series of testable hypotheses can be developed from the proposed research model, as shown below:

- Attitude and behavioral intention has a direct effect on persuasion
- Content quality has a direct effect on persuasion.
- Perceived benefits has direct effect on persuasion
- User Variables have a direct effect on persuasion.
- Internet access leads to persuasion.
- Social system variables have a direct effect on Persuasion.
- Institution variables have a direct impact on persuasion.
- Other Technology use has a direct effect on persuasion.
- Perceived LMS characteristics have a direct effect on persuasion.
- Compatibility and triability has a direct effect on persuasion

RESEARCH METHODOLOGY.

3.1 Procedures

To test the research model, a survey was conducted on *instructors, technicians' e-learning students* and *non e-learning students* all drawn from five Public universities in Kenya namely Nairobi, Kenyatta, Moi Maseno and Mombasa polytechnic university college.

3.1.1 Sample Frame

The determination of sample size was done using Bartlett's formula. These calculations are as follows:

$$N=384/(1+384/P)$$

E-Learning sample size

Assuming P=1200

$$n=384/(1+384/1200)=290$$

Non E-Learning sample size

Assuming A Population Of 3000

$$n=384/(1+384/3000)=340$$

1.2 E-learning students, Lectures and Technicians.

The e-learning students surveyed belonged to Education arts, Bsc software engineering, Supply chain managements, Bsc computer science, Bsc bio chemistry, Medical lab science, Bsc computer engineering, Early child hood education, Bsc information technology, BA, Bsc manufacturing engineering, Bed science, Ed arts, B-com, Theatre, Arts and film tech, Bsc analytical chemistry, Library and information science, Community resource management.

1.3 Non e-learning students

Non e-learning students included students from Faculty of Business and social studies Faculty of Engineering and faculty of Applied and health sciences

Total of 1000 questionnaires were distributed of which 500 were for e-learning and 500 for non e-learning.

730 questionnaires were returned for e-learning and 380 for non e-learning.

Of the 730 filled questionnaires, 91 were discarded because significant levels of missing data.

639 completed questionnaires were included in the analysis making a response rate of 87%.

Summary of demographic characteristics of participants is shown in Table 8.

Table 3.1 Summary of Respondents.

UNIVERSITIES	Students		Lecturers	Technicians
	HAVE DONE E-LEARNING	HAVE NOT DONE E-LEARNING		
UON	88	-	1	2
KU	139	-	22	10
MASENO	14	-	1	-
MOI	-	-	9	9
MPUC	-	344	-	-
TOTAL	241	344	33	21
	585		33	21
Grand Total				639

2.2 Measurements.

A majority of studies using the TAM and Rogers Model have relied on survey methodology for data collection. The survey method used in this research is similar to that used in previous TAM and Rogers studies, thus enabling continuity and comparability with previous research.

A five-point Likert scale (“I agree completely” to “I disagree completely”), a three point (“always”, “sometimes” and “never”) and a two point (“yes” and “no”) were used to measure instructors, students and technicians level of agreement or disagreement with 41 items for instructors, 37 for e-learning students, 37 for non e-learning students and 29 for technicians. These items were adapted and refined from the proposed research model.

The survey was conducted using a structured questionnaire having both closed ended and open ended questions. Closed ended questions formed 95% of the instrument while open ended questions formed the remainder.

Closed ended questions were used because they are easier to summarize and analyze.

After obtaining a research permit, the questionnaires were distributed to the universities and the respondents were assured that their individual responses would be kept confidential. The details of the questionnaire can be found in the appendix as follows:

Appendix 7.1 (students who have done e-learning) contains:

Variables tested (table 1)

Students questionnaire instrument (table 2)

Survey Result Tables and Bar Charts

KMO and Bartlett's Test

- v. Reliability statistics for the whole instrument
- vi. Descriptive statistics and alpha for each variable
- vii. Correlations

Appendix 7.2(students who have NOT done e-learning) contains:

- i. Student's questionnaire instrument
- ii. Survey Result Tables and Bar Charts
- iii. KMO and Bartlett's Test
- iv. Reliability statistics for the whole instrument
- v. Descriptive statistics and alpha for each variable
- vi. Correlations

Appendix 7.3(E-learning instructor) contains:

- i. Variables tested (table 1)
- ii. Instructor questionnaire instrument(table 2)
- iii. Survey Result Tables and Bar Charts
- v. KMO and Bartlett's Test
- v. Reliability statistics for the whole instrument
- vi. Descriptive statistics and alpha for each variable
- vi. Correlations

Appendix 7.4(E-learning Technicians) contains:

- i. Variables tested (table 1)
- ii. Technicians questionnaire instrument(table 2)
- iii. Survey Result Tables and Bar Charts
- iv. KMO and Bartlett's Test
- v. Reliability statistics for the whole instrument
- vi. Descriptive statistics and alpha
- vii. Correlations

Data Analysis

The data obtained from the questionnaires was analyzed using the SPSS program version 16.0 and presented using Microsoft PowerPoint.

The research conducted was both quantitative and qualitative. The quantitative research information was expressed in numerical form after which the frequencies, descriptive and reliability analyses for items

in the scales were run. To further explore the variables influencing the adoption of e-learning in the universities, a qualitative analysis of the comments that participants provided on the last page of the questionnaire was conducted. Such additional comments provide insights into additional factors influencing the adoption.

RESULTS AND DISCUSSIONS

4.1 Frequencies.

4.1.1 Frequencies. (Students who have done e-learning)

i. Sample

Out of the total students sampled, 56% from KU, 38% were from UON, and 6% from Maseno.

ii. E-learning awareness and benefits

The study found out that over 76% of students were aware, 8% undecided and 5% unaware.

iii. E-learning Platform User friendliness

75% agree their LMS are user friendly, 25% disagree and 20% were undecided

iv. Organized content

75% agree their e-learning content is organized, 28% disagreed and 25% were undecided

v. Clearly and effectively presented content

74% agree their e-learning content is clearly and effectively presented, 26% disagreed and 25% were undecided

vi. Useful content

70% agree their e-learning content is useful, 16% disagreed and 22% were undecided

vii. Up to date content

70% agree their e-learning content is up-to-date, 22% disagreed and 26% were undecided

viii. Basic computer and browsing skills

70% have basic computer and browsing skills, 13% don't have and 3% were undecided

ix. Training

70% accept they have been trained on e-learning use, 60% disagreed and 11% were undecided

x. Dislike for e-learning

70% dislike e-learning instruction, 76% like it and 8% were undecided

xi. Comparison with face to face learning.

70% believe face to face is better than e-learning, 33% believe e-learning is better than face to face, and 25% were undecided

xii. Instructor influence

70% accept that their instructors have influenced them, 27% disagreed and 19% were undecided

xiii. Fellow student influence

70% accept that fellow students have influenced them, 25% disagreed and 17% were undecided

xiv. Director/VC/Principal support

70% accept that their administrators support e-learning, 14% disagreed and 29% were undecided

xv. E-learning culture

70% accept that their institutions have an e-learning culture, 22% disagreed and 12% were undecided

xvi. Improved academic performance

70% accept that their academic performance have improved, 31% disagreed and 36% were undecided

xvii. Decreased expenses

70% accept that e-learning instruction makes them save money on education, 36% disagreed and 24% were undecided

xviii. Interaction

70% accept that e-learning is more interactive, 37% disagreed and 20% were undecided

xix. Enjoyment

70% accept that e-learning instruction is enjoyable, 20% disagreed and 16% were undecided

xx. Saves time

70% accept that e-learning saves time, 12% disagreed and 14% were undecided

i. E-learning functionalities

- 58 % accept that their e-learning functionalities are working well. 41% disagreed
- xxii. Internet speeds**
51% accept that slow internet affects their e-learning. 43% disagreed.
- xxiii. Posting announcements**
32% accept that their institutions post announcements on their e-learning platforms. 63 % disagreed.
- xxiv. Use of course Calendar**
34% accept that their instructors use the e-learning course calendar. 60% disagreed.
- xxv. Posting assignments**
32% accept that their institutions post assignments on their e-learning platforms. 58 % disagreed.
- xxvi. Use of grade book**
44% accept that their institutions use grade book for exams. 54 % disagreed.
- xxvii. Use of emails**
56% accept that their institutions post announcements on their e-learning platforms. 32 % disagreed.
- xxviii. Use of bulletin board**
37% accept that their institutions communicate via a bulleting board. 53 % disagreed.
- xxix. Use of audio conferencing**
5% accept that their institutions use audio conferencing. 70 % disagreed.
- xxx. Use of video conferencing**
9% accept that their institutions use video conferencing. 79 % disagreed.
- xxxi. Use of power points**
2% accept that their institutions use power points. 54% disagreed.
- xxxii. Sufficient computers**
1% accept that their institutions use have enough computers for e-learning. 57 % disagreed.
- xxxiii. Sufficient Technicians**
% accept that their institutions use have enough computers for e-learning. 55% disagreed.

2 Students who have not done e-learning

i. Sample

total was 344 with 177 from business and social studies, 131 from engineering and 36 from applied and health sciences. 67% were diploma students, 32% degree and 0.9 % higher diploma students

ii. Frequency of internet use.

daily (27%), weekly (28%), monthly (6%), occasionally (31%) and never (9%)

iii. Reason for non internet use.

lack of knowledge (5%), financial constraints (5%), don't see the need (1.2 %), occasionally (31%) and never (9%)

iv. Length of internet use.

less than 1yr (24%), 2-3yrs (19%), more than 4yrs (21%) and never used (9%)

v. Frequent source of internet.

internet cafe (45%), university lab (14%), home (8%), other sources (25%)

vi. Reason for internet use.

academic (43%), email (28%), sports (4%), pornography (3%) and others (11%)

vii. Problems encountered with internet use.

access (45%), knowledge (13%), finances (15%), insufficient sources (15%) and others (9%)

viii. Have basic internet skills

yes (61%), disagree (9%), undecided (18%)

ix. Need basic training on internet skills

yes (57%), disagree (20%), undecided (18%)

- x. **Will find e-learning easy to use**
Agree (86%), disagree (6%), undecided (8%)
- xi. **Believe e-learning will improve grades**
Agree (82%), disagree (4%), undecided (11%)
- xii. **Will use e-learning if friends do so.**
Agree (33%), disagree (45%), undecided (18%)
- xiii. **Will use e-learning if family think so.**
Agree (37%), disagree (55%), undecided (15%)
- xiv. **Believe e-learning will increase learning skills**
Agree (89%), disagree (4%), undecided (5%)
- xv. **Will use face to face even if e-learning is introduced**
Agree (43%), disagree (36%), undecided (18%)
- xvi. **I intend to use e-learning in the future.**
Agree (70%), disagree (10%), undecided (15%)

1.3 E-learning instructors

Sample.

The sample size was 33 with 23 instructors from KU, 9 from Maseno and 1 from UON.

E-learning awareness and benefits

7% of instructors were aware while 3 % were undecided.

University awareness.

0% of instructors were aware, 6% were neutral while 3 % were undecided.

Training

0% of instructors accept they have been adequately trained, 54% disagreed while 3 % were undecided.

Dislike for e-learning.

0% of instructors dislike e-learning instruction, 79% like it while 3 % were undecided.

vi. Comparing e-learning with face to face

0% of instructors believe e-learning is better than face to face. 39% believes face to face is better, while 0% were undecided.

Fellow instructor influence

0% of instructors accept they have been influenced by colleagues, 45% disagreed while 15 % were undecided.

Other Institutional influence

0% of instructors accept their use of e-learning has been influenced by other institutions, 60% agreed while 21 % were undecided.

Institutional support

0% of instructors agree that their institutions (director/VC/Principal) support e-learning, while 9 % were undecided.

Building an e-learning culture

0% of instructors agree that their institution works on building an e-learning culture. 15% disagreed while 12 % were undecided.

Saving time

0% of instructors accept that they save time with e-learning instruction. 21% disagreed while 24 % were undecided.

Better able to present complex materials

0% of instructors accept that they are better able to present complex materials. 15% disagreed while 27 % were undecided.

Interaction with students

0% of instructors accept that they interact more with their students. 30% disagreed while 12 % were undecided.

Better able to assess students work.

45% of instructors accept that they are better able to access students work. 43% disagreed while 12 % were undecided.

xv. Improved teaching

75 % of instructors accept that their teaching has improved. 9% disagreed while 12 % were undecided.

xvi. Improved student performance

70% of instructors accept that their student's performance has improved. 12% disagreed while 27% were undecided.

xvii. Intention to use it in the future

54% of instructors accept that they have enjoyed e-learning and intend to use it in the future. 18% disagreed while 12 % were undecided.

xiii. Availability of good e-learning software

54 % of instructors accept that their institutions have good e-learning software. 21% disagreed while 24 % were undecided.

xix. Ease of content development

61% of instructors don't have difficulty in developing content. 21% does while 15 % were undecided.

xx. Time to prepare content

1 % of instructors create time for content development. 30 % have no time while 6% were undecided.

xi. Slow internet speeds

2 % of instructors agree slow internet affect their e-learning programs. 30% disagreed while 15 % were undecided.

ii. Rewards

7% of instructors say they get rewarded for their e-learning achievements. 48% disagreed.

ii. No of computers

1% of instructors say their institutions lack enough computers. 18% disagreed.

iv. Seminars and workshops

7% of instructors agree they have not attended sufficient workshops or e-learning. 30% disagreed.

v. Promotion on e-learning

8% of instructors agree they get promoted for their e-learning achievements. 30% disagreed.

i. ICT policy

9% of instructors say they have an ICT policy. 6% disagreed.

ii. E-learning strategic plan

9% of instructors say they have an E-learning strategic plan. 18% disagreed.

4 E-learning Technicians

i. Sample.

The sample size was 21 with 10 instructors from KU, 9 from Maseno and 2 from UON.

ii. E-learning awareness and benefits

9% of technicians were aware of e-learning

iii. Dislike for e-learning.

9% of technicians like e-learning instruction, 14% dislike like it while 19 % were undecided.

iv. Intention to use it in the future

9% of technicians accept that they have enjoyed e-learning and intend to use it in the future. 10% disagreed while 29% were undecided.

v. User friendly LMS

9% of technicians accept that their LMS is user friendly. 15% disagreed while 5% were undecided.

vi. Stable and secure system

9% of technicians accept they have a stable and secure system. 19% disagreed.

vii. Training

57% of technicians accept they have been adequately trained, 29% disagreed while 14 % were undecided.

viii. Institutional support

95% of technicians agree that their institutions (director/VC/Principal) support e-learning, while 1 % were undecided.

ix. Slow internet speeds

99 % of technicians agree slow internet affect their e-learning programs.

x. No of computers

57% of technicians say their institutions lack enough computers. 43% disagreed.

xi. LMS used

91% of technicians say they use customized moodle. 9% disagreed.

xii. WAMP installation

79% of technicians agree they can install a WAMP server. 29% disagreed.

xiii. LMS installation on WAMP

52% of technicians agree they can install an LMS on a WAMP server. 38% disagreed.

xiv. LAMP installation

40% of technicians agree they can install a LAMP server. 50% disagreed.

xv. LMS installation on LAMP

7% of technicians agree they can install an LMS on a LAMP server. 52% disagreed.

xvi. PHP knowledge

4% of technicians agree they have good knowledge of PHP. 76% disagreed.

xvii. JAVASCRIPT knowledge

9% of technicians agree they have good knowledge of JavaScript. 81% disagreed.

xviii. LMS customization (moodle)

9% of technicians agree they can customize an LMS. 54% disagreed.

xix. LINUX knowledge

9% of technicians agree they have good knowledge Linux. 29% disagreed.

xx. Joomla cms

9% of technicians agree they can use joomla to create a CMS. 76% disagreed.

Rewards & Promotion

9% of instructors say they get rewarded and promoted for their e-learning achievements. 86% disagreed.

1.5 Open ended comments.

Time Issues

9 (15) of the e-learning students commented about time issues with the use of e-learning technology.

They stated that the time allocation for the labs were not sufficient.

Technology Not Fitting in Courses

9 (5) of the instructors reported that e-learning technology does not fit or align well with the courses

to teach. Specific subject areas mathematics, literature, engineering and drawing engineering.

Scale reliability.

The reliability for each of the four scales (e-learning students, non e-learning students, instructors and technicians) was calculated using Cronbach's alpha to ensure internal consistency of the instruments and

items. The higher the score, the more reliable the generated scale is. Nunnally, (1978) has indicated 0.7

as an acceptable reliability coefficient but lower thresholds are sometimes used in the literature.

4.3 Factor analysis.

Factor analysis to confirm the construct validity of the scales was performed adequately. Kaiser (1974) recommends accepting values greater than 0.5 as acceptable while values below this should lead you to either collect more data or rethink the values to include.

The alpha coefficient and factorial validity for the four instruments (from appendix 1-4) is in the table below:

Table 4.3.1 Instruments Factor analysis and alpha

	No of Items	Alpha	Factorial Validity
1 Students who have done e-learning	37	0.896	0.847
2 Students who have not done e-learning	20	0.510	0.569
3 E-learning instructors	41	0.708	.550
4 E-learning Technicians	29	.716	0.675

The results from table 1 shows the alpha coefficients are greater than the threshold value of 0.7 for 3 items and less for only one item. This means that three of the items are reliable while one may not.

Results of the Bartlett's test shows a "k" value greater than the recommended value of 0.5. This proves that the scales are reliable therefore suitable for the study.

4 Descriptive statistics

Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.

Descriptive Statistics are used to present quantitative descriptions in a manageable form

Univariate analysis involves the examination across cases of one variable at a time. There are three major characteristics of a single variable that we tend to look at:

1. the distribution
2. the central tendency
3. the dispersion

Distribution is a summary of the frequency of individual values or ranges of values for a variable.

1 Central Tendency

Central tendency of a distribution is an estimate of the "center" of a distribution of values. There are three major types of estimates of central tendency namely, mean, median and mode.

Mean or average is probably the most commonly used method of describing central tendency. To compute the mean all you do is add up all the values and divide by the number of values.

4.4.2 Dispersion

Dispersion refers to the spread of the values around the central tendency. There are two common measures of dispersion, the range and the standard deviation.

The Standard Deviation is a more accurate and detailed estimate of dispersion because an outlier can greatly exaggerate the range. The Standard Deviation shows the relation that set of scores has to the mean of the sample.

4.5 Correlations.

Bivariate correlation can be used to determine if two variables are linearly related to each other.

Correlations between variables can be positive, negative or zero. This relationship, which is expressed by what is known as the correlation coefficient, is represented by a value within the range of -1.00 to +1.00.

A correlation coefficient of +1.00 indicates that two variables move in the same direction at all times. If variable A gains in value, we would expect variable B to gain as well. A correlation coefficient of 0 indicates that the variable movements are totally random. A gain by variable A provides no insight into the expected movement of security B. A correlation coefficient of -1.00 indicates that two securities move in the opposite direction at all times. If security A gains in value, we would expect security B to decline in value.

4.5 Test of the Hypotheses

The first hypothesis (H1) proposed that **behavioral** intention and attitude has a direct effect on persuasion which leads acceptance and use e-learning technology. Behavioral intention will result into persuasion since it has a positive correlation with attitude so the hypothesis was supported. This hypothesis showed a positive correlation with all the three instruments (e-learning students; $p=0.02$ and $r=+155^*$, instructors: thus the hypothesis was supported.

The second hypothesis (H2) proposed that **content quality** leads to persuasion to accept and use e-learning technology. This hypothesis showed a positive correlation with attitude. (E-learning students: $p=0.061$ and $r=+0.122$, technicians: $p=0.061$ and $r=+0.122$) thus the hypothesis was supported.

The third hypothesis (H3) proposed that **perceived benefits** lead to persuasion to accept and use e-learning technology. This hypothesis showed a positive correlation with attitude. (E-learning students: $p=0.02$ and $r=+0.198^*$, instructors $p=0.575$ and $r=+0.101$) thus the hypothesis was supported.

The fourth hypothesis (H4) proposed that user variables lead to persuasion to accept and use e-learning technology. Training and internet skills showed no correlation with attitude and behavioral intention While influence showed no correlation.

The fifth hypothesis (H5) proposed that internet access lead to persuasion to accept and use e-learning Technology. The following outputs were obtained((Internet access is positively related to social influence since $p=0.821$ and $r= +0.12$;Internet access is positively related to behavioral intention since $p=0.849$ and $r= +0.10$;Performance expectancy is positively related to social influence $p=0.01$ and $r= +0.147^{**}$; Performance expectancy is positively related to behavioral intention $p=0.021$ and $r= +0.126^*$) so the Hypothesis was supported.

The sixth hypothesis (H6) proposed that social system variables leads to persuasion to accept and use e-learning technology. This hypothesis showed a negative correlation with attitude and behavioral intention. (E-learning students: $p=0.02$ and $r=+0.198^*$, non e-learning students= 0.01 and $r= +0.147^{**}$, instructors= 0.575 and $r= +0.101$) thus the hypothesis was not supported.

The seventh hypothesis (H7) proposed that institution variables lead to persuasion to accept and use e-learning technology. This hypothesis showed a positive correlation with attitude and behavioral intention (E-learning students: $p=0.02$ and $r=+0.198^*$, instructors= 0.575 and $r= +0.101$) thus the hypothesis was supported.

The eighth hypothesis (H8) proposed that other technology use lead to persuasion to accept and use e-learning technology. This hypothesis showed a positive correlation with attitude and behavioral intention (E-learning students: $p=0.02$ and $r=+0.198^*$, instructors= 0.575 and $r= +0.101$) thus the hypothesis was supported.

The ninth hypothesis (H9) proposed that perceived LMS factors lead to persuasion to accept and use e-learning technology. (E-learning students: $p=0.000$ and $r=+0.610$ for BI & $p=0.000$ $r=0.223$ for attitude For instructors, $p= 0.0778$ $r=0.065$ so there is a positive correlation. Hypothesis supported for technicians but not for students

The tenth hypothesis (H10) proposed that compatibility and triability lead to persuasion to accept and use e-learning technology. Compatibility has no correlation with attitude or behavioral intention while triability has.

