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ADOPTION OF LEARNING MANAGEMENT SYSTEM:
FACULTY PERSPECTIVE FROM UNIVERSITY OF GHANA

By

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ADOPTION OF LEARNING MANAGEMENT SYSTEM: FACULTY PERSPECTIVE FROM UNIVERSITY OF GHANA

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DECLARATION

I declare that this dissertation is a result of my own independent investigation. It has not been submitted to any other institution for any award. Where it is indebted to the work of others, due acknowledgment has been made.

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Abstract

The main motivation behind this research is to investigate the adoption of Sakai Learning Management System (LMS) at the University of Ghana.. The study used a survey approach that involved questionnaires to solicit data from 131 Lecturers from the colleges of Humanities, Education, Health Science and Basic and Applied Sciences. For the past few months lecturers of the university of Ghana have been exposed to Sakai LMS to complement the teaching effort of lecturers. The study, using the Unified Theory of Acceptance and Use Of Technology (UTAUT) attempts to establish the factors that influence lecturers to adopt and use LMS, the opportunity lecturers have to trial the LMS and the challenges facing lecturers in terms of using the LMS. The findings showed that all four variable of the UTAUT, that is performance expectancy, effort expectancy, social influence, and facilitating conditions have a significant influence on lecturers behavioural intention to use Sakai learning management system. Furthermore, findings showed that lack of time and the workload in managing student online would be too much for the lecturers. Also, the complexity associated with the use of Sakai LMS and poor, unreliable internet connectivity posed a challenge for lecturers. The study, therefore, recommends that since the factors used in the study were tested only in the University of Ghana. It would be interesting to test these factors in other universities using learning management system and the results compared to the findings of this study.

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CHAPTER 1:   INTRODUCTION

1.1   Background

In the words of Kanwal and Rehman (2014) "the integration of information and communication technologies in the traditional educational infrastructure has restructured knowledge sharing and transfer of knowledge". According to Chan and Robbins (2006), one of the areas where change has been felt is in the area of teaching and learning in universities. The authors further noted that those universities that have adopted technology have learned useful lessons and have improved the way technology has changed teaching and learning.

E-learning is a standout amongst the most encouraging means of learning in information and communication technologies (ICT) (Kanwal & Rehman, 2014). In other words, ICT has transformed the traditional learning process for the benefit of students and lecturers. As Jan, Lu, & Chou, (2012) observed, E-learning is a phase towards information imparting and coordinated effort among users and that this would enhance the knowledge and skills of used in the digital era. Again, giving an intelligent platform to patrons by means of computer innovation like online chatrooms, exercises, live streaming, online reference material, self-learning and group projects is another important advantage of e-learning (Wu, Xu, & Ge, 2012; Duan, He, Feng, Li, & Fu, 2010) .

Further, Kanwal & Rehman (2014) found that "E-learning provides a platform to the students where they can share their ideas and knowledge to their co-members and instructors as well. Importance of E-learning systems due to its interactive environment and improved collaboration are widely accepted and recognized. E-learning provides the support that fosters the learning process of the learner".

However, in order to realize the importance of e-learning among lecturers, they must demonstrate a favorable attitude towards its implementation. According to Adewole-odeshi (2014) great disposition demonstrates a more prominent likelihood that learners will acknowledge another learning framework. This favourable attitude, according to Adewole-odeshi (2014) is based on factors such as "patience, self-discipline, easiness in using software, good technical skills, and abilities regarding time management impact on lecturers attitude towards e-learning".

Over the years, there has also been the development of new educational technologies and shifts from the use of proprietary course management systems such as WebCT, Blackboard, Desire2Learn, and Angel towards open source software such as Sakai and Moodle (Chan & Robbins, 2006). Whether the CMS are used in distance learning programmes or in conventional universities, they provide the tools and patterns that can easily be customized to give online learning materials (Koszalka & Ganesan, 2004). In the last two decades, there has been proliferation of the use of open source software such as Sakai and Moodle in teaching and learning in universities in both advanced and developing countries and the proliferation of blended and online programmes.

Whilst it is important to recognize the enormous benefits that new technologies such as Sakai LMS bring to universities, it is also equally critical to spot challenges that come with the introduction of new technologies in large complex organisations such as universities because of the different actors (students, faculty, administrators and IT technicians) who have relevant roles in the adoption of new technology. Of these levels, frequent changes occur in the process and systems levels as new ideas, or technologies are introduced (Marshall, 2010). In the case of technological change, Eichelberger (2008) has argued that all stakeholders have to be included in

the process and to Mahdizadeh, Biemans, & Mulder (2008) faculty and students are key in this process of change. Further, Eichelberger (2008) observed that "management of universities introduce technological change, they need to realise that there may be distinct barriers that faculty and students may face in successful technological integration". Some of the barriers the author identified are inadequate institutional support, extra time spent preparing and posting or uploading materials online and interacting with students, irregular internet access, unreliable power supply, bandwidth challenges, and little experience with course management systems by lecturers and students (Dadzie, 2009; Moulton, Turtle, & Lowe, 2011;).

It is undoubtedly significance to expand our understanding of the adoption of Sakai Learning Management System within the peculiar setting of the University of Ghana. With this as the ultimate aim, this study sets out to investigate the adoption of Sakai Learning Management System at University of Ghana.

1.2   Statement of the Problem

As University of Ghana adopts Sakai LMS as campus-wide course management platform concerns have been expressed that merely offering courses and transforming the classroom environment may lead to disruption which may have to be managed effectively so that the new innovation does not fail (Park, 2009). When adequate preparations are not made to train faculty and opportunities are not created for all stakeholders to share their ideas and views concerning the process of change, it becomes very difficult for all stakeholders to accept and use the new technology.

Further, case studies and contemporary works in the area have shown a number of reasons why university lecturers do not use LMS. In their reasons, "lack of time and lack of support" are the

most common answers they gave (Al-Senaidi, Lin, & Poirot, 2009). "The lecturers' perceived shortness of time and lack of support as directly linked to the perceived ease of use" (Christie & Garrote, 2011). However, the implementation of learning management system primarily depends upon the teachers. Hence, it is very important that the whole system is easy to use by this same teacher. It is in reference to this that the researcher intends to find out the factors that influence the adoption of Sakai Learning Management System in University of Ghana.

1.3   Objectives of the study

The fundamental motivation behind this research is to investigate the adoption of Sakai Learning Management System at University of Ghana. Towards attaining this purpose, the study tried to achieve the following sub-objectives;

1. To investigate the factors that influence lecturers to adopt and use LMS

2. To find out whether lecturers had adequate opportunity to trial the LMS (Sakai)

3. To find out the challenges facing lecturers in terms of using the LMS

1.4   Research question

In the quest for accomplishing the research purpose and targets, answers would be sought to the question – what accounts for the adoption of Sakai at University of Ghana by faculty?

1. What factors influence lecturers to adopt and use LMS?

2. What opportunity exists to trial the LMS (Sakai) by lecturers?

3. What are the challenges facing lecturers in terms of using the LMS?

1.5   Scope of the Research

The principal research question that determines this study into the identification of the research scope, are portrayed beneath

- This study is solely based on lecturers who use the LMS (Sakai) of the University of Ghana, whereas any similar types of projects by any university are considered out of scope.

- The research administratively focuses on learning management system in university of Ghana.

1.6   Expected Contributions

The contribution of this research is in three areas, that is, to research, practice and policy. With regard to research, the study goes beyond current research on e-learning by investigating specifically the adoption of LMS (Sakai) at the University of Ghana. Thus, this is relevant because it answers the paucity of literature specific to issues relating to learning management system adoption in the university.

Concerning the significance to policy the study will give insight and serve as guidelines on how to formulate strategies to effectively adopt learning management system on university campuses. Furthermore, this topic is of significance and of most extensive interest to others due to the expanding weight given to e-learning as opposed to traditional classroom learning and therefore will contribute to already existing knowledge in the area.

1.7   Research Limitations

This study covers learning management system (Sakai) at the University of Ghana, specifically the adoption of the Sakai LMS. It does not study how e-learning programmes are developed,

evaluated and selected. It investigates the adoption of Sakai LMS at university of Ghana by faculty. Due to the local nature of the study, that is, the study will center only on University of Ghana and also due to the fact that the sample size is biased towards one institution, the results of the study cannot be totally generalized to other institutions of higher learning.

Further, the study is constrained to the chosen institutions in light of the fact that a careful search by the researcher revealed that most of the LMS projects have not gained ground in other institutions of higher learning in Ghana. Time and financial resources have also been considered in choosing the University of Ghana.

1.8   Structure of the Dissertation

This study is organized into five chapters. This introductory chapter comprises the background to the study, the problem statement and research questions, aims of the research, and significance of the study as well as expected contributions, limitation of research and the structure of research. Chapter Two discusses the review of relevant literature on e-learning and also develops the research framework for the research study. It also gives a review of relevant literature and related works, relating to the study. Chapter three throws light on the methodology. This comprises the research paradigm, research approach, sample selection and method of analyzing the data among others. The presentation and discussion of the findings is in chapter four. Chapter five contains the summary and conclusion of the study as well as the recommendations. The references and appendices follow this chapter.

