Heuristic Evaluation of the Usability of LMS (Moodle) at EMU

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ABSTRACT

The rapid expansion in the implementation and use of Learning Management System (LMS) in supporting the teaching and learning process in academic institutions is extensive. Most of the universities are acquiring the most suitable system tailored for their particular needs and necessities. It is seen that Moodle is the most preferable ones among those systems.

The aim of this study is to assess the LMS (Moodle) at Eastern Mediterranean University (EMU) with heuristic evaluation of the usability.

Throughout the study, it is observed that LMS (Moodle) at EMU satisfies the users in terms of 10 Nielsen's principles regarding to heuristic evaluation of the usability.

Keywords: Heuristic Evaluation, Usability, Learning Management Systems, Moodle, E-Learning, Eastern Mediterranean University.

ÖZ

Akademik kurumlardaki eğitim ve öğrenim sürecine yardımcı olan Öğrenim Yönetim Sistemleri'nin kullanımı çok yaygınlaşmıştır. Birçok üniversite, kendi ihtiyaç ve gereksinimlerine en uygun şekilde hazırlanmış sistemleri kullanmaktadır. Bus sistemler arasında en fazla tercih edilen sistemin Moodle olduğu görülmektedir.

Bu araştırma Doğu Akdeniz Üniversitesi (DAÜ)'de sağlanan Eğitim Yönetim Sistemi öğrencilerinin çevre yönetimindeki kullanılabilirliğinin bulgusal değerlendirmesini göstermektedir.

Bu çalışmada, DAÜ'de kullanılmakta olan Öğrenim Yönetim Sisteminin Bulgusal (Heuristic) analizinin yapılarak değrlendirilmesi amaçlanmıştır.

Çalışma sonucunda, Öğrenim Yönetim Sistemi (Moodle)'in kullanıcıları 10 Nielsen kullanılabılırlık bulgusu bakımından tatmin edici olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Bulgusal (Heuristic) Değerlendirme, Kullanılabilirlik, Eğitim Yönetim Sistemi, Moodle, E-Eğitim, Doğu Akdeniz Üniversitesi

DEDICATION

This thesis is dedicated to: The sake of Allah, my Creator and my Master, My great Supervisor and Co. Supervisor and my father, who taught us the purpose of life; my great parents, who never stop giving of themselves in countless ways, my beloved brother Mohammad Ali and my sister, Nazanin.

To all my family, the symbol of love and giving, my friends who encourage and support me, all the people in my life who touch my heart, I dedicate this research.

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Chapter 1

INTRODUCTION

1.1 Introduction

The use of internet as a commercial medium for transactions across the borderless world in a computer mediated environment. Over the years, the adoption of the WWW has allowed all aspects of life and society to encounter and immerse themselves fully into personal computers (Friedman, 2006).

As a result, any person who has access to a form of computerized software via a personal computer, notebook or telephone can access web resources. Therefore, the use of the web has elongated into all manner of social or work environment and is no longer restricted to the scientific community. The fields in which internet has infiltrated appears endless with a vast array of social-economics and educational backgrounds that allowed access to e-commerce, publication, communication and education. Hypertext has become a mainstream interface paradigm (Nielsen, 1993).

In this modern era that we currently live in, technology as developed constantly. It is in this development and evolving of the internet that has seen the most significant changes in day to day life, where the world has become one village and the people in it being able communicate, explore and learn as a result. These changes are shaping the world so much to an extent that we have now become accustomed and dependent on them for information and entertainment purposes. The internet is now the key in

finding, supplying and using information on events around the globe. It offers the user the opportunities that previously were not available and therefore has reshaped the way we all think in different aspects of our social and economic life. The increase in the level of distance learning has started to gain popularity as a result on thirst for knowledge. As at of recently in 2004, it was estimated that the volume of individuals partaking in grown-up instruction projects will increase to 100 million within the next ten years (Shneidermen, 1998).

The transition of management and operation in educational activities within academic institutions has been revolutionized by Information and Communication Technologies (ICTs) (Marques, Vilatte, and Carvalho, 2011). The use of ICTs, with other organizations, has helped universities and educational institutions in assisting with setting and achieving their strategies. LMS is part of this structure, it is highly adapted to support the teaching and learning processes within educational institutions and have been highly developed over the years.

LMS is a specific online based system design and developed in dealing with the association's online learning surroundings (Kats, 2010). It has the capacity to incorporate, sort out and institutionalizes the learning process through different aspects of the organization's area of education. Within educational institutions, LMSs are highlighted as resources for proactively and reactively enhancing the cooperation and communication between the lecturers, students, administrators and management. There are wide variety of LMSs available for institutions to work with. It is therefore recommended that they choose carefully to ensure that the system adopted works in order to achieve their goals in learning the styles and the learning outcomes.

Currently, Moodle is among the most popular, well-known free, open source management system available in educational organizations (Gutierrez, 2010). The name of the system is derived from Modular Object-Orientated Distributed Learning Environment and its popularity gained by simple and effective modular facilities for enhancements and extensions (Kumar, Gankotia and Dutta, 2011). Distance learning is a style of learning where the students are not restricted to the confines of a classroom. The students are able to receive the same type of quality education online as they would if they attended a university of their choice. To this result, the term distance learning can now be described as a Virtual University (Kurbel, 2001).

It is the evolution of the internet facilities and the technological era that these Virtual Universities have been allowed to become such a stalwart to the traditional learning methods. The development of distance learning has also enabled the established institutions to reduce the use of their facilities and thereby provide improved services in all aspects of their educational program. The programming process is a good example, as it needs extra features in order to assist in the delivery of quality courses. From research into programming courses, it is understood that the extra features gained from LMSs will help students as they offer them the opportunity for programmed evaluation and input on particular assignments, giving activities on the web, intuitive assemblages, representations and moment literary theft discovery offices (Gutierrez, 2010).

As with distance learning, the traditional methods of correspondence courses expanding to online educational courses through interactive websites, it has become vital for the development teams to explore the usability and ease of use aspect. Research has been centered on the aspect of student accessibility and the usability

within international websites for e-learning. From the exploration of the student and educator interactions, the term usability is difficult to refine as the term cannot be restricted to just the software. It is more expansive and the interactions between the user and the software are deemed to be the indicators for successful usability (Zahrias and Poulymenakou, 2006).The requirements for having such components can likewise be material in diminishing specialized complexities that are connected with the utilization of hidden Virtual Learning Environment (VLE) that are used to support the programming aspects of courses (Nikula, Gotel and Kasurinen, 2011).

In general terms, the users within computer science education will understand that using LMSs will not encourage the conveyance of value substance additionally but can, give suitable element that have the capacity to streamline the exercises that are connected with the learning and instructing procedure.

1.2 Background of the Study

LMSs is been identified as a systematic function with their character. Their main function is to incorporate, create and manage the learning goals. Following student's contribution and their advancement through information accumulation and reporting lastly appraisal of execution (Watson and Sunnie 2007). In this manner it can be expressed that LMSs include a variety of features which can further enhance the basic point of view of the general learning procedure in a scholars' situation. The essential elements included in LMSs are learning material generation and management process, a discussion capability, on line quizzes and chat forums etc. (Scwmugabi, 2006). Further, certain features can be added independence on specific user stipulations, also on a technical structure of the system.

Throughout the world, LMSs has offer a wide spectrum of courses, especially through Moodle. But not restricted to computer science, languages, education sciences and history etc., (Guido, Joy, Mereno, Radenski, Malm and Kerren, 2008). The development of software creation courses, has been suggested to use highlights from LMSs keeping in mind that the end purpose is bolstering their educational program and instruction structure (Guido, Joy, Mereno, Radenski, Malm and Kerren, 2008).

The heuristic evaluation method of inspection was adopted to evaluate the user interface design (Nielsen, 1994). Heuristic evaluation recognized as a standout amongst the most generally utilized routines for its Usability Inspection Methods (UIM), as a result of several advantages that it offers including ease of use, intuitiveness, low cost and furthermore does not require extensive advanced planning.

Furthermore, since Moodle has been chosen as the primary LMS there is a requirement to study the present condition of its utilization in EMU. The researches carried out previously has been more general when it comes to Moodle, and its use in computer science education is relatively low (Mirjana Ivanović, Zoran Putnik, Živana Komlenov, 2014). Therefore this study aims to concentrate on how Moodle can be coordinated in showing programming advancement lectures and moreover, to show whether enhancements can be offered to the university group for future education and research.

The focal point of this research lies in using Moodle in relation with the factors of heuristics evaluation, and its usability effecting distance education within LMS at EMU.

1.3 Purpose Study

The purpose of this study is to assess the heuristic evaluation of the usability of LMS (Moodle) at EMU regarding to 10 heuristic evaluation principles of Nielsen (2005).

1.3.1 Research Questions

The research question of this study is highlighted as follows:

1. What are the main factors, according to heuristic evaluation on usability interface within LMSs which influences upon distance education in EMU?

1.1. How does the visibility of the system affect the status?

1.2. In what way does the system and day to day life match one another?

1.3. How does the control of the system impact upon the freedom of use?

1.4. How does the consistency of the system in relation to standards adhere to the compliance?

1.5. How does the system prevent errors occurring through effective usability?

1.6. In what way does the system guide you through each step by recognized commands?

1.7. How much flexibility is in the system in order to provide efficient usage?

1.8. In what way does the design assistance user through minimalistic appearance?

1.9. How do the error messages clearly indicate to the user what the issues are?

1.10. When the help facilities are available how clear and concise and how much assistance do they provide?

1.4 Limitation

Due to the fact that using Moodle within heuristic evaluation method is a new phenomenon for EMU instructors its related concepts and usage is somehow unfamiliar to all teachers or lecturers, therefore they may found certain questions irrelevant to understand.

1.5 Significance of the Study

This case of study is importance in education for teachers and students to communicate via Moodle through distance education by development effectiveness, efficiency and inter-evaluator reliability.

Research on heuristic evaluation is focused on improving its effectiveness and efficiency with respect to user testing. A significant contribution on this research proved that the system is successful and can be re-use by other researchers, by obtaining the data regarding to heuristic evaluation and its usability.

The result with the use of is for LMS and Moodle, will help improve academics, and bridge the gap between students and instructors (By knowing Students having difficulties with their studies), in a different environments.

Due to the restrictions in time and availability of expert lecturers, this thesis surveyed as many lecturers as possible to thoroughly investigate and understand why heuristic evaluation of usability is important for Moodle in EMU and furthermore the factors that affect the subject matter.

Chapter 2

LITERATURE REVIEW

In this chapter, the general information are presented from distance education and heuristic evaluation in order to indicate the system via heuristic evaluation.

The purpose of this thesis is to explore the benefits of using emerging technology tools from Moodle to foster the student's interaction in online learning. It also reviews social software applications. Although emerging technologies offer a vast range of opportunities for promoting collaboration in both synchronous and asynchronous learning environments, distance education programs around the world face challenges that may limit the implementation of these technologies. Moore and Kearsley (2011) probe the influence of technology on theory and the possible implications this influence affords.