Compatibility: $p=0.689$, $r=-0.093$ for BI; $P=0.000$, $r=-0.148$ for attitude

Triability: $p=0.860$, $r=0.042$ for BI; $P=0.536$, $r=0.143$ for attitude

4.6 New hypotheses

4.6.1 E-learning students

1. Attitude is positively related to content quality since $p=0.061$ and $r=+0.122$
2. Attitude has a negative correlation with complexity $p= 0.060$ and $r=-0.123$
3. Behavioral intention has a positive correlation with training $p= 0.031$ and $r=0.234^{**}$
4. Awareness has a positive correlation with influence $p=0.131^*$ and $r=0.044$
5. Awareness is positively related to Attitude since $p=0.04$ and $r= +0.134^*$
6. Awareness is positively related to other technologies $p=0.118$ and $r= +0.102$

4.6.2 Non E-learning students

1. Internet access is positively related to performance expectancy since $p=0.377$ and $r= +0.48$
2. Internet access is positively related to social influence since $p=0.821$ and $r= +0.12$
3. Internet access is positively related to behavioral intention since $p=0.849$ and $r= +0.10$
4. Performance expectancy is positively related to social influence $p=0.01$ and $r= +0.147^{**}$
5. Performance expectancy is positively related to behavioral intention $p=0.021$ and $r= +0.126^*$

4.6.3 E-learning Instructors

1. Behavioral intention is positively related to attitude $p=0.475$ and $r= +0.129$
2. Behavioral intention is positively related to instructor variables $p=0.153$ and $r= +0.255$
3. Behavioral intention is negatively related to complexity $p=0.552$ and $r= -0.107$
4. Behavioral intention is positively related to motivation $p=0.452$ and $r= +0.136$
5. Behavioral intention is positively related to training $p=0.242$ and $r= +0.238$
6. Behavioral intention is positively related to other technology use $p=0.814$ and $r= +0.046$
7. Attitude is positively related to perceived benefits $p=0.575$ and $r= 0.101$
8. Attitude is positively related to institution variables $p=0.284$ and $r= +0.160$
9. Attitude is positively related to motivation $p=0.575$ and $r= +0.101$
10. Attitude is negatively related to other instructor variables $p=0.855$ and $r= -0.033$
11. Attitude is positively related to rewards and recognition $p=0.607$ and $r= +0.107$
12. Training has a positive correlation with behavioral intention $p=0.205$ and $r= 0.226$

4.6.4 E-learning Technicians

1. Behavioral intention is positively related awareness since $p=0.981$ and $r=+0.006$
2. Attitude is positively related to behavioral intention since $p=0.662$ and $r=+0.101$
3. Attitude and behavioral intention are negatively related to compatibility since ($p=0.689$ and $r=-0.093$; $p=0.441$ and $r=-0.178$)
4. Attitude and behavioral intention are positively related to institutional variables since ($p=0.310$ and $r=+0.233$; $p=0.523$ and $r=+0.148$)
5. Attitude and behavioral intention are positively related rewards since ($p=0.614$ and $r=+0.117$; $p=0.726$ and $r=+0.081$)
6. Attitude and behavioral intention are negatively related complexities since ($p=0.423$ and $r=-0.185$; $p=0.786$ and $r=-0.063$)
7. Attitude and behavioral intention are positively related to triability since ($p=0.860$ and $r=+0.041$; $p=0.536$ and $r=+0.144$)
8. Attitude and behavioral intention are positively related training since ($p=0.299$ and $r=+0.238$; $p=0.441$ and $r=+0.178$)

CONCLUSIONS

5.1 introduction

This chapter presents an overall summary of the research undertaken. The research investigated the factors that influence e-learning acceptance in Kenya based on Rogers's diffusion of innovation theory. The research explored the e-learning development trends in five universities and outlines several directions which have emerged from the study and will further provide recommendations the way forward.

5.2 E-learning students

Over 75% of the students sampled are aware of e-learning and its benefits and like using it.

The students also agreed that most of the content provided by their instructors is organized, useful, up-to-date and clearly represented.

Majority of the students have basic computer and internet skills (79%) and agree that their LMS have user friendly interfaces (55%).

On e-learning training, over 60% say they have not received adequate training. This calls for instructors and technicians to train their students on the use of learning management systems.

Besides neither suggesting that face to face instruction is still better than e-learning, the students also noted that e-learning has not reduced their study costs nor improved their performance in class. Half of the students also felt that interactivity with fellow students has declined.

These calls for the instructors to emphasize on the importance of e-learning and, create courses that meet study objectives and blend e-learning with face to face instruction.

Some of the positive aspects of e-learning raised by the students were; it saves time (71%), enjoyable (62%), working functionalities (58%), institutional support and fellow student influence (52%) and an e-learning culture (52%)

The negative aspects of e-learning raised were; slow internet speeds (51%), underutilization by institution of LMS features like announcements on LMS (62%), LMS calendar (60%), posting assignments on LMS (58%), use of grade book for exams (54%), use of bulletin board (53%)

Other technology use, video conferencing (19%) and audio conferencing (25%) are still out of reach for many institutions. The most common form of communication is email (66%) and use of PowerPoint's (62%). The students also recommended an increase in the number of technicians (57%) and computers (55%) for e-learning

Institutions must fully utilize the LMS functionalities to make it more enjoyable. They also need to source for funding to improve the e-learning infrastructure

5.3 Non e-learning students

Half of the students browse the internet regularly (daily, 27%), (weekly, 54%) and the frequent source of the internet is the cyber café (45%). The institutions need to develop internet labs to make it easier for students access the internet.

Majority of the students browse the internet for academic reasons (43%) while emails (28%) are another main reason. This proves that e-learning will be a success if introduced.

Family (37%) or fellow students (33%) will not influence students to do e-learning

The greatest challenge faced by these students is slow internet speeds (45%). Over 60% of the students have basic internet and browsing skills while over 80% think they will find e-learning easy to use, their learning skills will improve and their performance will increase.

Majority of the students (43%) say they will use face to face instruction even if e-learning is introduced while 36% disagree. Over 70% of the students have an intention to use e-learning in the future

5.4 E-learning instructors

Over 90% of the instructors are aware of e-learning and agree that their institutions support e-learning.

The institutions have developed ICT policy and an e-learning strategic plan, good e-learning software's (54%) and have developed an e-learning culture (67%).

The instructors say they like e-learning (79%), as it makes them save time (54%) on their work, interacts more with their students (54%) and can present complex materials (55%) with it.

The instructors add that that e-learning has improved their teaching (75%), improved student performance (70%) and so intent to use it in the future (54%)

Content development is easy (61%) and they can always create time (61%) for it. But assessing students work is not easy (55%). Other challenges include slow internet speeds (52%), lack of rewards and recognition and promotion (48%), lack of enough computers (61%), training (54%) and seminars (49%)

The majority of instructors (39%) still believe face to face instruction is better than e-learning instruction (33%) They however disagree that fellow instructors (45%) or other institutions (60%) have influenced them into using e-learning.

5.5 E-learning Technicians

Over 90% of the technicians are aware of e-learning and agree that their institutions support e-learning.

66% of the technicians like e-learning while 62% intend to use it in the future.

Over 80% say their LMS are user friendly, stable and secure and also admit they have been adequately trained for e-learning use.

Slow internet speed and insufficient computers and lack of rewards and promotion(86%)are some of the challenges faced by the technicians.

On the technical aspect, most of the technicians understand Linux operating system (71%), can install a WAMP server (79%) and install an LMS (62%) on it.

Acknowledging that moodle (91%) is the most common open source LMS in use, only 43% can customize it. 50% can install a LAMP server while only 43% can install an LMS on LAMP.

The technicians also admit poor having poor PHP (24%) and Javascript (19) skills and knowing very little about joomla cms(24%)

This calls for thorough trainings in server side and client side scripting and Linux.

5.6 The extended modified Rogers framework according to this research

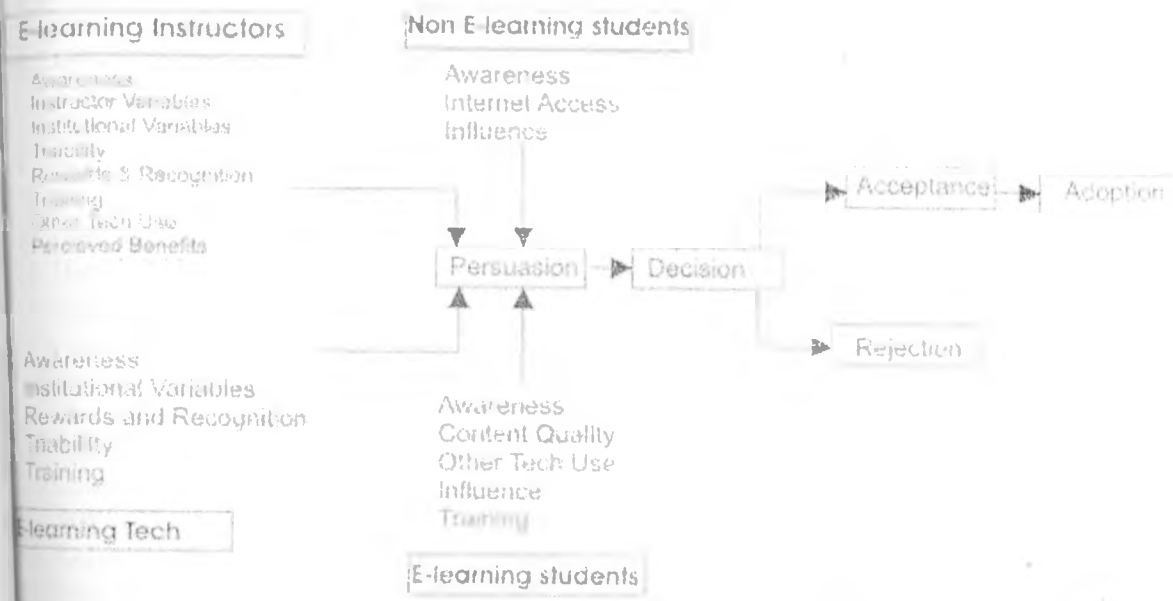


Figure 5.1: Proposed framework after modification

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APPENDICES

7.1 Appendix 1 (Students that have done e-learning)

Table 7.1.1 E-learning students: Tested Variables.

Variable	Items of measurement	Scale
E-learning Awareness	I know what e-learning is and the benefits it offers	5-point Likert-type response scale: strongly agree; agree; undecided; disagree; strongly disagree 3-point "always", "sometimes" "never" & a 2 point Yes or No
Behavioral Intention	I enjoyed using e-learning & intend to use it in the future.	"
Attitude	<ul style="list-style-type: none"> • I dislike e-learning • I don't think e-learning can be better than face to face 	"
Perceived LMS characteristics	<ul style="list-style-type: none"> • User friendly & easy to use • Working Functionalities • Interactive system 	"
Content Quality	<ul style="list-style-type: none"> • Well organized • Clearly & effectively presented. • Useful • Up-to-date 	"
Learner Variables (influence)	<ul style="list-style-type: none"> • instructor influence • fellow student influence • training 	"
Learner Variables (training & Skills)	<ul style="list-style-type: none"> • Computer & internet Skills • Training 	"
Learner Variables (confidence)	<ul style="list-style-type: none"> • Self confidence 	"
Perceived Benefits	<ul style="list-style-type: none"> • Saves money. • Improved academic performance. 	"
Complexity	<ul style="list-style-type: none"> • Lack adequate computers for learning. • Lack of enough technicians • Slow internet speed 	"
Evaluation	<ul style="list-style-type: none"> • Posting announcements. • Posting assignments • Using the e-calendar. • Communication via the bulletin board. • administrating exams/quizzes; using the grade book 	"
Other Technology Use	<ul style="list-style-type: none"> • Audio conferencing. 	"

- Video conferencing.
- PowerPoint presentations
- Emails

Table 7.1.2 E-learning Students Questionnaire.

This questionnaire is to be filled by E-learning students in Kenyan Universities

Correspondent Background:

Course Name: -----

Department: -----

Course Level: Master's degree [] First Degree [] Diploma []

Year of Study: Yr1 [] Yr2 [] Yr3 [] Yr4 [] Yr5 []

Gender: Male [] Female []

Mark using a pen against your preferred choice by a tick (√) or a cross (x)

SA= strongly agree; A= Agree; U= Undecided; D= Disagree; SD= strongly disagree

		SA	A	U	D	SD
1	I know what e-learning is and the benefits it offers					
2	My Departments e-learning platform is user friendly and easy to use					
3	My Departments e-learning solution is stable & secure					
4	My Departments e-learning system content is well organized.					
5	My Departments e-learning content is clearly & effectively presented					
6	My Departments e-learning system content is useful					
7	My Departments e-learning system content is up-to-date					
8	I have basic computer and browsing skills.					
9	My department have sufficiently trained us on e-learning system use.					
10	I dislike the idea of using e-learning					
11	I like using e-learning and think it is a good idea					
12	I don't believe e-learning can be better than face to face learning					
13	Instructors encourage me to use e-learning					
14	Other students encourage me to use e-learning					
15	Our VC/Principal/Director supports & endorses e-learning					
16	My institution/ department works on building an e-learning culture					
17	E-learning instruction is easier than face to face instruction					
18	My academic performance has improved since i started using e-learn					
19	I save money on my education by using e-learning					
20	I interact more with my classmates by using e-learning.					
21	I have enjoyed using e-learning and intend to use it in the future					

22	I am motivated to use e-learning as it saves time					
----	---	--	--	--	--	--

		Always	Sometimes	Never
24	Slow internet speeds hinder my e-learning classes			
25	My Department posts announcements on e-learning platform			
26	My Department uses the e-learning course calendar			
27	My department posts assignments on the e-learning platform			
28	My department uses the grade book for exams/quizzes			
29	My department communicates via email			
30	My department communicates via the bulletin board			
31	My institution uses audio conferencing			
32	My institution uses video conferencing			
33	My institution/department uses PowerPoint presentations.			

		Yes	No
34	My Department has enough computers for e-learning		
35	I am always confident when using e-learning		
36	My department has enough e-learning technicians support		

State any other challenges that you face during your e-learning lessons.

Suggest any improvements for e-learning in your department.

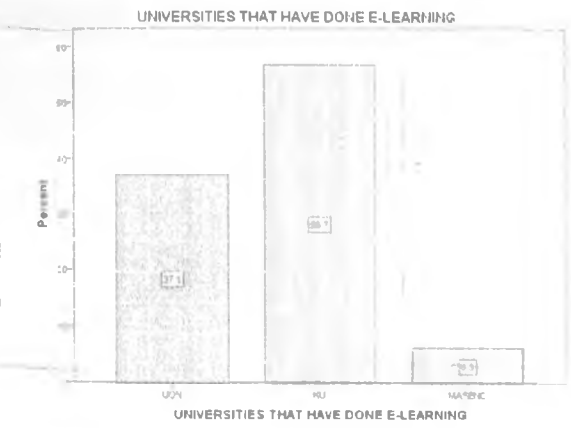
Make any necessary comments.

1.1 E-learning students: Result Tables and Bar Charts.

1a. Universities that have done e-learning

	Frequency	Percentage

	UON	89	36.9
	KU	136	56.4
	MASE	15	6.2
	NO		
	Total	240	99.6
Missi	System	1	.4
ng			
Total		241	100.0



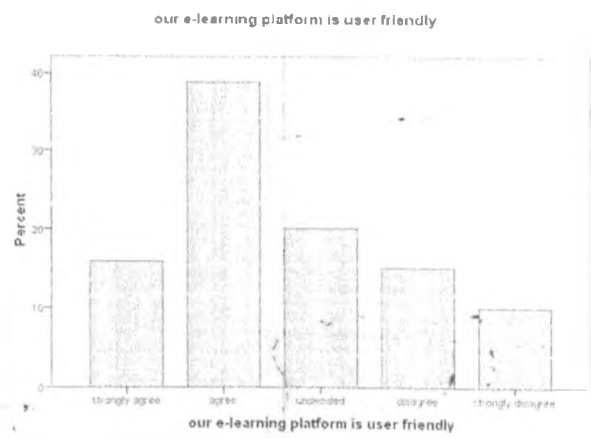
1.1b. I know what e-learning is and the benefits it offers

	Frequency	Percent
Valid strongly agree	85	35.3
agree	101	41.9
undecided	20	8.3
disagree	12	5.0
strongly disagree	20	8.3
Total	238	98.8
Missin System	3	1.2
g		
Total	241	100.0



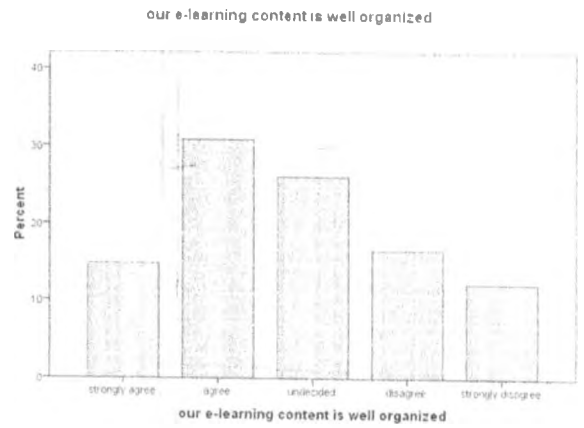
1c. our e-learning platform is user friendly

	Frequency	Percent
Valid strongly agree	38	15.8
agree	93	38.6
undecided	48	19.9
disagree	36	14.9
strongly disagree	24	10.0
Total	239	99.2
Missi System	2	.8
g		
Total	241	100.0



1.1d. our e-learning content is well organized.

		Frequency	Percent
Valid	strongly agree	34	14.1
	agree	71	29.5
	undecided	60	24.9
	disagree	38	15.8
	strongly disagree	28	11.6
	Total	231	95.9
Missing	System	10	4.1
Total		241	100.0



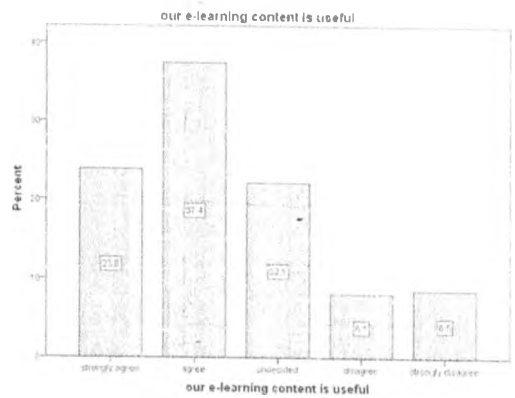
1.1e. our e-learning content is clearly and effectively presented

		Frequency	Percent
Valid	strongly agree	34	14.1
	agree	73	30.3
	undecided	61	25.3
	disagree	40	16.6
	strongly disagree	25	10.4
	Total	233	96.7
Missing	System	8	3.3
Total		241	100.0



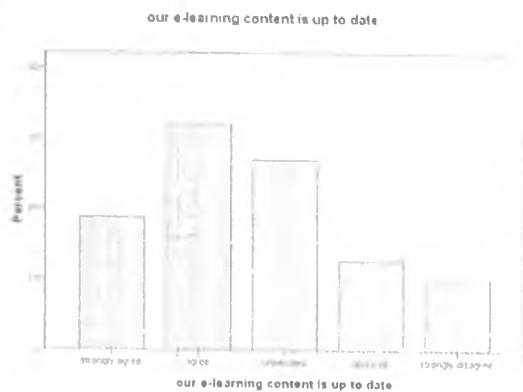
1.1f. our e-learning content is useful

		Frequency	Percent
Valid	strongly agree	56	23.2
	agree	88	36.5
	undecided	52	21.6
	disagree	19	7.9
	strongly disagree	20	8.3
	Total	235	97.5
Missing	System	6	2.5
Total		241	100.0



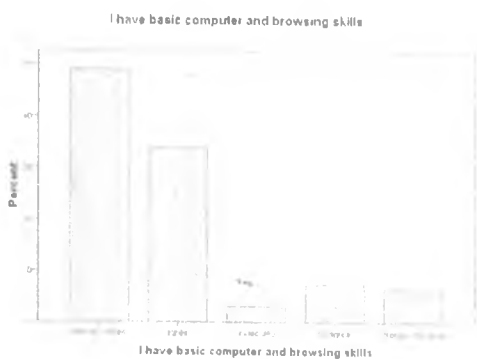
1.g. our e-learning content is up to date

		Frequency	Percent
Valid	strongly agree	43	17.8
	agree	74	30.7
	undecided	62	25.7
	disagree	29	12.0
	strongly disagree	23	9.5
Total		231	95.9
Missing	System	10	4.1
Total		241	100.0



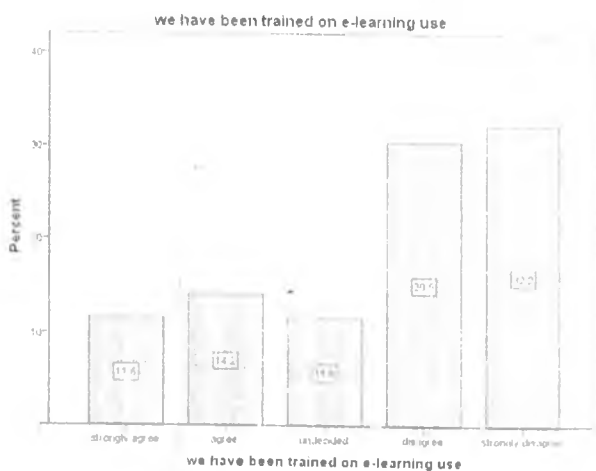
1.h. I have basic computer and browsing skills

		Frequency	Percent
Valid	strongly agree	113	46.9
	agree	78	32.4
	undecided	7	2.9
	disagree	17	7.1
	strongly disagree	15	6.2
Total		230	95.4
Missing	System	11	4.6
Total		241	100.0



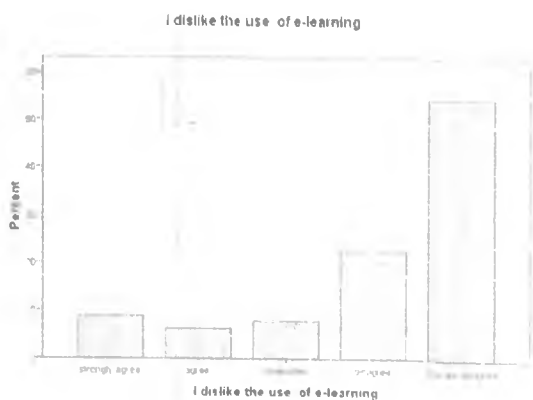
1.i. we have been trained on e-learning use

		Frequency	Percent
Valid	strongly agree	27	11.2
	agree	33	13.7
	undecided	27	11.2
	disagree	71	29.5
	strongly disagree	75	31.1
Total		233	96.7
Missing	System	8	3.3
Total		241	100.0



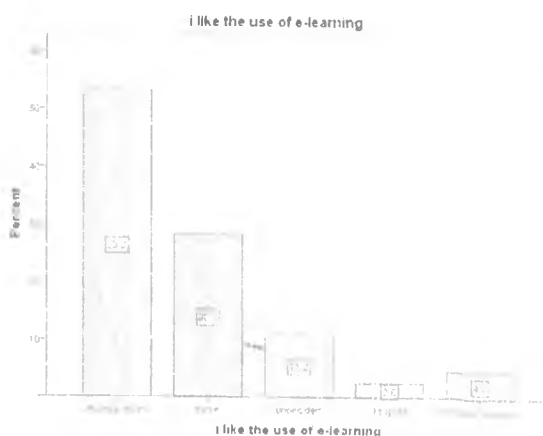
1.j. I dislike the use of e-learning

		Frequency	Percent
Valid	strongly agree	21	8.7
	agree	15	6.2
	undecided	19	7.9
	disagree	54	22.4
	strongly disagree	131	54.4
	Total	240	99.6
Missing	System	1	.4
Total		241	100.0



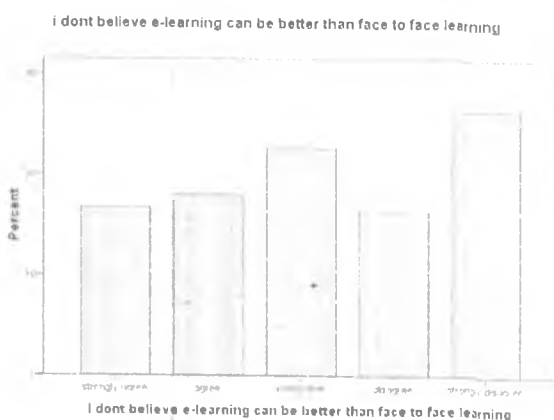
1. k. I like the use of e-learning

		Frequency	Percent
Valid	strongly agree	124	51.5
	agree	66	27.4
	undecided	26	10.8
	disagree	6	2.5
	strongly disagree	11	4.6
	Total	233	96.7
Missing	System	8	3.3
Total		241	100.0