CHAPTER 2:   LITERATURE REVIEW

2.1   Overview

Literature review gives a system for establishing the significance of the study and in addition a benchmark for contrasting results and different discoveries. Creedy (2008) opined that writing survey goes for setting the study obviously within a bigger context. The study investigates the deployment and adoption of Sakai LMS at the University of Ghana. The literature review for the study focuses on the theoretical framework; E-Learning concept; Knowledge and use of learning management system among lecturers; and challenges in adoption of LMS by lecturers.

2.2   Theoretical framework

Preceding studies have been able to identify causes that enable persons to adopt and use any new technology that comes to the market. Some factors can also lead to technology adoption failure or success when implemented in organizations, firms or industries (Abukhzam & Lee, 2011; Ginzberg, 1981). Moreover, most of these factors are derived from theories and models (Marchewka, Liu, & Kostiwa, 2007). This study provides review on the technology adoption models which include Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT) and Unified Theory of Acceptance and the Use of Technology (UTAUT).

2.3   Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour was proposed by Ajzen (1991) as an extension to the Theory of Reasoned Action (TRA). The TRA allows individuals to think of their actions before engaging into any behavior. The theory doesn't consider situation where individuals don't have control over their own actions or behaviour (involuntary). Ajzen enlarged TRA, by including

additional variable which made Theory of Planned Behaviour to have three conceptual determinants of adopting any new technology (Abukhzam & Lee, 2010). The first determinant was the attitude towards the behaviour which Fishbein & Ajzen (1975) defined as the individual's positive or negative feelings about performing target behaviour. The second determinant was the subjective norm which was also defined by Fishbein & Ajzen (1975) as the perceptions that the vast majority of people who truly matter to the individual, , examine that they either ought to or ought not fulfill the behaviour being referred to. However, the new determinant added was Perceived Behavioural Control (PBC). Ajzen (1985) defined Perceived Behavioural Control as factors that impedes or facilitate performance of a given behaviour. That is, "one's perception of the difficulty of performing behaviour" (Ajzen, 1985). According to Ajzen (1985), relative weights of these three factors (attitude, subjective norm and control behaviour) influences the outcome of a person's decision making as well as the action performed by the person. In summary, a person's intention to perform a particular behaviour is likely to be stronger if the attitude to that behaviour is positive, with positive beliefs about the others and as well as incomplete perceived constraints associated with performing the behaviour. The TPB has been used in different studies (Gentry & Calantone, 2002; George, 2004; Lwin & Williams, 2003).

2.4   Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) adapted from Fishbein & Ajzen (1975) theory of reasoned action (TRA) and has been used as the theoretical basis for the explanation of the acceptance of technology (Davis et al., 1989). Although TAM was originally developed to predict people's technology-adoption behavior at the work environment, over the years, TAM has been used in different contexts to explain behavior of people with adopting of technology

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(Lin, Shih, & Sher, 2007). In the TAM, Davis (1989) postulates that perceived ease of use (PEOU) and perceived usefulness (PU) are two beliefs that determine the attitude towards acceptance or rejection of technologies. Perceived usefulness is defined as the "degree to which a person believes that using a particular technology would enhance his or her job performance" (Davis, 1989). Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989).

In its application to e-learning adoption, TAM posits that actual use of the platform is determined by the users' behavioral intentions, which is in turn together controlled by the users' attitudes towards using the device and their perceived usefulness of the device (Davis et al., 1989). Indeed, TAM has been expanded over the years to take into account other variables relevant to adoption of technology. Taylor and Todd (1995) included subjective norm and perceived behavioral control, as well as prior experience in their study of experienced and inexperienced potential users of an IT system. Also in their work, Venkatesh and Davis (2000) expanded the original TAM to TAM2 which included extra hypothetical construct crossing social impact forms (subjective standard, willfulness, and image) and cognitive instrumental methods (work importance, yield quality, result verifiability, and perceived ease of use).

Morris and Venkatesh (2000) in addition to including subjective norm and perceived behavioural control have also paid attention to gender and age in TAM. These scholars have noted that age and gender play crucial roles in technology adoption. In his study on factors that encourage the adoption of an e-learning system among students, Lee (2006) in using TAM identified constructs such as "content quality, perceived network externality, computer self-

efficacy, course qualities, subjective norm and a mechanism of competing behavioural intentions to e-learning".

2.5   Innovation Diffusion Theory (IDT)

Rogers (2003) has been accredited with the diffusion theory. For Rogers (1995) an innovation is "an idea, practice, or object that is perceived as new by an individual or another unit of adoption." An innovation generates uncertainty and anxiety, and these motivate an individual or another unit of adoption to seek more information about alternative (Tung & Chang, 2007). Diffusion on the other hand is "the process by which an innovation is communicated through certain channels over time, among the members of a social system" (Rogers, 1995). The four primary components in the diffusion of new thoughts are (1) innovation, (2) communication channels, (3) time, and (4) the social system (Rogers, 2003). Rogers (1995, 2003) identified the characteristics that determine rate of innovation as: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability.

Relative advantage is the extent to which a development is seen as being superior to the thought it supersedes (Rogers, 2003). Relative advantage indicates the benefits and costs associated with the introduction of new technology. The sub-measurements of relative advantage incorporate the level of economic productivity, low beginning cost, a reduction in distress, social distinction, an investment fund in time and exertion, and the quickness of the prize (Rogers, 2003). Relative advantage means that Sakai will be more likely to be adopted when the advantages of the innovation are greater advantages than the traditional face-to-face method of teaching.

Complexity is defined by Rogers as the 'extent to which an innovation is complex to use and understand. Simpler innovations have a higher rate of adoption than more complex innovations (Martins, Steil, & Todesco, 2004).

Compatibility is the step to which people trust that the innovation is regular with prevailing values, past experiences and needs of faculty members (Rogers, 1995). What this means is that, individuals are more prone to receive an advancement they are agreeable with and that is good with different innovations they as of now utilize (Rogers, 1995; Eastin, 2002). Greater compatibility generally leads to a faster rate of adoption of the innovation (Tung & Chang, 2007). Complexity is the step to which people find the innovation difficult to understand, learn and use (Rogers, 2003).

Trialability relates to the possibility of adopters having the opportunity to trial, experiment with the new product to decrease ambiguities and to learn hands on prior to adopting (Rogers, 2003). Weiss and Dale (1998) note that trialability is an important feature for an innovation because it provides opportunities to prospective adopters to reduce the uncertainty they may feel towards a new technology. Observability is the extent to which the results of the new product are visible to others (Rogers, 2003). Innovations, whose results are effortlessly watched, have a tendency to be embraced speedier than those with more unpretentious results (Rogers, 1995cited in Lee, 2004).

Rogers (1995) noted that innovations perceived by people as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations. Various studies have been conducted to show that relative advantage, complexity and compatibility are consistently related to adoption decisions (Teo & Pok, 2003; Surry, 1997 cited in Martins et al., 2004; Wu & Wang, 2005; Tung & Chang, 2007). The relative

benefit of the concept is similar to the perceived usefulness in TAM, and the complexity construct is similar to the perceived ease of use (Teo & Pok, 2003; Tung & Chang, 2007; J.-H. Wu & Wang, 2005).

Since the introduction of Roger's Innovation Diffusion Theory, several scholars have applied the theory to the adoption of new technologies, whilst some have expanded the theory. Moore & Benbasat (1991) expanded the innovation characteristics to seven and developed an instrument to measure perceptions. The constructs included relative advantage, ease of use, compatibility, observability, trialability, image, visibility, result demonstrability, and voluntariness of use. This study expands the combination of TAM and Rogers' Diffusion of Innovation theory by including constructs such as age and gender (Other constructs critical to this study include relative advantage, perceived ease of use, computer anxiety and trialability)

2.6 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh, Morris, Davis, & Davis (2003) is credited with the development of the Unified Theory of Acceptance and Use of Technology (UTAUT) model to complement earlier TAM related studies. They complement the eight models to discuss the new framework which is UTAUT, that is, Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis et al., 1989), Theory of Planned Behavior (TPB) (Ajzen, 1985), the Combined TAM and TPB (Taylor & Todd, 1995), Roger's Innovation Diffusion Theory (IDT) (Rogers, 1995), Motivation Model (MM) (Davis et al., 1989), Model of PC Utilization (MPCU) (Thompson, Higgins, & Howell, 1991; Triandis, 1979) and Social Cognitive Theory (SCT) (Bandura, 1999; Compeau & Higgins, 1995). The UTAUT model coordinates the issues that were gotten from the past examination model into four center determinants:

Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Condition (FC). The hypothesis likewise contains four control variables, which are Age, Gender, Experience and Voluntariness of Use. In the UTAUT model, performance expectancy and effort expectancy were used to wire ideas of perceived usefulness and ease of use in the original TAM study respectively.

In spite the fact that the UTAUT model such as the Effort Expectancy concept can be foremost in choosing user acknowledgement of information technology, concerns for ease of use may become non-significant over expanded and supported utilization. Subsequently, perceived ease of use can be obliged to be more remarkable just in the early phases of utilizing a new technological innovation and it can have a helpful result on perceived usefulness of the technology (Marchewka et al., 2007).