With the rapid increase from ICT infrastructures every educational institution has the opportunity to make use of the Internet as a communication medium with the students. For an effective and efficient access to learning materials, the concepts of technology-based learning are increasing in importance with e-learning becoming a crucial resource for institutions. Since so as to associate with points they are reliant on some of correspondence innovation as technologies to utilize advances effectively, instructors must know the distinctive outline design of methods for provide the take

online courses the student need to figure out how to utilization of this sort of advances(Moore, 2011).

2.1 Distance Education

As distance education has stimulated from traditional, to online educational web site, it is vital to look at the definition of this theme.

In describing distance education, the definition has been developed and then redefined over a period of time in order to provide a detailed description of the outline (Moore and Kearsley, 1996). This is outlined in Moore's narrative into distance education definitions. This has been further explored over some time however the initial definition was generated in 1990, and was highlighted as "any arrangements for initiating instruction or teaching whether by printed material or via the medium of electronic communication to any person involved as planned tuition in a location or period of other time from the educator or educators" (Moore and Kearsley, 1996).

In order to provide a detailed and exact description, the definition of distance education must be adhered to provide a proper and specific arena in the current digital and technological environment in which this form of education is under taken. Without such a definition, the facility for which distance research can take place is restricted or even prevented. In order to gain a specific and clear students from the role in distance education has overall educational forum, both the teachers and students must engage in a thorough and exhaustive clarification process. This process introduces and enables all parties to comprehend and accept the processes they are about to enter (Gotwood, 2014). It must be stated that as the development of technology continues to grow then the definition and the goals of distance education must grow too.

With a departure from physical contact for the extent of the educational course undertaken, it is seen to be distinguishing and fundamental identifiers in describing distance education. As lectures, tutorials and in general terms, student/lecturer support are all conducted via electronic means, it highlights still further in this definition. However, in making this description Yellen, neglected to highlight another core element in describing distance education, that being the actual physical contact between students in relation to an educational environment (Yellen, 1998).

The method of providing DE is considered by many colleges and universities around the globe as a crucial and fundamental method of providing tuition and enables them to access more students. However it is also important that an initial training course is investigated before any online tuition is undertaken (Desmond Keegan, 2013).

The ability to provide distance education has an extensive history within university life with these types of programs entering the educational arena at the beginning of the 20th Century and has remained a vital element of providing educational courses via correspondence and online facilities. It is the perception of students and their overall satisfaction for online courses that has engaged educational scholars and lecturers to investigate online learning (Lee Ayers Schlosser, Michael and Simonson, 2009)

2.1.1 Correspondence Education

Correspondence is characterized as correspondence by the trading of letters. In the 21st century it means taking an advanced education course through specialized communication procedure, for example, the trading of electronic reports, messages, and faxes, as opposed to taking a course in a traditional classroom on the web.

It is a formal instructive procedure under which the organization gives instructional materials, to understudies who are isolated from the teacher. This is kind of connection between the teacher and students and it has not any constrained, and is essentially started by the students courses are commonly self-managed (Lee Ayers Schlosser, Michael and Simonson, 2009).

It has developed such interest that online and correspondence courses have become recognized as one of the favorite ways in which to carry out education from a distance.

The materials required for classes are all downloadable, however, should physical textbooks be necessary then these are acquired via university bookshops or online stores (Miller, 2014).

In the case of correspondence study, this form of education is an entirely separate department within university life and as such all formal education is carried out in an electronic form. This collaboration represents an online action and reaction conducted by the lecturer and the student.

Further advantages of students online courses are as location work can be carried out in any location or students are able to carry out their work at comparatively their own time frame also transportation costs are greatly reduced as no need to attend university campus

2.1.2 Broadcast

Broadcast is likewise for the investigation of makers and each one of the individuals who are included in the generation of media in one way or the other.

There is an extensive variety of colleges and associations for distance education on the planet and all the utilize media in one way or the other way, there is still need to utilize media broadly for the reason for training. Broadcast is amount of obliged to cover the entire of the college curricula. There are sure purposes behind the absence of utilization of show media. One of the reasons is that neither the scholastics not the makers like to feel that they are taking requests from one another (Flor, 1994).

Then again they need to be the center of the way. It is additionally a truth that every of the academics have not the preparation or foundation of utilizing media. Then, again every of the makers are not academicians. The goal of this manual is to give at work preparing to the instructors in distance education, to the makers and each one of the individuals who are connected with the generation of broadcast media in instruction.

The term broadcast media describes the transmission of data, opinions and ideas specifically through the media of electronic communication devices like television or radio and tele-course (Adegbya and Fakomogbon, 2013).

2.1.3 Open University

Open University (OU) begun at 1969 for giving degree courses to the students can take it at home. Students can any age and, in the off chance that they don't have the standard capabilities for entering university, they take an entrance course before beginning their degree. Since students have to learn at home and send their work to their guides, who they can likewise converse with by telephone or over the Internet. Also they can likewise go to instructional exercises at center of study in a regional center close to the place where they grew up, and they might likewise go to summer schools. Most understudies are taking part time degree courses enduring quite a long while, however there is no time limit. Professional courses are likewise offered that shows degree

courses through radio and TV programs and on the Internet, primarily for grown-up understudies who learn at home and send their work to the instructors by post or email.

2.1.4 Tele-Conferencing

The concept of Teleconferencing encounter through an information transfers medium. It is a nonexclusive term for connecting individuals between two or more areas by gadgets. There are some kind of remotely coordinating such as video, sound, PC, distance education and business TV. The techniques utilized vary as a part of the innovation, yet basic elements add to the mutual of remotely Teleconferencing by utilize an information transfers channel, connection individuals at various areas, intelligent to give two-way interchanges or element to require clients' dynamic cooperation (Michael, Moore and Greg Kearsley, 2011)

2.1.5   Internet and WWW

Distance education projects include many sorts of technology. The World Wide Web (WWW) and Internet are the essential method for introducing instructive data. When learners have subscribed to, or needed an Internet supplier, they obtain entrance to the instructive materials and administrations intended for the World Wide Web and Internet. The instructive data is put away electronically; along these lines learners with access to the webpage can download or utilize the data the length of it is put away there. This makes it simple for learners to work at their own particular pace and to visit the site as much of the time as they like.

The Web can give learning data in a wide range of fascinating arrangements. It can show data in sound bits, for example, music, voice or embellishments. Representation may be additionally displayed in an exceptional sort of fine art, for example, liveliness or feature. Likewise, Learners can likewise utilize another extremely advantageous instrument on the Internet: hypertext joins. Hypertext connections can take viewers to

a specifically related bit of data inside of the same record or Web website, or to data found at another webpage (Porter 1997).

2.1.5.1 E-learning through the use of the internet

The development of the internet and use of the World Wide Web (WWW) in e-learning is heralding a new form of teaching and studying practice.

The term e-learning relates to a specific form of teaching and studying process that includes the tuition taking place outside of the usual "classroom". This form of education is carried out through the medium of any form of computerized technology ranging from multimedia CD-ROMs and DVDs through to satellite broadcasting (Research Article, 2010) The variety is so diverse that the terminology can encompass simple aspects of listening to tuition tapes on line to video conferencing through the internet/intranet and extranets and then to the more traditional computer-assisted learning.

The date of introduction of e-learning is not definite but it is suspected that is came about around the same time as the online capabilities commenced about the 1980's.

The research into e-learning is still ongoing and therefore the specific references to the exact forms of technology that are utilized remain unclear. From the current research,

Authors remain divided on opinions of what constitutes the term e-learning, whether it is the programs or the communication aspect, there is clearly one focus that remains constant, and that is that e-learning is developing and that there is an opportunity for all students to learn. The constraints of classroom based education are being removed

and the wider scope of education is being allowed to span the globe (Dringus and Cohen, 2005)

It is this ability to reach out further than ever before that makes distance learning so progressive. The cost aspect and the removal of geographical restrictions enables e-learning to conquer where the more traditional methods are unable to operate. The flexibility created by distance learning allows for students, tutors and company employees to benefit as time and geography are removed from the list of constraints.

2.2 The Explanation of Learning Management System (LMS)

The term of LMS covers a variety of systems that are all part of the process (Wright, Lopes, Montgomerie, Reju and Schmoller, 2014), these include:

- Course Management System (CMS)

- Learning Content Management System (LCMS)

- Virtual Learning System (VLS)

- Virtual Learning Environment (VLE)

- Learning Portal or

- E-learning platform

Each of these systems has variances that set them apart from the others depending on the understanding of each. It could also be defined as an Instructional Management System due to the instructors generally being the ones who implement them as opposed to the students.

However in order to maintain clarity, for the remainder of the article (Moraes Rêgo, 2014) the term LMS will be employed and defined as a comprehensive, integrated

software that supports the development, delivery, assessment and administration of education combining the traditional face to face environment with a combination and then entirely online learning experience (Kats and Yefim, 2010).

As the experience of online education has expanded, Virtual Learning Environments (VLE), also known as Course Management Systems, (CMS) have become a fundamental and integral part of the higher and further education sector. In order for clarity, the definition of Virtual Learning Environment should be established. According to the definition of Tec terms, a Virtual Learning Environment is a simulated classroom, which allows students and tutors to engage in communication with each other. In most cases the information, materials for learning and setting of assignments is usually carried out through the web(Mario Barajas and Mario Barajas Frutos, 2003).There is the ability for students to log in to a website specifically designed for the subject, course or class, which provides then all the relevant material to be downloaded and accessed when it is necessary. Furthermore with many Virtual Learning Environments the students are required to complete assignments and examinations online.

 A virtual learning environment is not restricted to merely an educational website and 3D virtual reality technology. They suggest that it goes much further into the educational field and beyond, with the opportunity for a virtual campus (Dillenbough, Schneider and Synteta, 2002).

However there is also a further capability to go even further as there are no restrictions on age or educational level it offers university courses for all. Therefore it can be described as a virtual educational space, a space for all to encompass and embrace with

interactions in the educational field and also social. The level of interaction can be limited or expansive with all aspects of social and teaching involved and is not restricted to simply tutoring but can include every aspect of the technology available.

For example, the teaching online is not constrained by simply correspondence courses, they are able to be more involved and much more interactive with the ability to communicate in real time with others on the course, their tutors through a variety of different mediums. The institutionalized approach to learning is also embracing this technology to provide a more varied and appropriate educational platform from which to improve standards(St-Amant, Kirk and Computers, 2009)

Therefore it can be suggested that the ability to offer distance education with the many facets and facilities available has impacted in a positive way that the more traditional institutions approach.

In the current educational environment that we experience, the systems like VLE and CMS are now regularly used in traditional primary and secondary schools. They offer a variety of features that aid and assist teaching and for the students to learn, from simple document sharing to the availability of interactive classroom discussions and further still to the adoption of information and technological systems for all aspects of school life (Livingstone and Kemp, 2008)

Traditional institutions are able to utilize these LMS operations to carry out in depth planning, scheduling, implementation, and facilitate student sharing and learning, which can then be accessed through the same facility. The LMS also enables schools to carry out more extensive and complicated centralizing procedures for preparation

of classes, lesson planning, educational resourcing, the ordering and delivery of educational assets, the tracking of student attainment levels and highlighting of areas of concern with students both individually and collectively. Furthermore the software has more to offer the behind the scenes administration of a learning establishment offering them a virtual protective barrier and protecting the data relating to the students. This provides schools and colleges with a measure of security and therefore establishes a feeling of authentication.