11. I don't believe e-learning can be better than face to face learning

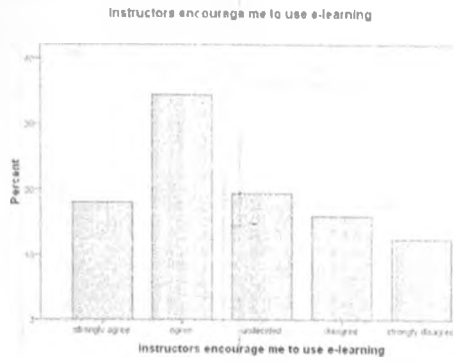
		Frequency	Percent
Valid	strongly agree	39	16.2
	agree	42	17.4
	undecided	53	22.0
	disagree	38	15.8
	strongly disagree	62	25.7
	Total	234	97.1
Missing	System	7	2.9
Total		241	100.0



12. m. instructors encourage me to use e-learning

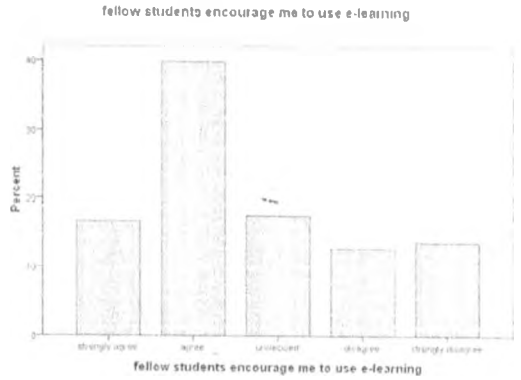
		Frequency	Percent
Valid	strongly agree	42	17.4
	agree	80	33.2

	undecided	45	18.7
	disagree	37	15.4
	strongly disagree	29	12.0
	Total	233	96.7
Missing	System	8	3.3
Total		241	100.0



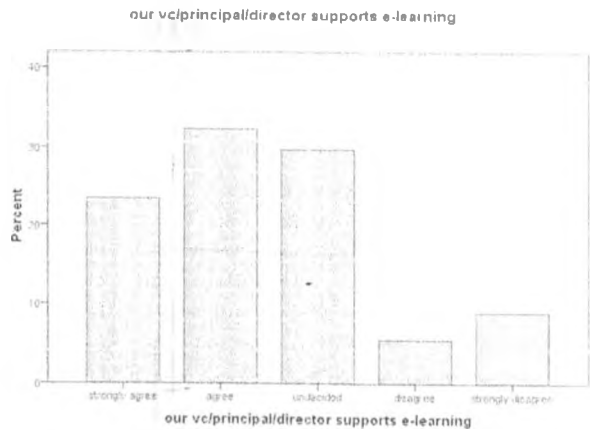
1. In. fellow students encourage me to use e-learning

		Frequency	Percent
Valid	strongly agree	39	16.2
	agree	94	39.0
	undecided	41	17.0
	disagree	30	12.4
	strongly disagree	32	13.3
	Total	236	97.9
Missing	System	5	2.1
Total		241	100.0



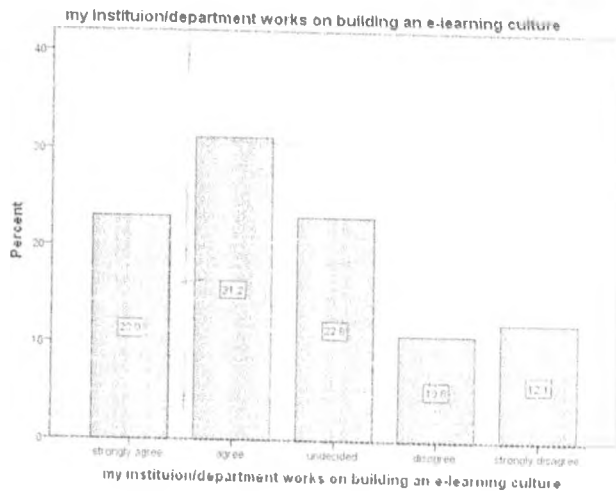
1o. our vc/principal/director supports e-learning

		Frequency	Percent
Valid	strongly agree	55	22.8
	agree	76	31.5
	undecided	70	29.0
	disagree	13	5.4
	strongly disagree	21	8.7
	Total	235	97.5
Missing	System	6	2.5
Total		241	100.0



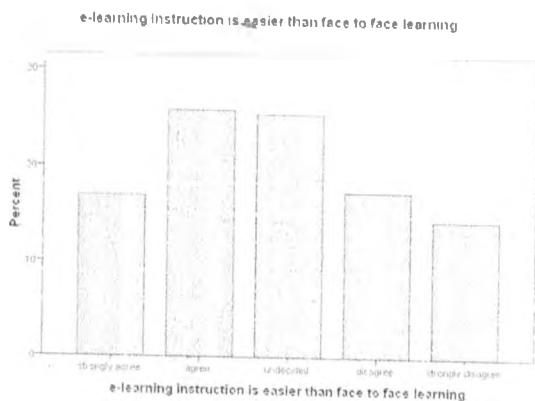
1.p. my institution/department works on building an e-learning culture.

		Frequency	Percent
Valid	strongly agree	53	22.0
	agree	72	29.9
	undecided	53	22.0
	disagree	25	10.4
	strongly disagree	28	11.6
	Total	231	95.9
Missing	System	10	4.1
Total		241	100.0



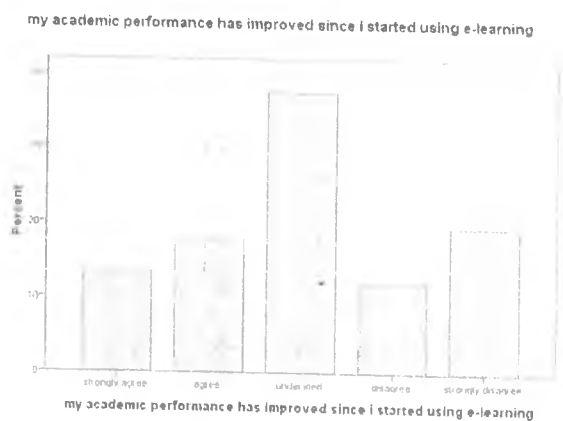
1.q. e-learning instruction is easier than face to face learning.

		Frequency	Percent
Valid	strongly agree	40	16.6
	agree	61	25.3
	undecided	60	24.9
	disagree	41	17.0
	strongly disagree	34	14.1
	Total	236	97.9
Missing	System	5	2.1
Total		241	100.0



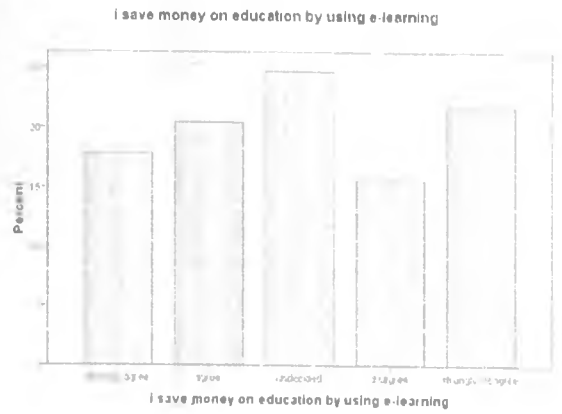
1.r. my academic performance has improved since i started using e-learning

		Frequency	Percent
Valid	strongly agree	31	12.9
	agree	41	17.0
	undecided	87	36.1
	disagree	28	11.6
	strongly disagree	45	18.7
	Total	232	96.3
Missing	System	9	3.7
Total		241	100.0



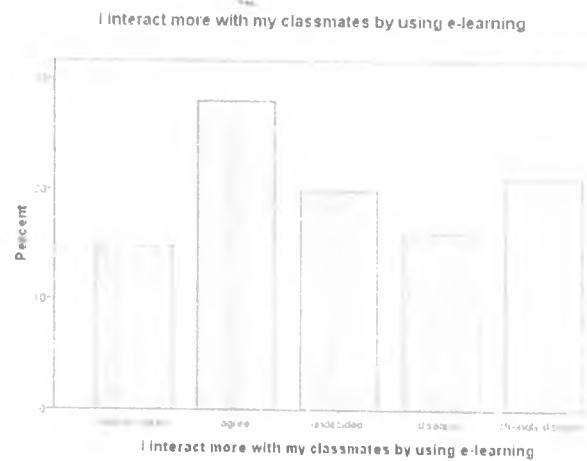
1.1s. I save money on education by using e-learning

		Frequency	Percent
Valid	strongly agree	41	17.0
	agree	47	19.5
	undecided	57	23.7
	disagree	36	14.9
	strongly disagree	50	20.7
	Total	231	95.9
Missing	System	10	4.1
Total		241	100.0



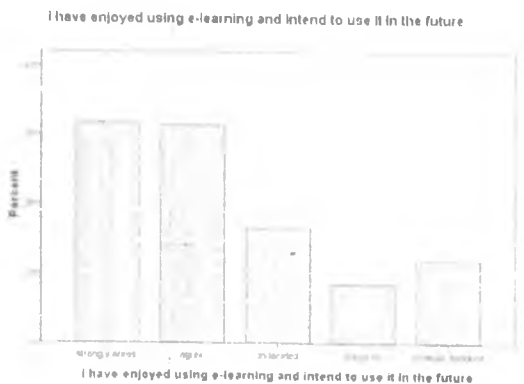
1.1t. i interact more with my classmates by using e-learning

		Frequency	Percent
Valid	strongly agree	35	14.5
	agree	66	27.4
	undecided	47	19.5
	disagree	38	15.8
	strongly disagree	50	20.7
	Total	236	97.9
Missing	System	5	2.1
Total		241	100.0



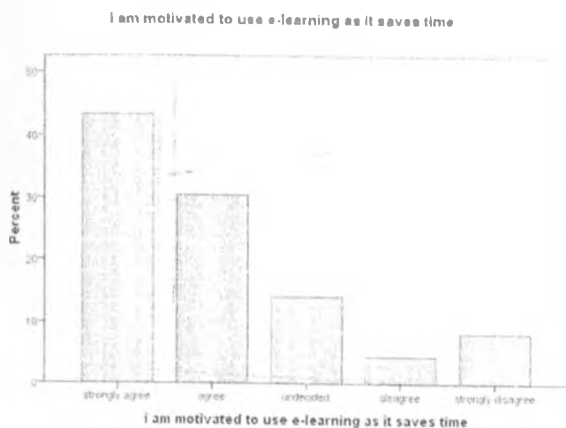
1u. I have enjoyed using e-learning and intend to use it in the future.

		Frequency	Percent
Valid	strongly agree	75	31.1
	agree	74	30.7
	undecided	39	16.2
	disagree	20	8.3
	strongly disagree	28	11.6
	Total	236	97.9
Missing	System	5	2.1
Total		241	100.0



1v. I am motivated to use e-learning as it saves time

		Frequency	Percent
Valid	strongly agree	101	41.9
	agree	71	29.5
	undecided	33	13.7
	disagree	10	4.1
	strongly disagree	19	7.9
	Total	234	97.1
Missing	System	7	2.9
Total		241	100.0



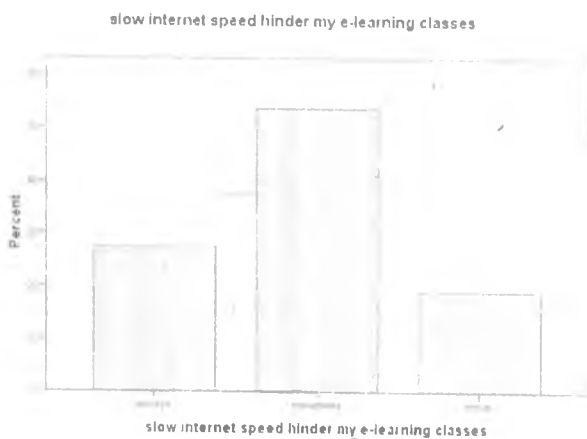
1.1w. our e-learning functionalities are all working

		Frequency	Percent
Valid	always	68	28.2
	sometimes	124	51.5
	never	42	17.4
	Total	234	97.1
Missing	System	7	2.9
Total		241	100.0



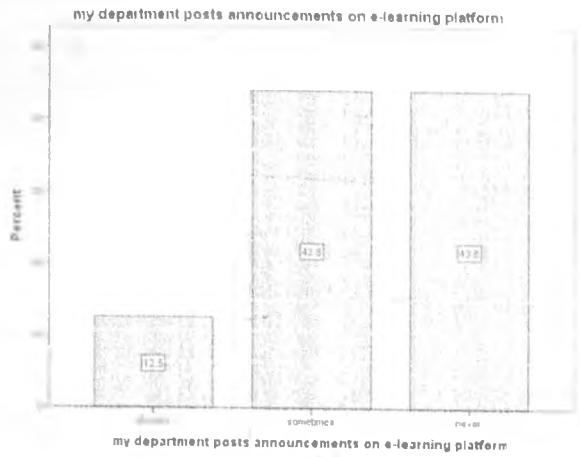
1.1x. slow internet speed hinder my e-learning classes

		Frequency	Percent
Valid	always	63	26.1
	sometimes	124	51.5
	never	44	18.3
	Total	231	95.9
Missing	System	10	4.1
Total		241	100.0



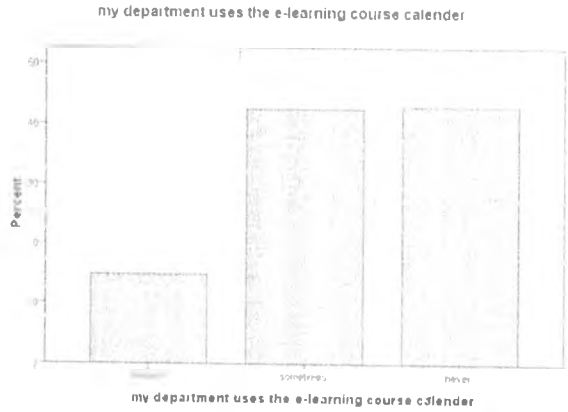
my department posts announcements on e-learning platform.

	Frequency	Percent
always	30	12.4
sometimes	105	43.6
never	105	43.6
Total	240	99.6
System	1	.4
	241	100.0



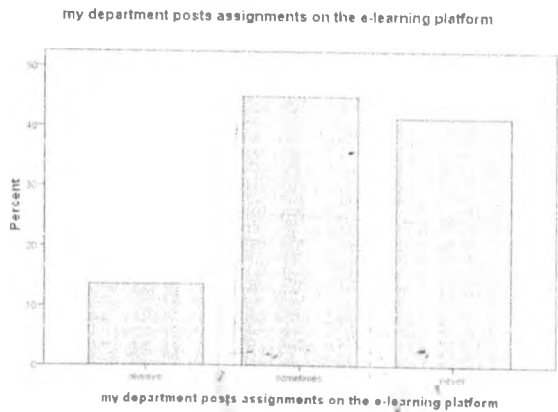
my department uses the e-learning course calendar.

	Frequency	Percent
always	33	13.7
sometimes	95	39.4
never	96	39.8
Total	224	92.9
System	17	7.1
	241	100.0



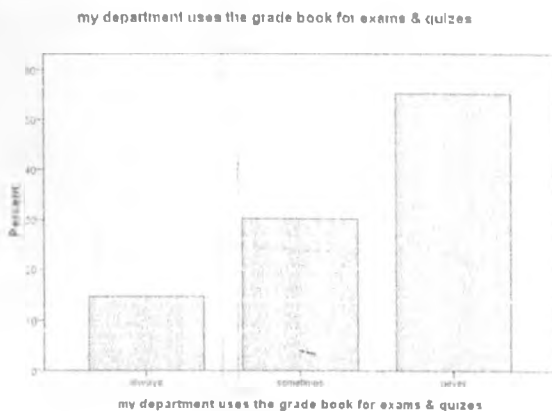
my department posts assignments on the e-learning platform.

	Frequency	Percent
always	30	12.4
sometimes	99	41.1
never	91	37.8
Total	220	91.3
System	21	8.7
	241	100.0



1.1.c. my department uses the grade book for exams & quizzes

		Frequency	Percent
Valid	always	35	14.5
	sometimes	72	29.9
	never	132	54.8
	Total	239	99.2
Missing	System	2	.8
Total		241	100.0



1.1.d. my department communicates via email.

		Frequency	Percent
Valid	always	39	16.2
	sometimes	123	51.0
	never	78	32.4
	Total	240	99.6
Missing	System	1	.4
Total		241	100.0



1.1.e. my department communicates via the bulletin board.

		Frequency	Percent
Valid	always	53	22.0
	sometimes	85	35.3
	never	81	33.6
	Total	219	90.9
Missing	System	22	9.1
Total		241	100.0



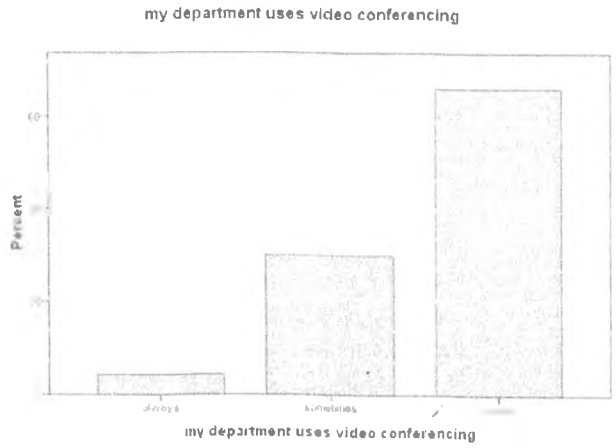
1.1.1f. my department uses audio conferencing.

		Frequency	Percent
Valid	always	23	9.5
	sometimes	78	32.4
	never	134	55.6
	Total	235	97.5
Missing	System	6	2.5
Total		241	100.0



1.1.1g. my department uses video conferencing.

		Frequency	Percent
Valid	always	10	4.1
	sometimes	70	29.0
	never	155	64.3
	Total	235	97.5
Missing	System	6	2.5
Total		241	100.0



1.1.1h. our instructor supports us on e-learning.

		Frequency	Percent
Valid	always	48	19.9
	sometimes	114	47.3
	never	77	32.0
	Total	239	99.2
Missing	System	2	.8
Total		241	100.0



1.1.1i. my department uses PowerPoint presentations.

		Frequency	Percent
Valid	always	30	12.4
	sometimes	148	61.4
	never	60	24.9
	Total	238	98.8
Missing	System	3	1.2
Total		241	100.0



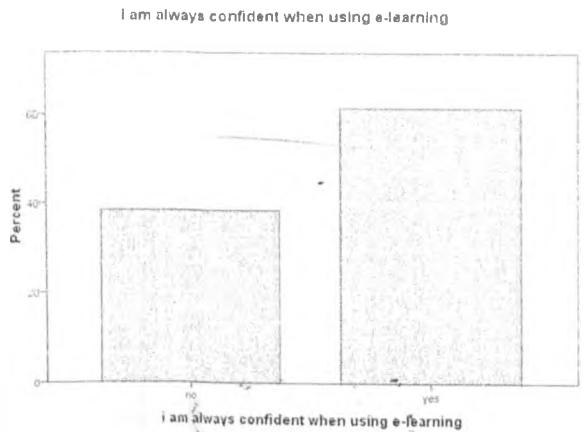
1.1.1j. my department has enough computers for e-learning.

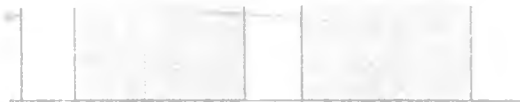
		Frequency	Percent
Valid	no	137	56.8
	yes	67	27.8
	Total	204	84.6
Missing	System	37	15.4
Total		241	100.0



1.1.1k. i am always confident when using e-learning.

		Frequency	Percent
Valid	no	89	36.9
	yes	142	58.9
	Total	231	95.9
Missing	System	10	4.1
Total		241	100.0





my department has enough technicians support

7.1.2 Reliability statistics for the whole instrument (e-learning students)

Cronbach's Alpha	N of Items
0.896	37

7.1.3 KMO and Bartlett's Test (e-learning students)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.847
Bartlett's Test of Sphericity	Approx. Chi-Square	2254.007
	df	630
	Sig.	.000

7.1.4 Descriptive statistics (e-learning students)

	Mean	Std. Deviation	N
awareness	2.0798	1.18265	238
Behavioral intention	2.3729	1.32599	236
attitude	2.9627	.74488	241
LMS factors	2.5187	.80780	241

Content quality	2.6489	1.03369	239
benefits	2.5357	1.13153	238
complexity	.3997	.36750	236
evaluation	2.2941	.51146	241
Other TECHNOLOGY	2.3378	.45128	241
influence	2.6805	1.14637	241
training	2.7396	.99049	240
Self confidence	.6147	.48772	231

		awareness	Behavioral intention	attitude	LMS factors	Content quality	benefits	complexity	evaluation	Other TECHNOLOGY	influence	training	Self confidence
awareness	Pearson Correlation	1	.315	.134	.318	.335	.227	-.131	.162	.102	.131	.310	-.124
	Sig. (2-tailed)		.000	.039	.000	.000	.000	.045	.012	.118	.044	.000	.062
	N	238	234	238	238	237	236	233	238	238	238	237	228
Behavioral intention	Pearson Correlation	.315	1	.155	.610	.359	.658	-.250	.264	.224	.367	.234	-.390
	Sig. (2-tailed)	.000		.017	.000	.000	.000	.000	.000	.001	.000	.031	.000
	N	234	236	236	236	235	236	231	236	236	236	235	227
attitude	Pearson Correlation	.134	.155	1	.223	.122	.198	-.123	.253	.190	.165	.201	-.056
	Sig. (2-tailed)	.039	.017		.000	.061	.002	.060	.000	.003	.010	.002	.397
	N	238	236	241	241	239	238	236	241	241	241	240	231
LMS factors	Pearson Correlation	.318	.610	.223	1	.661	.538	-.321	.402	.370	.373	.314	-.312
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	238	236	241	241	239	238	236	241	241	241	240	231
Content quality	Pearson Correlation	.335	.359	.122	.661	1	.401	-.347	.383	.221	.339	.309	-.310
	Sig. (2-tailed)	.000	.000	.061	.000		.000	.000	.000	.001	.000	.000	.000
	N	237	235	239	239	239	237	234	239	239	239	238	229
benefits	Pearson Correlation	.227	.658	.198	.538	.401	1	-.250	.350	.251	.369	.236	-.315
	Sig. (2-tailed)	.000	.000	.002	.000	.000		.000	.000	.000	.000	.000	.000
	N	236	236	238	238	237	238	233	238	238	238	237	229
complexity	Pearson Correlation	-.131	-.250	-.123	-.321	-.347	-.250	1	-.301	-.206	-.232	-.318	.277
	Sig. (2-tailed)	.045	.000	.060	.000	.000	.000		.000	.001	.000	.000	.000
	N	233	231	236	236	234	233	236	236	236	236	235	227
evaluation	Pearson Correlation	.162	.264	.253	.402	.383	.350	-.301	1	.425	.317	.262	-.193
	Sig. (2-tailed)	.012	.000	.000	.000	.000	.000	.000		.000	.000	.000	.003
	N	238	236	241	241	239	238	236	241	241	241	240	231
Other TECHNOLOGY	Pearson Correlation	.102	.224	.190	.370	.221	.251	-.206	.425	1	.164	.288	-.214
	Sig. (2-tailed)	.118	.001	.003	.000	.001	.000	.001	.000		.011	.000	.001
	N	238	236	241	241	239	238	236	241	241	241	240	231

influence	Pearson Correlation	.131	.367	.165	.373	.339	.369	-.232	.317	.164	1	.209	-.185
	Sig. (2-tailed)	.044	.000	.010	.000	.000	.000	.000	.000	.011		.001	.005
	N	238	236	241	241	239	238	236	241	241	241	240	231
training	Pearson Correlation	.310	.234	.201	.314	.309	.236	-.318	.262	.288	.209	1	-.123
	Sig. (2-tailed)	.000	.000	.002	.000	.000	.000	.000	.000	.000	.001		.062
	N	237	235	240	240	238	237	235	240	240	240	240	230
Self confidence	Pearson Correlation	-.124	-.390	-.056	-.312	-.310	-.315	.277	-.193	-.214	-.185	-.123	1
	Sig. (2-tailed)	.062	.000	.397	.000	.000	.000	.000	.003	.001	.005	.062	
	N	228	227	231	231	229	229	227	231	231	231	230	231

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 7.1.3 Correlations (e-learning students)

7.1.6 E-learning students Hypotheses

a. New hypotheses

1. Attitude is positively related to content quality since $p=0.061$ and $r=+0.122$
2. Attitude has a negative correlation with complexity $p= 0.060$ and $r=-0.123$
3. Behavioral intention has a positive correlation with training $p= 0.031$ and $r=0.234^{**}$
4. Awareness has a positive correlation with influence $p=0.131^*$ and $r=0.044$
5. Awareness is positively related to Attitude since $p=0.04$ and $r= +134^*$
6. Awareness is positively related to other technologies $p=0.118$ and $r= +102$

b. Rejected hypotheses

1. Attitude has no correlation to learner variables since $p=0.001$ and $r=+0.209^{**}$ so no significance
2. Attitude and behavioral intention has no correlation with perceived benefits since ($p=0.002$ and $r=+0.198^*$; $p=0.000$ and $r=+0.658^{**}$)
 - a. Behavioral intention has no correlation to complexity since $p=0.000$ $r=-0.250$)
3. Attitude has no correlation to behavioral intention Attitude since $p=0.02$ and $r= +155^*$
4. Learner variables(training) has a positive correlation with behavioral intention $p=0.031$ and $r= +0.231$)
5. Learner variables(influence) has no correlation with behavioral intention($p=0.000$ and $r= 0.367$)
6. LMS factors have no correlation with attitude or behavioral intention.($p=0.000$ and $r= 0.223$, $p=0.000$ and $r= 0.610$)
7. Other technology use have no correlation with attitude or behavioral intention.($p=0.003$ and $r= 0.190$, $p=0.001$ and $r= 0.610$)

7.2 Appendix 2(Non e-learning students)

7.2.1 Non e-learning students Questionnaire.

E-learning is learning experiences delivered or enabled by electronic technology e.g. Internet, intranets or extranets, audio and videotapes, satellite broadcast, interactive TV, CD-ROM.