Evidence based results shows that the UTAUT model has been justified and has explanation strength for technology acceptance behaviour up to 70%. That is, the model "account for 70% of the variations in usage intention" (Marchewka et al., 2007; B. Wu et al., 2012).   This clarification has made the UTAUT model more effective than any known technology acceptance frameworks from the past. The model has been used in research studies conducted by (Wu, Cao, Zheng, & Zheng, 2008; Schaper & Pervan, 2007; Marchewka et al., 2007; Oshlyansky, Cairns, & Thimbleby, 2007; Foon & Fah, 2011; Sandberg & Wahlberg, 2006).   Thus, the original graphical model of UTAUT is given below.
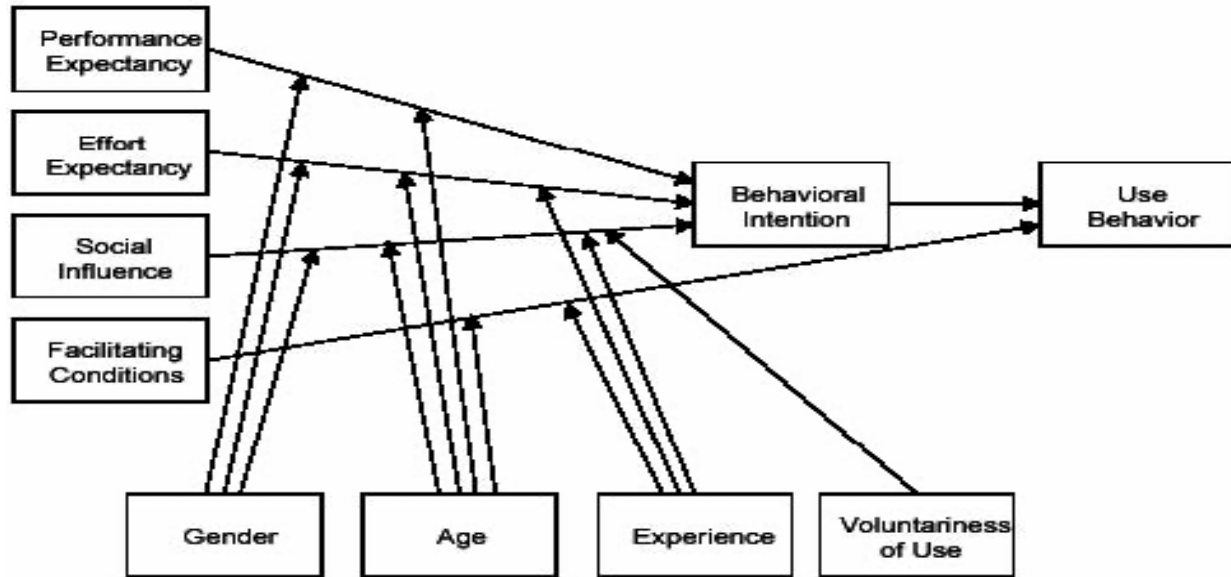
Figure 2.1 *Source: Venkatesh et al.* (2003)

2.7 Reason for the use of UTAUT Model

With the latest progress being made in the area of technology, and its related adoption; various ways of examining individual acceptance to new technologies has emerged (Hsu & Lu, 2009).Various literatures have proposed different models in determining the use or adoption of mobile technology in various countries. One of such models is the Unified Theory of Acceptance and Use of Technology (UTAUT).). However, evidence based results shows that the UTAUT model has been justified and has explanation strength for technology acceptance behaviour up to 70% compared to the past models which explain individuals' technology adoption up to 40% (Marchewka et al., 2007). The model has been used in research studies like Marchewka et al., (2007) and Sandberg & Wahlberg (2006). It is important to note here that the UTAUT model contains control variables, but I didn't include them. Some authors have said that the control variables will not have any weighty impact on user technology adoption (Marchewka et al.,

2007). Due to the benefit of the UTAUT model, it was adopted and modified for the study as the base model.
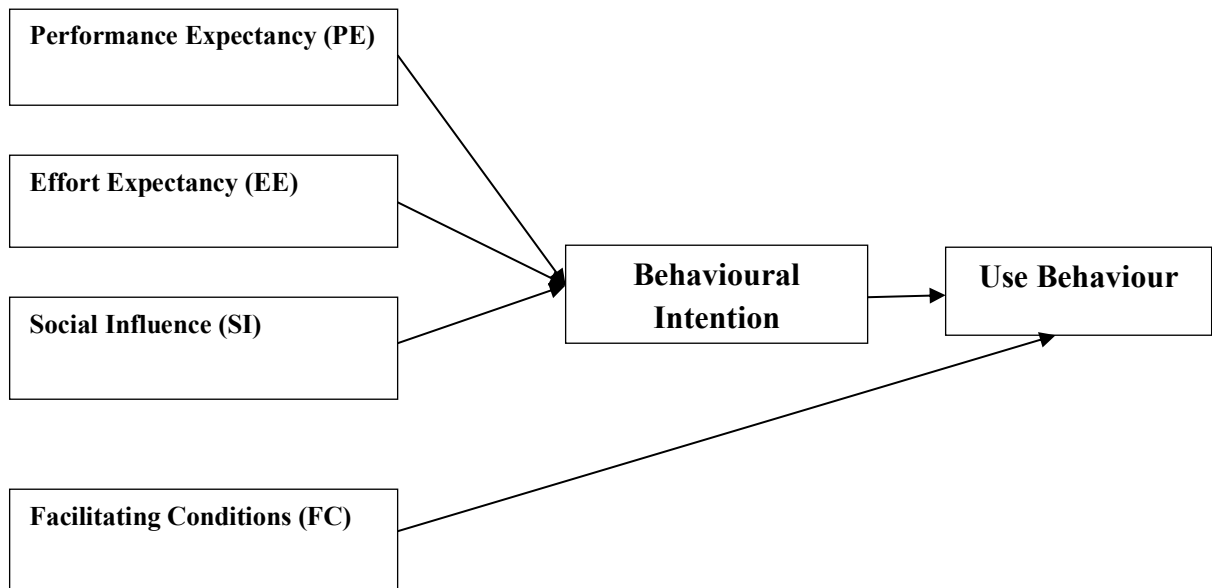
Figure 2.2   Modified Research Model of UTUAT

2.8   Performance Expectancy

In UTAUT model, Venkatesh et al., (2003) combined several factors like perceived usefulness (TAM/TAM2), relative advantage (IDT), extrinsic motivates derived from motivation model (MM), job-fit derived from model of PC utilization (MPCU), and outcome expectations social cognitive theory (SCT) to form performance expectancy. The authors explained that performance expectancy as the amount to which persons believe that utilizing any information system can enhanced his or her job performance. Brown and Alemayehu (2005) led a study on consumers' adoption of mobile banking. The authors found out that the more prominent the perceived relative advantage the more probable technology would be embraced by consumers. Other researchers like Amin, Rahman, Sondoh Jr, & i Hwa (2011) and Sripalawat, Thongmak,

and Ngarmyarn (2011) have also identified perceived usefulness as a crucial factor for technology adoption by individuals. Yang (2010) determined that relative advantages significantly affect a persons' intention to adopt mobile banking. Park, Yang, and Lehto (2007) confirmed in their studies that performance expectance considerably affect persons to embrace mobile technologies. Likewise, through using mobile data services instead of mobile banking services, Lu et al. (2009) also used UTAUT model to survey 1320 respondents. They found out that performance expectance considerably affects people intention to use mobile services. Performance expectancy has been seen as a key determinant of individuals' technology adoption. Hence, this work postulates the following hypothesis:

H1: Performance expectancy significantly affects individual intention to use Sakai LMS.

2.9   Effort Expectancy

Venkatesh et al. (2003) captured the concept of perceived ease-of-use (TAM/TAM2), complexity (MPCU), and ease-of-use (IDT) to characterize effort expectancy as the extent of ease associated with technology use. Previous empirical studies have supported perceived ease-of-use as a determinant impacting people intention to use mobile banking (Amin et al., 2011; Luarn & Lin, 2005). Teng, Lu, & Yu (2009) employed this construct and found out that effort expectancy significantly influenced human intention to use mobile technology or service. Since, this determinant is an integration of other factors; it will best explain users' technology adoption (Venkatesh et al., 2003). Subsequently, established in UTAUT, this study hypothesizes:

H2: Effort expectancy significantly affects individual intention to use Sakai LMS.

2.10 Social Influence

Social influence was used to represent subjective norm in TRA, TAM2, TPB/Decompose Theory Of Planned Behaviour (DTPB), and Combined TAM-TPB (CTAM-TPB), social factors in MPCU, and image in IDT (Venkatesh et al., 2003). They defined social influence as the extent to which a person perceives that others believe he/she should use the technology. Amin et al. (2011) performed a quantitative study exploring factors that influences users to adopt technology. The study adopted the UTAUT model. Findings from their study depicted that social influence on individuals affect their intention to adopt any new technology that comes to the market.