The LMS has currently in operation is constantly being upgraded to incorporate many more measures to improve the efficiency of learning institutes. The level of in-depth knowledge that is now available goes beyond the simple strategies of previous, they are now able to detect specific patterns of student activity to analyze, predict and offer the teacher ways to better support their students. Through the LMS, institutions are able to maintain the integrity of their educational programs and enable the individual faculties to effectively and efficiently redevelop courses in line with the information gathered. They are then able to introduce further instruction methods, increase communication, help collaboration and assist students. So LMS is able to connect with traditional face to face schools, as well as reach out to the blended and entirely online educational institutions (Moore, 2013).

It has been proposed that when educational establishments wish to offer online courses through the world wide web, they have four choices in deciding which LMS is most suitable to their specific requirements;

1. To develop local human resources with the appropriate software to manage the content and activity learning ensuring that accessibility and maintenance.

2. To build an individual LMS specifically for open source software which are usually free of charge e.g. Moodle.

3. To use existing open source software that do not charge a license fee to operate with, e.g. Sun and IBM.

4. To hire a company that offer their services via their own platform and hosting through the use of their own servers, thereby they are solely responsible for the preparation of content and learning activities (Litto, 2009).

A strong LMS should have the capability of carrying out the following tasks: centralizing and automation of all administrative duties, offer self-service and self-tutored services, collate and deliver learning support content, amalgamate training initiatives via a web-based platform, support the growth and improvement of standards, offer personalized content and the ability to reuse content where ever feasible. As a result a LMS should collaborate with other integrated systems to provide a complete package to offer a thorough management structure to improve standards and support student/teacher contact (Albagami and Dimitrov, 2014).

The development of LMS is now fundamental as the new LMS offer different capabilities than the course delivery LMS, more specifically in relation to classroom operation and educational support. The new LMS has generated, through assignment and assessment monitoring, a different set of tools to provide classroom support and management and immediate real-time assessment of student attainment levels.

The new LMS operate on three types of presence: social, cognitive and teaching (Traphagan, Chiang, Chang, Wattanawaha, Mayrath, Woo, Yoon, Jee, and Resta, 2010). The term social presence is the manner in which students react social and

emotionally to the virtual learning community, whereas cognitive presence represents the actual process of building the student's knowledge through the communication process.

2.2.1 Necessities for Learning Management System in an E-Learning Process

When describing a Learning Management system, it is defined as any software that has been developed specifically for providing a learning capability through presentation which has a substantial role in which to participate with in the e-learning environment. Within the context of advanced e-learning systems, they are required to comply with the following exacting requirements (Kritikou, Demestichas, Adamopoulou, Demestichas, Theologou and Paradia, 2008).

- Compatibility and capability to work with other LMS,

- Management content ability for example simple electronic filing procedures,

- The understanding of content and creation process within the title "Learning Objective",

- Content reusability through compatible software e.g. Scorn, AIIC and IMS,

- Fast content formation, distribution, integration and authorizing tools,

- Compatibility and support with creative content programs e.g. Dreamweaver, Flash, Word and PowerPoint,

- Adaptability and longevity to the learning environment,

- Multi language support facilities.

As detailed above many of the required features in a LMS, as fundamental to the support and authenticity of the software supplied however it should also be noted that

there is a direct correlation between the success and usability of the LMS with the number of features included within it. (Kritikou, 2008).

These features can be listed as follows (NETS, 2011):

- Content creation through different input formats for example: Scorm, IMS Content package, MPE g files, Office file, Java script, PHP.

- Inclusion of suitable tools for content development and management of installation of content – Modular structure

- Database support

- Advanced search and header hiding ability

- XML support to work with different systems

- Compatibility with industrial standards e.g. AICC and SCORM etc

- Support for video conferencing

- Exam module and capability for online examinations (test based question preparation)

- Multi-language support

- Calendar

- Back up support

- Chat tools

- Interactive white board

- Group work and debate forums

- Simple installation process

- Ability to add functions e.g. surveys etc.

- System requirements – for example the simpler the requirements the easier it is to set-up

2.2.2 Advantages of an LMS

The general benefits of all automatic systems and the ability to centralize functionality is well documented, however over and above the standard advantages (Szabo and Flesher, 2002). LMS systems also offer additional benefits as follows:

1. The reduction in costs through the decrease in training capabilities and therefore reduction in operational costs through less errors and down-time

2. An increase in efficiency through the integration of content preparation, and furthermore the operating procedures, maintenance packages, setting environmental standards and finally the process of job referencing thereby reducing complexity and costs.

3. Rationalization of existing resources by complimenting established policies and procedures, and thereby utilizing existing training material and links to off the shelf commercial computer based courseware(Felix, 2003)

2.2.3 Types of LMS

The variety of Learning Management Systems (LMS) available on the market is extensive however they all share the common purpose of organizing and managing e-learning and assist in delivering course materials to a far and wide educational forum. However when an organization looks to procure a LMS there are a number of individual factors that should be considered to ensure that the effectiveness of the software is fully operational.

The aspects to be considered vary from the delivery of the educational material to the ability of the students undertaking the course. The fact distance learning can be

undertaken in such a wide spectrum means that there is no need to consider the geographical position as the LMS should cover all aspects of the delivery and material required.

Once the above factors have been taken into consideration, the organization then just needs to match the organizations requirements with the LMS that offers the corresponding features. Below is a brief insight in to the 2 different types of LMS:

2.2.3.1 Commercial

Business oriented LMSs are proprietary and are generally specifically designed and developed by commercial sellers (Fertalj, Jerkovic and Hlupic, 2006) The cost of these specific systems have been one of the main challenges for commercial entities, as the overheads remain large with annual licenses and the complexity of educational organizations requiring more and more diversity making the software more complex. In order to maintain the ability to modify their systems in line with institutional requirements the costs are excessive as the copyrights will remain with the developing company (Kakasevski, Mihajlov, Arsenovski, and Chungurski, 2008)

As a result many of the systems with in this category have resulted from university development projects as opposed to business oriented software development companies. Although the e-learning industry is at present dominated by open source applications like Moodle, there still remains a place for these commercial systems too. A couple of proprietary LMSs are Blackboard and Desire2Learn (Kats and Yefim, 2010)

A further example of this kind of commercial software is Microsoft which has created many successful systems.

Blackboard: is a provider of some very powerful and simple to use systems that have been developed and designed specifically for educational instruction, communication and assessment processes. Over the recent years this company has developed and introduced 2 major product lines: the Blackboard Commerce Suite and the Blackboard Academic Suite, which is centered on the Blackboard Learning System. This learning system provides a course management system that is in use in classrooms and available for online educational assistance too.

ELeaP: The flexibility and adaptable nature of the eLeaP LMS's software is rapidly making this one of the leading learning support systems. The ability to adapt it and to customize it and the ease of use make it easier than some systems as the application can be up and running in such a short space of time. The training courses extend to over 700 different ready to go facilities and can easily be interchanged and arranged through the team.

In order to maximize the opportunity for employees they should be conversant with these systems. Then once they have customized the e-learning system to suit the requirements of each member of staff and preceded with the full training facilities the employees will be more likely to achieve optimum job satisfaction. It has been recorded that employees resign from positions simply because there is not sufficient training or learning opportunities.

EleaP is an online e-learning application with a straightforward and understandable user interface which permits both experienced and non-technical training managers to adapt, design and monitor interactive training courses and learning programs for a

wide range of user's abilities. eLeap also has the capability to proceed and monitor in classroom environments training or teacher led training (NETS, 2002).

Elogic Learning: is an exciting new application enabling the continuance of more complex education management functionality. The latest form known as essential Learning Management System has been designed to assist organizations to manage, track and report on ongoing educational activities through a range of locations, with much more efficiency, however retaining compliance with local regulations. The chief Technology engineer at eLogic, Bill Snowdon commented that the objection has always been to continually improve and develop systems in line with the requirements of the education sector, through the elimination of manual processes. The main features of the system include (NETS, 2002):

- The ability to define a varying level of credit types, learning abilities and credit scores on a single course in accordance with state-to-state regulations
- The capability to send email and/or text notifications automatically to advise them of educational requirements and deadlines.
- The potential to send automated reported to accreditation authorities without manual implementation.
- The accessibility of complex reporting for continuing educational credits to include course or curriculum tracking.

Geo-learning Inc.: was a company with headquarters in West Des Moines, Iowa, USA, providing on-demand Software as a service (SaaS) learning management system, providing solutions for corporate training for internal and external initiatives. Geo-learning Inc., was a company with headquarters in West Des Moines, Iowa, USA,

providing on-demand Software as a service (SaaS) learning management system, providing solutions for corporate training for internal and external initiatives (NETS.2000).

Point Cast A completely web-based solution, Point Cast Portal, offers a straight forward user interface to enable non-technical users to easily store, administer, deliver and track training objectives and communicates across companies of any volume. This simple log on and use technology gives strength to companies to distribute and track the training through interactive means and allows presentations to employees, partners and customers simultaneously.

By posting your specific training, presentations and other files through your portal site and you can automatically share them a small group, a company or if you choose the whole world. The utilization of the LMS's full reporting facilities to review usage, statistics, responses and user actions (NETS, 2014)

2.2.3.2 Open Sources (OSC)

In a distance learning process, it is possible to utilize open source in many different phases of the educational process. They offer an adaptability that can take in small or large areas of the educational prospect. The ability to interchange is crucial for example the application software that performs learning content preparation and in the LMS which provides the learning content presentation through a web based environment and in turn as a web server software e.g. APACHE.

Due to the many advantages offered by distance learning, many schools and learning organizations are introducing and benefitting from these new learning technologies and in turn increasing the investments they are making in it. Apart from the obvious

advantages of LMSs, there are some drawbacks and they relate to initial installations and costs compared to the more traditional learning environments. However these costs can easily be reduced by the introduction of open sourced software.

The advantages of using open course are summarized as follows (Okmen, 2008):

- Confidence with the OSC software, there is a strict review process where developers and software experts examine the software for glitches and is therefore filtered and all errors removed. By performing these tasks, the quality is improved, the aim of the specific software that is being produced is considered better and therefore the user confidence in the software increases.

- Sensitivity and flexibility for specific user requirements: Open Source Software is regularly updated more often than the proprietary software, which in most cases have been specially requested or modified in conjunction with the users' requirements.

- The support of innovation: Due to the diversity of the nature of OSC software the development and production processes gives an improvement to the software. Creative ideas are encouraged.

- Security: The aspect of OSC security is rated in relevance depending on the level of the users' requirement, however this is not usually to the degree of commercial software. The access to the coding is restricted in both circumstances, therefore they don't actually have specific knowledge of the level of security.

With the excessive number of Learning Management Systems currently available on the market at the present, it is important that the correct one is employed and for the right reason.

2.3 Brief Resume of the Most Popular Systems Available

Open Source innovation is technology where the source code is open, that is, the code is accessible to people in general and liberated to be changed. Changes can be made by engineers and it can be spread or sold to the more extensive group. All in all, why should to an association pick an open source LMS instead of a homegrown or restrictive LMS?