Instructions

- Please tick in the appropriate box.
- Please use the rating codes below wherever required to respond:

SA - Strongly Agree A - Agree N - Neutral D - Disagree SD - Strongly Disagree

PART 1: Demographic Information (DI)

1a. which faculty are you in?

- Faculty of Business and social studies []
- Faculty of Engineering []
- Faculty of Applied and health sciences []

1a. which course level are you pursuing at MPUC?

- Degree []
- Higher diploma []
- Diploma []

PART 2: Internet Access

2a. Please indicate how frequently you use the internet

- Daily []
- Weekly []
- Monthly []
- Occasionally []
- Never used []

2b. If never in 2(a) above, what is the reason for non-use of the internet?

- Lack of knowledge/ skill [] Not Applicable []
- Financial constraints []
- Do not see the need []

2c. How long have you been using the internet?

- Less than 1yr []
- 1-2yrs []
- 2-3yrs []
- More than 4yrs []
- Never used []

2d. Which is your frequent source of internet access?

- Cyber café []
- College internet lab []
- Home []
- Other sources []

2e. What is your main reason for use of the internet?

- Email []
- Academic []
- Sports []
- Pornography []
- Other []
- Never used []

2f. Please indicate some of the problems you have encountered in the use of, the internet

- Slowness []
- Inadequate knowledge []
- Financial problems []

Insufficient source of internet access

Other problems

None

PART 3: Effort Expectancy (EE)

3a. I have basic computer and internet skills

SA A N D SD

3b. I need to be trained on basic computer and internet skills

SA A N D SD

PART 4: Performance Expectancy (PE)

4a. I believe E-learning will increase my learning skills

SA A N D SD

4b. I believe E-learning will improve on my grades

SA A N D SD

SA A N D SD

4d. I believe I will find e-learning easy to use

PART 5: Social Influence

5a. I will use E-learning if my friends do so

SA A N D SD

5b. I will use E-learning if my Lecturer insists that I should do so

SA A N D SD

PART 6: Behavioral Intention

6a. I will continue to use face-to-face learning even if MPUC introduces e-learning

SA A N D SD

6b. I intend to use e-learning even if MPUC does not introduce it in the near future

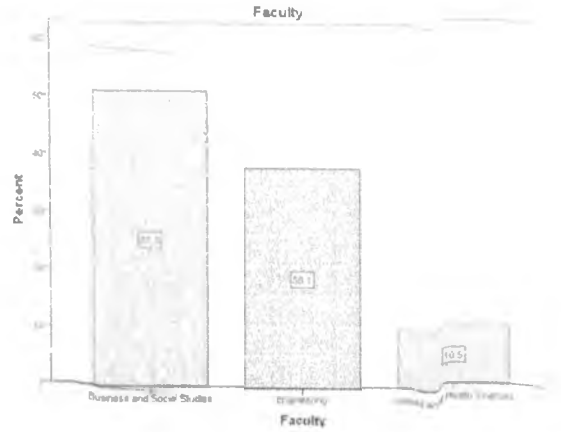
SA A N D SD

The data collected will greatly be of value in the study of e-learning implementation framework. Thank you for your time and co-operation.

7.2.2 Survey Result Tables and Bar Charts (Non e-learning students)

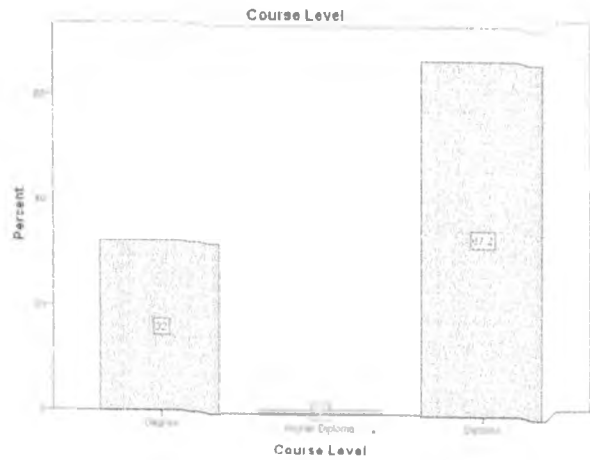
2.1 a. Faculty

		Frequency	Percent
Valid	Business and Social Studies	177	51.5
	Engineering	131	38.1
	Applied and Health Sciences	36	10.5
	Total	344	100.0



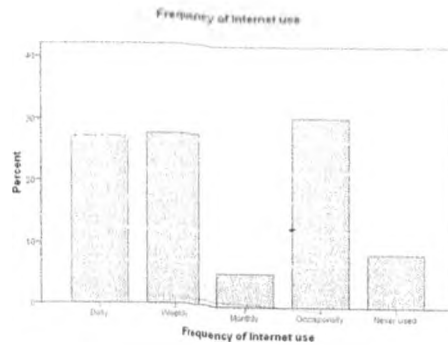
2.1b. Course Level

		Frequency	Percent
Valid	Degree	110	32.0
	Higher Diploma	3	.9
	Diploma	231	67.2
	Total	344	100.0



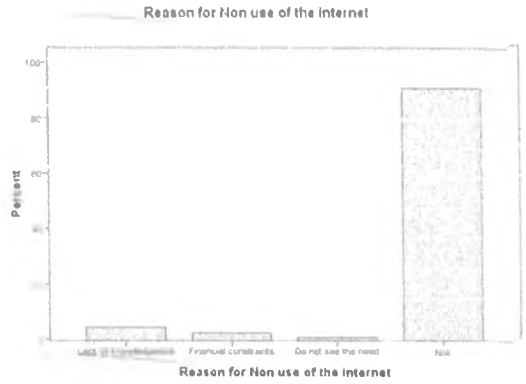
2.1 c. Frequency of internet use

		Frequency	Percent
Valid	Daily	93	27.0
	Weekly	95	27.6
	Monthly	19	5.5
	Occasionally	105	30.5
	Never used	30	8.7
	Total	342	99.4
Missing	System	2	.6
Total		344	100.0



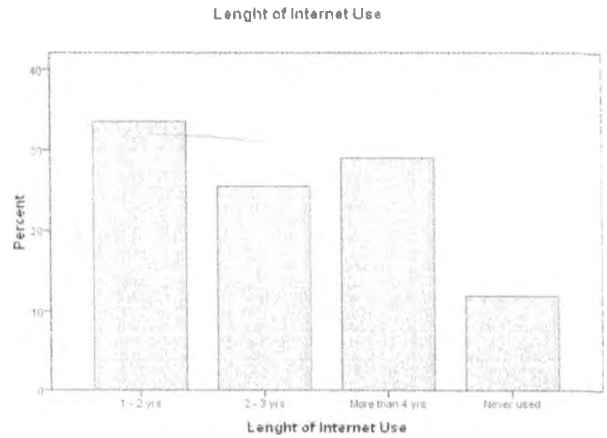
2.1d. Reason for non internet use

		Frequency	Percent
Valid	Lack of knowledge/skill	17	4.9
	Financial constraints	10	2.9
	Do not see the need	4	1.2
	N/A	311	90.4
	Total	342	99.4
Missing	System	2	.6
Total		344	100.0



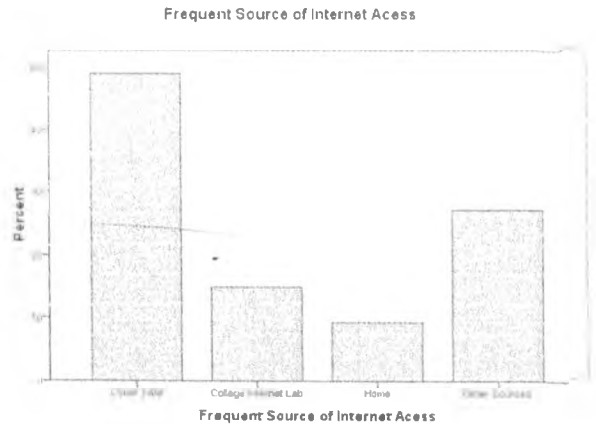
2.1 e. Length of internet use

		Frequency	Percent
Valid	1 - 2 yrs	84	24.4
	2 - 3 yrs	64	18.6
	More than 4 yrs	73	21.2
	Never used	30	8.7
	Total	251	73.0
Missing	Less than 1 yr	90	26.2
	System	3	.9
Total	Total	93	27.0
Total		344	100.0



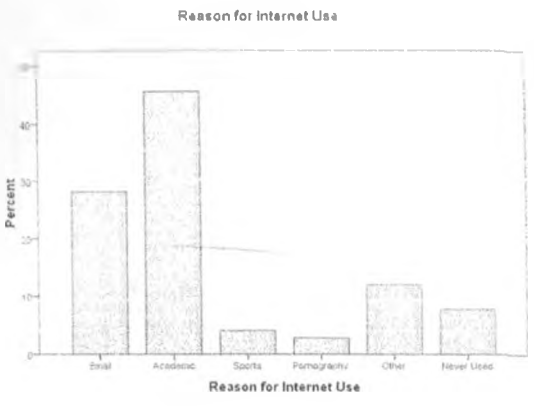
2.1f. Frequent source of internet access

		Frequency	Percent
Valid	Cyber cafe	155	45.1
	College Internet Lab	47	13.7
	Home	29	8.4
	Other Sources	86	25.0
	Total	317	92.2
Missing	System	27	7.8
Total		344	100.0



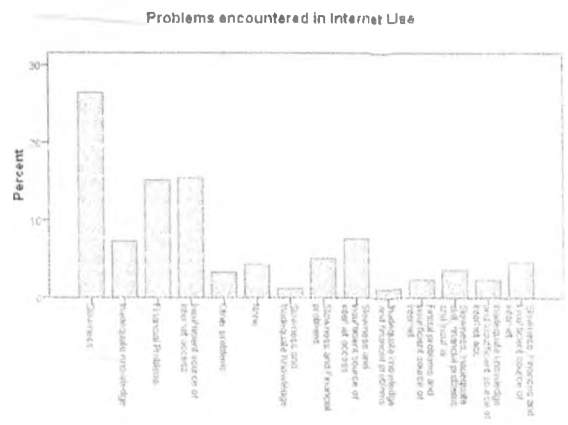
2.1g. Reason for internet use

		Frequency	Percent
Valid	Email	92	26.7
	Academic	149	43.3
	Sports	13	3.8
	Pornography	9	2.6
	Other	39	11.3
	Never Used	25	7.3
	Total	327	95.1
Missing	System	17	4.9
Total		344	100.0



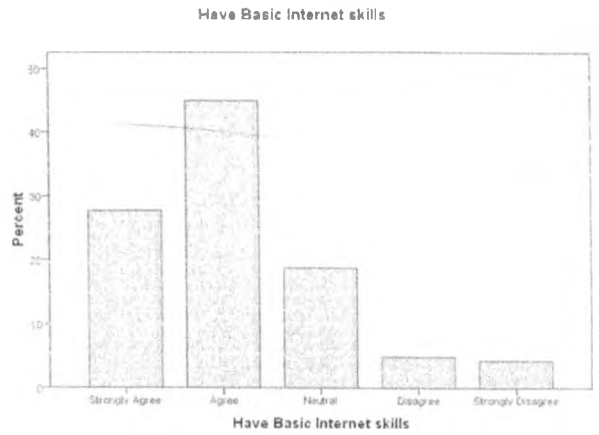
2.1h. Problems encountered with internet use

		Frequency	Percent
Valid	Slowness	87	25.3
	Inadequate Knowledge	24	7.0
	Financial Problems	50	14.5
	Insufficient source of internet access	51	14.8
	Other problems	11	3.2
	None	14	4.1
	Slowness and Inadequate Knowledge	4	1.2
	Slowness and Financial problems	17	4.9
	Slowness and Insufficient source of internet access	25	7.3
	Inadequate knowledge and financial problems	4	1.2
	Fincial problems and insufficient source of internet	8	2.3
	Slowness, Inadequate skill, financial problems and Insuf ia	12	3.5
	Inadequate knowledge and insufficient source of internet acc	8	2.3
	Slowness, Finances and Insufficient source of internet	15	4.4
	Total	330	95.9
Missing	System	14	4.1
Total		344	100.0



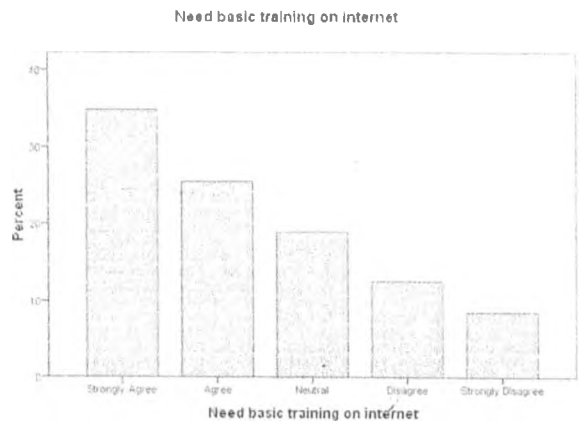
2.1i. Have basic Internet skills

		Frequency	Percent
Valid	Strongly Agree	93	27.0
	Agree	151	43.9
	Neutral	63	18.3
	Disagree	16	4.7
	Strongly Disagree	14	4.1
	Total	337	98.0
Missing	System	7	2.0
Total		344	100.0



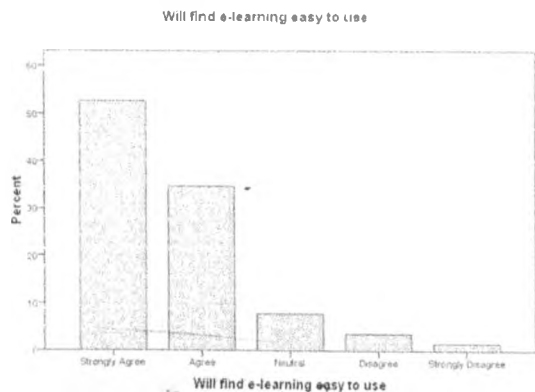
2.1j. Need basic training on internet

		Frequency	Percent
Valid	Strongly Agree	115	33.4
	Agree	84	24.4
	Neutral	62	18.0
	Disagree	41	11.9
	Strongly Disagree	28	8.1
	Total	330	95.9
Missing	System	14	4.1
Total		344	100.0



2.1k. Will find e-learning easy to use

		Frequency	Percent
Valid	Strongly Agree	178	51.7
	Agree	117	34.0
	Neutral	26	7.6
	Disagree	12	3.5
	Strongly Disagree	5	1.5
	Total	338	98.3
Missing	System	6	1.7
Total		344	100.0



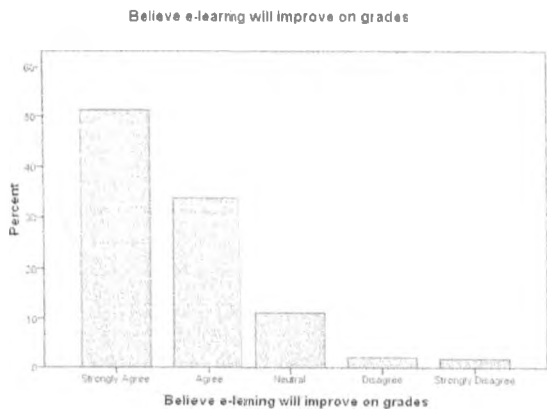
2.11 Believe e-learning will increase learning skills

		Frequency	Percent
Valid	Strongly Agree	207	60.2
	Agree	98	28.5
	Neutral	17	4.9
	Disagree	4	1.2
	Strongly Disagree	9	2.6
	Total	335	97.4
Missing	System	9	2.6
Total		344	100.0



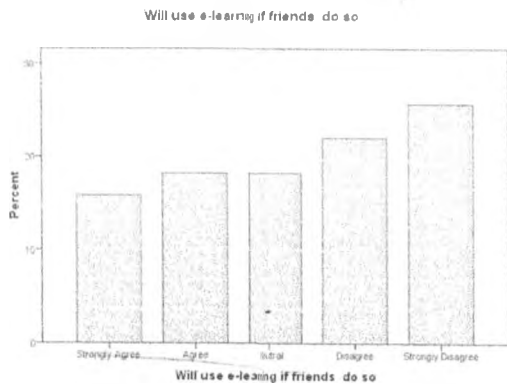
2.1m. Believe e-learning will improve on grades

		Frequency	Percent
Valid	Strongly Agree	170	49.4
	Agree	112	32.6
	Neutral	37	10.8
	Disagree	7	2.0
	Strongly Disagree	6	1.7
	Total	332	96.5
Missing	System	12	3.5
Total		344	100.0



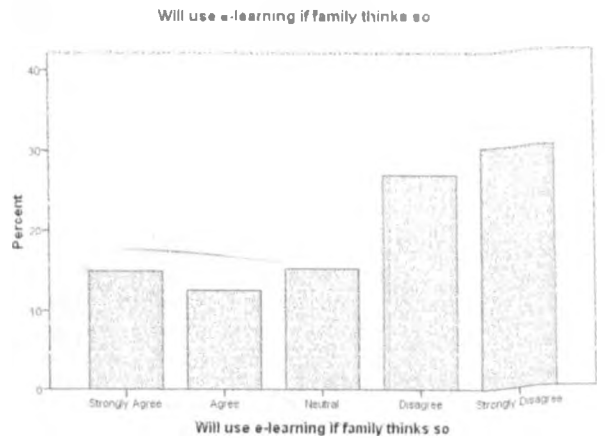
2.1n. will use e-learning if friends do so

		Frequency	Percent
Valid	Strongly Agree	53	15.4
	Agree	61	17.7
	Neutral	61	17.7
	Disagree	74	21.5
	Strongly Disagree	86	25.0
	Total	335	97.4
Missing	System	9	2.6
Total		344	100.0



2.10 will use e-learning if family thinks so

		Frequency	Percent
Valid	Strongly Agree	50	14.5
	Agree	42	12.2
	Neutral	51	14.8
	Disagree	90	26.2
	Strongly Disagree	101	29.4
	Total	334	97.1
Missing	System	10	2.9
Total		344	100.0



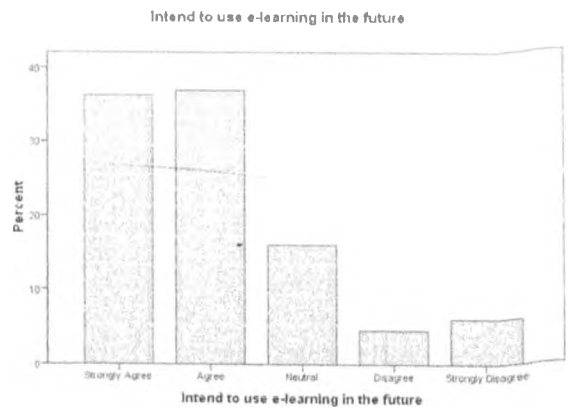
2.1p. Use f2f even if e-learning is introduced

		Frequency	Percent
Valid	Strongly Agree	72	20.9
	Agree	76	22.1
	Neutral	63	18.3
	Disagree	47	13.7
	Strongly Disagree	77	22.4
	Total	335	97.4
Missing	System	9	2.6
Total		344	100.0



2.1 q Intend to use e-learning in the future

		Frequency	Percent
Valid	Strongly Agree	120	34.9
	Agree	122	35.5
	Neutral	53	15.4
	Disagree	15	4.4
	Strongly Disagree	20	5.8
	Total	330	95.9
Missing	System	14	4.1
Total		344	100.0



7.2.3 Reliability statics for the whole instrument (Non e-learning students)

Cronbach's Alpha	N of Items
.510	20

7.2.4 KMO and Bartlett's Test (Non e-learning students)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.569
Bartlett's Test of Sphericity	Approx. Chi-Square	617.594
	df	120
	Sig.	.000

7.2.5 Descriptive statistics (Non e-learning students)

Scale variable	N	Number of items	Mean	Std. Deviation
Internet Access	344	6	3.0807	.78029
Effort expectancy	339	3	2.0438	.59153
Social influence	335	2	3.3433	1.29314
Behavioral intention	335	2	2.5164	.94006
Performance expectancy	336	2	1.6265	.82385
Valid N (listwise)	335			