Singh, Srivastava, and Srivastava (2010) presented in their study that individual' decisions to use mobile services were influenced by friends and family members. Other researchers like Karjaluoto, Riquelme, & Rios (2010) and Sripalawat, Thongmak, & Ngarmyarn, (2011) indicated that subjective norm has significant influence on users' intention to use technology services. Moreover, Singh et al. (2010) held out that mobile users are part of social network. Hence, hypothesis is conjectured below:

H3: Social influence significantly affects individual intention to use Sakai LMS

2.11 Facilitating Conditions

Perceived behavioral control (TPB/DTPB, CTAM-TPB), facilitating conditions (MPCU), and compatibility such as the way it is done (IDT) were combined to form the UTAUT model (Venkatesh et al., 2003). Venkatesh et al., (2003) defined facilitating conditions as the extent to which a person believes that an institution and technical infrastructure exists to support the utilization of technology. In the mobile banking adoption literature, Joshua and Koshy (2011)

explained that the "more suitable the access of respondents to the computer and Internet, the more proficient their use of the computer and Internet, which results in a higher adoption rate of respondents using online software". The following hypothesis is put forth:

H4: Facilitating conditions significantly affect individual behavior to use Sakai LMS

2.12 Behavioral Intention

"Consistent to all models, drawing from psychological theories, which argue that individual behavior is predictable and influenced by individual intention, UTAUT contended and proved behavioral intention to have significant influence on technology usage" (Venkatesh et al., 2003). In other words, the ultimate goal of businesses is to attract consumers to adopt their services rather than the intention to adopt services. However, only few studies have taken this relation into the research structure in mobile banking (Sripalawat et al., 2011), which inspires a need to examine the relationship between behavioral intention and actual behavior in the mobile banking setting.

2.13 The Concept E-learning

E-learning commonly refers to "methods of learning which use electronic instructional content delivered via the internet and is a term which is synonymous with Web-based or online learning" (Trombley & Lee, 2002). E-learning is a step towards information offering and cooperation among users to improve their insight and abilities in the digital era (Jan et al., 2012). The advent of E-learning as a way of learning in universities and to be precise distance education has grown significantly over the years (Holomisa & Dube, 2014).

2.14 Knowledge and use of learning management system among lecturers

Knowledge and use of learning management system in universities are a common phenomenon in the western world. For instance Elgort (2005) found that 22 universities in Australia, New Zealand (NZ) and the United Kingdom (UK) utilized one or more LMS (learning management systems) and many have completed the early stages of LMS adoption. Other specific country study of LMS also showed similar findings. A UK survey (JISC & UCISA, 2003) cited in (Elgort, 2005), for instance, shows that 86% of the 102 Universities studied utilized a computer assisted learning environment. In New Zealand a study by Mitchell, (2005) which used 18 Institutes of Technology and Polytechnics (ITP) revealed that all studied ITPs used an LMS. Almost the same picture appears in Australia, where, according to the NCODE LMS Survey (2002) cited in (Elgort, 2005), "33 participating universities all used an LMS and these were developed either commercially or in-house".

One may therefore conclude that the adoption rate of LMS in tertiary institutions in the advance countries is higher compare to a developing country like Ghana. Dadzie (2009) for example, found that many lecturers of the University of Ghana were not mainly conscious of the presence of Knowledge Environment for Web-based Learning (KEWL) a learning management system. According to her only 27 teaching faculty, mostly from the Faculties of Arts and Sciences had registered to use KEWL. She inferred that this number is woefully insignificant in view of the fact that there are 792 teaching staff at the University of Ghana in 2007 when the study was conducted.

In Australia, a study by Zanjani, Nykvist, & Geva (2012) found that the "Lack of knowledge about the functionalities of the various collaborative tools or their existence within Blackboard©,

a learning management system , was identified as a factor affecting their use. This was identified as a factor by 48.2% of students and 75% of lecturers". It is within this context that research conducted by Bradford, Porciello, Balkon, and Backus (2007) supports these findings in associating complexity and knowledge of LMS tools as a limitation of these environments. Again, a study in Sweden also found that almost every "lecturer used the institution's LMS to distribute material that would otherwise have been handed out as paper copies" (Garrote & Pettersson, 2007). Further a more recent study in Sweden by Christie & Garrote (2011) added that "although Higher Education researchers have been largely responsible for the creation of the Internet, university lecturers have been far less innovative and active in their use of this form of Information Communication Technology (ICT)".

2.15 Challenges in adoption of LMS by lecturers

Participating in online learning and instructing poses significant encounters for higher education lecturers (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001). For instance, in a study by Al-Senaidi et al (2009), want of time and want of support were the most common responses, respondents gave with regard to the barriers of the use of educational technology. The lecturers' apparent time constraints and the absence of 'support' is specifically connected to perceived ease of use.

Garrote and Pettersson (2007) observed that a lot of the challenges related with the implementation of LMS are usual, when changing work processes in institutions. "Process innovation initiatives are inherently distinct from business as usual"(Davenport, Harris, & Cantrell, 2004). In this way, most educational institutions have depended on progressive increases in the utilization of IT (Collis & Wende, 2002).

An issue when employing a LMS in an academic institution and rolling out improvements in work methods is that conventionally lecturers are exclusively in charge of the detailed planning and execution of courses. This implies that a few instructors may lack motivation to attempt the important work to begin utilizing new instruments, regardless of the fact that there are incredible benefits for the establishment, other staff and students (Garrote & Pettersson, 2007). In order to alleviate these challenges, Al-Senaidi et al (2009) suggested that competent online lecturers requires "IT expertise, information handling expertise, teaching and learning skills, time management and team building skills as necessary prerequisites".

CHAPTER 3:   METHODOLOGY

3.1   Overview

Methodology as stated in (Polit & Beck, 2004) is the "process of obtaining, organizing and analyzing data". In finding methods to respond to the study objectives, quantitative method was adopted. This segment was divided into themes such as the research paradigm, research design, research population, sample frame, data collection procedure, data collection instrument and data analysis techniques. The inquiry examined the adoption of learning management system from faculty perspective from University of Ghana.

3.2   Philosophical Perspective of the Study

Philosophical position enables the researcher to precisely define, in deeper terms, the "why" for the research other than just choosing the methodology the "how" (Holden & Lynch, 2004). Easterby-Smith, Lyles, & Peteraf (2009) provide a comprehensive summary of the importance of a philosophical position in any research. According to the authors, a philosophical position primarily simplify the research design in terms of its overall approach, reveals to the researcher which research design would work best or otherwise and also enables the researcher to recognize and even create designs that may be outside his or her past experience. Healy & Perry (2000) propose that the two extreme dimensions of philosophical positions can be categorized into Positivism and Interpretivism. Therefore, to clarify the study structure and methodological decisions, the strategy adopted for this study is discussed beneath.

3.3   Positivism Underpinnings of the Research

The positivist approach to research involves the capturing of social reality using formal propositions, predictions and control (Lee, 1991). A positivist sees reality as something which is

stable and can be observed and described from an objective point of view and therefore does not need to interfere with the phenomenon he/she is studying (Lee, 1991). Positivists believe that knowledge exists independent of humans (researchers and their participants) and can be revealed through the use of empirical methods, which assume that knowledge can only be acquired through the collection and analysis of value-free facts and this is the epistemological position of positivism which means that objective knowledge can be obtained from studying objective and independent reality (Walsham, 1995). However, many authors have criticized the positivist paradigm although it has been successfully used for investigating natural phenomena e.g. (Guba & Lincoln, 1994; Orlikowski & Baroudi, 1991). It has been observed that the positivist paradigm is not appropriate for studying social reality, which is subjective by nature (Myers & Avison, 1997). Nonetheless, the core belief of the positivism approach is the view that the social world exists as an outside environment, where certain arrangements affect people in like ways and vice versa and therefore its constructs should be calculated through objective methods, rather than subjective methods (Denzin & Lincoln, 2005; Guba & Lincoln, 1994; Saunders, Lewis, & Thornhill, 2007).

3.4   Research Design

A research design provides a scheme for the gathering and examination of data. Research design constitutes the plan for the gathering, measuring and examination of data (Kothari, 2004). Research design decision mirrors choices about the need being given to the associated imparting causal associations between variables, summing up to bigger gatherings of people than those really forming part of the examination, understanding conduct and importance of that conduct in its particular social setting and having a temporal (i.e. over the long haul) appreciation about social phenomena and their interconnections (Bell & Bryman, 2007). Since there is no one

accepted way to conduct a research, the researcher customized the research methodology to suit the research questions stated in chapter one. In view of this, the research design was structured in two fold that is the research approach and research strategy.

3.4.1 Research Approach

According to Engström & Salehi-Sangari (2007) Researchers have distinguished between two basic approaches to conducting a research and these are qualitative and quantitative approaches. Potter (1996) suggests that the "decision of a research approach is contingent on the research purpose". Thus, the approach to this study is quantitative which according to Creswell (2013), it is quantitative when it is an investigation into a societal or human difficulty based on measuring a theory made of variables , calculated mathematically, and analyzed with statistical tools in order to know if the general predictive conclusions of the theory hold true. Quantitative research uses "data that are structured in the form of numbers or that can be immediately transported into numbers" (Hair, Celsi, Money, Samouel, & Page, 2003). It is a precisely a measured approach to research (Muijs, 2010). The rules principal to quantitative methods are that reality is objective and free from the researcher and the researcher remains cold and free of what is being investigated. Further the beliefs of the researcher do not interfier with the research (research is value-free.). Primarily, studies are founded on theories and deductive forms of logic and hypotheses which are verified in a cause-effect order. According to Creswell (2013) the main reason for conducting research is to empower the researcher to forecast, clarify, and understand some phenomenon after establishing generalizations that contribute to theory.