With the immense number of LMS accessible today, settling on the choice on which stage to pick can be very overpowering. Underneath I have composed brief clarifications a portion of the best frameworks right now available (NETS, 2011).

Moodle – launched in 2001, Moodle introduced this effective and free tool for teachers and students to utilize in order to engage in open communication. From its' incept the innovators at Moodle have continued to grow and evolve their design, providing a free and open source learning platform designed around education. The success is widespread with in excess of 50 million users in every country that benefits from computers. The success of Moodle as a Learning management system or Virtual Learning environment, is down to its extensive availability, free for all to use and it is global appeal. Covering over 200 countries and more than 70 million utilizing the benefits of commercial and non-commercial projects, all without the need for a license fee (Cooch, Foster and Costello, 2014). It is a fast and effective development process

and supported by Moodle Partners and the Moodle Head Quarters actively seeks to develop and support educators worldwide.

Joomla − A successful and innovative system that also offers a good selection of different solutions and with a comparatively easy install and set up process is favored by some. The system is divided in to three different types of pages, comprising of Sections, Categories and Articles. It provides a user-friendly platform, that for those with basic computer skills are still able to operate with great design and layout configurations. There is also the capability to extend the use through Hypertext Markup Language (XHTML) and Cascading Style Sheets (CSS). Joomla can also be adapted, edited and configured to the user's own preferences with free templates, therefore the design and system has won several awards including the Packt Publishing Open Source CMS Award (Amin and Navik, 2014). Joomla's adaptability with free modules, add-ons and additional components which are easy to install with Windows and Linux operating systems make them a good choice. They are also involved in generating websites globally for the following:

- Government applications

- Universities and Educational Institutes

- Online journals, newspapers and magazines

- School and college websites

- Corporate Websites and portals

- E-commerce and online reservations

- Small business websites

- NGO websites

- Community-based portals

- Personal homepages/blogs

E-front is a platform utilizing an open source as a Course Management System (CMS), Learning Management System (LMS) and Virtual Learning Environment (VLE), (NETS, 2015).

E-Front is a recognized and an essential system of adapting e-learning into the classroom or individually through a series of downloadable modules available through the E-Front webpage.

With this specific LMS is available in three versions, comprising of the following, the original free open source; the professional version; a Specialist Medical version. This kind of system has been developed without going through the process of high graphic expertise. The features are:

- Conversion of Office documentation in to a learning path

- Adaptability for specific authoring techniques

- Video conferencing

- Synchronization with Human Resource management systems

- Print certificates (Chaudhari 2012).

Sakai – This tool is another open source solution, similar to the Moodle, however there are also some key elements that create a distinctive and different solution. Firstly it is built on Java, instead of LAMP (Linux, Apache, MySQL and PHP) which although it

is an open source system, it is only available to key personal and therefore is ideal for the educational institutions as opposed to the corporate training(Medved 2013).

The Sakai system was specifically designed by universities for universities and was built by MIT, Stanford and Berkeley Universities amongst others to ensure individuality and therefore cut costs as no outside vendors were utilized and other homegrown systems. They themselves describe the project as a Collaborative Learning Environment (CLE). Key Features include:

- Site roster
- Availability of site statistics including usage
- Display of external WWW web pages
- Adaptability to re-create new Sakai templates from pre-loaded tools
- Portfolio based activities actively encouraged with tools designed for retention of such data

However, due to the complexity and the coding through Java, it can cause some problems with some browsers and the availability of Java skilled programmers are more difficult to find.

A-Tutor – The system known as A-Tutor is an Open Source Web-based Learning Management system (LMS) and is used to develop and deliver online courses. Administrators can install and update the A-Tutor in a matter of moments, they can develop customized themes, generate a new appearance for A-Tutor, and adapt the functionality of the system to suit the requirements and adapt new modules. At the other end, the educators are able to assemble, package and then redistribute through

web-based content direct to the student, they can attach and import new revised content and carry out courses fully online. Finally, the students are able to learn in an accessible, adapting and social learning environment.

There are slight differences between this system and others as A-Tutor is a Learning Content Management System (LCMS) and the 'A' in A-Tutor stands for Accessible. This is the key feature for the system with accessibility, plus there are navigational tracking capabilities to enable teachers to follow the process the students have progressed through the site and the students can keep track of their own route. Key features of A-Tutor as follows:

- Compiler for printing tasks to ensure notes and transcripts can be printed in sequence
- SCORM and IMS packages can be imported
- Easy generation of course creation (although with more problematic content can become complicated)
- Accessibility and adaptability highly rated
- Within the file storage feature, there is a version control which monitors changes and drafts.

2.4 Why Moodle Is Considered the Most Popular Tool in LMS

Since the development of Information and Communication Technologies (ICTs) the adaption and integration transferred into the educational sector, allowing institutions, universities and other academic organizations to utilize the vast capabilities available. As with other organization, educational establishments are investing in ICTs to set

strategies, monitor and ensure the objectives are achieved (Marques, Vilatte and Carvahlo, 2011).

Part of this process is the induction of Learning Management Systems (LMS) which has been very effective in generating a support network between students, teachers and establishments. The term LMS refers to a web based platform for maintaining an institutions distance learning process. The system should be capable of amalgamating, arrange and standardize the learning process through a variety of distance educational environments.

Within the LMSs these can be highlighted as providing a high level of collaborations in order to communicate with students, educators, administrators and management. The key aspect of this arrangement should be the availability of adaptive processes to enable the relationship between student and teacher to develop and grow. This is a crucial aspect as there are many different teaching styles that can be adopted which encourage growth and an individual's capability to learn. The choice of which system to choose is the responsibility of the academic institution.

Currently one of the most popular open source learning management systems is Moodle and has been adopted by many of the most popular academic institutions. The system is named Moodle due to the Modular object orientated distributed learning environment. The main reason for the popularity is down to the simple approach and ease of use and the extensions through modular facilities for enhancing the learning experience (Kumar, Gankotiya and Dutta, 2011).

As the development of computer technology has progressed, there have been many courses on computer science undertaken through the use of LMSs- especially with Moodle (Guido and Andreas, 2009). It has been noted that the development of software through ICT courses within a computer science course involves the use of LMSs in order to provide a full curriculum. A fine example of this kind of procedure is the programming which utilizes many aspects of the LMSs and allows educators to support their students with practical use of the system utilizing the processes of assignments, visualizations and interactive compilations. The requirement to use these elements can also provide assistance as they reduce the complex nature of the technical aspects of the system as demonstrated in VLEs which are used as supporting programs Nikula, Gotel and Kasurinen, 2011).

In most circumstances, users of computer science education utilize LMSs that are not restricted to simply delivery of content but can also be used for demonstration of activities through programming online with student input and teacher assessment.

2.4.1 The Reason for Using Moodle in EMU

The rate of selection and utilization of LMS to bolster and learning procedures in scholarly foundations is becoming quickly. Moodle has been passed from the champion amongst of the maximum surely understood and general on LMS in today organizations. The despite, aside from the framework, colleges have a tendency to keep up different applications with the end goal of supplementing their showing and learning procedures. This circumstance is like EMU, which is our contextual investigation in this university.in the EMU University are using some king of Moodle web page such as: Open Course Ware, Faculty of education-Online, Modern Language Division, EMU Distance Education Institute, etc.(Net, 2007).

In each web site have too many faculty and each faculty approximately dependence of the semesters has around of sixteen courses will be open.

As we can see there is too many kind of the Moodle at EMU University but in this thesis we just discuss about faculty of online education because of we want to get assessment from the education department from the Moodle as distance education.

2.5 Usability

The term usability in relation to "ISO" (STD, 1991) is defined as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use".

As far as the ISO/IEC (1991) describes usability as a whole from specific features that can collectively assess the usability of a product/website.

Usability has over the past been described in many differing manners, which are all dependent of different aspects of the requirement for the product subject to; learn ability, memorability, error and efficiency. The attention is to expert users when describing efficiency through learning capability. When describing memo ability, this mainly relates to the more casual user and the effects of errors and the corresponding reaction to the errors, which potentially can have more unsatisfactory results Smulders, 2003). Another similar definition is supplied by Shneiderman (2004). Who expresses the term usability of e-learning as quantifiable aspects from evaluation in human factor goals? Those being as follows: Speed in time of understand/training; memory more than a time of period. Dix's definition has similar but refined definitions, those being system usability, learning ability, flexibility of use, robustness to errors (Dix, 2006).

Furthermore the term usability can refer to the extent in which the user and the system combine through the interface to communicate with one another and with a clear understanding of the goals to be achieved. The field of cognitive ergonomics generated the term of usability, and as their area of expertise refers to the Human Computer Interaction (HCI), it relates the interface between human cognition and software design that validates the term (Caboral, 2015).

2.5.1 Usability Methods

The evaluators of usability operate different methods to evaluate the effectiveness of usability. As such there are no standardized methods or systems that have been accepted for all usability evaluators and this is due to each evaluators use diverse methodologies, techniques and approaches for the usability evaluation. It have used a mixed approach and they highlighted three specific types of usability evaluation method (Adelman and Riedel, 1997).

- Heuristic
- Empirical
- Subjective

2.5.1.1 Heuristic Evaluation of the Usability

In order to ascertain the effectiveness and usability of any software application, the method of heuristic evaluation is used and to date Nielsen's heuristic evaluation method is widely considered to be the most comprehensive instrument.

With the continual growth in the Electronic Commerce (E-Commerce) sector and the huge impact websites have led to the majority of organizations to extend their efforts to use the internet in a manner to expand their business interests (Lee and Koubeck, 2010). As a result of these efforts international companies have focused their main

activities into the internet and web based environment, thereby generating a vast number of indexed Websites to a wide array of users around the globe (Gulli and Signorini, 2005).

As a result these corporations and companies are expanding their challenges to offer their customers understandable and simple to use Websites. The objective of all these companies is to provide a comprehensible and clear website that is easy to use and is easily workable to enable the user to achieve what they set out to do with effective, efficient and satisfactory results. So the objective for developing a website in terms of usability has become the crucial and fundamental course of action as this aspect determines the kind of user experience involved in the interaction with the system. If a website is complicated to use or even fails to deliver what it states it is prepared to deliver the users will automatically leave immediately says Nielsen (Nielsen, 2014). This could be an indicator as to why so many companies have closed or ceased trading as a result of an over complex website. Therefore, it is conceivable that if usability is not considered in the development of such software applications, a company runs a greater risk of losing customers and further opportunities, which in turn would be reflected in a highly significant negative influence on the company (Lee and Kozar, 2012).

The development of different usability evaluation techniques have been explored and introduced in the design and developing of websites. Currently the two most popular techniques adopted are user testing and heuristic evaluation (HE), Heuristic evaluation refers to a type of technique that evaluates and examines an interface for the issues relating to usability (Tan, Liu and Bishu, 2009).