7.2.6 Correlations (Non e-learning students)

		Internet Access	Effort expectancy	Performance expectancy	Social influence	Behavioral intention
Internet Access	Pearson Correlation	1	.261**	.048	.012	.010
	Sig. (2-tailed)		.000	.377	.821	.849
	N	344	339	336	335	335
Effort expectancy	Pearson Correlation	.261**	1	.536**	.075	.268**
	Sig. (2-tailed)	.000		.000	.171	.000
	N	339	339	336	335	335
Performance expectancy	Pearson Correlation	.048	.536**	1	.147**	.126*
	Sig. (2-tailed)	.377	.000		.007	.021
	N	336	336	336	335	335
Social influence	Pearson Correlation	.012	.075	.147**	1	.162**
	Sig. (2-tailed)	.821	.171	.007		.003
	N	335	335	335	335	335
Behavioral intention	Pearson Correlation	.010	.268**	.126*	.162**	1
	Sig. (2-tailed)	.849	.000	.021	.003	
	N	335	335	335	335	335

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

7.2.7 Hypotheses-Non e-learning students

- i. Internet access is positively related to performance expectancy since $p=0.377$ and $r= +048$
- ii. Internet access is positively related to social influence since $p=0.821$ and $r= +012$
- iii. Internet access is positively related to behavioral intention since $p=0.849$ and $r= +010$
- iv. Performance expectancy is positively related to social influence $p=0.01$ and $r= +0.147^{**}$
- v. Performance expectancy is positively related to behavioral intention $p=0.021$ and $r= +0.126^*$

Table 7.2.1 Correlations (Non e-learning students)

7.3 Appendix 3(E-learning instructors)

7.3.1 Instructors Questionnaire.

Table 7.3.1 Variables Tested (E-learning instructors)

	Variable	Items of measurement	Scale
1	E-learning Awareness	<ul style="list-style-type: none"> I know what e-learning is and the benefits it offers. 	<p>5-point Likert-type response scale: strongly agree; agree; undecided; disagree; strongly disagree</p> <p>3- point "always", "sometimes" " never" & a 2 point Yes or No</p>
2	Behavioral Intention	I enjoyed using e-learning & intend to use it in the future	„
3	Attitude	<ul style="list-style-type: none"> I dislike e-learning I don't think e-learning can be better than face to face 	„
4	Instructor Variables(influence)	<ul style="list-style-type: none"> We use e-learning because other institutions are also using Fellow encourage me to use e-learning. 	„
5	Instructor Variables(training)	<ul style="list-style-type: none"> I have attended many e-learning workshops. I have been sufficiently trained on e-learning 	
6	Instructor Variables(confidence)	<ul style="list-style-type: none"> I am always confident when using e-learning. 	
7	Perceived Benefits	<ul style="list-style-type: none"> Saves time on daily tasks. Better able to present complex materials with ease Better able to assess students' work. Students' performance is enhanced. Better able to improve my teaching 	„
8	Complexity	<ul style="list-style-type: none"> Lack adequate computers for learning. Slow Internet speeds prevent the use of technology in classes. Lack the time needed to develop e-content Lack of good e-learning software. 	„

9	Evaluation	<ul style="list-style-type: none"> • Posting announcements. • Posting assignments • Using the e-calendar. • Communication via the bulletin board. 	”
10	Other Technology Use	<ul style="list-style-type: none"> • Audio conferencing. • Video conferencing. • Emails. • Power Point’s 	”
11	Institution variables(policy)	<ul style="list-style-type: none"> • My institution has an ICT policy • My institution has an e-learning strategic plan • Has benchmarked with other institutions. 	”
12	Institution variables(rewards recognition) &	<ul style="list-style-type: none"> • Promotes and rewards • My institution involves in e-learning decisions 	
13	Motivation	<ul style="list-style-type: none"> • I am motivated to use e-learning as it is easier and saves time • I am motivated to use e-learning so as to comply with the university policy 	”
14	Triability	<ul style="list-style-type: none"> • I have tried using a variety of e-learning management systems 	

7.3.2 Instructors Questionnaire.

This questionnaire is to be filled by E-learning Instructors in Kenyan Universities

Correspondent Background:

Position: -----

Department: -----

Type of Employment: *Permanent* [] *Contract* []

Number of years worked in this institution: *Less than 1 year* []; *1 – 3 years* [];
3 – 5 years [] *5 – 10 years* []; *More than 10 years* [];

What is your highest qualification? *Doctor of Philosophy* []; *Master's degree* [];
First degree/equivalent []; *Diploma* [];

Others: -----

Mark using a pen against your preferred choice by a tick (√) or a cross (x)

SA= strongly agree; A= Agree; U= Undecided; D= Disagree; SD= strongly disagree

Table 7.3.2. Instructors Questionnaire instrument

		SA	A	U	D	SD
1	I know what e-learning is and the benefits it offers					
2	My Intuition/department is aware of e-learning and its benefits.					

3	My department have sufficiently trained us on e-learning system use.					
4	I dislike the idea of using e-learning for teaching					
5	I like using e-learning and think it is a good idea					
6	I don't believe e-learning can be better than face to face learning					
7	Fellow instructors encourage me to use e-learning					
8	We use e-learning because other institutions are also using it					
9	Our VC/Principal/Director supports and endorses e-learning					
10	My institution/ department works on building an e-learning culture					
11	E-learning instruction method is easier than face to face instruction					
12	I save time on daily tasks like preparations and teaching					
13	I am better able to present complex materials with e-learning					
14	I spend more time with my students(more interaction)					
15	I am better able to assess students work with e-learning					
16	I am better able to improve my teaching with e-learning					
17	Students performance is improved through e-learning					
18	I have enjoyed using e-learning and intend to use it in the future					
19	My institution lacks good e-learning software					
20	I find developing e-content for my subjects very difficult					
21	I lack the time needed to develop e-content					
22	My institutions slow internet connection prevents effective e-learning					
23	I am motivated to use e-learning as it easier and saves time					
24	I am motivated to use e-learning so as to comply with university policy					

		Always	Sometimes	Never
25	My Department posts announcements on e-learning platform			
26	My Department uses the e-learning course calendar			
27	My department posts assignments on the e-learning platform			
28	My department communicates via email			
29	My department communicates via the bulletin board			
30	My institution uses audio conferencing			
		Always	Sometimes	Never
31	My institution uses video conferencing			
32	I am motivated to use e-learning as it saves time			
33	My institution motivates and rewards us for using e-learning			
34	My institutions internet connection is adequate for e-learning			

		Yes	No
35	I am always confident when using e-learning		
36	My departments e-learning solution can run on windows operating system		
37	My departments e-learning solution can run on Linux operating system		
38	My Department has enough computers for e-learning		
39	I have attended many useful e-learning workshops		
40	I have tried using a variety of e-learning management systems		
41	My institution has benchmarked with other institutions on e-learning		
42	My institution promotes and rewards hardworking e-learning instructors		
43	My institution has qualified and competent e-learning support staff		
44	My institution has an ICT policy		
45	My institution has an e-learning strategic plan		
46	My institution involves staff before making any e-learning decisions		

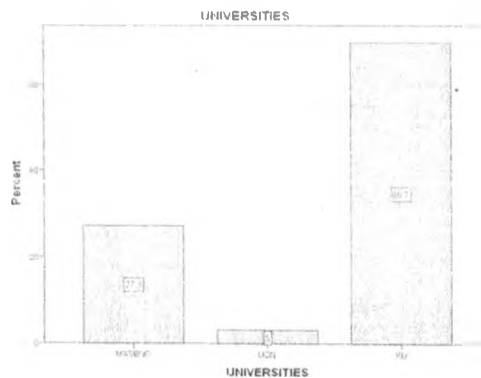
State any other challenges that you face during your e-learning lessons

---Suggest any improvements for e-learning in your department

7.3.3 Survey Result Tables and Bar Charts (E-learning instructors)

3.1 a. Universities

		Frequency	Percent
Valid	MASEN	9	27.3
	O		
	UON	1	3.0
	KU	23	69.7
	Total	33	100.0



3.1 b. I know what e-learning

		Frequency	Percent
Valid	strongly agree	23	69.7
	agree	9	27.3
	neutral	1	3.0
	Total	33	100.0



3.1 c. Our university/department is aware about e-learning

	Frequency	Percent
Valid strongly agree	10	30.3
agree	20	60.6
neutral	2	6.1
strongly disagree	1	3.0
Total	33	100.0



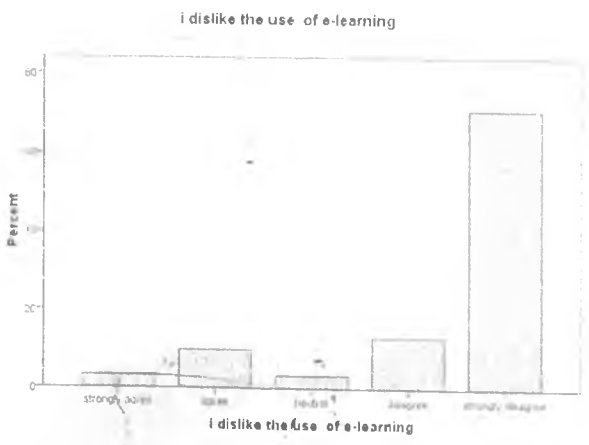
3.1.d. my department has sufficiently trained us on e-learning use.

	Frequency	Percent
Valid strongly agree	3	9.1
agree	10	30.3
neutral	2	6.1
disagree	12	36.4
strongly disagree	6	18.2
Total	33	100.0



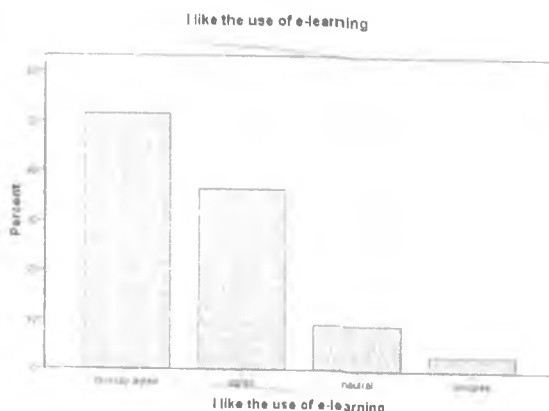
3.1 e. I dislike the use of e-learning

	Frequency	Percent
Valid strongly agree	1	3.0
agree	3	9.1
neutral	1	3.0
disagree	4	12.1
strongly disagree	22	66.7
Total	31	93.9
Missing System	2	6.1
Total	33	100.0



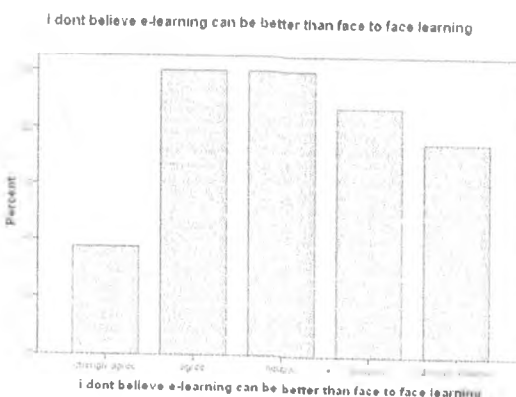
3.1f. I like the use of e-learning.

	Frequency	Percent
Valid strongly agree	17	51.5
agree	12	36.4
neutral	3	9.1
disagree	1	3.0
Total	33	100.0



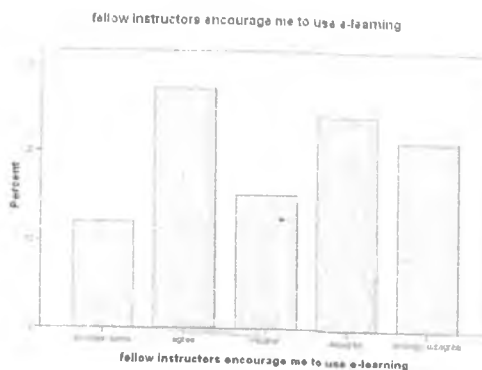
3.1g. I dont believe e-learning can be better than face to face learning.

	Frequency	Percent
Valid strongly agree	3	9.1
agree	8	24.2
neutral	8	24.2
disagree	7	21.2
strongly disagree	6	18.2
Total	32	97.0
Missing System	1	3.0
Total	33	100.0



3.1h. fellow instructors encourage me to use e-learning.

	Frequency	Percent
Valid strongly agree	4	12.1
agree	9	27.3
neutral	5	15.2
disagree	8	24.2
strongly disagree	7	21.2
Total	33	100.0



3.1i we use e-learning because other institutions are using it

	Frequency	Percent
--	-----------	---------

Valid	agree	6	18.2
	neutral	7	21.2
	disagree	13	39.4
	strongly disagree	7	21.2
	Total	33	100.0



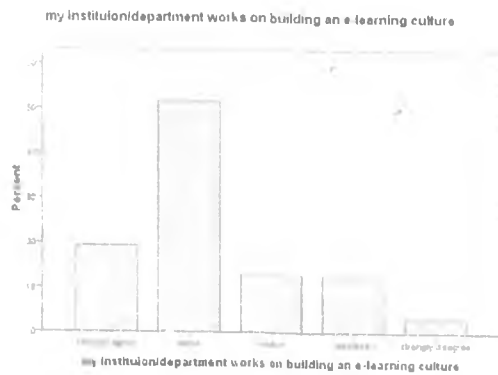
3.1j. our vc/principal/director supports e-learning.

		Frequency	Percent
Valid	strongly agree	19	57.6
	agree	11	33.3
	neutral	3	9.1
	Total	33	100.0



3.1k my institution/department works on building an e-learning culture

		Frequency	Percent
Valid	strongly agree	6	18.2
	agree	16	48.5
	neutral	4	12.1
	disagree	4	12.1
	strongly disagree	1	3.0
	Total	31	93.9
Missing	System	2	6.1
	Total	33	100.0



3.1l e-learning instruction is easier than face to face learning

		Frequency	Percent
Valid	strongly agree	2	6.1
	agree	13	39.4
	neutral	11	33.3
	disagree	5	15.2
	strongly disagree	2	6.1
	Total	33	100.0



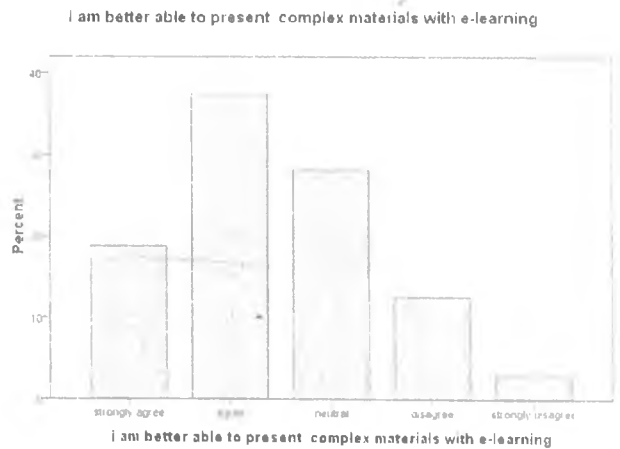
3.1 m i save time on daily tasks like preparations and teaching

		Frequency	Percent
Valid	strongly agree	7	21.2
	agree	11	33.3
	neutral	8	24.2
	disagree	6	18.2
	strongly disagree	1	3.0
	Total	33	100.0



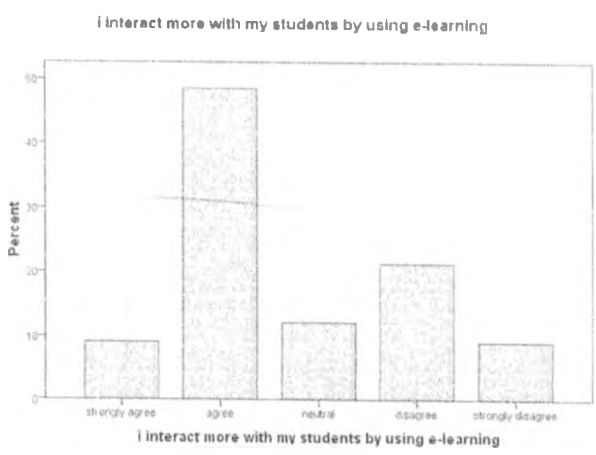
3.1 n I am better able to present complex materials with e-learning

		Frequency	Percent
Valid	strongly agree	6	18.2
	agree	12	36.4
	neutral	9	27.3
	disagree	4	12.1
	strongly disagree	1	3.0
	Total	32	97.0
Missing	System	1	3.0
	Total	33	100.0



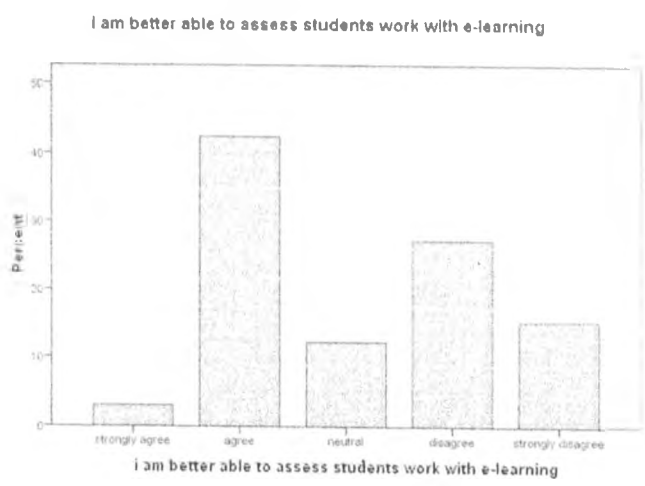
3.10 i interact more with my students by using e-learning

		Frequency	Percent
Valid	strongly agree	3	9.1
	agree	16	48.5
	neutral	4	12.1
	disagree	7	21.2
	strongly disagree	3	9.1
	Total	33	100.0



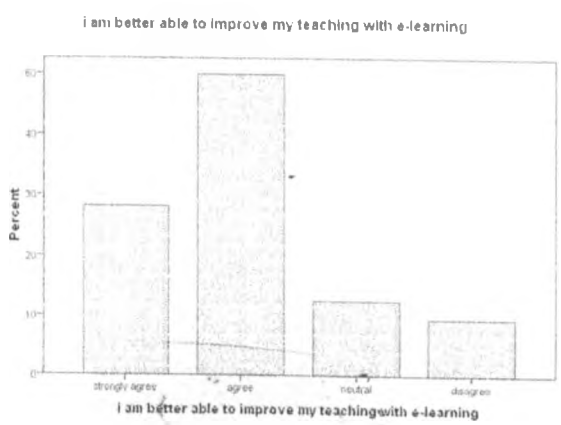
3.1 p i am better able to assess students work with e-learning

		Frequency	Percent
Valid	strongly agree	1	3.0
	agree	14	42.4
	neutral	4	12.1
	disagree	9	27.3
	strongly disagree	5	15.2
	Total	33	100.0



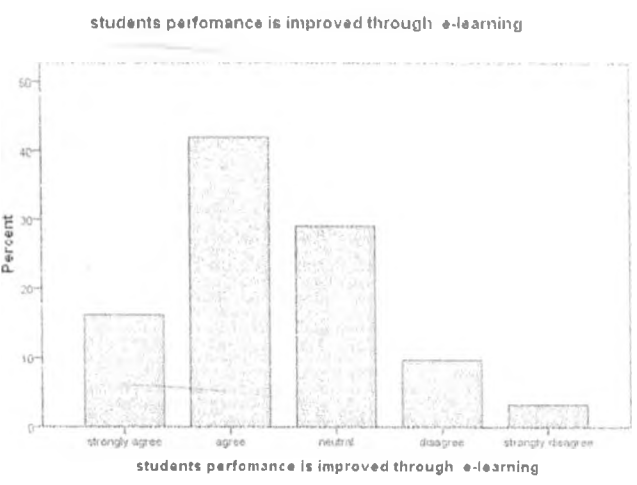
3.1 q i am better able to improve my teaching with e-learning

		Frequency	Percent
Valid	strongly agree	9	27.3
	agree	16	48.5
	neutral	4	12.1
	disagree	3	9.1
	Total	32	97.0
Missing	System	1	3.0
	Total	33	100.0



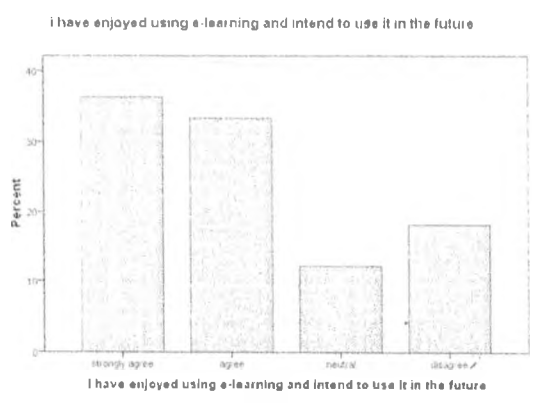
3.1 r students performance is improved through e-learning

		Frequency	Percent
Valid	strongly agree	5	15.2
	agree	13	39.4
	neutral	9	27.3
	disagree	3	9.1
	strongly disagree	1	3.0
	Total	31	93.9
Missing	System	2	6.1
	Total	33	100.0



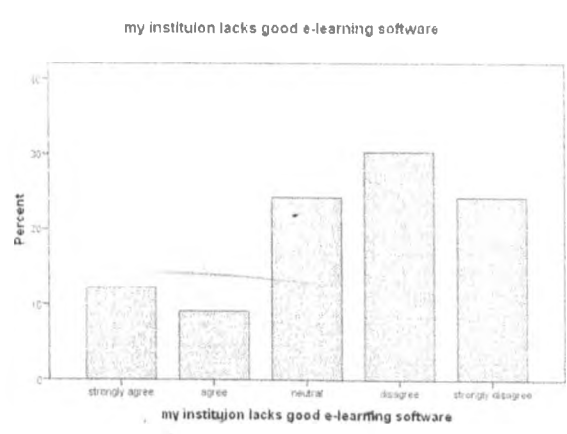
3.1s I have enjoyed using e-learning and intend to use it in the future

		Frequency	Percent
Valid	strongly agree	12	36.4
	agree	11	33.3
	neutral	4	12.1
	disagree	6	18.2
	Total	33	100.0



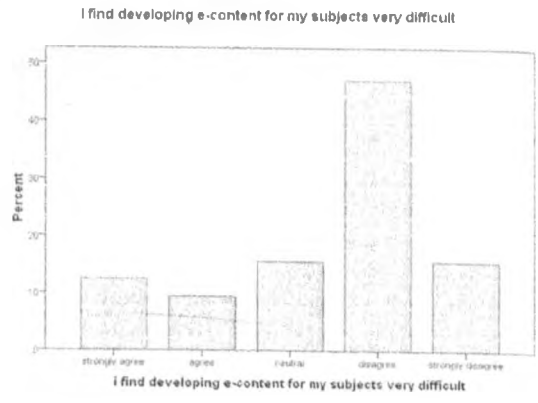
3.1 t my institution lacks good e-learning software

		Frequency	Percent
Valid	strongly agree	4	12.1
	agree	3	9.1
	neutral	8	24.2
	disagree	10	30.3
	strongly disagree	8	24.2
	Total	33	100.0



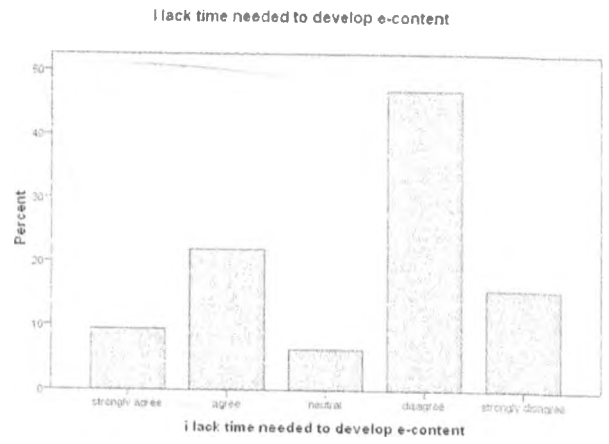
3.1 u I find developing e-content for my subjects very difficult