Also quantitative approach was used because according to Collins, Onwuegbuzie, & Jiao (2006) "quantitative researchers tend to make statistical generalizations, which involve generalizing findings and inferences from a representative statistical sample to the population from which the sample was drawn".

3.4.2 Research Strategy

Tagoe (2009) firmly establishes that the research problem and the purpose of study determines the choice of a particular type of quantitative research. The research strategy under quantitative research for this study was the survey strategy. According to Fowler Jr (2008) the survey strategy offers a numeric or quantitative narrative of segment of the population; "the sample through the data collection process of asking questions of people". Also according to Babbie (1990) "it provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population". One very important advantage of survey research is that it has the prospect of providing us with a lot of information acquired from a large sample of individuals (Fraenkel & Wallen, 2000). Thus, in the words of Owens (2002) survey design should be employed because of its "uniqueness", that is, it gathers information not available from other sources, "standardization of measurement", that is, every respondent answer the same question, and "analysis needs" that is, findings are used to find out whether they complement other findings in the literature.

3.5   Population

A population is the aggregate gathering of components or members about which the analyst makes a few inductions (Cooper & Schindler, 2003) and Bless, Higson-Smith, and Kagee (2006) also define a "population as a complete set of events, people or things on which the focus of the research falls and in which the researcher has an interest about which the researcher wants to determine some characteristics". The target population of the study comprises all lecturers of University of Ghana from the four colleges. Senior Members engaged in research and teaching in total are One thousand three hundred and seven (1,307). This constituted the targeted population which based on Biga & Neuman, (2006) is the specific group of cases that the researcher will make inferences from after a diligent study has been conducted.

Table 3-1: Population Distribution of Faculty

Colleges	Faculty
College of Humanities	519
College of Education	54
College of Health Sciences	398
College of Basic & Applied Sciences	336
Total	**1,307**

Source: UG Basic Stats (2015)

3.6   Sample and Sampling Technique

A sample according to Field (2009) refers to "a smaller (but hopefully representative) collection of units from a population used to determine truths about that population". The appropriate sample size influenced by ones' purpose in conducting the research. At the first level of research to define the factors that impact the adoption of learning management system by faculty

members, Krejcie and Morgan (1970) cited in (Chuan, 2006) sample size table was used to select a sample size of 131 faculty members. This figure is enough to draw inferential conclusions, and as far as possible, represent the target population under scrutiny.

The stratified random sampling approach was employed to handpicked faculty members from the four colleges (Colleges of Humanities, Education, Basic and Applied Sciences, and Health Science). Using appropriate distribution sample formula (as shown below) the proportionate sample size for lecturers in the university of Ghana was determined as follows:

3.6.1 Proportionate Sampling Technique

Where Ps = proportionate sample,

Ps =   Total Class Size

$\overline{\text{Total number of faculty}}$ × Sample size

Total number of faculty =   519 +54+398+336 in Colleges of Humanities, Education, Basic and Applied Sciences, Health Science respectively.

Population of lecturers =   **1, 307**

Sample size is 10% of entire population: $(10 \div 100) \times 1307 = 131$

So Colleges of Humanities $(509 \div 1307) \times 131 = 52$

Colleges of Education: $(54 \div 1307) \times 131 = 5$

Colleges of Basic and Applied Sciences: $(336 \div 1307) \times 131 = 34$

Colleges of Health Science: $(398 \div 1307) \times 131 = 40$

From the calculations above, links to online questionnaires were distributed to the lecturers of the respective Colleges selected for this study by email.

Table 3-2: Target Population

Respondents	Population	Sample Selected
College of Humanities	509	52
College of Education	54	5
College of Basic and Applied science	336	34
College of Health Science	398	40
Total	**1307**	**131**

3.7 Data Collection Instruments

Instrumentation is the process of collecting data; it involves the selection or design and the administration of the instrument (Fraenkel & Wallen, 2000). The device this study adapted to collect the data was an online questionnaire which is a document containing a number of questions to be investigated (Kumekpor, 2002). In other words, quantitative data was collected via a cross-sectional survey on faculty LMS technology acceptance. The choice was because questionnaires are usually cheaper, ability to collect data over a wide geographical area within a short period of time. Additionally, (Biga & Neuman, 2006; Heather & Stone, 1984) explains that respondents do not spend too much time answering questionnaires as compared to the other forms and also allows respondents to remain anonymous.

The instrument was self-designed and administered through online survey platform called Limesurvey. The questionnaire comprise sections on demographic characteristics, knowledge and use of learning management systems, performance expectancy, effort expectancy, social

influence, facilitating conditions, behavioural intention and intention to use the learning management system. The items for perceived ease of use, perceived usefulness, attitude towards use and behavioural intention were adapted from (Davis, 1989).

As indicated earlier data was gathered using online questionnaire as the main instrument and this was administered by the researcher to the respondent's through an online survey using Limesurvey online version 1.92. This was done by sending the link of the survey to respondents to fill and after the close of the survey, data was exported to SPSS. With the Limesurvey quotas were set for the various colleges. After the quota is reached for each college any subsequent data would not be accepted by the Limesurvey, that is, Limesurvey automatically terminate.

3.8   Data Analysis

Creswell (2013) stated that, "data analysis requires that the researcher be comfortable with developing categories and making comparisons and contrasts". In other words the researcher must be open to possibilities and see substitutes accounts for the results. The analytical tool for this study was the Statistical Package for Social Science (SPSS) version 19.0. It is a common computer program that performs the statistical calculations and is widely used in data analysis (Gravetter & Forzano, 2006). Since the data was gathered quantitatively it was analysed using multivariate techniques to analyze the hypotheses stated in the literature review. The findings of this study were presented using tables and graphs. After the field work, the quantitative data were entered into SPSS package, and cleaned and verified. Following this, the data have been analyzed using one technique. That is, lecturers selected for the study have been compared and contrasted using descriptive statistics and multivariate techniques.

3.9   Ethical considerations

Creswell (2009) states that "researchers need to protect their research participants; develop a trust with them; promote the integrity of the research; guard against misconducts and impropriety that might reflect on their organizations or institutions; and cope with new challenges". Ethics help to define what is or is not right to do, what moral research procedure involves (Biga & Neuman, 2006). An introductory letter was obtained from the School of Technology, GIMPA which was sent to the various schools of the university of Ghana understudy selected for the study before questionnaires were administered. In the data collection process, informed consent of the respondents was sought and respondents were guaranteed beforehand the privacy of the information they will provide. Anonymity of respondents was adhered to when storing and processing data. The researcher accordingly acknowledged all scholarly work and data consulted including books, journals, theses, and field data.

CHAPTER 4:   FINDINGS AND DISCUSSION

4.1   Overview

This chapter displays the discoveries of the study on the adoption of learning management system: faculty perspective from university of Ghana. A sample of 131 respondents who were directly associated with university of Ghana, that is, lecturers, were selected for the study. Responses from the respondents were imported and analyzed using statistical software commonly known as SPSS version 19.0. Using descriptive analysis tools, tables and frequencies were developed and constructively analyze. The results were organized under the themes of the objectives. Findings were presented and interpreted as shown below:

4.2   Demographic Information

Table 4-1: Gender of Respondents

Gender	Frequency	Percentages
Male	84	64.1
Female	47	35.9
Total	**131**	**100.0**

Sources: field study, 2015

The table above (Table 4.1) depicts the response by gender. It shows that most of the respondent 84(64.1%) was males while the number of females were 47 representing 35.9% of the respondents. This was done to ensure that the study was not skewed to any particular gender and to include views from both genders so as to present a fair demographic result. It is fair to say that the ratio of men to women in this study is not biased and therefore does not affect the responses in any significant way indicating that the University of Ghana has a fairly favorable policy towards the employment of women.

Table 4-2: Age of the Respondents

Age of the respondents	Frequency	Percentage
20-29 years	11	8.4
30-39 years	19	14.5
40-49 years	37	28.2
50-59 years	39	29.8
60-69 years	18	13.7
70 and above	7	5.3
Total	**131**	**100.0**

Sources: field study, 2015

Looking at the ages of respondents in the table above (Table 4. 2), it shows that most of the lecturers who responded to the questionnaires were between 50 to 59 years. In percentage measure they represent a total of 29.8% of the respondents. This is followed by respondents between the ages of 40 and 49 years representing 28.8%. A total of 13.7% of them were between 60 and 69 years and the remaining 5.3% were 70 and above. This clearly shows that the majorities of the lecturers of University of Ghana tends to be in their productive years of life and for that matter a study of this nature would grasp their interest.

Table 4-3: Colleges of University of Ghana

College	Frequency	Percentages
Health Science	40	30.5
Humanities	52	39.7
Education	5	3.8
Basic and Applied Science	34	26.0
Total	**131**	**100.0**

Sources: field study, 2015

Further, on accessing the colleges of the University of Ghana by the respondents, it was found that most 52(39.7%) of them were from the College of Humanities while 30.5% and 26.0% were from Colleges of Health Sciences and Basic and Applied Sciences respectively as shown in the

Table 4.3 above. Given this statistics the implication is that respondents clearly participated with interest.