2.5.1.2 Empirical-User Action

The term Empirical Usability Evaluation refers to a process of utilizing questionnaires and real time users in order to carry out test on the usability of a system. These empirical methods can be utilized in either a prototype of a system when it is available for testing or if the system is already in use. These usability tests include a number of diverse methods, for example; video feedback, log files, screen recording, thinking-aloud method, eye and attention tracking, load progression testing and conjoint analysis of which the most important will be elaborated upon in the following.

The process of usability tests are conducted by users of a system that is required to be evaluated. The objective of the tests is to highlight and identify any specific or non-specific problems that the users have experienced when working within the system (Rubi and Chisnel, 2008).Then upon receipt of the data achieved from carrying out the tests, the team is able to draw conclusions in relation to the problems highlighted and then make recommendations for redesigning the system.

They have described the process of carrying out usability testing as the collection of empirical data which representative users have been observed whilst interacting with the system carrying out typical tasks.

The use of usability testing is very convenient as the tests are carried out by users who can identify the precise error and description. The authors however state that usability testing with users should always be accompanied by further usability evaluation with use of experts. As explained previously, usability tests can be carried out with the assistance of a selection of other techniques these include: video feedback or recording of screen which is used to film a specific user when they are completing a set task or

test. Thereafter the video material can be examined simultaneously by an investigator and the user. This technique gives the opportunity to thoroughly analyze the problems occurring however it is a time intensive process (Blecken and Br"uggemann, 2010)

Log files or input protocols, these document all specific actions that any user performs when operating on the system. Therefore the exact time and process sequence can be replicated to source any issues. However this type of technique requires substantial preparation and is also time consuming therefore it is rarely used.

The Thinking Aloud Technique is a process in which a user is required to verbally repeat all forms of cognitions when attempting to solve a test task.

The thinking-aloud technique is one of the most powerful methods to identify usability problems. However, one disadvantage of this technique is the double stress under which the user is put and which can lead to prolonged answering and task solving times. Since this technique is unnatural to most people, test users might not be able to continuously express their thoughts while dealing with the system (Nielsen, 1993).

This technique is easily applicable but needs an experienced investigator who is able to adequately conduct the usability test and interact with the test users appropriately.

2.5.1.3 Subjective- User Opinion

One relatively new method for usability testing, called subjective, has been developed at the University of Tampere in Finland in 2009(NETS, 2009). Subjective is aimed at gathering subjective metrics from user experiences by capturing both user expectations and user experiences of the UI under testing. In subjective method the test participants fill out a questionnaire before and after the use of the application. The questionnaires

are named as the expectations questionnaire and the experience questionnaire. Both of them contain the same set of statements regarding the feel and use of the application. The results from the two questionnaires are then compared in order to analyze the different usability factors of the application.

By collecting also the pre-test user expectations the subjective method provides a more user-driven context for interpreting the usability test results as the expectations can show how significant the different factors are. Moreover, the results from the expectations questionnaire alone can already provide more understanding to the usability evaluators how the test participants perceive the system under testing.

In both of the questionnaires the statements are followed by a seven point scale where the test participants mark their expectations and experiences (Turunen, Hakulinen, Melto, Heimonen, Lavio and Hella, 2009). The expectations from the test of questionnaire divided in two values for each statement: a passable section describing the lowest quality level passable and a desired section.

After having used the application the test participant then fills out the experiences questionnaire but now they only mark one value: a value describing the perceived level of quality. Thus the gap between the expectations and experiences can be measured using two measures: the Measure of Service Superiority (MSS) that describes the difference between the perceived level and the desired level and the Measure of Service Adequacy (MSA) that describes the difference between the perceived level and the accepted level. When the experiences fall into the zone of tolerance the MSS values are negative and MSA values are positive (Kilpelainen, 2014).

2.6 Usability Inspection

Usability inspection techniques with end users include focus groups, surveys, and Field studies. These techniques are aimed at obtaining information about user preferences and needs. In usability inspection usability related aspects of a certain user interface are evaluated by one or more evaluator. Depending on who is doing the inspection, usability inspection procedure may roughly divided by two parts: usability inspections and then by the end-users expert inspection.

The different techniques for expert inspection include heuristic evaluation, guideline reviews, pluralistic and cognitive walkthroughs, consistency and standard inspections, formal usability inspections and feature inspections.

In heuristic evaluation usability specialists evaluate each dialogue element of the UI against a set of predefined usability principles, i.e. heuristics. Guideline review is similar to heuristic evaluation as in guideline reviews the UI is also checked against a list of usability guidelines. The difference is that the guidelines can be more comprehensive and larger in number than the heuristics (Mack and Nielsen, 1994).

2.7 Nielsen Technique

In today's world, we live in an era that is dominated by technology with new areas of technology appearing all the time. The result of this technological world is that the world has now become a single village, with every form of communication now available for everyone. The populations around the world are able to talk, video and communicate with other villages, towns, cities, countries and continents without restriction and as a result the advantages of the modern technology has become very apparent. The manner in which it has influenced everyone's lives is self-explanatory

and it has developed and shaped our lives accordingly. Our lives in most cases have become enriched by these technologies whether it is for work or entertainment; it has become evident in a positive way. The most useful of all the technological breakthroughs has been the inception of the Internet, with the ability to learn, explore and discover new information from around the world instantly. With the development of the internet technology has a growing awareness and the input into social and business life is felt in every day events (Delice, 2009)

As a result of the development of website technology, the impact and the influence of people's lives is obvious, with expectations on the functionality of a website being crucial in the manner in which they use a site. As a result, this study is aimed at detailing the usability problems in relation to websites.

Therefore in order to identify the usability issues, Heuristic Evaluation (HE) was engaged. Finally, to discover the impact of user-friendly websites, a new approach to judge the extent of the usability problems is developed by HE.

Relevance to Industry: There is a developing need for greater usability in the website development industry and communities and therefore the different usability evaluation techniques have been developed and incorporated into the process of website design and growth.

2.8 Extended Heuristics in LMS

The projected heuristics evaluation comprises of two main categories: Interface Usability and Didactic Effectiveness Criteria. The interface usability has 10 criteria while the didactic effectiveness comprises of 6 criteria.

The interface usability criteria was adapted and refined from the 10 Nielsen heuristics to suit the contexts of LMS. The relevant sub-criteria or items for each criterion were adapted from relevant literature specifically from (Alsumait and Al-Osaimi, 2009).

The criteria/heuristics plus a list of items in each criterion are shown in Table 1.Each of the criterion is described as follows:

1. Visibility of System Status: The system should ensure that learners are informed about what is happening through appropriate feedback within a reasonable time. The system should also provide visual and/or audio response in order that learner can comprehend the result of their actions.

2. Comparability between the framework and genuine world: The system should ensure that the LMS uses the learners' language, adopting words, phrases and concepts that are familiar to the learner as opposed to system-orientated terminology. Furthermore, system information should be presented and organized in the logical and chronological order.

3. Learner control and liberty: The system should have the means and capability for users/learners to leave the system through the appropriate exit signs, to be able to undo and redo operations.

4. Consistency and Standard: The system should ensure that the learner's experiences with the user interface are consistent in terms of menus, colors, typography and dialogue design. However, the learning resources are varied.

5. Error Prevention: The design of the system should incorporate a prevention of common errors occurring in the first place. However, it should also have the capability for users/learners to correct their own errors should they appear plus the system should not allow learners to make irreversible errors.

6. Recognition Rather than Recall: The system should reduce the learners' memory load by ensuring that objects, actions and options are visible and learners should not be required to remember information from one area of the dialogue to another.

7. Flexibility and Efficiency of Use: The application or system must be able to capable for distinctive levels of clients, from beginner to specialist, further more with expert users able to use shortcuts and other advanced tools.

8. Legitimacy and Minimalism in Design: The System dialogs should not comprise of unessential or seldom required data that may occupy learners during the learning process.

9. Identify recognition and improvement of Errors: The application or system must express error messages in plain and simple language that does not involve programmer codes, but precisely indicates the problem and a friendly manner that suggests a solution that a learner can understand and relate to.

10. Help and Documentation: The system should offer appropriate help online and provide documentation that can easily be accessed, easy to search and related to the learners' needs.

Chapter 3

METHODOLOGY

3.1 Research Method

The techniques used for evaluating the usability of LMSs have varied from simple checklists to more complex standardized questionnaires. Picking the right technique for evaluation depends on the complexity and functionality of the LMS and sometimes on the system goals. Many research studies have been conducted to evaluate the usability of existing LMSs, for instance used usability testing and questionnaires to evaluate Moodle LMS.

This study is intending to explore using the Moodle system at EMU on heuristic evaluation of the usability by Nielsen (2005). In this the study a qualitative method is used for data collection. This method aims to understand the experiences and attitudes of the participants. Hence, it is preferred in order to evaluate the experience, ideas, and beliefs of the participants regarding to the usability feature of the Moodle at EMU.

3.2 Participant

Demographic distribution of participant represented the frequency and percentage of gender department, age and experiment distribution.

Table 1 : Gender Distribution

Gender		N	%
VALID	Male	5	41.7
	Female	7	58.3
	Total	12	100

As it can be seen in Table 1 participant of male is 41.7 percentage and female is 58.3%, it is apparent that the highest percentage of respondents were female.

Table 2 : Years of Experience

Experiment		N	%
VALID	0-5	5	33.3
	6-11	7	16.7
	12+	6	50
	Total	12	100

Table 2 demonstrates the years of experience of using this system as shows the highest percentage of respondents 50% is 12+ years.

Table 3 : Age Distribution

Age		N	X
VALID	-28	3	25.0
	29-35	2	16.7
	36+	7	58.3
	Total	12	100

The demographics of Table 3 those respondents the majority of the respondents it is noted were aged 36 years or over by 58.3 percentage.

Table 4 : Department

Department		N	X
VALID	ICT	2	16.7
	Education science	9	75.0
	English language	1	8.3
	Total	12	100

As it can be seen in Table4, the department of EMU is showing 75% of departments at EMU which are using this program are in education science department.

3.3 Data Collection Tools

In this study, the data collected by two different forms: The Nielsen Heuristic Evaluation of the Usability form (Nielsen, 2005) and semi-structured form.

The evaluation form concluded in two parts. The first part including demographic information, such as gender, age and department, and the part is Nilsen (2005) principles via 10 section. The second part is the interview question, also by questionnaires from (UFPE, 2014). The data collected in the evaluations performed with usability experts were analyze from the 10 Nielsen usability heuristics. The results showed that this method of assessment is effective in pointing various usability issues in the virtual environment assessed. The value of significant level (p) was taken as 0.05 in the case of study, all the data collected and colluded from instructors.

3.3.1 Data Analysis

Data were enter to the SPSS version 22.0 for conclude the percentage and take mean frequency analysis to find the minimum to maximum use of the tools in distance education as we said by each participant from strongly agree to strongly disagree therefore can see the weak and strengths points showing by each part in Moodle at EMU.

The data analysis by two part as descriptive analysis and frequency statistics. In descriptive statistic achieved by the number of questions in ten section separately also the basic mean obtain from fifty five questions.

The descriptive analysis for each part is different in first level concluded by five questions the sound part via six question, third section via four question, level fourth by ten question, level fifth by five, level sixth by five question, level seventh via five questions, level eighth via five questions, level ninth via six questions, level ten via four questions.