		Frequency	Percent
Valid	strongly agree	4	12.1
	agree	3	9.1
	neutral	5	15.2
	disagree	15	45.5
	strongly disagree	5	15.2
	Total	32	97.0
Missing	System	1	3.0
	Total	33	100.0



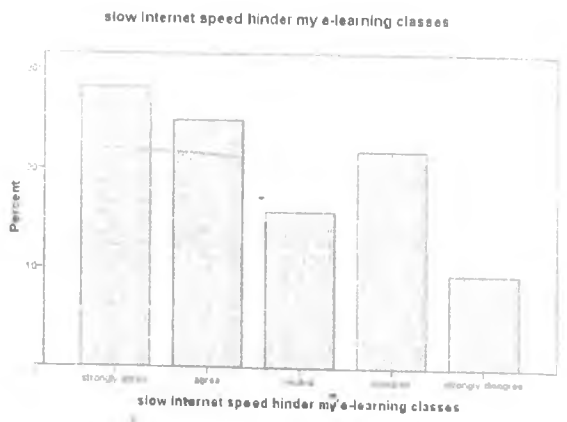
3.1 v I lack time needed to develop e-content

		Frequency	Percent
Valid	strongly agree	3	9.1
	agree	7	21.2
	neutral	2	6.1
	disagree	15	45.5
	strongly disagree	5	15.2
	Total	32	97.0
Missing	System	1	3.0
	Total	33	100.0



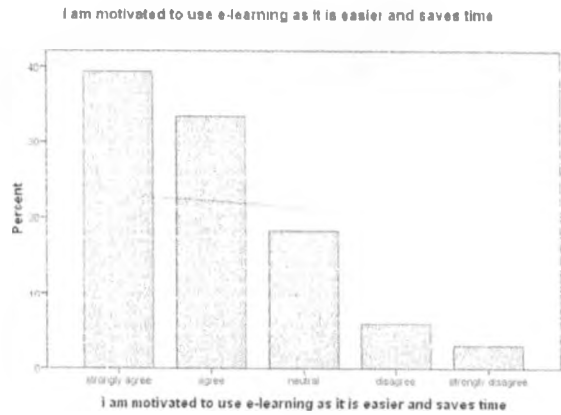
3.1 x slow internet speed hinder my e-learning classes

		Frequency	Percent
Valid	strongly agree	9	27.3
	agree	8	24.2
	neutral	5	15.2
	disagree	7	21.2
	strongly disagree	3	9.1
	Total	32	97.0
Missing	System	1	3.0
	Total	33	100.0



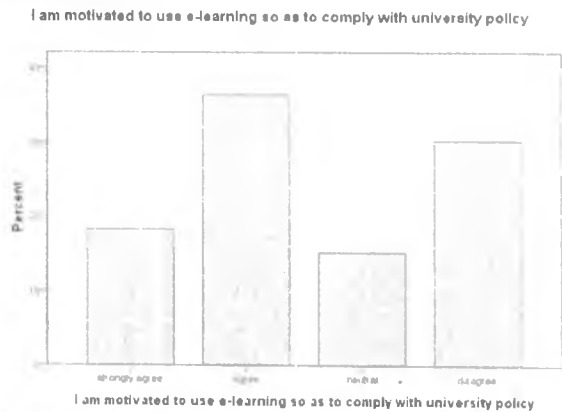
3.1 y I am motivated to use e-learning as it is easier and saves time

		Frequency	Percent
Valid	strongly agree	13	39.4
	agree	11	33.3
	neutral	6	18.2
	disagree	2	6.1
	strongly disagree	1	3.0
	Total	33	100.0



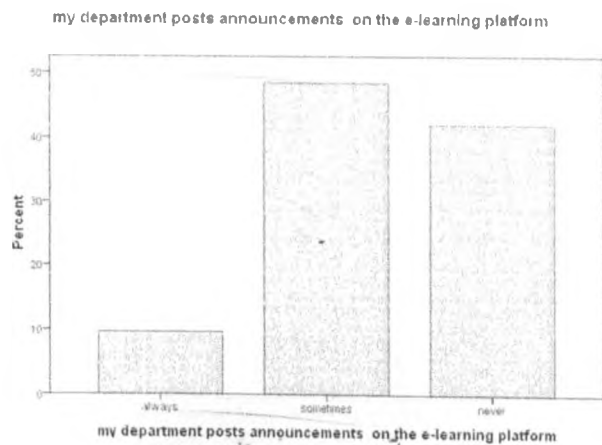
3.1 Z i am motivated to use e-learning so as to comply with university policy

		Frequency	Percent
Valid	strongly agree	6	18.2
	agree	12	36.4
	neutral	5	15.2
	disagree	10	30.3
	Total	33	100.0



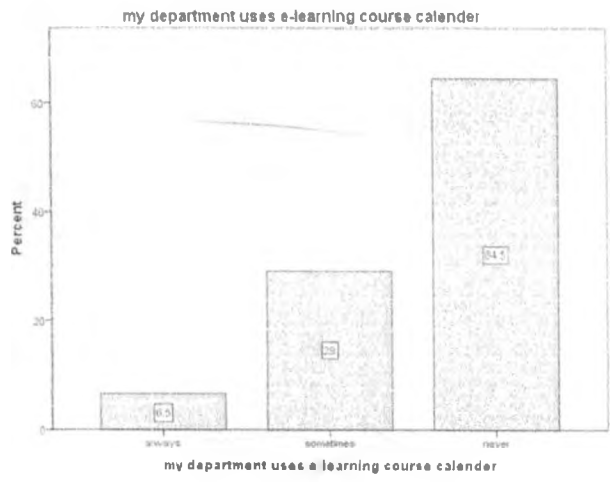
3.1.1 a. My department posts announcements on the e-learning platform

		Frequency	Percent
Valid	always	3	9.1
	sometimes	15	45.5
	never	13	39.4
	Total	31	93.9
Missing	System	2	6.1
	Total	33	100.0



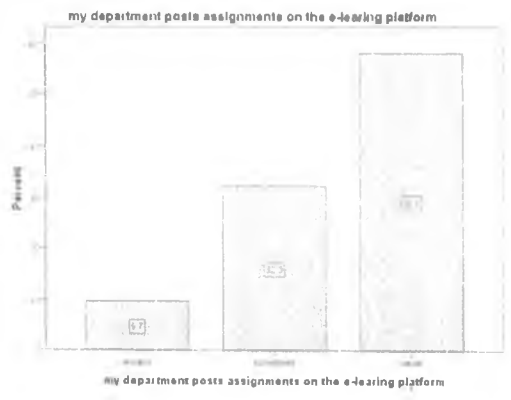
3.1.1 b. my department uses e-learning course calendar

		Frequency	Percent
Valid	always	2	6.1
	sometimes	9	27.3
	never	20	60.6
	Total	31	93.9
Missing	System	2	6.1
Total		33	100.0



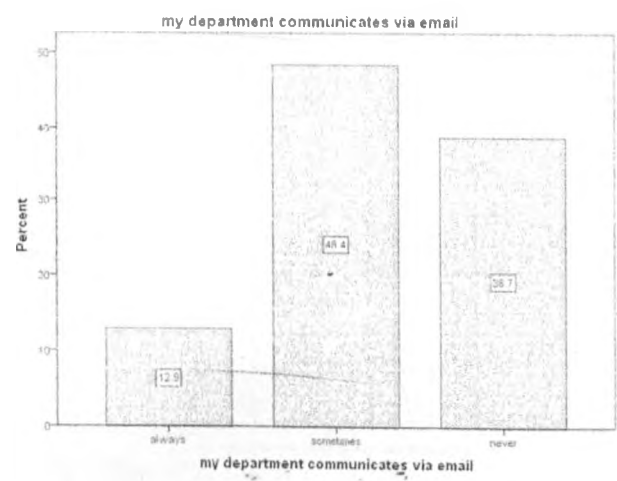
3.1.1 c. My department posts assignments on the e-learning platform

		Frequency	Percent
Valid	always	3	9.1
	sometimes	10	30.3
	never	18	54.5
	Total	31	93.9
Missing	System	2	6.1
Total		33	100.0



3.1.1 d. My department communicates via email

		Frequency	Percent
Valid	always	4	12.1
	sometimes	15	45.5
	never	12	36.4
	Total	31	93.9
Missing	System	2	6.1
Total		33	100.0



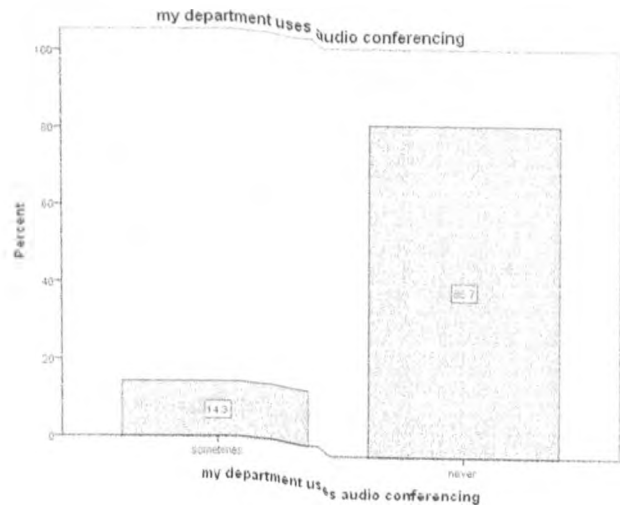
3.1.1 e. my department communicates via the bulletin board

		Frequency	Percent
Valid	always	4	12.1
	sometimes	11	33.3
	never	15	45.5
	Total	30	90.9
Missing	System	3	9.1
Total		33	100.0



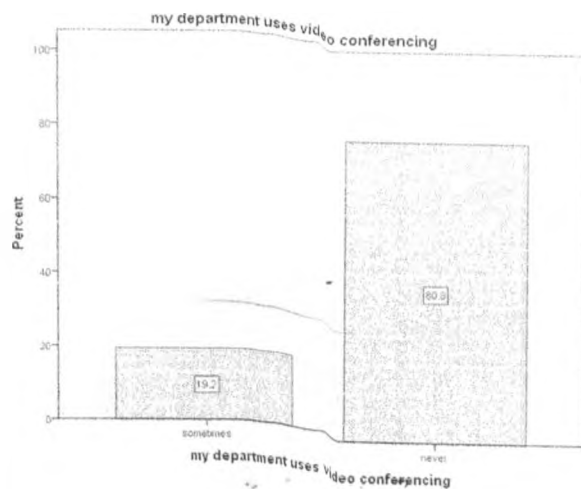
3.1.1. f. My department uses audio conferencing

		Frequency	Percent
Valid	sometimes	4	12.1
	never	24	72.7
	Total	28	84.8
Missing	System	5	15.2
Total		33	100.0



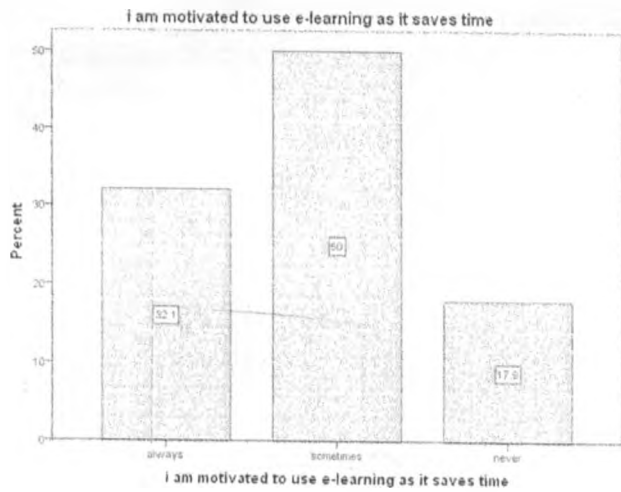
3.1.1 g. My department uses video conferencing

		Frequency	Percent
Valid	sometimes	5	15.2
	never	21	63.6
	Total	26	78.8
Missing	System	7	21.2
Total		33	100.0



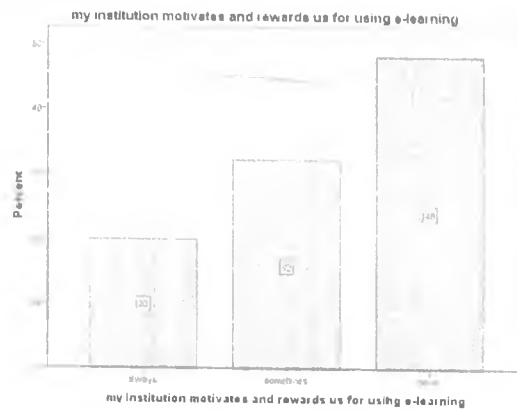
3.1.1 g. I am motivated to use e-learning as it saves time

		Frequency	Percent
Valid	always	9	27.3
	sometimes	14	42.4
	never	5	15.2
	Total	28	84.8
Missing	System	5	15.2
Total		33	100.0



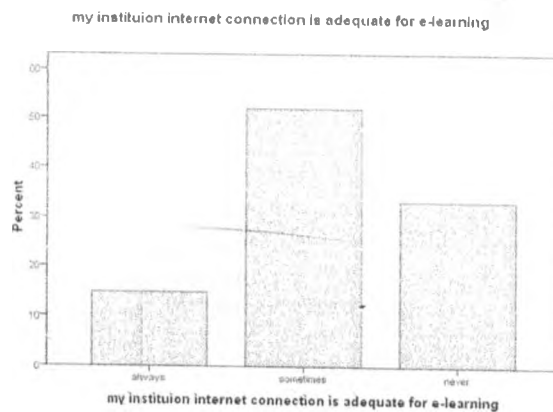
3.1.1 h. My institution motivates and rewards us for using e-learning

		Frequency	Percent
Valid	always	5	15.2
	sometimes	8	24.2
	never	12	36.4
	Total	25	75.8
Missing	System	8	24.2
Total		33	100.0



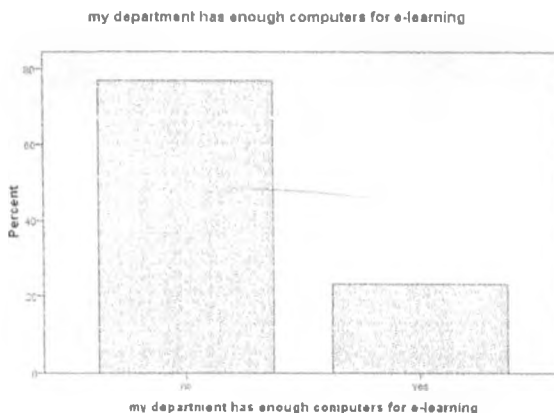
3.1.1 i my institution internet connection is adequate for e-learning

		Frequency	Percent
Valid	always	4	12.1
	sometimes	14	42.4
	never	9	27.3
	Total	27	81.8
Missing	System	6	18.2
Total		33	100.0



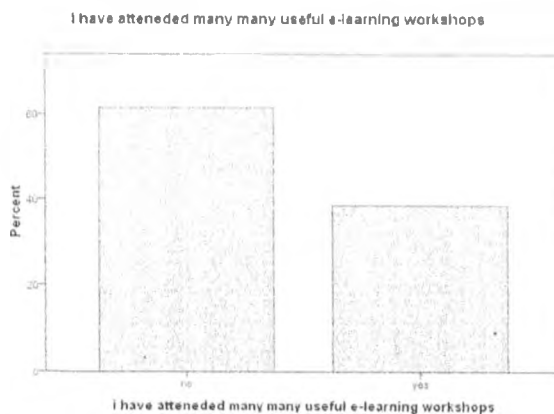
3.1.1. j My department has enough computers for e-learning

		Frequency	Percent
Valid	no	20	60.6
	yes	6	18.2
	Total	26	78.8
Missing	System	7	21.2
	Total	33	100.0



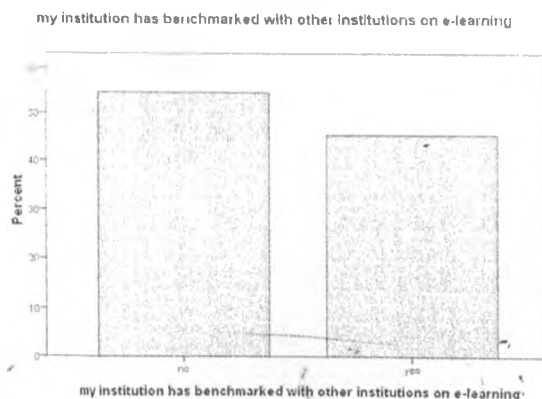
3.1.1k i have attended many useful e-learning workshops

		Frequency	Percent
Valid	no	16	48.5
	yes	10	30.3
	Total	26	78.8
Missing	System	7	21.2
	Total	33	100.0



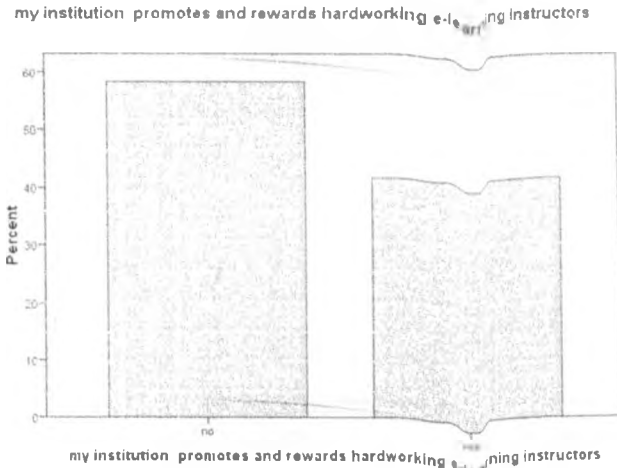
3.1.1l my institution has benchmarked with other institutions on e-learning

		Frequency	Percent
Valid	no	12	36.4
	yes	10	30.3
	Total	22	66.7
Missing	System	11	33.3
	Total	33	100.0



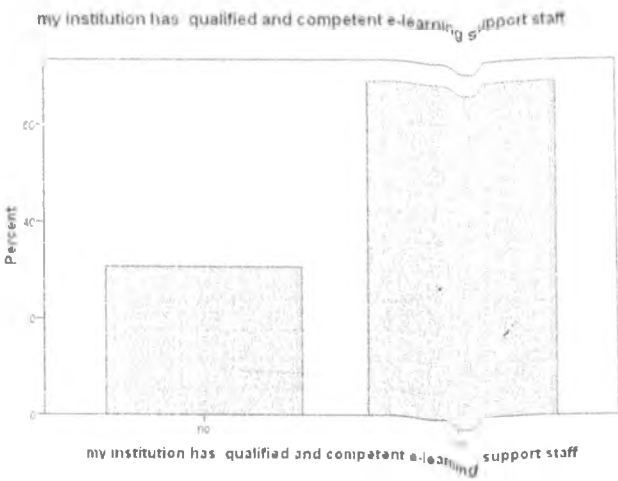
3.1.1m. my institution promotes and rewards hardworking e-learning instructors

		Frequency	Percent
Valid	no	14	42.4
	yes	10	30.3
	Total	24	72.7
Missing	System	9	27.3
	Total	33	100.0



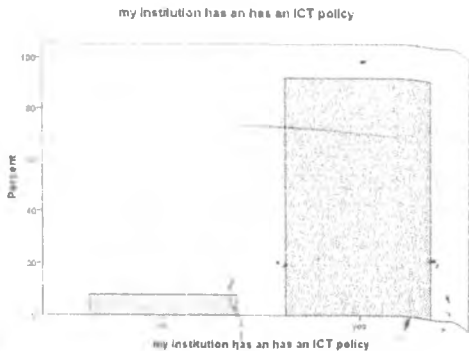
3.1.1.n my institution has qualified and competent e-learning support staff

		Frequency	Percent
Valid	no	8	24.2
	yes	18	54.5
	Total	26	78.8
Missing	System	7	21.2
	Total	33	100.0



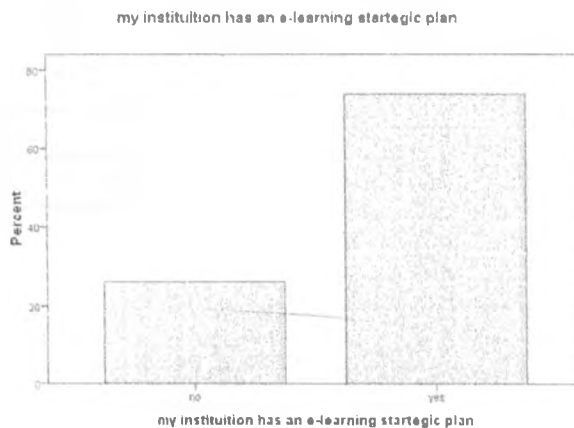
3.1.1.o my institution has an has an ICT policy

		Frequency	Percent
Valid	no	2	6.1
	yes	23	69.7
	Total	25	75.8
Missing	System	8	24.2
	Total	33	100.0



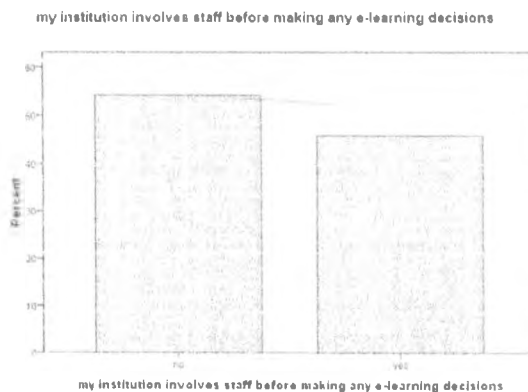
3.1.1p my institution has an e-learning strategic plan

		Frequency	Percent
Valid	no	6	18.2
	yes	17	51.5
	Total	23	69.7
Missing	System	10	30.3
	Total	33	100.0

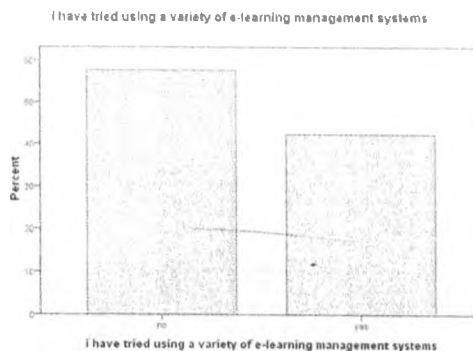


3.1.1 q my institution Consults Instructors before making any e-learning decisions

		Frequency	Percent
Valid	no	13	39.4
	yes	11	33.3
	Total	24	72.7
Missing	System	9	27.3
	Total	33	100.0



		Frequency	Percent
Valid	no	15	45.5
	yes	11	33.3
	Total	26	78.8
Missing	System	7	21.2
	Total	33	100.0



7.3.4 Reliability statistics (E-learning instructors)

Table 7.3.4 Reliability statistics (E-learning instructors)

Cronbach's Alpha	N of Items
.708	41

Table 7.3.5 Reliability statistics for each construct (E-learning instructors)