Table 4-4: Ranks of Lecturers

Ranks	Frequency	Percentages
Assistant Lecturer	21	16.0
Lecturer	32	24.4
Senior Lecturer	44	33.6
Associate Professor	16	12.2
Professor	18	13.7
Total	**131**	**100.0**

Sources: field study, 2015

Again, on accessing the ranks of lecturers by the respondents, it was found that most 44(33.6%) of them were senior lecturers while 24.4% were lecturers as shown in the Table 4.4 above. Besides, an aggregate of 34 (25.9%) were associate professors and professors. Given their rank the implication is that respondents clearly understood the questionnaire and that the answers they gave may well be understood as coming from a reliable source.

Table 4-5: Length of Service

Length of Service	Frequency	Percentages
1-5	18	13.7
6-10	23	17.6
11-15	17	13.0
16-20	22	16.8
21-25	17	13.0
26-30	22	16.8
31 and above	12	9.2
Total	131	100.0

Sources: field study, 2015

Finally, on the demographic variables, the length of service was ascertained and the responses in Table 4.5 showed that majority of the respondents has worked for at least more than 5 years and

above. Which is demonstrative of the way that larger part of the lecturers are very experienced in

teaching and can understand the benefits of a learning management system.

4.3 Data Analysis

4.3.1 <u>Knowledge of e-learning</u>

Table 4-6: Knowledge of e-learning

Variables	N	SA	%	A	%	ND	%	D	%	SD	%
I was permitted to use Sakia LMS on a trial basis long enough to see what it could do	**131**	26	19.8	49	37.4	53	40.5	3	2.3	0	0
I have had a great deal of opportunity to try various tools in Sakai LMS.	**131**	22	16.8	49	37.4	57	43.5	3	2.3	0	0
I know where I can go to satisfactorily try out various uses of Sakai LMS.	**131**	22	16.8	53	40.5	55	42.0	1	.8	0	0
A course site on Sakai LMS was available to me to adequately test run various tools in Sakai LMS.	**131**	30	22.9	55	42.0	46	35.1	0	0	0	0
During the trial, there was effective technical support.	**131**	25	19.1	54	41.2	50	38.2	2	1.5	0	0
I did not really have adequate opportunity to try out different tools on my course site	**131**	1	.8	36	27.5	37	28.2	32	24.4	25	19.1
There are not enough knowledgeable people in my department to help me try the various tools in Sakai LMS	**131**	11	8.4	36	27.5	56	42.7	21	16.0	7	5.3

N=131

SA = strongly agree   A = agree   ND = neither agree nor disagree
D = disagree   SD = strongly disagree

From Table 4.6 with respect to lecturer being permitted to use Sakai LMS on a trial basis, (19.8%) and (37.4%) strongly agreed and agreed respectively that they were permitted the use of the system on a trial basis. This gives 57.2% level of agreements. On the other hand, 40.5% and 2.3% remain neutral and disagree respectively. The implication is that either most of the lecturers were not aware of the uses of the various tools in Sakai LMS or they are too busy to commit to learning the new learning management system.

Looking at whether lecturers had a great deal of opportunity to try various tools in Sakai LMS, 16.8% and 37.4% of the respondents strongly agreed and agreed respectively. The remaining 43.5% were neutral on this scale. This means that most of the lecturers did not have the opportunity to try the various tools of Sakai LMS.

On whether lecturers know where they can go, to satisfactorily try out the various uses of Sakai LMS, majority (57.3%), that is the sum of 'SA' and 'A', of the lecturers were in agreements, while 42% remain neutral. The implication is that either, much has not been done to sensitize lecturers or some lecturers may lack the time to explore the new learning management system.

Further, to inquire whether lecturers are aware that a course site on Sakai LMS was available to them adequately test run various tools in Sakai LMS, 64.9% were in agreement with the statement, whereas 35.1% were neutral. In spite of the fact majority of the lecturers are aware of this feature is still not enough since the LMS is meant for all lecturers.

Again, to ascertain the knowledge of the lecturers as regard effective technical support during the trial. Majority 60.3% of the respondents indicated that they received effective technical support during the trial, while a quarter 38.2% remains neutral.

Moreover, lecturers were asked, in order to test their knowledge of Sakai LMS, whether they have adequate opportunity to try out different tools on my course site. Thus, from the finding, 28% of the lecturers agreed to the statement. On the other hand, a quarter, 43.5% disagreed with the statement, while 28.2% remain neutral.

Finally, on whether they have knowledgeable people in my department to help them try the various tools in Sakai LMS, about half, 35.9% agreed with the statement, while 21.3% disagreed with the statement. However, 42.7% remain neutral on this statement.

4.3.2   Descriptive Statistics

The t – test (one sample T-test) table below displays the means and t-values of the various variables (25 variables) used and these indicate the extent to which the respondents disagreed or agreed with the statements in the questionnaire. The 25 variables are the sum of all the questions ask on the research model. For instance, performance expectancy consist of six questions, effort expectancy consist of six questions, social influence consist of three, behavioural intention consist of three, facilitating condition consist of three, Attitude towards usage also consist of three questions; making a total of 25 questions (variables). From Table 4.7, the means of the variables were seen to be closer. This means that the lecturers have similar experiences in terms of using the learning management software. Their intention of using the Sakai software is much closer and does not differ from one another. However, all the variables were seen to be statistically significant since their P-value (**Sig. 2-tailed**) is less than 0.05 with bigger t-values. Table 4.7 present the summary results of the t-test. The t-test analysis was performed to test the significance of the variables. Variables that were not significant would have to be removed from the analysis set.

The t-test analysis alone is not adequate to determine which variables must be included in the sample or not. A more comprehensive analysis was performed to check for more accuracy and consistency. The next section presents an exploratory factor analysis.

Table 4-7: One Sample Test Result of the Variables

Variables	T	df	Sig. (2-tailed)	Mean
Using Sakai LMS improves the quality of teaching that I do	57.099	130	.000	3.779
Using Sakai LMS enhances my effectiveness on the job	55.854	130	.000	3.748
Using Sakai LMS enables me to accomplish task more quickly	57.881	130	.000	3.779
Overall, I find using Sakai LMS to be more advantageous in my job	57.995	130	.000	3.847
The information on the Sakai LMS is interesting to me	53.273	130	.000	3.863
I find the Sakai LMS as a tool that adds value	56.507	130	.000	3.847
Learning to navigate Sakai LMS is easy for me	53.906	130	.000	3.786
My interaction with Sakai LMS is clear and understandable	58.785	130	.000	3.847
Interacting with Sakai LMS does not require a lot of my mental effort	53.502	130	.000	3.656
I find it easy to accomplish tasks in Sakai LMS	59.556	130	.000	3.740
It is easy for me to become skillful at using Sakai LMS	57.775	130	.000	3.794
It is easy for me to navigate around Sakai LMS	56.188	130	.000	3.718
People who influence my behaviour or talk to me think I should use Sakai LMS	56.912	130	.000	3.672
People who are important to me think that I should use Sakai LMS	59.226	130	.000	3.733
In general, the university has supported my use of Sakai LMS	57.746	130	.000	3.901
I intend to use Sakai LMS next semester	55.200	130	.000	3.878
I intend to alert other lecturers not using Sakai LMS to use it in the next few days	56.153	130	.000	3.756
I wish to use Sakai LMS for all my courses in the next semester	56.935	130	.000	3.809
My living or working environment supports me to use Sakai LMS	59.912	130	.000	3.786
I have the knowledge necessary to use Sakai LMS	59.912	130	.000	3.786
I could complete teaching or task using the Sakai LMS	61.414	130	.000	3.832
Using Sakai LMS is a good idea	56.073	130	.000	4.008
Sakai LMS supplements classes and is interesting	60.591	130	.000	3.962
Working with Sakai LMS is fun	57.646	130	.000	3.939
I like using Sakai LMS	58.149	130	.000	3.985

4.3.3 Exploratory Factor Analysis

An exploratory factor analysis was performed to check for sample consistency and to remove variables that do not have any significant influences in the data set. In performing factor analysis, we first check for sample adequacy using Bartlett test of Sphericity. This test is performed to check if our sample size is adequate enough to perform factor analysis. Prior to the extraction of factors, the Bartlett test of Sphericity (Appox.: Chi-square= 3412.825, df. 300, sig. 0.000) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Value of 0.910) affirmed that there was noteworthy connection among the variables to warrant the use of exploratory factor analysis (Hair, 2010). According to Hair (2010) the KMO should range from 0.7 to 0.90. Table 4.8 present the findings. Next paragraph presents loadings of the variable.

Table 4-8: Bartlett Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.910
Bartlett's Test of Sphericity	Approx. Chi-Square	3412.825
	Df	300
	Sig.	0.000

The variable loadings for exploratory factor analysis are considered high if they are all 0.5 or greater (J.-H. Wu & Wang, 2005) but this is unlikely to occur in real data. (Hair, 2010) posit that ideally variables should have loadings greater than 0.5 to be retained for analysis. However more common magnitudes in the social sciences are low to moderate variable loadings of above 0.4. If an item has a loading of less than 0.4, it might either not be identified with alternate items, or may recommend an extra element that ought to be investigated. Table below present the various loadings on the factors.