3.4 Validity and Reliability

The data collection tools are examined in terms of validity and reliability. In order to establish the conceptual construct validity of the tools, the factual structure was examined, using the principal components analysis method.

In this study, to ensure the reliability of data collected through interviews, they were collected with great care in accordance with ethical research.

The number of participant is sufficient when emerging concepts and processes starts to repeat each other (Yıldırım & Şimşek, 2008). In order to reach the utilization in the

study, the Education Faculty of EMU instructors who experienced Moodle were selected due to the availability and accessibility.

Chapter 4

RESULT AND DISCUSSION

4.1 Heuristic Evaluation of the Usability on the Interface within LMS at EMU

In this chapter, data which has been composed from the survey at EMU is presented and analysed statistically. The point of this thesis is considerable from the parts of LMS according to usability of heuristic evaluation. In this study, a questionnaire is spread among 12 instructors who were familiar with the educational program. In addition, an interview with those instructors was done in order to validate the gaps in the questionnaire.

The set of heuristic evaluation usability principles (Nielsen, 2005) have been used for 10 research factor and 55 items were combined to evaluate the usability of the system. Table 5 shows the heuristic evaluation of the usability for Moodle at EMU. The minimum and maximum scores are 182 and 242, respectively.

Table 5 : Descriptive Statistics

	N	Min	Max	Mean	SD
Total	12	182	242	214.5	20.10653

In Table 5, distribution of the descriptive statistics is represented. As it can be seen from the table, the overall mean is 214.5 which corresponds to 78%. This shows that the instructors were satisfied with the usability of the system.

4.1.1 How does the visibility of the system have effect on the study?

In this section, the visibility of the system is examined and the results are shown in Table 6 in which 5 items were combined to determine this factor. The minimum and maximum scores are 13 and 25, respectively.

Table 6 : Descriptive Statistics in Visibility of System

	N	Min	Max	Mean	SD
TOTAL	12	13.00	25.00	19.7500	3.74469

As it can be seen from Table 6, the mean is 19.75 and it is high. So, it can be comprehended that the instructors were satisfied with the visibility feature of the system in which it keeps the instructors informed about what is going on through appropriate feedback within reasonable time. Table 7 shows the instructors' feedbacks on how the visibility of the system affects the study

Table 7 : Frequencies Statistics in Visibility of System

1.Visibility of system study	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
The framework keeps me educated through feedback about what is going on	1	**8.3**	4	**33.3**	2	16.7	0	0	1	8.3
I understand what the feedback means.	5	**41.7**	5	**41.7**	1	8.3	0	0	1	8.3
I get the feedback within reasonable time.	3	25	4	33.3	4	33.3	0	0	1	8.3
For every movement I make and can see or hear the consequences of the action.	5	**41.7**	5	**41.7**	2	16.7	0	0	0	0
The framework does not respond in a way that amazes me and it doesn't do anything unforeseen.	3	25	4	33.3	4	33.3	1	8.3	0	0

As it can be seen from the results in Table 7, around 63.98% of the instructors' responses fall in the range of agree and strongly agree which shows a high satisfaction on the visibility of the system in study. It's worth to mention that around 1.66% of the instructors are neutral on their response on the visibility of the system.

International Islamic University Malaysia (IIUM) supports the results obtained in this study in which 70% of the instructors are agree on the visibility of the system (IIUM, 2007). In addition, 81% of the instructors in University at Saudi Arabia (Mutlaq, 2013) and 62% of the instructors in Allama Iqbal Open University 2013 (Afifa Lodh, 2010) have high satisfaction on that feature of the system.

There were a number of comments of the instructors' regarding to the received feedback. The majority of respondents clearly indicated that there were no issues related to the feedback of the system regarding to the response time and the results of action. Some of the instructors' comments on the feedback are as follows:

"Feedback is useful", "Feedback is sent directly by email/message to the instructor", "If feedback comes from Forum it is better because everyone can see it and therefore if they have the same problem they can try and solve it", "Answers to feedback are at the top of the page on the forum", "Occasionally there are errors occurring in the feedback", "The instructor will generally check day by day or sometimes twice on a week and then respond with the answers by email to the student".

4.1.2 The way that the system and day to day life match with real world

In this section, the way that the system and day to day match with the real world is examined and the results are shown in Table 8 in which 6 items were combined to determine this factor. The minimum and maximum scores are 17 and 27, respectively.

Table 8 : Descriptive Statistics comparability between framework and real world

	N	Min	Max	Mean	SD
TOTAL	12	17.00	27.00	22.5000	2.90767

As it can be seen from Table 6, the mean is 22.5 and it is high. So, it can be comprehended that the instructors were satisfied with systems' feature such as speaking the users' language, with words, phrases and concepts that familiar to the user, rather than system-oriented terms.

Table 9 shows the levels of comparability between the framework and real world and comparability between designer and learner style.

Table 9: Frequencies Statistics comparability between framework and real world

2. comparability between the framework and real world & comparability between designer model and learner model	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
The language utilized is regular to natural, since in the terms, expressions, and ideas are like those utilized as a part of my normal or study environment.	3	**25**	8	**66.7**	0	0	0	0	1	8.3
I'm 'not disarranged by the utilization of terms.	0	0	8	**66.7**	4	33.3	0	0	0	0
I'm 'not disarranged by them are utilized images, symbols, and pictures.	0	0	7	**58.3**	4	33.3	0	0	1	8.3
There is no jargon used ('jargon' means words, acronyms or expressions that are developed and used by a group of people).	1	8.3	5	**41.7**	5	41.7	0	0	1	8.3
The representations utilized relate to real world concepts or object, for instance, the symbol for saving resembles a floppy disk	1	8.3	7	**58.3**	4	33.3	0	0	0	0
Data is organized in a characteristic and legitimate request	4	**33.3**	6	**50**	1	8.3	0	0	1	8.3

As it can be seen from the results in Table 9, around 68.61% of the instructors' responses fall in the range of agree and strongly agree which shows a high satisfaction on the comparability between the framework and real world; and the comparability between designer and learner style. It's worth to mention that 24.98% of the instructors are neutral on their response on that feature of the system.

International Islamic University Malaysia (IIUM) (IIUM, 2007) supports the results obtained in this study in which 71% of the instructors and 59% of the instructors in University at Saudi Arabia (Mutlaq, 2013) have high satisfaction on that feature of the system.

From the information received from the respondents through interviews, there were a number of comments regarding to the terminology of the system and whether the language is understandable. The majority of respondents reported that they were satisfied by the language and terminology in the system and also mentioned that the information was arranged in a natural and logical order. Some of the comments are as follows: "The system has no problems", "The system is easy to use and understand", "The system is clear to understand however there is no option to change anything", "The system looks like a standard rule but there is no option to extend the page when there is homework to respond".

4.1.3 The impact on the control of the system upon the freedom of use

In this section, the impact on the control of the system upon the freedom of use is examined and the results are shown in Table 10 in which 5 items were combined to determine this factor. The minimum and maximum scores are 10 and 20, respectively.

Table 10 : Descriptive Statistics Learners control and liberty

	N	Min	Max	Mean	SD
TOTAL	12	10.00	20.00	15.5000	3.52910

As it can be seen from Table 10, the mean is 15.5 and it is moderate. So, it can be

comprehended that the instructors were partially satisfied with the systems' feature

regarding to the control and the liberty. Table 11 shows the level of learners' control

and liberty.

Table 11: Frequencies Statistics Learners control and liberty

3. Learners control and liberty	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
I control the system, rather than its controlling me.	3	**25**	5	**41.7**	2	16.7	2	16.7	0	0
The framework lives up to expectations the way I need it to work.	2	**16.7**	5	**41.7**	3	25	2	16.7	0	0
Each page has all the required navigation buttons or hyperlink (link), such as previous (back) next and home.	5	**41.7**	5	**41.7**	1	8.3	1	8.3	0	0
When I commit an error I can decide to leave (close) the system, utilizing an obviously checked Emergency Exit button.	5	**41.7**	3	**25**	3	25	1	8.3	0	0

As it can be seen from the results in Table 11, 68.8% of the instructors' responses fall

in the range of agree and strongly agree which shows a high level of satisfaction on

the learners control and liberty. It's worth to mention that 14.575% of the instructors

are neutral on their response on that feature of the system.

International Islamic University Malaysia (IIUM) (IIUM, 2007) supports the results obtained in this study with a moderate satisfaction level of 50%. On the other hand, the Allama Iqbal Open University (AIOU) have same level ranking with EMU University, which is 68% ,and it has also have the highest level toward to IIUM in terms of learners' control and liberty.

From the information received from the frequencies respondents there were a number of comments regarding to the navigation and logging in/out of the system. Some of the instructors mentioned about some problems of the system such as the necessity of a clearly marked "emergency exit" button in order to exit from an unwanted state and not having any other options for sharing information other than uploading a file. Some of the respondents' comments are as follows:

"Just on the first time of opening there is a problem understanding/controlling the system", "When a problem occurred it was easy and quick to resolve, however if there was a more serious problem then you can ask Moodle to resolve.", "The system has a problem with regards the space for inputting information in file and also does not have any option other than to upload it."

4.1.4 The consistency of the system and adherence to standards

In this section, the consistency of the system in relation to standards adhere is examined and the results are shown in Table 12 in which 10 items were combined to determine this factor. The minimum and maximum scores are 33 and 47, respectively.

Table 12 : Descriptive Statistics Consistency and Adherence to Standards

	N	Min	Max	Mean	SD
TOTAL	12	33.00	47.00	39.9167	3.94181

As it can be seen from Table 12, the mean is 39.91 and it is moderate. So, it can be comprehended that the instructors were moderately satisfied with the systems' feature regarding to the consistency and adherence to standards. Table 13 presents the levels of consistency and adherence to standards of the system in EMU.

Table 13 : Frequencies Statistics Consistency and Adherence to Standards

4.Consistency and adherence to standards	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
The same tradition (standard are organized) utilized all through system.	3	25	8	**66.7**	1	8.3	0	0	0	0
It is simple to figure out the tradition utilized all through the framework. .	0	0	10	**83.3**	2	16.7	0	0	0	0
The convention utilized is like the ones in different system I am utilized to.	0	0	7	**58.3**	5	41.7	0	0	0	0
Same words, expressions, circumstances, or activities allude to the same thing all through the system.	0	0	11	**91.7**	1	8.3	0	0	0	0
Colors are utilized as a part of a steady way (same path) all through the system.	3	25	5	**41.7**	4	33.3	0	0	0	0
Graphics, symbols and pictures are reliably utilized all through the system. .	3	25	6	**50**	3	25	0	0	0	0
There is consistency in the screen designs.	3	25	8	**66.7**	1	8.3	0	0	0	0
There is consistency in the utilization of menus	3	25	8	**66.7**	1	8.3	0	0	0	0
There is consistency utilization of text style sorts and sizes	1	8.3	9	**75**	2	16.7	0	0	0	0
Association with pages are unfaltering with the titles of the pages they association.	4	33.3	7	**58.3**	1	8.3	0	0	0	0

As it can be seen from the results in Table 13, 76.68% of the instructors' responses fall in the range of agree and strongly agree which shows a high satisfaction on the

consistency and adherence to standards. This can be due to the consistency in expressions, circumstances, menus, text styles and screen designs all through the system. It's worth to mention that 17.49% of the instructors are neutral on their response on that feature of the system.