	N	No. of items	Mean	Std. Deviation	alpha
awareness	33	1	1.5909	.53698	NA
attitude	33	2	2.9091	.73372	0.6344
Behavioral intention	33	1	2.1212	1.11124	NA
training	33	2	2.0909	1.01130	0.5663
Perceived benefits	33	6	2.4985	.71354	0.7554
complexity	33	6	3.0561	.62209	0.1886
evaluation	31	5	2.4892	.46285	0.7752
Other technology use	28	2	2.8036	.36866	0.7089
motivation	33	2	2.2879	.90165	0.5381
confidence	25	1	.4000	.50000	NA
influence	33	2	3.3939	.81737	0.1954
policy	25	2	.8400	.31358	0.7560
Rewards recognition	26	1	.4231	.48358	NA
variability	26	1	.4231	.50383	NA

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7.3.5 Correlations. (E-learning instructors).

		awareness	attitude	Behavioral intention	training	Perceived benefits	complexity	evaluation	Other technology	motivation	confidence	influence	policy	Rewards recognition	trialability
awareness	Pearson Correlation	1	.101	.269	.517	.249	-.025	-.055	-.181	-.120	-.095	.254	.061	.169	.012
	Sig. (2-tailed)		.576	.130	.002	.162	.890	.767	.356	.505	.652	.154	.774	.410	.955
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
attitude	Pearson Correlation	.101	1	.129	-.210	.101	.003	-.185	-.201	.194	-.083	-.095	.252	.107	-.073
	Sig. (2-tailed)	.576		.475	.242	.575	.987	.318	.305	.279	.695	.600	.224	.604	.722
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
behavioral intention	Pearson Correlation	.269	.129	1	.226	.497	-.107	-.102	.046	.136	-.191	.393	.348	.250	-.364
	Sig. (2-tailed)	.130	.475		.205	.003	.552	.585	.816	.452	.361	.024	.088	.218	.067
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
training	Pearson Correlation	.517	-.210	.226	1	.243	.096	.337	-.074	.065	-.149	.296	-.042	-.289	-.088
	Sig. (2-tailed)	.002	.242	.205		.174	.595	.064	.708	.721	.476	.095	.842	.152	.670
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
Perceived benefits	Pearson Correlation	.249	.101	.497	.243	1	-.105	-.034	-.023	.384	-.310	.280	.250	.352	-.373
	Sig. (2-tailed)	.162	.575	.003	.174		.561	.856	.907	.027	.131	.115	.227	.078	.061
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
complexity	Pearson Correlation	-.025	.003	-.107	.096	-.105	1	.074	-.215	-.240	.029	-.043	-.130	.034	-.017
	Sig. (2-tailed)	.890	.987	.552	.595	.561		.691	.271	.179	.890	.811	.537	.871	.934
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
evaluation	Pearson Correlation	-.055	-.185	-.102	.337	-.034	.074	1	.408	.034	-.328	.072	.027	-.275	-.295
	Sig. (2-tailed)	.767	.318	.585	.064	.856	.691		.031	.857	.110	.699	.899	.173	.144
	N	31	31	31	31	31	31	31	28	31	25	31	25	26	26
othertechnology	Pearson Correlation	-.181	-.201	.046	-.074	-.023	-.215	.408	1	.030	.051	-.116	.217	-.189	-.497
	Sig. (2-tailed)	.356	.305	.816	.708	.907	.271	.031		.878	.817	.557	.320	.375	.013
	N	28	28	28	28	28	28	28	28	28	23	28	23	24	24
motivation	Pearson Correlation	-.120	.194	.136	.065	.384	-.240	.034	.030	1	-.043	.170	.110	.390	-.245
	Sig. (2-tailed)	.505	.279	.452	.721	.027	.179	.857	.878		.838	.344	.602	.049	.229
	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
confidence	Pearson Correlation	-.095	-.083	-.191	-.149	-.310	.029	-.328	.051	-.043	1	.010	-.090	.261	.428
	Sig. (2-tailed)	.652	.695	.361	.476	.131	.890	.110	.817	.838		.962	.675	.207	.033

influence	N	25	25	25	25	25	25	25	23	25	25	25	24	25	25
	Pearson Correlation	.254	-.095	.393	.296	.280	-.043	.072	-.116	.170	.010	1	.194	-.041	-.109
	Sig. (2-tailed)	.154	.600	.024	.095	.115	.811	.699	.557	.344	.962		.354	.842	.594
policy	N	33	33	33	33	33	33	31	28	33	25	33	25	26	26
	Pearson Correlation	.061	.252	.348	-.042	.250	-.130	.027	.217	.110	-.090	.194	1	.345	-.325
	Sig. (2-tailed)	.774	.224	.088	.842	.227	.537	.899	.320	.602	.675	.354		.091	.113
	N	25	25	25	25	25	25	25	23	25	24	25	25	25	25
Rewards & recognition	N	26	26	26	26	26	26	26	24	26	25	26	25	26	26
	Pearson Correlation	.169	.107	.250	-.289	.352	.034	-.275	-.189	.390	.261	-.041	.345	1	.139
	Sig. (2-tailed)	.410	.604	.218	.152	.078	.871	.173	.375	.049	.207	.842	.091		.499
	N	26	26	26	26	26	26	26	24	26	25	26	25	26	26
triability	N	26	26	26	26	26	26	26	24	26	25	26	25	26	26
	Pearson Correlation	.012	-.073	-.364	-.088	-.373	-.017	-.295	-.497	-.245	.428	-.109	-.325	.139	1
	Sig. (2-tailed)	.955	.722	.067	.670	.061	.934	.144	.013	.229	.033	.594	.113	.499	
	N	26	26	26	26	26	26	26	24	26	25	26	25	26	26

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 7.3.5 Correlations. (E-learning instructors).

7.3.6 Hypotheses-E-learning Instructors

1. Awareness is positively related to behavioral intention $p=0.130$ and $r= +0.269$
2. Awareness is positively related to attitude $p=0.576$ and $r= +0.101$
3. Awareness is positively related to instructor variables $p=0.166$ and $r= +0.247$
4. Awareness is positively related to triability $p=0.955$ and $r= +0.012$
5. Awareness is positively related to institution variable s $p=0.269$ and $r= +0.225$
6. Behavioral intention is positively related to attitude $p=0.475$ and $r= +0.129$
7. Behavioral intention is positively related to instructor variables $p=0.153$ and $r= +0.255$
8. Behavioral intention is negatively related to complexity $p=0.552$ and $r= -0.107$
9. Behavioral intention is negatively related to triability $p=0.067$ and $r= -0.364$
10. Behavioral intention is positively related to motivation $p=0.452$ and $r= +0.136$
11. Behavioral intention is positively related to training $p=0.242$ and $r= +0.238$
12. Behavioral intention is positively related to other technology use $p=0.814$ and $r= +0.046$

13. Attitude is positively related to perceived benefits $p=0.575$ and $r= 0.101$
14. Attitude intention is positively related to institution variables $p=0.284$ and $r= +0.160$
15. Attitude is negatively related to usability $p=0.722$ and $r= -0.073$
16. Attitude is positively related to motivation $p=0.575$ and $r= +0.101$
17. Attitude is negatively related to other technology $p=0.305$ and $r= -0.201$
18. Attitude is negatively related to other instructor variables $p=0.855$ and $r= -0.033$
19. Attitude is positively related to rewards and recognition $p=0.607$ and $r= +0.107$
20. Attitude is positively related to policy $p=0.224$ and $r= +0.254$
21. Attitude and behavioral intention is negatively related to influence ($p=0.600$ and $r= -0.095$,
22. Training has a positive correlation with behavioral intention $p=0.205$ and $r= 0.226$

7.4 Appendix 4(E-learning Technicians)

Table 7.4.1 E-learning technicians (Variables tested).

Table 7.4.1 E-learning technicians (Variables tested).

	Variable	Items of measurement	Scale
1	E-learning Awareness	I know what e-learning is and the benefits it offers	5-point Likert-type response scale: strongly agree; agree; undecided; disagree; strongly disagree 3- point "always", "sometimes" "never" & a 2 point Yes or No
2	Perceived LMS characteristics	<ul style="list-style-type: none"> • User friendly & easy to use • Stable s & secure system • Working Functionalities 	''
3	Behavioral Intention	I enjoyed using e-learning & intend to use it in the future	''
4	Attitude	<ul style="list-style-type: none"> • I dislike e-learning • I don't think e-learning can be better that face to face 	''
5	Content Quality	<ul style="list-style-type: none"> • Well organized • Clearly & effectively presented. • Up-to-date 	''
6	Complexity	<ul style="list-style-type: none"> • Lack adequate computers for learning. • Slow Internet speeds prevent the use of technology in classes. 	''
7	Other Technology Use	<ul style="list-style-type: none"> • Audio conferencing. • Video conferencing. 	''
8	Rewards & Incentives	<ul style="list-style-type: none"> • My institution promotes and rewards hardworking technicians. 	''
9	Institution variables	<ul style="list-style-type: none"> • Our VC/Director/Principal supports e-learning • My institution works on building an e-learning culture. • Our institution consults us on e-learning decisions 	''
10	Training workshops &	<ul style="list-style-type: none"> • We attend e-learning workshops regularly • We have been trained adequately on e-learning use 	''
11	Compatibility	<ul style="list-style-type: none"> • My department uses a customized e-learning system • Our e-learning solution can run on windows • Our e-learning solution can run on Linux. 	''
12	Triability	<ul style="list-style-type: none"> • I can install & configure a WAMP server. 	''

- I can install & configure a LAMP server
- I can install an LMS on a WAMP server
- I can install an LMS on a LAMP server
- I have knowledge of php
- I have knowledge of JavaScript
- I have knowledge of Linux
- I have knowledge of Joomla CMS
- I have knowledge of drupal CMS
- I can customize a learning management system

7.4.2 E-learning Technicians Questionnaire.

This questionnaire is to be filled by E-learning Support Staff in Kenyan Universities

Correspondent Background:

Position: -----

Department: -----

Type of Employment: *Permanent* [] *Contract* []

Number of years worked in this institution: *Less than 1 year* [];

3 – 5 years []

5 – 10 years [];

1 – 3 years [];
More than 10 years [];

What is your highest qualification? *Doctor of Philosophy* []; *Master's degree* [];

First degree/equivalent []; *Diploma* [];

Others: -----

Mark using a pen against your preferred choice by a tick (√) or a cross (x)

SA= strongly agree; A= Agree; U= Undecided; D= Disagree; SD= strongly disagree

Table 7.4.2: E-learning Technicians questionnaire instrument

		SA	A	U	D	SD
1	I know what e-learning is and the benefits it offers					
2	My Departments e-learning platform is user friendly and easy to use					
3	My Departments e-learning solution is stable & secure					
4	My Departments e-learning system content is well organized.					
5	My Departments e-learning content is clearly & effectively presented					
7	My Departments e-learning system content is up-to-date					
8	My department have sufficiently trained us on e-learning system use.					
9	Our VC/Principal/Director supports & endorses e-learning					
10	My institution/ department works on building an e-learning culture					
		Always	Sometimes	Never		
11	Slow internet speeds hinder our e-learning use					
12	My institution uses audio conferencing					

13	My institution uses video conferencing			
14	My institution regularly organizes e-learning workshops for us.			

		Yes	No
15	My Department has enough computers for e-learning		
16	My Department uses an open source learning solution(e.g. moodle, claroline, sakai etc)		
		Yes	No
17	My Department uses a customized e-learning solution		
18	My departments e-learning solution can run on windows operating system		
19	My departments e-learning solution can run on Linux operating system		
20	I know how to install and configure a WAMP server.		
21	I can install a learning management system on a WAMP a server.		
22	I know how to install and configure a LAMP server		
23	I can install a learning management system on a LAMP a server		
24	I can write quality PHP code conforming to my institutions LMS		
25	I can write quality javascript code conforming to a customized LMS		
26	I can customize an open source LMS solution fit my institutions needs.		
27	I have reasonable knowledge of Linux operating system.		
28	I can use Joomla to develop a content management system.		
29	I can use Drupal to develop a content management system		
30	My institution/department has trained us sufficiently on e-learning use		
31	My institution provides incentives/rewards and promotion to us based on e-learning use.		
32	My institution consults us before making decisions involving e-learning.		

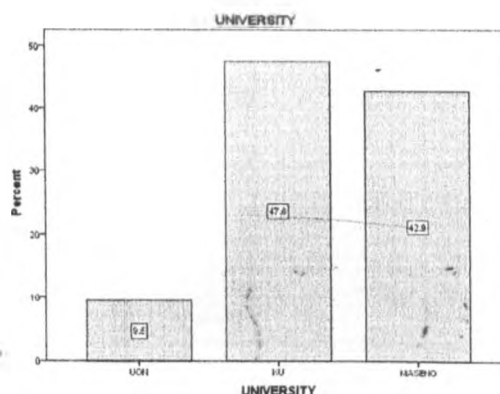
State any other challenges that you face concerning e-learning lessons

Suggest any improvements for e-learning in your department.

7.4.3 Survey Result Tables and Bar Charts (E-learning technicians)

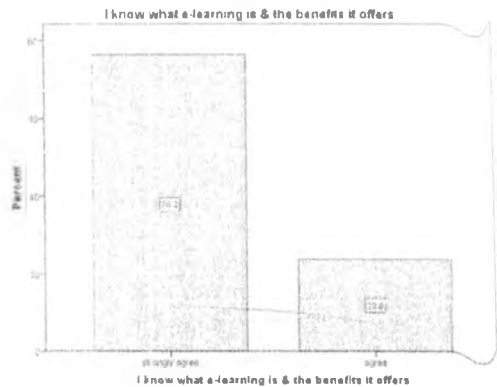
4.1 a. Universities

		Frequency	Percent
Valid	UON	2	9.5
	KU	10	47.6
	MASENO	9	42.9
	Total	21	100.0



4.1b I know what e-learning is & the benefits it offers

	Frequency	Percent
Valid strongly agree	16	76.2
agree	5	23.8
Total	21	100.0



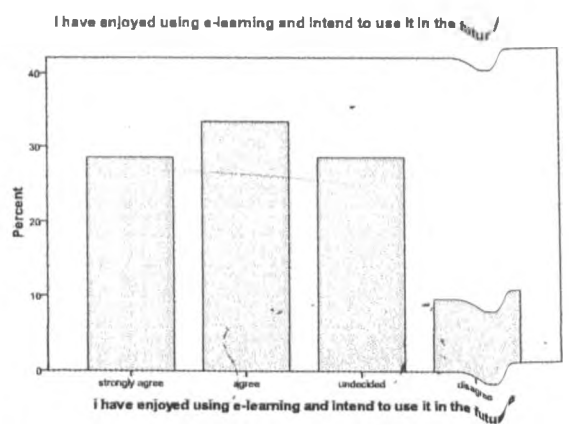
I think e-learning is not a good for training

	Frequency	Percent
Valid strongly agree	1	4.8
agree	2	9.5
undecided	4	19.0
disagree	11	52.4
strongly disagree	3	14.3
Total	21	100.0



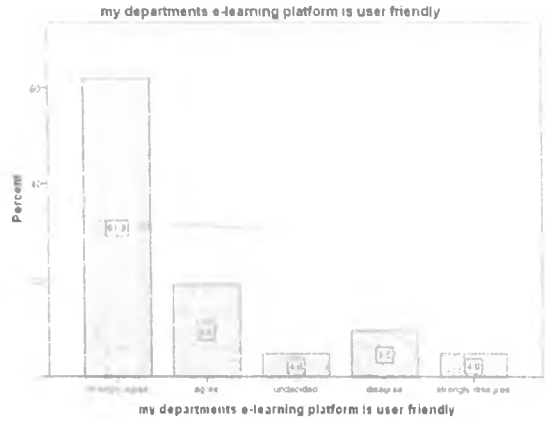
I have enjoyed using e-learning and intend to use it in the future

	Frequency	Percent
Valid strongly agree	6	28.6
agree	7	33.3
undecided	6	28.6
disagree	2	9.5
Total	21	100.0



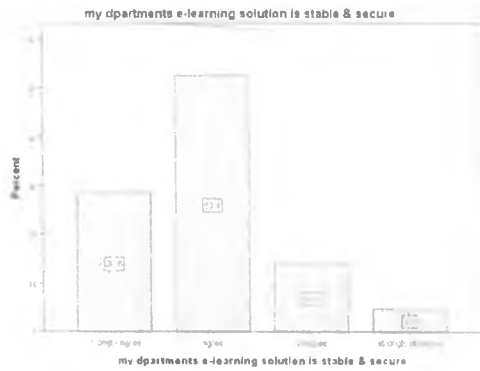
4.1 c My departments e-learning platform is user friendly

	Frequency	Percent
Valid strongly agree	13	61.9
agree	4	19.0
undecided	1	4.8
disagree	2	9.5
strongly disagree	1	4.8
Total	21	100.0



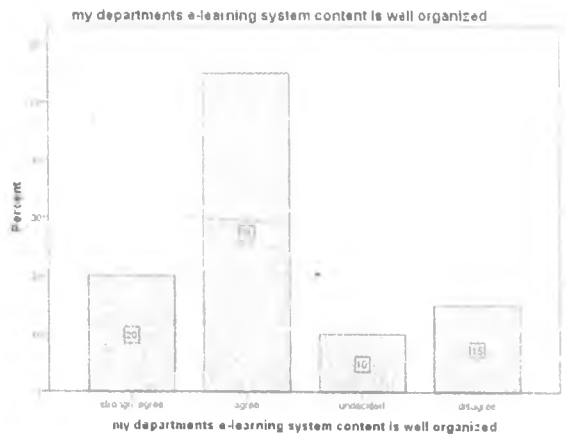
4.1 d My departments e-learning solution is stable & secure

	Frequency	Percent
Valid strongly agree	6	28.6
agree	11	52.4
disagree	3	14.3
strongly disagree	1	4.8
Total	21	100.0



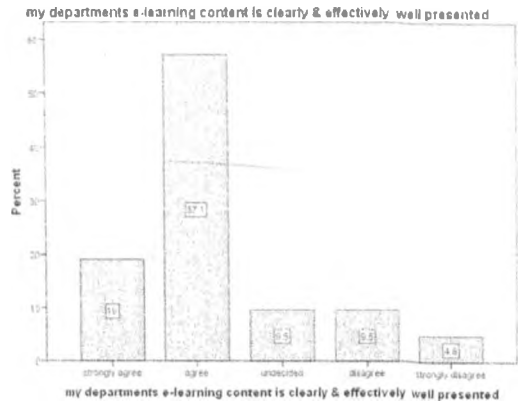
4.1 e my departments e-learning system content is well organized

	Frequency	Percent
Valid strongly agree	4	19.0
agree	11	52.4
undecided	2	9.5
disagree	3	14.3
Total	20	95.2
Missing System	1	4.8
Total	21	100.0



4.1d. my department's e-learning content is clearly & effectively well presented

		Frequency	Percent
Valid	strongly agree	4	19.0
	agree	12	57.1
	undecided	2	9.5
	disagree	2	9.5
	strongly disagree	1	4.8
	Total	21	100.0



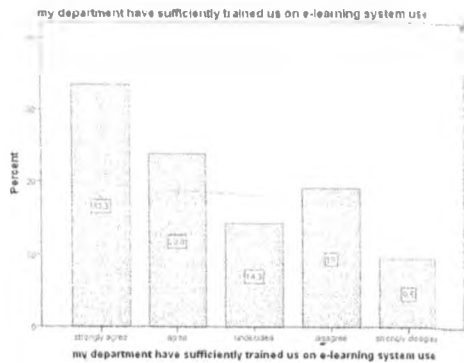
4.1 e. my department's e-learning content is up-to-date

		Frequency	Percent
Valid	strongly agree	2	9.5
	agree	11	52.4
	undecided	5	23.8
	disagree	2	9.5
	strongly disagree	1	4.8
	Total	21	100.0



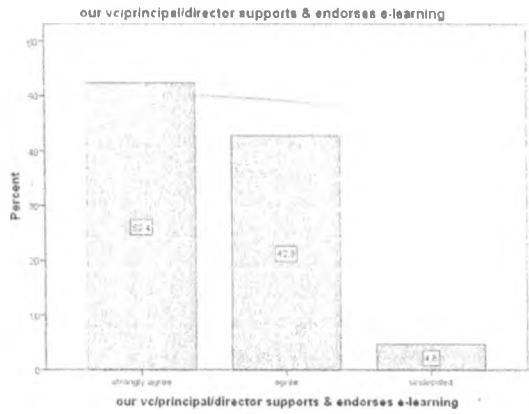
4.1f. my department has sufficiently trained us on e-learning system use

		Frequency	Percent
Valid	strongly agree	7	33.3
	agree	5	23.8
	undecided	3	14.3
	disagree	4	19.0
	strongly disagree	2	9.5
	Total	21	100.0



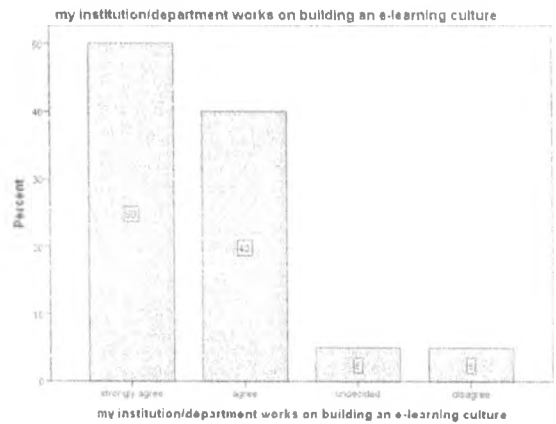
4.1g. our VC/Principal/director supports & endorses e-learning

	Frequency	Percent
Valid strongly agree	11	52.4
agree	9	42.9
undecided	1	4.8
Total	21	100.0



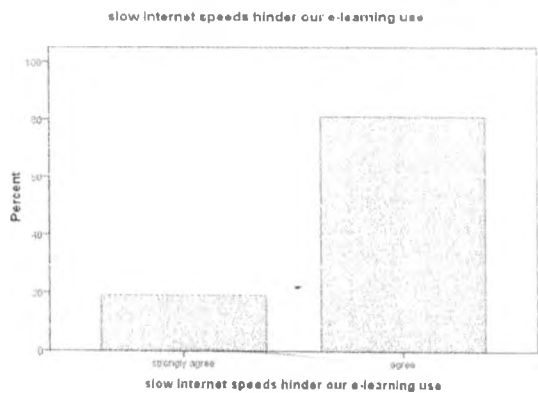
4.1h My institution/department works on building an e-learning culture

	Frequency	Percent
Valid strongly agree	10	47.6
agree	8	38.1
undecided	1	4.8
disagree	1	4.8
Total	20	95.2
Missing System	1	4.8
Total	21	100.0



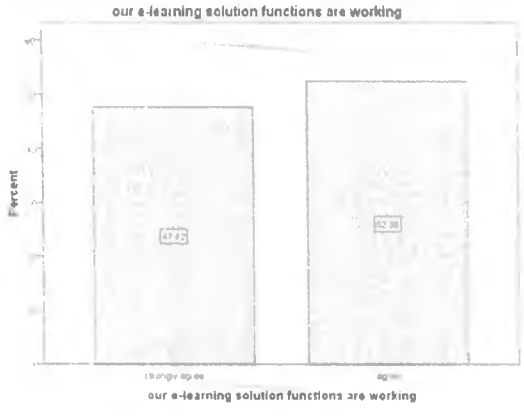
Slow internet speed hinder our e-learning