Table 4-9: Factor Loadings

	1	2	3	4	5	6
EE1	.809					
EE5	.782					
EE3	.776					
EE4	.767					
EE2	.761					
EE6	.727					
PE1		.834				
PE3		.805				
PE4		.798				
PE2		.746				
PE6		.744				
PE5		.738				
ATT2			.796			
ATT1			.783			
ATT3			.701			
ATT4			.729			
FAC1				.794		
FAC2				.789		
FAC3				.779		
S3					.799	
S2					.868	
S1					.850	
B2						.765
B1						.833
B3						.861

PE = Performance Expectancy   **SI = Social Influence**

BI = Behaviour Intention   **ATT = Attitude towards using technology or use behaviour**

EE = Effort Expectancy

FAC = Facilitating Condition

The loadings used in the analysis table are all high, which indicates that the extracted components represent the variables well. The 25 variables were rotated and it was reduced to six

component factor. Variables that were seen to have a high loading (correlated) were selected to represent the component. This was done to prevent multicollinearity. E. g. 0.809 was used to represent component 1 or factor (Performance Expectancy) for subsequent analysis.

4.3.4 Reliability Test

Reliability test was also conducted to explore if the cumulative of the questions or variables are reliable. That is, if the number of questions for each factors is reliable. This was done to know if the factors are reliable in order to carry out a different analysis.

Table 4.10 presents the reliability test of the factors of the 25 variables measured.

Table 4-10: Reliability of scales

Variables	Number of Items	Cronbach's alpha
Performance Expectancy	6	**0.938**
Effort Expectancy	6	**0.943**
Social Influence	3	**0.832**
Behaviour Intention	3	**0.893**
Facilitating Condition	3	**0.909**
Attitude towards using technology	4	**0.920**
Total variables	**25**	

From the Cronbach's alpha coefficient results, it is clear that all the scales for the variables exceeded the conventional acceptable value of 0.7, and thus proved to be reliable for multiple regression analysis (Hair, 2010). All the variables have high loadings and loaded perfectly among themselves with a very good Cronbach's alpha. With very high reliability, a researcher can carry out a different analysis.

4.4 Regression Analysis

Since the means of the variables are significant and the factor loadings of the components are high with reliable factors, it is therefore a matter of natural sequence to proceed to investigate the relationship among the dependent variables and the independent variables.

4.4.1 Multiple Regression Analysis

A multiple regression was employed to analyze the correlation between the dependent variables and the independent variables. That is, behavioural intention (dependent variable) and its predictors - performance expectancy, effort expectancy and social influence which are the independent variable. Also, the relationship between independent variables (Facilitating condition, Behavioural intention) and attitude towards using the technology was also assessed.

A. Relationship between Dependent variables (Behavioural Intention) and independent variables (Effort expectancy, Performance Expectancy, Social influence)

Table 4-11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.717[a]	0.514	0.502	0.567

a. **Predictors**: (Constant), Performance Expectancy, Effort Expectancy, Social Influence

b. **Dependent Variable**: Behavioural Intention

Table 4.11 presents the model summary of the regression analysis. It was found that the correlation coefficient is 0.717 and it indicates that there is a strong correlation among the

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various constructs. That is, the relationships between the constructs are very close and have the ability to explain the dependent variables. Also, the Adjusted R Square value is 0.502, meaning that 50% of the variance in individual behavioural intentions can be predicted from performance expectancy, effort expectancy and social influence. As a whole, the regression does a good job of modeling behavioural intention. Nearly more than half of the variation in behavioural intention is explained by the model. Table 4.12 also presents the summary of the ANOVA table.

Table 4-12**:** ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.181	3	14.394	44.733	.000[a]
	Residual	40.865	127	.322		
	Total	84.046	130			

a. **Predictors**: (Constant), Performance Expectancy, Effort Expectancy, Social Influence

b. **Dependent Variable**: Behavioural Intention

From the above ANOVA table, the F-value of 44.733 was found to be significant, with the   P-Value < 0.05. This means that the combination of the independent variables can significantly predict the dependent variable.

Table 4-13: Regression Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 **(Constant)**	.580	.337		1.722	.087
Performance Expectancy	.397	.070	.374	5.634	.000
Effort Expectancy	.541	.068	.541	7.938	.000
Social Influence	.667	.077	.660	8.876	.000

a. Dependent Variable: Behavioural Intention

4.5 Model Evaluation for the relationship between behavioural intention; performance expectancy; effort expectancy and social influence.

Some research scholars have argued that a model reaches statistical significance if the Sig < 0.05 or P-value < 0.05 (Ellahi & Manarvi, 2010; Hair, 2010). In the present study the Sig = 0.000 of the F-statistics depicts that the model is statistically significant. The R-Square value in the model summary depicts the degree of variance in the dependent variable which is clarified by the model (including the independent variables). From the table, it can be found that R Square value = 0.51, which indicate a substantially solid correlation between the dependent and independent variables of the regression model. Hence, the independent variables can explain individuals' behavioural intention to use Sakai learning management system at a level of 51% of the sample population.

Also, from the regression analysis output, effort expectancy was found to have a significant influence on behavioural intention towards using the Sakai learning management system (p=0.000, < 0.05). This means that the lecturers who use Sakai learning management system

consider whether the technology will be easy to understand, easy to use, easy to operate and help them to be skillful before deciding to adopt and use it.

The next contributor to behavioural intention is performance expectancy (p=0.000, < 0.05) implying that lecturers have some characteristics using a particular technology, whether the technology will be useful in their work or job, whether it will help them to accomplish their work more quickly as well as improving their productivity before deciding to adopt it.

The third factor that drives lecturers to use Sakai learning Management system is social influences (p=0.000, < 0.05). This reveals the extent to which friends or any individual can influence one's intention to use technology.

B. Relationship between Dependent variables (Attitude towards using the technology) and independent variables (facilitating condition and behavioural intention)

Table 4-14: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.692[a]	0.479	0.470	0.545

a. **Predictors**: (Constant), Facilitating condition, behavioural intention
b. **Dependent Variable**: Attitude towards using technology

Table 4.14 above also presents the model summary of the regression analysis between the independent variables (Facilitating condition, behavioural intention) and the dependent variable (Attitude towards usage). It was found that the correlation coefficient is 0.692. This indicates that there is a strong correlation among the various constructs. That is, the relationships between the

constructs are very close and have the ability to explain the dependent variables. Also, the Adjusted R Square value is 0.470, meaning that 47% of the variance in attitude towards usage can be predicted from Facilitating condition, behavioural intention. As a whole, the regression does a good job of modeling. Nearly half the variation in attitude towards usage is explained by the model. Table 4.15 also presents the summary of the ANOVA table.

Table 4-15: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.842	2	17.421	58.732	.000[a]
	Residual	37.967	128	.297		
	Total	72.809	130			

a. **Predictors**: (Constant), Facilitating condition, behavioural intention

b. **Dependent Variable**: Attitude towards using technology

From the above ANOVA table, the F-value of 58.732 was found to be significant, with the P-Value < 0.05. This means that the combination of the facilitating conditions and behavioural intention can significantly predict attitude toward using technology.

Table 4-16: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.020	.282		3.611	.000
	Behavioural intention	.465	.068	.500	6.793	.000
	Facilitating condition	.301	.076	.291	3.951	.000

a. Dependent Variable: Attitude towards usage

From the above table, it can be seen that behavioural intention towards Sakai learning management system has a significant influence on attitude towards usage; with p-value < 0.00. This means that lecturers' intention to use Sakai learning management system on the job has influence on using the system. Also, facilitating conditions was also seen to have influence on the use of Sakai LMS.

Figure 4.1: Model Evaluation
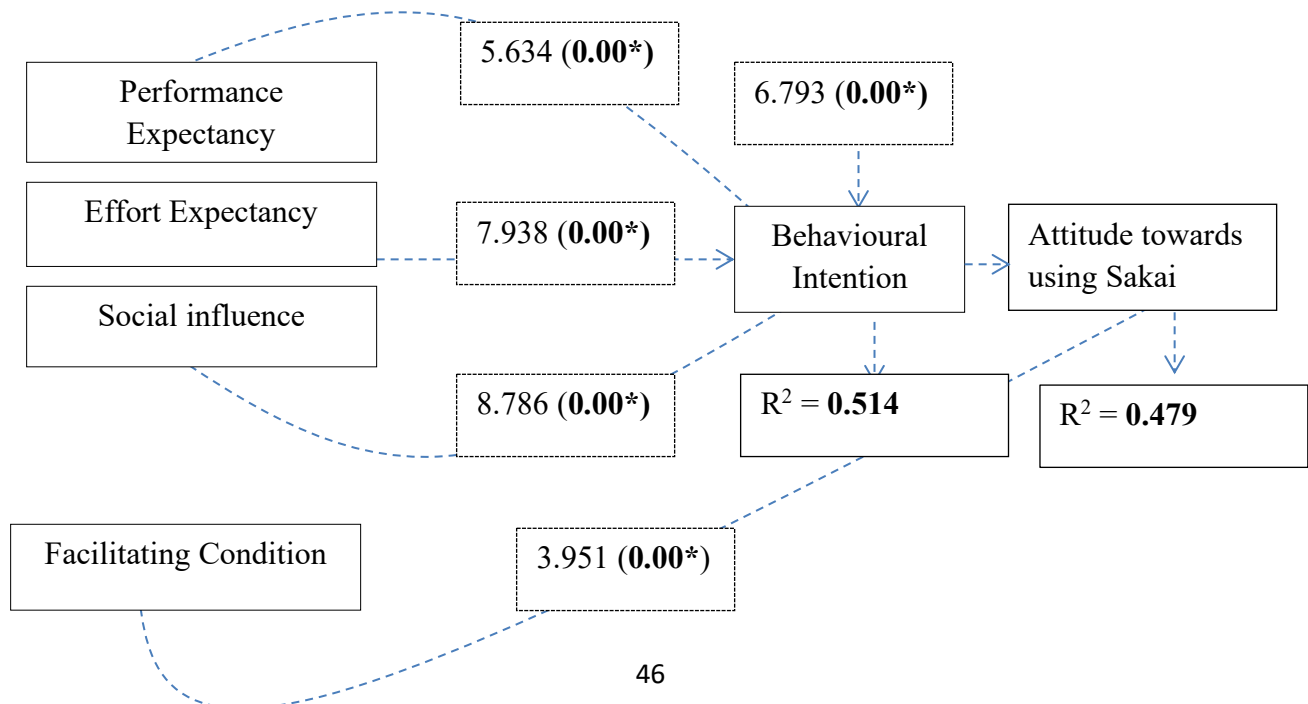
4.6   Challenges facing lecturers in terms of using the LMS