In addition, the International Islamic University Malaysia (IIUM) (IIUM, 2007) supports the results obtained in this study with a high satisfaction level of 85%. On the other hand, the Allama Iqbal Open University (AIOU) have same lower satisfaction level than EMU, which is 63% terms of consistency and adherence to standards.

From the information received from the respondents there were a number of positive comments regarding to the effectiveness of the convention and the consistency of the system in terms of colours and graphics. One of the respondents stated that, "There is flexibility to change the colours and the graphics in the system".

However, there are some comments that are mentioning a few problems of the system. Such respondents' comments are as follows:

"There is a limitation of space on the system and when opening the system for the first time it is hard to understand", "If there was an option to choose items through html then this will assist and amend program through colors and graphics".

4.1.5 The system prevention of occurring errors through effective usability

In this section, the system prevention of occurring errors through effective usability is examined and the results are shown in Table 14 in which 5 items were combined to determine this factor. The minimum and maximum scores are 16 and 23, respectively.

Table 14 : Descriptive Statistics in Error Prevention

	N	Min	Max	Mean	SD
TOTAL	12	16.00	23.00	19.1667	2.79068

As it can be seen from Table 14, the mean is 19.16 and it is close to the maximum score. So, it can be comprehended that the instructors were satisfied with systems' error prevention feature.

Table 15 presents the levels of error prevention debarment of circumferential usability-related errors.

Table 15 : Frequencies Statistics Error Prevention

5. Error prevention debarment of circumferential Usability-Related Errors	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
The framework supports me in a manner that it is difficult to commit serious errors.	1	8.3	8	**66.7**	3	25	0	0	0	0
At whatever point a mix-up is made a mistake message error is given	4	33.3	4	33.3	4	33.3	0	0	0	0
The system utilizes a graphical client interface, (for example, records, dropdown, hyper-connected or symbol driven interfaces) that can be clicked on by a mouse, rather than charge driven ones, where summons must be written in utilizing a keyboard.	3	25	4	33.3	5	**41.7**	0	0	0	0
I am requested to confirm my entry before carrying out a 'potentially dangerous' action such as deleting.	3	25	6	**50**	2	16.7	1	8.3	0	0
I find that it's simple to enter data in the system.	1	8.3	8	**66.7**	3	25	0	0	0	0

As it can be seen from the results in Table 13, 69.98% of the instructors' responses fall in the range of agree and strongly agree which shows that the system is successful in preventing errors before occurring. It's worth to mention that 28.34% of the instructors are neutral on their response on that feature of the system.

Moreover, the Allama Iqbal Open University (Afifa Lodh, 2010) supports the results obtained in this study with a 60% satisfaction level regarding to system error prevention.

From the information received from the respondents there were a number of positive comments on the mistake reporting, error prevention and whether this assists the user to re-train those errors or not. Some of respondents' comments are as follows: "Solving errors are easy to resolve", "If there is a serious problem it is very easy and quick to resolve through Moodle tools".

4.1.6   The system guidance on users through each step by recognized commands

In this section, how the system guide on users through each step by recognized commands is examined and the results are shown in Table 16 in which 5 items were combined to determine this factor. The minimum and maximum scores are 14 and 25, respectively.

Table 16 : Descriptive Statistics Recognition Rather Than Recall

	N	Min	Max	Mean	SD
TOTAL	12	14	25	20.4167	3.80092

As it can be seen from Table 16, the mean is 20.41 and it is high. So, it can be comprehended that the instructors were satisfied with the system guidance on their each step by minimizing the user's memory load by making objects, actions, and options visible and making instructions visible or easily retrievable whenever appropriate. Table 17 presents the statistics of frequencies from the levels of recognition rather than recall.

Table 17 : Frequencies Statistics Recognition Rather than Recall

6.Recognition rather than recall	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
Instructions on the best way to utilize the framework are obvious.	3	25	5	**41.7**	1	8.3	3	25	0	0
There is a conspicuous relationship in the middle of controls and their activities.	3	25	8	**66.7**	1	8.3	0	0	0	0
Objective to utilize, for example, representation on devices bars, are obvious.	5	41.7	6	**50**	1	8.3	0	0	0	0
Choices to be chosen, for example, menus, are anything but difficult to perceive.	5	41.7	6	**50**	1	8.3	0	0	0	0
At the point when taking a shot at an assignment, I don't have to review (recollect) data from another errand.	6	**50**	1	8.3	3	25	2	16.7	0	0

As it can be seen from the results in Table 17, 80% of the instructors' responses fall in the range of agree and strongly agree which shows that the instructors were highly satisfied with the system guidance on their each step by recognized commands. This is due to the feature of the system of having instructions, menus and choices that guides

the users to utilize the framework. It's worth to mention that 11.64% of the instructors are neutral on their response on that feature of the system.

Moreover, the Allama Iqbal Open University (AIOU) supports the results obtained in this study with a lower level of satisfaction, which is 68% in terms of system guidance on each step by recognized commands.

From the information received through interviews, there were a number of positive comments regarding to the instructions is the best way to utilize the framework due to availability of visible instructions, recognizable options through menus, and a reasonable relationship between the controls of the framework and their actions. Some of the respondents' comments are as follows:

"The system is very easy to proceed through the process via a number of optical buttons, to hide and unhide etc.", "Accessibility to pages, or chapters in relation to specific lessons are easy to find".

4.1.7   The flexibility of the system in order to provide efficient usage

In this section, the flexibility of the system in order to provide efficient usage is examined and the results are shown in Table 18 in which 5 items were combined to determine this factor. The minimum and maximum scores are 15 and 25, respectively.

Table 18 : Descriptive Statistics Flexibility and Efficiency of Use Statistics

	N	Min	Max	Mean	SD
TOTAL	12	15	23	18	2.41209

As it can be seen from Table 18, the mean is 18 and it is high. So, it can be comprehended that the instructors were satisfied with the flexibility of the system in order to provide efficient usage for both experienced and inexperienced users.

Table 19 presents the statistics of frequencies from the levels of flexibility and efficiency of use statistics.

Table 19 : Frequencies Statistics Flexibility and Efficiency of Use Statistics

7.Flexibility and efficiency of use	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
The site provides food for diverse levels of clients, from beginner to specialists.	8	**66.7**	0	0	2	16.7	2	16.7	0	0
Alternate ways or quickening agents, in type of shortened forms, uncommon keys, concealed orders or macros, are accessible for expert users.	2	16.7	5	**41.7**	4	33.3	1	8.3	0	0
The site guides novice users sufficiently.	8	**66.7**	4	**33.3**	0	0	0	0	0	0
There is an alternative to utilize the console alone to perform errands.	0	0	8	**66.7**	4	33.3	0	0	0	0
There is an alternative to utilize the console alone to perform tasks.	2	16.7	3	25	6	**50**	1	8.3	0	0

As it can be seen from the results in Table 19, 66.68% of the instructors' responses fall in the range of agree and strongly agree which shows that the instructors were satisfied with the flexibility of the system. This is due to the feature of providing information for diverse levels of users, having alternate ways in the form of macros or uncommon keys, and guiding novice users sufficiently all through the system. It's worth to mention that 26.66% of the instructors are neutral on their response on that feature of the system.

Moreover, the Allama Iqbal Open University (AIOU) supports the results in this study with a satisfaction level by 65% regarding to the flexibility of the system.

From the information received through interviews, there were a number of positive comments regarding to the flexibility and the efficiency use of the system due to the varying levels of the system for experienced and inexperienced users. One of the respondent's comments is as follows: "The system is very easy to used efficiency proceed and have good flexibility".

4.1.8 Design assists to user through minimalistic appearance

In this section, in what way the design assists to the user through minimalistic appearance is examined and the results are shown in Table 20 in which 5 items were combined to determine this factor. The minimum and maximum scores are 15 and 25, respectively.

Table 20 : Descriptive Statistics Correctness and Minimalism in Design

	N	Min	Max	Mean	SD
TOTAL	12	15	25	18.6667	3.025

As it can be seen from Table 20, the mean is 18.66 and it is high. So, it can be comprehended that the instructors were satisfied with the way on how the design assists to user through minimalistic appearance. Table 21 presents statistics of frequencies from the levels of legitimacy and minimalism in design.

Table 21 : Frequencies Statistics Correctness and Minimalism in Design

8.Legitimacy,and Minimalism in Design	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
Pages contain the required information.	3	25	6	**50**	2	16.7	1	8.3	0	0
The data on every page is not all that much to confound or divert me.	1	8.3	5	**41.7**	4	33.3	2	16.7	0	0
There are no extreme utilization of representation and pictures on the site.	1	8.3	8	**66.7**	3	25	0	0	0	0
Dialog boxes give satisfactory data to performing undertakings.	2	16.7	6	**50**	4	33.3	0	0	0	0
Dropdown records and menus have the obliged choices to look over.	2	16.7	4	33.3	6	**50**	0	0	0	0

As it can be seen from the results in Table 21, 64.64% of the instructors' responses fall in the range of agree and strongly agree which shows that the instructors were satisfied with the minimalism in design. This is because the pages contain required information, and not having extreme utilization of representation/pictures on the site. Its worth to mention that 31.66% of the instructors are neutral on their response on that feature of the system due to the dropdown records' and menus' obligation choices.

In addition, the Allama Iqbal Open University (AIOU) supports the results in this study with a satisfaction level by 65% regarding to the minimalism in design.

From the information received through interviews, there were a number of positive comments regarding to the graphics of the system and how this consistency guides the user through the application. Thus, one of the respondents stated that "To have a menu

on each page each semester is a little complicated, therefore if there was an option to show it for each semester it would be preferable."

4.1.9 Identification of recognition and improvement of errors

In this section, the identification of recognition and improvement of errors are examined and the results are shown in Table 22 in which 6 items were combined to determine this factor. The minimum and maximum scores are 18 and 27, respectively.

Table 22 : Descriptive Statistics Identify recognition and improvement of Errors

	N	Min	Max	Mean	SD
TOTAL	12	18	27	24.6667	7.90090

As it can be seen from Table 22, the mean is 24.66 and it is quite high. So, it can be comprehended that the systems was successful in the identification of recognition and error improvements as the errors are expressed in plain language (no codes), precisely indicate the problem, and constructively suggests a solution all through the system.

Table 23 : Frequencies Statistics Identify recognition and improvement of Errors

9. Identify recognition and improvement of Errors	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
Error messages are expressed in plain language.	4	33.3	3	25	5	**41.7**	0	0	0	0
Error messages indicate precisely what is the problem	3	25	4	33.3	5	**41.7**	0	0	0	0
Every message gives a methodology to fix the error.	3	25	5	**41.7**	3	25	1	8.3	0	0
The procedure to fix the error is specific, quick and efficient.	3	25	4	33.3	5	**41.7**	0	0	0	0
On the off chance that wrote summon (information) results in a mistake, I don't need to retype the whole order, yet rather repair just the defective part.	0	0	4	33.3	7	**58.3**	1	8.3	0	0

The site accommodates simple inversion of activity where conceivable, for instance, by giving both Undo and Redo.	2	16.7	1	8.3	9	**75**	0	0	0	0

As it can be seen from the results in Table 23, 59.98% of the instructors' responses fall in the range of agree and strongly agree which shows that the instructors were satisfied with the minimalism in design. This is because the error messages are expressed in plain language and gives a methodology to fix the errors. Its worth to mention that 45.02% of the instructors are neutral on their response on that feature of the system due to the inversion of activities (i.e. undo/redo), the necessity of retyping whole command and the procedure to fix the errors.