	Frequency	Percent
Valid strongly agree	4	19.0
agree	17	81.0
Total	21	100.0



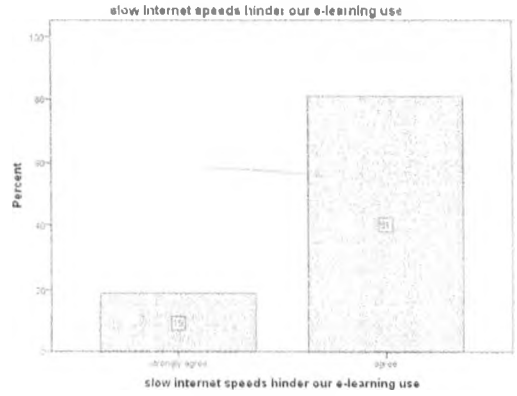
4.1j our e-learning solution functions are working

		Frequency	Percent
Valid	strongly agree	10	47.6
	agree	11	52.4
	Total	21	100.0



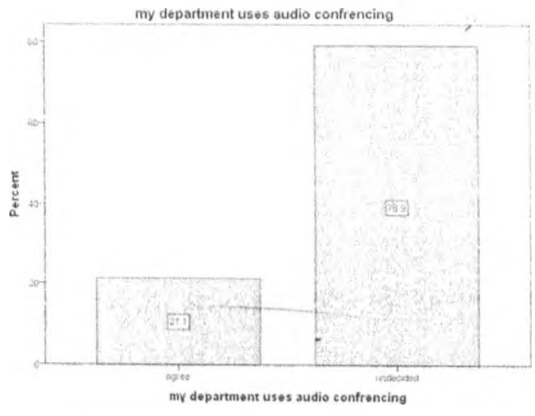
4.1 k slow internet speeds hinder our e-learning use

		Frequency	Percent
Valid	strongly agree	4	19.0
	agree	17	81.0
	Total	21	100.0



4.1 p. My department uses audio conferencing

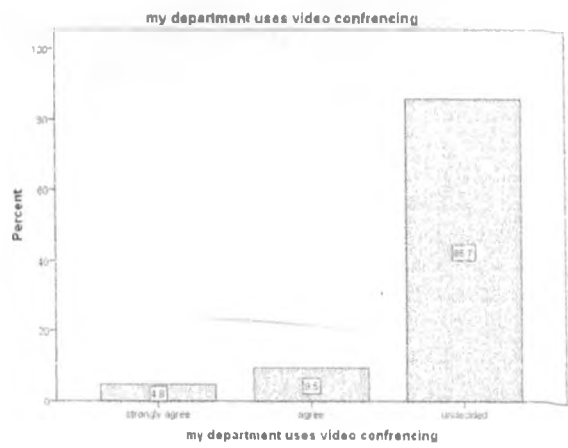
		Frequency	Percent
Valid	agree	4	19.0
	undecided	15	71.4
	Total	19	90.5
Missing	System	2	9.5
	Total	21	100.0



4.1q. my department uses video conferencing

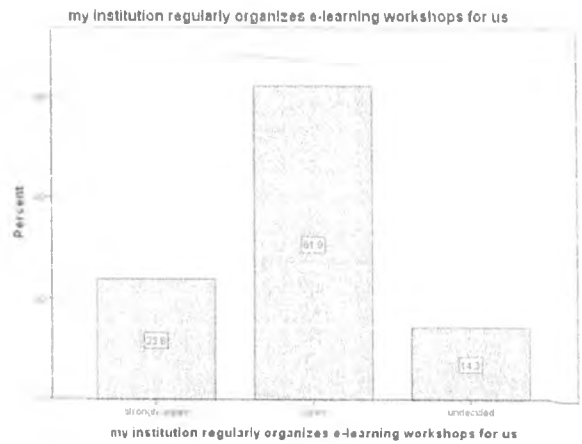
		Frequency	Percent
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Valid	strongly agree	1	4.8
	agree	2	9.5
	undecided	18	85.7
	Total	21	100.0



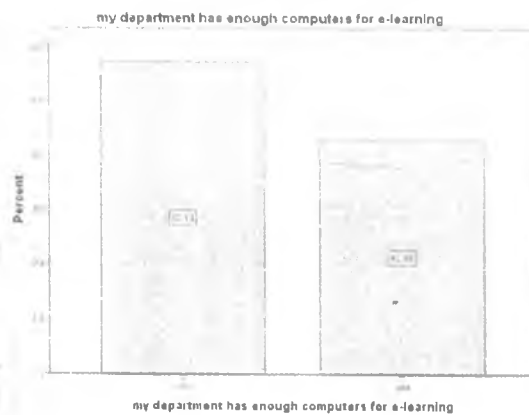
4.1s. My institution regularly organizes e-learning workshops for us

		Frequency	Percent
Valid	strongly agree	5	23.8
	agree	13	61.9
	undecided	3	14.3
	Total	21	100.0



4.1t. My department has enough computers for e-learning

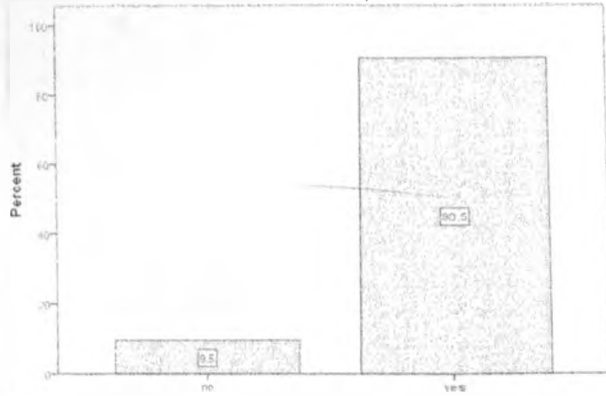
		Frequency	Percent
Valid	no	12	57.1
	yes	9	42.9
	Total	21	100.0



4.1 z. we are using an open source Learning Management System(eg moodle, claroline, sakai etc)

		Frequency	Percent
Valid	no	2	9.5
	yes	19	90.5
	Total	21	100.0

we are using an open source Learning Management System(eg moodle, claroline, sakai etc)

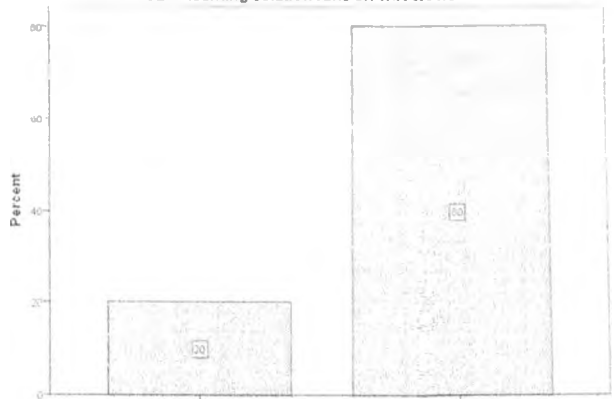


we are using an open source Learning Management System(eg moodle, claroline, sakai etc)

4.1.1a. our e-learning solution can run on Windows

		Frequency	Percent
Valid	no	4	19.0
	yes	16	76.2
	Total	20	95.2
Missing	System	1	4.8
	Total	21	100.0

our e-learning solution runs on Windows



our e-learning solution runs on Windows

4.1.1 b. our e-learning solution can run on Linux

		Frequency	Percent
Valid	no	5	23.8
	yes	16	76.2
	Total	21	100.0

our e-learning solution runs on Linux

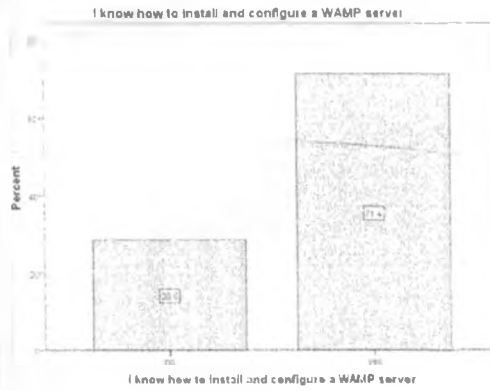


our e-learning solution runs on Linux

4.1.1c. I know how to install and configure a WAMP server

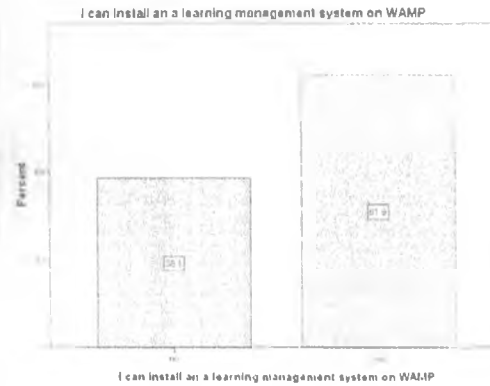
	Frequency	Percent
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Valid	no	6	28.6
	yes	15	71.4
	Total	21	100.0



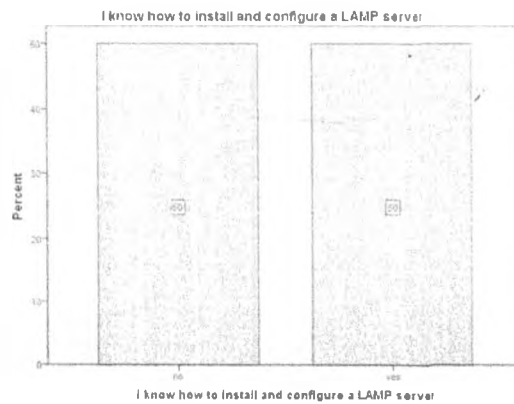
4.1.1. d. I can install an a learning management system on WAMP

		Frequency	Percent
Valid	no	8	38.1
	yes	13	61.9
	Total	21	100.0



4.1.1.e. I know how to install and configure a LAMP server

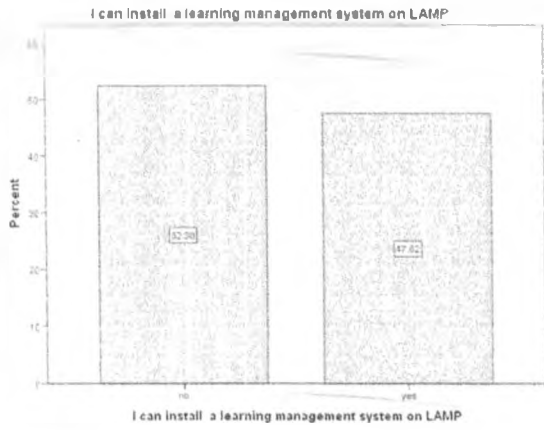
		Frequency	Percent
Valid	no	10	47.6
	yes	10	47.6
	Total	20	95.2
Missing	System	1	4.8
	Total	21	100.0



4.1.1 f I can install a learning management system on LAMP

		Frequency	Percent
Valid	no	11	52.4
	yes	10	47.6

Total	21	100.0
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4.1.1.h. i have good knowledge of PHP scripting language

	Frequency	Percent
Valid no	16	76.2
yes	5	23.8
Total	21	100.0



4.1.1.i i have good knowledge of javascript scripting language

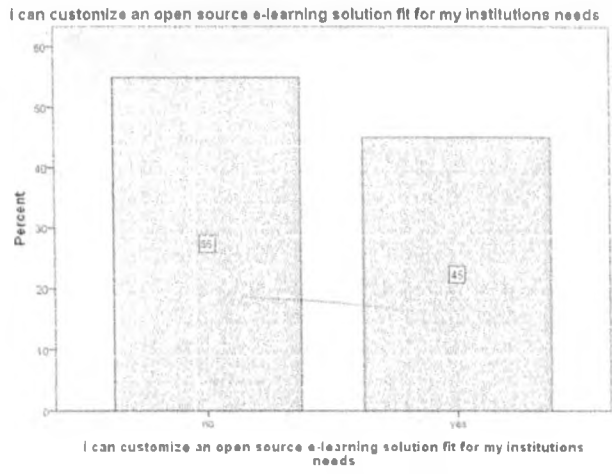
	Frequency	Percent
Valid no	17	81.0
yes	4	19.0
Total	21	100.0



4.1.1.j i can customize an open source e-learning solution fit for my institutions needs

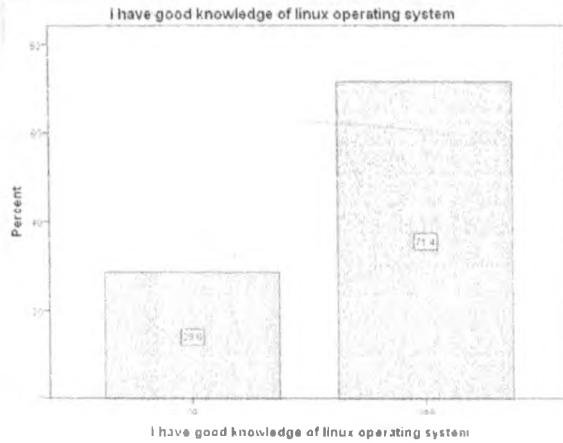
	Frequency	Percent
Valid no	11	52.4

	yes	9	42.9
	Total	20	95.2
Missing	System	1	4.8
Total		21	100.0



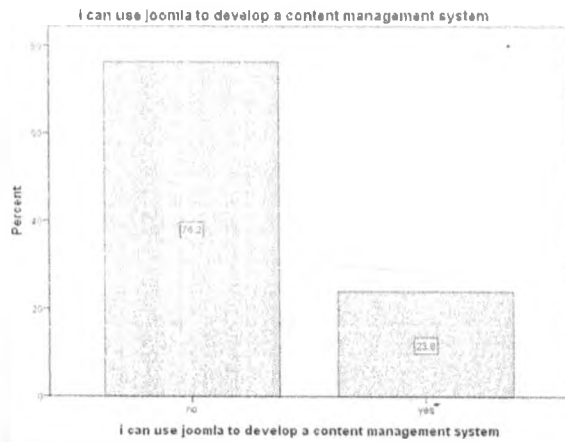
4.1.1.k i have good knowledge of Linux operating system

		Frequency	Percent
Valid	no	6	28.6
	yes	15	71.4
	Total	21	100.0



4.1.1.l i can use joomla to develop a content management system

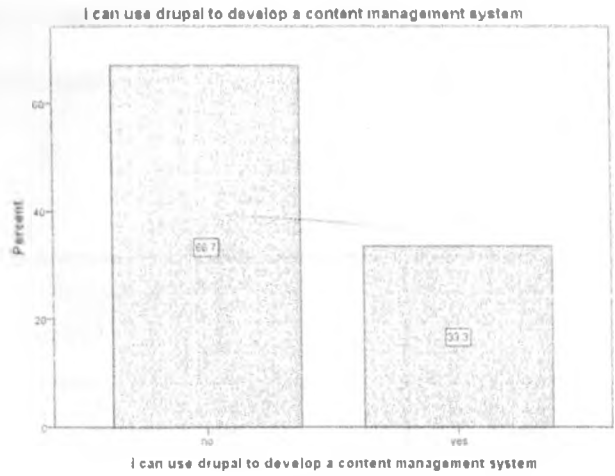
		Frequency	Percent
Valid	no	16	76.2
	yes	5	23.8
	Total	21	100.0



4.1.1.m i can use drupal to develop a content management system

	Frequency	Percent
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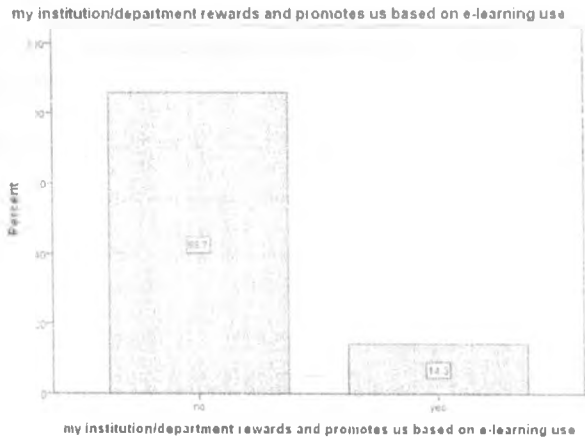
Valid	no	15	71.4
	yes	5	23.8
	Total	20	95.2
Missing	System	1	4.8
Total		21	100.0



4.1.1n my institution/department rewards and promotes us based on e-learning

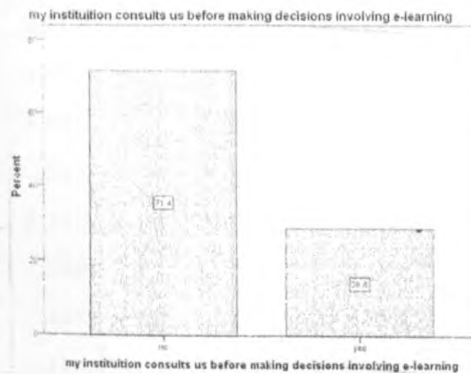
use

	Frequency	Percent
Valid no	18	85.7
yes	3	14.3
Total	21	100.0



4.1.1.o My institution consults us before making decisions involving e-learning

	Frequency	Percent
Valid no	15	71.4
yes	6	28.6
Total	21	100.0



7.4.4 KMO and Bartlett's Test (E-learning Technicians)

Table 7.4.4 KMO and Bartlett's Test (E-learning Technicians)

Bartlett's Test of Sphericity	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.675
	Approx. Chi-Square	122.220
	df	66
	Sig.	.000

7.4.5 Reliability statistics for the whole instrument (E-learning Technicians)

Table 7.4.5 Reliability statistics for the whole instrument (E-learning Technicians)

	Cronbach's Alpha		N of Items
	0.716		29

	N	No of items	Mean	Std. Deviation	alpha
awareness	21	1	1.2381	.43644	NA
attitude	21	2	3.6190	1.02353	0.6980
Behavioral intention	21	1	2.1905	.98077	NA
LMS characteristics	21	4	1.80952	.853564	0.7952
Content quality	21	4	2.3175	.87861	0.8585
training	21	2	2.1905	.92839	0.6354
Institution variables	21	4	1.6032	.66348	0.7601
rewards	21	1	.1429	.35857	NA
Other tech use	21	2	2.7619	.51524	0.7792
compatibility	21	2	.7619	.30079	0.4469
triability	21	10	.4455	.31480	0.8920
complexity	21	2	1.1190	.38421	0.5806

7.4.6 Correlations (e-learning Technicians)

		awareness	attitude	Behavioral intention	LMS characteristics	content quality	training	complexity	rewards	Institution variables	compatibility	triability	Other technology use
awareness	Pearson Correlation	1	.101	.006	.575	.315	.561	-.476	-.228	.227	-.435	-.156	.042
	Sig. (2-tailed)		.662	.981	.006	.165	.008	.029	.320	.321	.049	.501	.855
	N	21	21	21	21	21	21	21	21	21	21	21	21
attitude	Pearson Correlation	.101	1	-.074	.065	.011	.238	-.185	.117	.233	-.093	.041	-.133
	Sig. (2-tailed)	.662		.751	.778	.961	.299	.423	.614	.310	.689	.860	.565
	N	21	21	21	21	21	21	21	21	21	21	21	21
Behavioral intention	Pearson Correlation	.006	-.074	1	-.154	-.016	.178	-.063	.081	.148	-.178	.143	-.104
	Sig. (2-tailed)	.981	.751		.506	.946	.441	.786	.726	.523	.441	.536	.655
	N	21	21	21	21	21	21	21	21	21	21	21	21
LMS characteristics	Pearson Correlation	.575	.065	-.154	1	.633	.753	-.741	-.124	.439	-.748	-.357	.271
	Sig. (2-tailed)	.006	.778	.506		.002	.000	.000	.591	.047	.000	.112	.235
	N	21	21	21	21	21	21	21	21	21	21	21	21
Content quality	Pearson Correlation	.315	.011	-.016	.633	1	.566	-.661	.008	.684	-.499	-.443	.323
	Sig. (2-tailed)	.165	.961	.946	.002		.008	.001	.974	.001	.021	.044	.154
	N	21	21	21	21	21	21	21	21	21	21	21	21
training	Pearson Correlation	.561	.238	.178	.753	.566	1	-.557	-.461	.575	-.665	-.267	.126
	Sig. (2-tailed)	.008	.299	.441	.000	.008		.009	.035	.006	.001	.242	.587
	N	21	21	21	21	21	21	21	21	21	21	21	21
complexity	Pearson Correlation	-.476	.185	-.063	-.741	-.661	-.557	1	.233	-.525	.474	.353	-.229
	Sig. (2-tailed)	.029	.423	.786	.000	.001	.009		.309	.015	.030	.117	.319
	N	21	21	21	21	21	21	21	21	21	21	21	21
rewards	Pearson Correlation	-.228	-.117	-.081	-.124	.008	-.461	.233	1	-.100	.022	.048	.193
	Sig. (2-tailed)	.320	.614	.726	.591	.974	.035	.309		.666	.924	.837	.401
	N	21	21	21	21	21	21	21	21	21	21	21	21
Institution variables	Pearson Correlation	.227	.233	.148	.439	.684	.575	-.525	-.100	1	-.330	-.453	.100
	Sig. (2-tailed)	.321	.310	.523	.047	.001	.006	.015	.666		.144	.039	.667
	N	21	21	21	21	21	21	21	21	21	21	21	21

compatibility	Pearson Correlation	-.435	-.093	-.178	-.748	-.499	-.665	.474	.022	-.330	1	.370	-.061
	Sig. (2-tailed)	.049	.689	.441	.000	.021	.001	.030	.924	.144		.098	.791
	N	21	21	21	21	21	21	21	21	21	21	21	21
triability	Pearson Correlation	-.156	.041	.143	-.357	-.443	-.267	.353	.048	-.453	.370	1	-.392
	Sig. (2-tailed)	.501	.860	.536	.112	.044	.242	.117	.837	.039	.098		.079
	N	21	21	21	21	21	21	21	21	21	21	21	21
Other technology use	Pearson Correlation	.042	-.133	-.104	.271	.323	.126	-.229	.193	.100	-.061	-.392	1
	Sig. (2-tailed)	.855	.565	.655	.235	.154	.587	.319	.401	.667	.791	.079	
	N	21	21	21	21	21	21	21	21	21	21	21	21

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 7.4.6 Correlations (e-learning Technicians)

7.4.8 Hypotheses'-learning Technicians

- 1) Behavioral intention is positively related awareness since $p=0.981$ and $r=+0.006$
- 2) Attitude is positively related to content quality since $p=0.061$ and $r=+0.122$
- 3) Attitude is positively related to behavioral intention since $p=0.662$ and $r=+0.101$
- 4) Attitude and behavioral intention are negatively related compatibility since ($p=0.689$ and $r=-0.093$; $p=0.441$ and $r=-0.178$)
- 5) Attitude and behavioral intention are positively related to institutional variables since ($p=0.310$ and $r=+0.233$; $p=0.523$ and $r=+0.148$)
- 6) Attitude and behavioral intention are positively related rewards since ($p=0.614$ and $r=+0.117$; $p=0.726$ and $r=+0.081$)
- 7) Attitude and behavioral intention are negatively related complexities since ($p=0.423$ and $r=-0.185$; $p=0.786$ and $r=-0.063$)
- 8) Attitude and behavioral intention are positively related triability since ($p=0.860$ and $r=+0.041$; $p=0.536$ and $r=+0.144$)
- 9) Attitude and behavioral intention are positively related training since ($p=0.299$ and $r=+0.238$; $p=0.441$ and $r=+0.178$)