The research has recognized the lecturer's perceived challenges of the Sakai LMS for instructional use and some of the gazette challenges identified in an open ended question indicated that they "*lack to time to sit behind their computers and use the internet to post handouts, download student's assignments, and also, sometimes it may take a whole day to download these assignments when you need to mark these assignments and take your hands of them*". Further, "*I don't feel like teaching my course on Sakai and besides the training we received is too technical as far as using the Sakai platform is concerned*". Finally, others indicated that in their view "*the whole Sakai thing is complex and coupled with the fact that there is unreliable internet connectivity makes it more complex to use*".

4.7   Summary

From the analysis it was shown that performance expectancy, effort expectancy, social influence and facilitating condition have a significant impact on Sakai LMS adoption by lectures. This means that lecturers will consider adopting any software or online application if and only if it will improve the performance of work and life, it will provide expected efforts, it will influence them socially, and also when the facilitating conditions of the end user are right.

CHAPTER 5:   DISCUSSION OF FINDINGS

5.1   Introduction

This study investigated learning management system adoption by university lecturers. The research used four key determinants from UTAUT model to study user technology adoption. Factors used for the study consists of performance expectancy, effort expectancy, social influence, facilitating condition, behavioural intention and attitude towards using of technology. This chapter presents the discussion of results, draws conclusions according to the findings on each of the study objective, and gives recommendations as per research objective.

5.2   Demographic Information

From the findings the demographic information tends to look at gender, age, rank and experience of the respondents under study.

Gender; it was realized that out of 131 respondents, 84(64.1%) were found to be males, whereas the remaining 47(35.9%) were females. This result indicates that there are dominants of male lecturers than female lecturers. Despite the fact that there are more males than females, in terms of technology adoption, Chong, Ooi, Lin, & Bao (2012) presented that men are more technologically inclined that females. They further added that men love to play and try to implement or use any new technology they come into contact whiles women love to understand the nature of any new technology before using it.

5.3   Factors affecting the Learning Management Adoption

5.3.1   Performance Expectancy

Performance expectancy was seen to have a significant influence on individual's behavioural intention to use Sakai learning management system. This determinant was used in studies by J. Park et al., (2007), Teng, Lu, & Yu (2009) and Amin, Hamid, Lada, & Anis (2008) and has been confirmed by these researchers to have a statistical significance on individual's intention to use technology. However, according to Venkatesh et al (2003), performance expectancy is the degree to which individuals believe that using any information system can improve their job performance. Moreover, users are more attracted to use a particular technology if they find that technology as a source of benefit, especially if it can help them increase their work performance. If Sakai LMS is able to provide different tools to help lecturers deliver on their mandate on time and can satisfy their requirements, their perceived usefulness will increase. The results of this survey confirmed the findings of Amin et al (2008), who found performance expectancy as a significant determinant on users' technology adoption.

5.3.2   Effort Expectancy

The study also found that effort expectancy plays a significant role in influencing lecturers' decision to adopt the Sakai learning management system. Effort expectancy is the degree to which individuals believe that using a particular technology will let them be free from effort. When users of Sakai feel that the application is complicated, they would have no willingness to use it. However, if the application is operated simply and users apply less time and energy for using the tools, then it will influence the adoption rate. As indicated and confirmed by Teng et al (2009), who employed this construct and found out that effort expectancy significantly

influenced human intention to use an online application software. However, the Sakai LMS itself is a simple tool that doesn't take weeks or months for individuals to learn and start using it (Amin et al., 2008). The tools of the Sakai LMS is designed such a way that individuals can understand its usage. This is the more reason why the lecturers find it very easy to use the application.

5.3.3   Social Influence

With regards to the users, social influence also plays an important role in learning management application adoption. Social influence was seen to have a significant positive influence on individual intention to use Sakai LMS. Chong et al. (2012) defined social influence as the degree to which an individual user perceived the importance others believe he or she should use an innovation. Some researchers believe that use intention of any new particular technology is influenced by the social environment of people. This includes friends, families work colleagues and superiors. Peers influence their friends to use technology when they find the technology to be useful. Users' friends and work colleagues can influence them to use Sakai LMS. Consequently, the behaviors and manners of the friends or work colleagues around the lecturers would all influence the lecturers' desire to use the Sakai LMS. This was confirmed in Singh et al. (2010) studies. Majority of the respondent indicated in the survey that their peers influenced them to use the application due to the benefit it provides to them.

5.3.4   Facilitating Condition

The study also found facilitating condition to have a significant influence on lecturer's adoption of Sakai LMS. Venkatesh et al. (2003) presented that facilitating condition is the degree to which an individual believes that an organizational and technical infrastructure exists to support

technology use. Internet infrastructure, availability of computers and power can have an effect on lecturers' adoption to an online application. Lecturers may adopt and use Sakai if they see that the university have deployed infrastructure for the usage. This was seen in the work of Joshua & Koshy (2011). Joshua & Koshy (2011) presented in their study that the more convenient the access of respondents to computer and Internet, the more proficient their use of the computer and Internet, which results in a higher adoption rate of respondents using the online application.

5.4   Opportunity exists to trial the LMS (Sakai) by lecturers

The findings showed that most of the lecturers were given the opportunity to trial the LMS (Sakai). However, with regard to adequate opportunity to try out different tools on their course site, most of the lecturers indicated they did not have such opportunity at all.

5.5   Challenges facing lecturers in terms of using the Sakai LMS

The findings showed that lack of time and the workload in managing student online would be too much for the lecturers. Further, it appears most lectures lack the needed motivation to use the learning management system. Finally, the complexity associated with its use and poor, unreliable internet connectivity posed a challenge for lecturers.

5.6   Practical Implication

In understanding factors that influence Sakai adoption by lecturers, the study benefitted from UTAUT model from literature. The results obtained showed that the adoption intention of learning management system is dependent on the influences of performance expectancy, effort expectancy, social influence and facilitating condition. Performance expectancy is one of the major determinants that influence lectures acceptance of Sakai software. This variance explained that people care about the benefit they will obtain from learning management system. Effort

expectancy is also seen as a key factor to influence users' adoption of learning management system. With effort expectancy, people care about how easy they can use Sakai tools. Social influence and facilitating condition was also seen as influential determinants. This can be developed with managerial implications, seeking for ways to expand the usage of Sakai software.

5.7   Limitations of the Study

Since the evidence was collected at the University of Ghana the results may not be generalized and hence not applicable to other universities. The measures of constructs were collected in the same university. Therefore, individuals' perceptions and intentions to use Sakai learning management system may change over time as an unremitting process due to greater experience and advancement of online technologies.

5.8   Recommendations

Factors used in the study were tested only in the University of Ghana. It would be interesting to test these factors in other Universities using learning management software and the results compared to the findings of this study. Such cross comparison studies would allow us to have a better understanding on the factors that influence learning management systems adoption in Ghanaian universities. Studies can also include variables like security and perceived enjoyment to see how these factors can also influence learning management system adoption.

5.9   Conclusions

The purpose of this study was to investigate lecturers' knowledge on learning management system; and the factors that influence them to adopt the new learning management system deployed in university of Ghana.

The idea of using an LMS like Sakai to compliment teaching and learning in the traditional classroom environment is a very laudable one and from the study, lecturers would adopt such a system if there's reliable internet access and power can be guaranteed. The study employed the UTAUT theory to determine the adoption of Sakai LMS among faculty at the University of Ghana. The study also identified factors that enables faculty from the University of Ghana to adopt Sakai LMS. There was positive correlation between faculty's behavioural intentions to use the Sakai LMS with adoption factors such as performance expectancy, effort expectancy, social influence and facilitating conditions.

The study showed that if Sakai LMS is able to provide different tools to help lecturers deliver on their mandate of teaching and research on time and can satisfy their requirements, their perceived usefulness will increase over time and when users of Sakai feel that the application is complicated, they would have no willingness to use it. However, if the application is operated simply and users apply less time and energy in learning and using the tools, then it will influence the adoption rate

Overall the study suggests that faculty in University of Ghana is more likely to use the Sakai LMS if they believe that it will impact their job performance, and/or if their colleagues and the technical team has created a culture of such usage.

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