In addition, the Allama Iqbal Open University (AIOU) supports the results in this study with a satisfaction level by 48% regarding to improvements of errors.

From the information received through interviews, there were a number of positive comments regarding to the procedure to fix an error. Thus, one of the respondents stated that "Normally there are no errors, however if there are any errors then it can be resolved by the assistance of Moodle or by help option".

4.1.10 The clarification and assistance of the help facilities

In this section, the clarification and assistance of the help facilities are examined and the results are shown in Table 24 in which 4 items were combined to determine this factor. The minimum and maximum scores are 12 and 20, respectively.

Table 24 : Descriptive Statistics Help and Documentation

	N	Min	Max	Mean	SD
TOTAL	12	12	20	15.9167	3.42340

As it can be seen from Table 24, the mean is 15.91 which is close to maximum score. So, it can be comprehended that the system was successful in providing help and documentation. Table 25 presents the statistics of frequencies from the levels of help and documentation.

Table 25 : Frequencies Statistics Help and Documentation

10.Help,and documentation	Strongly Agree		Agree		Maybe		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
I discover the help offices –, for example, online help and the glossary – valuable.	5	**41.7**	2	16.7	4	33.3	0	0	1	8.3
The help facilities are anything but difficult to utilize.	4	33.3	4	33.3	4	33.3	0	0	0	0
I think that it's simple to scan for obliged help.	5	**41.7**	4	33.3	3	25	0	0	0	0
Connections to different assets are helpful.	4	33.3	3	25	5	**41.7**	0	0	0	0

As it can be seen from the results in Table 25, 64.57% of the instructors' responses fall in the range of agree and strongly agree which shows that the instructors were satisfied with help facilities. This is because the simplicity of scanning for obliged help all through the system and the availability of various help offices, i.e. online help. Its worth to mention that 33.32% of the instructors are neutral on their responses on that feature due to the connections to different assets.

The Allama Iqbal Open University (AIOU) and Saudi Arabia University (Mutlaq, 2013) support the results obtained in this study by 52% and 75% level of agree in the system, respectively.

From the information received through interviews, there were a number of positive comments regarding to help facilities. Thus, one of the respondents stated that "The help and documentation is very good and provides assistance easily if you required it".

Chapter 5

CONCLUSION

This chapter presents an evaluation of the topic and provides a conclusion. In this study, heuristic evaluation of the usability with the Moodle at EMU is presented. The evaluations are performed according to the 10 Nielsen usability heuristics by a questionnaire and interviews with a professional background all with information and language experience.

From the evaluation, it is observed that that there were no issues related to the feedback of the system regarding to the response time and the results of action. In addition, it is seen that majority of the respondents were satisfied with the language, terminology and information arrangement in the system.

In addition, the results shows that instructors were highly satisfied in terms of the consistency in expressions; colors, circumstances, menus, text styles, graphics and screen designs all through the system. Moreover, the instructors were satisfied with error prevention of the system in which there are positive comments on the mistake reporting, preventing errors before occurring and whether those assists the user to re-train those errors or not.

Furthermore, availability of visible instructions, recognizable options through menus and a reasonable relationship between the controls of the framework and their actions are satisfied the instructors in terms of system guidance.

It is worth to mention that, the instructors were satisfied with the flexibility of the system as it is providing information for diverse levels of users, having alternate ways in the form of macros or uncommon keys, and guiding novice users sufficiently all through the system. Finally, it is observed that, the system help facilities; its documentation and assistance, was found as successful by the instuctors.

As a conclusion, the majority of instructors are stated that the system works properly and they are not facing any problems while working with it. In addition, they have figured it out that, it would be better to expend the system in terms of uploading new materials or adding new features such as recovery option and hide/unhide material options.

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APPENDIX

Appendix A. Interviewed Questions

The purpose of this interview is to discover the opinion of lecturers at Eastern Mediterranean University in relation to the use of the E-learning system within this university.

The interview questionnaire will be used for a master thesis study performed in ICT department at EMU.

I would appreciate your time and cooperation in assisting me, therefore to ensure accuracy, I would like to record our conversation.

All your responses will be entirely confidential and will be used for this research only.

Contact:

Azadeh Samani

Samani2646@gmail.com

Supervisor:

CO-Supervisor:

Interview Date:

Interviewer:

Interviewee:

Section 1

1. How long have you been working as a lecturer in EMU?
2. How many years experiment you are working with the system?
3. Which part of the system are you responsible for?
4. When using the system, what is your ultimate purpose?
5. In your opinion, what are the beneficial features of using this technology?

Section 2

Visibility of system status

1. What do you think about the time scale for receiving and relation to providing feedback the feedback?

Comparability between the framework and genuine would

1. In relation to the terminology of the system, do you think the system is clearly understandable and react toward the system language?

User rein and liberty

1. How do you consider the control of the system and react to navigating out of the system?

Consistency and adherence to standards

1. How do you think that colors and graphic affect the use of consistency to the standard system?

Error prevention - debarment of circumferential Usability-Related Errors

1. If you were to make a mistake on the system, how is it reported? Is that sufficiency to help the user to re-train themselves and prevent further errors?

Recognition rather than recall

1. "The directions on the most proficient method to utilize the framework are clear and noticeable to guarantee progression", how do you react to this statement?

Flexibility and efficiency of use

1. What do you think about flexibility of system whether there is a sufficient variances in the system to cater for all levels of users? How you customizing in your own system?

Legitimacy and Minimalism in Design

1. In your opinion, what are the effects of graphic on the route through the system in structuring of the pages to be clear and concise?

Identify recognition and improvement of Errors

1. After receiving an error message, what do you think of the explanation and recovery process?

Help & documentation

1. When you require assistance whilst progressing through the system, what is your impression of the online help facilities?

Section 3

1. What are the advantages and disadvantages of using this technology?

2. What is your suggestion for improvement to the system?

Any other comments on the issue?

Thank you for your cooperation.

Appendix B. Questionnaire

Distinguished participants

Dear Participant

I am a graduate student in the Information and Communication Technologies in Education Department at Eastern Mediterranean University. Within the scope of my dissertation, the aim is to evaluate the "Heuristic evaluation of usability of Distance Education LMS at EMU". The information obtained from the questionnaire will construct the basis of the scientific work and will not be used for any other purpose.

Azadeh Samani

Gender: femal ☐ mal ☐ **Age:** ☐
☐

Years of experience : ☐ **Department :**

E-Learning application evaluation	Strongly	Agree	Maybe	Disagree	Strongly
1. Visibility of system status					
The framework keeps me educated through feedback about what is going on					
I understand what the feedback means.					
I get the feedback within reasonable time.					
For every movement I make and can see or hear the consequences of the action.					
The framework does not respond in a way that amazes me and it doesn't do anything unforeseen.					
2. Comparability between the framework and genuine would & comparability between designer model and learner model					
The language utilized is regular to natural, since in the terms, expressions, and ideas are like those utilized as a part of my normal or study environment					
I'm 'not disarranged by the utilization of terms.					
I'm 'not disarranged by them are utilized images, symbols, and pictures.					
There is no jargon used ('jargon' means words, acronyms or expressions that are developed and used by a group of people).					

	Strongly	Agree	Maybe	Disagree	Strongly
The representations utilized relate to real world concepts or object, for instance, the symbol for saving resembles a floppy disk					
Data is organized in a characteristic and legitimate request					
3. User rein and liberty					
I control the system, rather than its controlling me.					
The framework lives up to expectations the way I need it to work.					
Each page has all the required navigation buttons or hyperlink (link), such as previous (back) next and home.					
When I commit an error I can decide to leave (close) the system, utilizing an obviously checked Emergency Exit bottom.					
4. Consistency and adherence to standards					
The same tradition (standard are organized) utilized all through system					
It is simple to figure out the tradition utilized all through the framework.					
The convention utilized is like the ones in different system I am utilized to.					
Same words, expressions, circumstances, or activities allude to the same thing all through the system.					
Colors are utilized as a part of a steady way (same path) all through the system.					
Graphics, symbols and pictures are reliably utilized all through the system.					
There is consistency in the screen designs.					
There is consistency in the utilization of menus					
There is consistency utilization of text style sorts and sizes					
Association with pages are unfaltering with the titles of the pages they association.					
5. Error prevention - debarment of circumferential Usability-Related Errors					
The framework supports me in a manner that it is difficult to commit serious errors.					
At whatever point a mix-up is made a mistake message error is given					
The system utilizes a graphical client interface, (for example, records, dropdown, hyper-connected or symbol driven interfaces) that can be clicked on by a mouse, rather than charge driven ones, where summons must be written in utilizing a keyboard.					

	Strongly	Agree	Maybe	Disagree	Strongly
I am requested to confirm my entry before carrying out a 'potentially dangerous' action such as deleting.					
I find that it's simple to enter data in the system.					
6. Recognition rather than recall					
Instructions on the best way to utilize the framework are obvious.					
There is a conspicuous relationship in the middle of controls and their activities.					
Objective to utilize, for example, representation on devices bars, are obvious.					
Choices to be chosen, for example, menus, are anything but difficult to perceive.					
At the point when taking a shot at an assignment, I don't have to review (recollect) data from another errand.					
7. Flexibility and efficiency of use					
The site provides food for diverse levels of clients, from beginner to specialists.					
Alternate ways or quickening agents, in type of shortened forms, uncommon keys, concealed orders or macros, are accessible for expert users.					
The site guides novice users sufficiently.					
There is an alternative to utilize the console alone to perform tasks.					
The framework is sufficiently adaptable to empower clients to alter settings to suit them, i.e. redo the framework.					
8. Legitimacy and Minimalism in Design					
Pages contain the required information.					
The data on every page is not all that much to confound or divert me.					
There are no extreme utilization of representation and pictures on the site.					
Dialog boxes give satisfactory data to performing undertakings.					
Dropdown records and menus have the obliged choices to look over.					
9. Identify recognition and improvement of Errors					
Error messages are expressed in plain language.					
Error messages indicate precisely what the problem is.					
Every message gives a methodology to fix the error.					
The procedure to fix the error is specific, quick and efficient.					
On the off chance that wrote summon (information) results in a mistake, I don't need to retype the whole order, yet rather repair just the defective part.					
The site accommodates simple inversion of activity where conceivable, for instance, by giving both Undo and Redo.					

10. Help and documentation					
I discover the help offices for example, online help and the glossary valuable.					
The help facilities are easy to use.					
I think that it's simple to scan for obliged help.					
Connections to different assets are helpful.					

Thanks for Your Valuable Cooperation